



Oregon

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NOTICE OF ADOPTED CHANGE TO A COMPREHENSIVE PLAN OR LAND USE REGULATION

Date: June 17, 2015

Jurisdiction: City of Canyonville

Local file no.:

DLCD file no.: 001-15

The Department of Land Conservation and Development (DLCD) received the attached notice of adopted amendment to a comprehensive plan or land use regulation on 06/15/2015. A copy of the adopted amendment is available for review at the DLCD office in Salem and the local government office.

Notice of the proposed amendment was submitted to DLCD 35 days prior to the first evidentiary hearing.

Appeal Procedures

Eligibility to appeal this amendment is governed by ORS 197.612, ORS 197.620, and ORS 197.830. Under ORS 197.830(9), a notice of intent to appeal a land use decision to LUBA must be filed no later than 21 days after the date the decision sought to be reviewed became final. If you have questions about the date the decision became final, please contact the jurisdiction that adopted the amendment.

A notice of intent to appeal must be served upon the local government and others who received written notice of the final decision from the local government. The notice of intent to appeal must be served and filed in the form and manner prescribed by LUBA, (OAR chapter 661, division 10).

If the amendment is not appealed, it will be deemed acknowledged as set forth in ORS 197.625(1)(a). Please call LUBA at 503-373-1265, if you have questions about appeal procedures.

DLCD Contact

If you have questions about this notice, please contact DLCD's Plan Amendment Specialist at 503-934-0017 or plan.amendments@state.or.us

DLCD FORM 2



NOTICE OF ADOPTED CHANGE TO A COMPREHENSIVE PLAN OR LAND USE REGULATION

FOR DLCD USE
DEPT OF
File No.:
Received: JUN 15 2015

Local governments are required to send notice of an adopted change to a comprehensive plan or land use regulation **no more than 20 days after the adoption.** (See [OAR 660-018-0040](#)). The rules require that the notice include a completed copy of this form. **This notice form is not for submittal of a completed periodic review task or a plan amendment reviewed in the manner of periodic review.** Use [Form 4](#) for an adopted urban growth boundary including over 50 acres by a city with a population greater than 2,500 within the UGB or an urban growth boundary amendment over 100 acres adopted by a metropolitan service district. Use [Form 5](#) for an adopted urban reserve designation, or amendment to add over 50 acres, by a city with a population greater than 2,500 within the UGB. Use [Form 6](#) with submittal of an adopted periodic review task.

Jurisdiction: City of Canyonville

Local file no.:

Date of adoption: June 8, 2015

Date sent: 6/10/2015

Was Notice of a Proposed Change (Form 1) submitted to DLCD?

Yes: Date (use the date of last revision if a revised Form 1 was submitted): April 30, 2105

No

Is the adopted change different from what was described in the Notice of Proposed Change? Yes No

If yes, describe how the adoption differs from the proposal:

no

Local contact (name and title): Janelle Evans

Phone: 541-839-2458

E-mail: cityadministrator@cityofcanyonville.com

Street address: 250 N. Main Box 765

City: Canyonville, OR

Zip: 97417-

PLEASE COMPLETE ALL OF THE FOLLOWING SECTIONS THAT APPLY

For a change to comprehensive plan text:

Identify the sections of the plan that were added or amended and which statewide planning goals those sections implement, if any:

The following policy was added to the Community Facilities section of the Comprehensive plan. The City of Canyonville completed a water master plan in June of 2015 which is incorporated into the Canyonville Comprehensive Plan as a source reference document to be utilized for future development.

For a change to a comprehensive plan map:

Identify the former and new map designations and the area affected:

Change from	to	acres.	A goal exception was required for this change.
Change from	to	acres.	A goal exception was required for this
change.			
Change from	to	acres.	A goal exception was required for this
change.			
Change from	to	acres.	A goal exception was required for this change.

Location of affected property (T, R, Sec., TL and address):

The subject property is entirely within an urban growth boundary

The subject property is partially within an urban growth boundary

If the comprehensive plan map change is a UGB amendment including less than 50 acres and/or by a city with a population less than 2,500 in the urban area, indicate the number of acres of the former rural plan designation, by type, included in the boundary.

Exclusive Farm Use – Acres:	Non-resource – Acres:
Forest – Acres:	Marginal Lands – Acres:
Rural Residential – Acres:	Natural Resource/Coastal/Open Space – Acres:
Rural Commercial or Industrial – Acres:	Other: – Acres:

If the comprehensive plan map change is an urban reserve amendment including less than 50 acres, or establishment or amendment of an urban reserve by a city with a population less than 2,500 in the urban area, indicate the number of acres, by plan designation, included in the boundary.

Exclusive Farm Use – Acres:	Non-resource – Acres:
Forest – Acres:	Marginal Lands – Acres:
Rural Residential – Acres:	Natural Resource/Coastal/Open Space – Acres:
Rural Commercial or Industrial – Acres:	Other: – Acres:

For a change to the text of an ordinance or code:

Identify the sections of the ordinance or code that were added or amended by title and number:

For a change to a zoning map:

Identify the former and new base zone designations and the area affected:

Change from	to	Acres:
Change from	to	Acres:
Change from	to	Acres:
Change from	to	Acres:

Identify additions to or removal from an overlay zone designation and the area affected:

Overlay zone designation:	Acres added:	Acres removed:

Location of affected property (T, R, Sec., TL and address):

List affected state or federal agencies, local governments and special districts: none

Identify supplemental information that is included because it may be useful to inform DLCD or members of the public of the effect of the actual change that has been submitted with this Notice of Adopted Change, if any. If the submittal, including supplementary materials, exceeds 100 pages, include a summary of the amendment briefly describing its purpose and requirements.

ORDINANCE NO. 634

AN ORDINANCE ADOPTING THE 2015 WATER MASTER PLAN AND INCORPORATING THE PLAN INTO THE CITY OF CANYONVILLE COMPREHENSIVE PLAN

WHEREAS, the Oregon Water Resources Department regulates all water systems within the state of Oregon; and

WHEREAS, the Water Resources Commission adopted a statewide policy on Conservation and Efficient Water Use which are established in Oregon Administrative Rule 690-410; and

WHEREAS, Municipal water suppliers are encouraged to prepare water management plans, and are required to do so if a plan is prescribed by a condition of a water use permit; and

WHEREAS, the City of Canyonville wishes to be proactive in assessing the needs of the water system; and

WHEREAS, there is a request to annex 49.9 acre of land into the City limits; and

WHEREAS, the City needs to insure the ability to provide adequate water to the new development and the existing water master plan is 19 years old; and

WHEREAS, the City was able to obtain a technical assistance grant from the Department of Land Conservation and Development to create a new water master plan; and

WHEREAS, the City desires to adopted the 2015 water master plan and incorporate it into the Canyonville Comprehensive Plan.

NOW, THEREFORE, the City of Canyonville ordains as follows:

Section 1. The Council for the City of Canyonville officially adopts the 2015 water master plan.

Section 2. Add the following policy to the Community Facilities Goal 2 section of the Canyonville Comprehensive Plan:

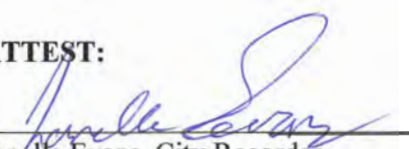
The City of Canyonville completed a water master plan in June of 2015 which is incorporated into the Canyonville Comprehensive Plan as a source reference document to be utilized when planning future development.

Effective Date. This ordinance shall become effective on the 30th day following its passage.

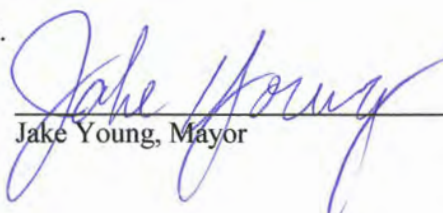
PASSED by the Canyonville City Council this 8th day of June 2015.

APPROVED AND SIGNED this 8th day of June 2015.

ATTEST:



Janelle Evans, City Recorder

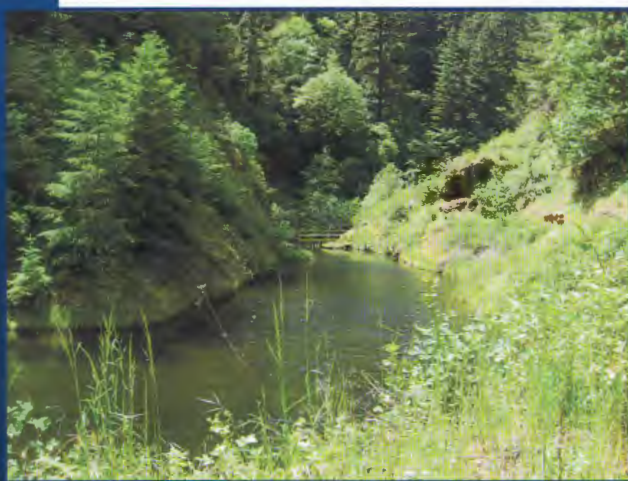


Jake Young, Mayor

City of Canyonville
Douglas County, Oregon

WATER MASTER PLAN

June
~~MAY~~ 2015



The Dyer Partnership
Engineers & Planners, Inc.

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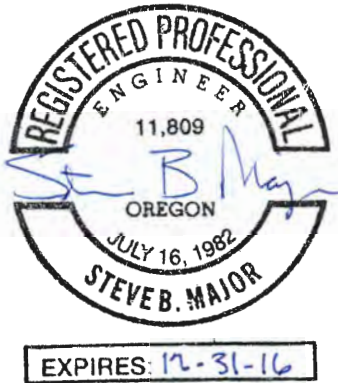
City of Canyonville

Douglas County, Oregon

Water Master Plan

June
May 2015

Project No. 180.03



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SECTION 1: EXECUTIVE SUMMARY

Executive Summary

This Water Master Plan was compiled to provide guidance to address the City of Canyonville's future water needs. This plan summarizes the components of the existing water distribution system, analyzes local water demand patterns, evaluates the performance of the water system with respect to critical service standards, and identifies the improvements necessary to remedy system deficiencies and accommodate future growth. This plan recommends specific projects for inclusion in the water distribution system Capital Improvement Program (CIP). Also presented is a financing plan that will facilitate successful implementation of the recommended CIP.

Source of Supply and Water Supply Rights

The current source of supply of raw water is diverted, primarily, from Canyon Creek. O'Shea Creek is used to supplement Win Walker during dry late season months. The Water Treatment Plant grounds are irrigated to keep water fresh in pipe line. The City has water rights for the diversion of 1.212 cfs from Canyon Creek and 1.0 cfs from O'Shea Creek for municipal use. The City has water storage and surface water rights for 300 ac-ft from the Win Walker Reservoir. The total available water rights from Canyon Creek and Win Walker Reservoir is 1.626 cfs, and the total from O'Shea Creek is 1.0 cfs. The combined total available water rights from all sources is 2.626 cfs.

Existing System

Around 1910, potable water was supplied to the residents of Canyonville. Improvements have been made to satisfy demand and to maintain excellent water quality. The City's current water system consists of facilities for diversion, treatment, transmission, storage and distribution of water.

Water drawn from either source is conveyed to and treated at a Water Treatment Plant (WTP) that was originally built in 1978. The WTP was renovated in 2001. The WTP is utilized year-round and has a maximum treatment capacity of 600 gpm (0.864 MGD). The peak rate of production from the treatment plant is 680 gpm (0.979 MGD) which is based on 2012 Disinfection Tracer Study.

Distribution and Storage System

The City has two separate supply zones with different pressures. The majority of the City is serviced from the 1 million gallon reservoir in the Supply Zone southeast of Canyonville and the downtown portions in Canyonville. This will be referred to as Supply Zone 1. The other 753,000 gallon reservoir, on Hill Rd., mostly supplies Canyonville to the west side of I-5. This Supply Zone will be referred to as Supply Zone 2. Water Storage totals approximately 1.75 million gallons.

These supply zones include one booster pump station and two potable water storage tanks capacity. Reynolds Reservoir is concrete and has a storage capacity of 1 million gallons, and Hill Reservoir is welded steel and has a storage capacity of 753,000 gallons.

The City's distribution system consists of approximately 5.9 miles of piping ranging from 2-inch to 12-inch diameter mains. Fire flow deficiency, in general, was a problem with pipes less than 6-inches in diameter.

Water Demand

The City's last water system analysis was completed in June 1996. The existing water treatment plant has been able to meet the needs of the current residents. However, with the submittal of urban growth boundary and annexation applications, the City must seriously consider the future needs of the water system.

The population currently being served by the City's water system is 1,910. Modest residential growth is expected. Population growth during the 25-year planning period is estimated to occur at a rate of 0.77 percent per year.

The City's water system has changed dramatically since the 1996 assessment. A new water source has been developed and the Cow Creek Band of Indians was disconnected from the City's water supply in 2007. Several subdivisions and Knoll Terrace Manufactured Home Park were all completed after the 1996 assessment. However, the 40% loss of revenue from the Cow Creek Tribal Casino has left the City struggling to fund improvements to the water system.

A new subdivision is planned that would be annexed into the UBG. This development will add approximately 200 residences to the City's water system, as well as a new water storage tank.

System water demand was compiled for both the amount of water pumped to the City, produced at the WTP, and diverted from the raw water sources. Current water demand production is calculated to be 0.20. Canyon Creek and Win Walker Reservoir water rights are limit to 1.05 million gallons per day (MGD) on an annual average with a maximum month and daily demand of 0.35 MGD and 0.51 MGD, respectively. The rated capacity of the City's WTP is 0.864 MGD (600 gpm). No additional WTP capacity is needed for future water demand. The average of nonaccount (water sold less water produced) in the City's system is approximately 16 percent, which is comparable to the calculation presented in previous City water planning documents.

Future water demand is primarily based on current water production/consumption parameters, projected growth within the City, and anticipated nonaccount water (10 to 20%). Population growth for Canyonville is projected using the City's accepted annual growth rate of 0.77 percent per year over a 20-year period. Based on the projected maximum daily demand (MDD), the City's existing water rights to Canyon Creek should be sufficient to meet the City's demand through the Year 2035.

Distribution System Modeling

The City's water distribution system was evaluated using a hydraulic computer model, with emphasis on selected vital or high fire flow areas within the City. Based on the results of this model, the only vital areas shown to have less than required fire flow were Alder Ln. and Sabbath Way. Proposed projects to improve fire flows within the City's distribution include looping dead end lines, installation of larger diameter mains, and upsizing of pipes at various locations within the City.

Storage capacity of the treated water tanks within the City was evaluated and found to be currently sufficient. Improvements to some of the existing storage tanks, such as cathodic protection and tank reconditioning, are also recommended.

Financing and Implementation Plan

A total of 26 improvements are recommended in the Capital Improvement Plan. The improvements were listed in two phases, Phase I Improvements, being the most critical projects. Total estimated cost for installation and construction of the 23 Phase I improvements is \$5,651,000. Recommended Phase I Improvements include distribution system projects to improve fire flow, the water treatment plant improvements, pump station improvements, tank improvements and new fire hydrant installations.

Various funding programs were evaluated for financing the Phase I Improvements through the use of either low-interest loans or a combination of low-interest loans and grants. Projected monthly rate increase (\$/Equivalent Dwelling Unit (EDU)/month) from viable funding programs, ranged from \$4.10 to \$35.57. Projected monthly user rates, including debt reserve and system O&M costs, would be \$53.38 per EDU.

Recommendations for implementing the elements of this Water Master Plan include the following:

- Submit Plan to the Oregon Health Division and Department of Water Resources for review and approval.
- Schedule and attend “One-Stop” Meeting to discuss financing options for the proposed Phase I Improvements, and submit system this information to private funding sources for funding consideration.
- Submit necessary applications to the funding agencies requesting loans and grants to finance the Phase I Improvements.
- Following favorable review by the selected financing agencies, secure the authority to issue revenue or general obligation bonds in the amount needed to finance the Phase I Improvements.
- Authorize detailed design of recommended improvements, and preparation of plans and specifications for the Phase I improvements. Secure the necessary special use permits for construction.
- Receive construction bids and award contracts for Phase I Improvements.

The following is a tentative schedule identifying key activities and approximate implementation date for the Water Master Plan over the next three years.

• Submit Plan to Health Division and Department of Water Resources	February 2016
• City Attend One-Stop Meeting for Financing Options	May 2016
• Obtain Financing for Phase I Improvements	October 2016
• Design of Phase I Improvements	November 2016 – September 2017
• Health Division Approval of Phase I Improvements	September 2017
• Advertise for and Receive Construction Bids for Phase I Improvements	October 2017
• Construction of Phase I Improvements	December 2017 – December 2018

SECTION 2: **INTRODUCTION**

Introduction

2.1 Background and Objective

The City of Canyonville water distribution system currently serves approximately 1,910 people and covers 620 acres of developed property within the city limits. The existing system is composed of an extensive pipeline network, one booster pump station and two reservoirs. This chapter provides background information on the various elements of the existing system as well as an overview of system operations.

This Water Master Plan (WMP) will provide an evaluation of the City's current water system facilities, project future water needs and recommend improvements to satisfy the anticipated water demand. To address the above concerns, the City initiated the compilation of a water master plan in 2014.

2.2 Study Objective

The purpose of the Plan is to provide the City of Canyonville with a comprehensive planning document that provides engineering assessment and planning guidance for the successful management of its water system over the next 20 years and beyond. This document satisfies the Oregon Health Authority requirement for communities with 300 or more service connections to have a current water master plan (OAR 333-061-0060). The principal objectives include:

- Evaluation of the existing water system components,
- Prediction of future water demands,
- Evaluation of the capability of the existing system to meet future needs, and
- Recommendations for improvements needed to meet future needs and/or address deficiencies.

The Plan outlines water system improvements necessary to comply with State and Federal standards and to provide for anticipated growth. The capital improvements are presented as projects with estimated costs to allow the City to plan and budget as needed. Supporting technical documentation is included to aid in grant and loan funding applications; the documentation meets the requirements of the Oregon Business Development Department (OBDD), Oregon Water Resources Department (OWRD), Rural Development (RD), and the Oregon Health Authority (OHA).

2.3 Scope of Study

The overall scope of this Plan consists of: 1) an examination of the City's existing water supply sources and system; 2) determination of the adequacy of existing water sources and possible need to develop new water sources for future potable water service in the City; 3) Look at alternatives to meet the City's needs for the next 20 years; and 4) Develop a capital improvement plan for updating the existing system.

Planning Period

The planning period for this Plan is 20 years, ending in Year 2035. The period is short enough for current users to benefit from system improvements, yet long enough to provide reserve capacity for future growth and increased demand.

Planning Area

The City's Urban Growth Boundary (UGB), plus the additional limits of the system defined by raw water sources and transmission is considered the Study Area in this Plan.

Work Tasks

In compliance with Oregon Health Authority and Water Resources Department (WRD) plan elements and standards, this study provides descriptions, analysis, projections, and recommendations for the City's water system over the next 20 years. The following elements are included:

- **Executive Summary** – Provide a summary of the conclusions and recommendations from this study.
- **Study Area Characteristics** – Identify applicable study area characteristics, land use, population trends and projections.
- **Regulatory Requirements** – Identify current and future regulatory requirements/regulations that affect the planning, operation and maintenance of community water systems.
- **Existing Facilities** – Describe and evaluate the existing water system including supply, treatment, storage, and distribution.
- **Water Use and Projected Demand** – Determine the City's future water demand based on current use, projected population and economic growth.
- **Alternatives/Capital Improvement Plan** – Identify and evaluate various alternatives for the City's water system. Select the most cost-effective program that will meet the City's water needs within the planning periods. Identify and describe a capital improvement plan for the water system with recommended implementation schedule.
- **Improvement Phasing and Financing** – Identify various local financing mechanisms and the most applicable funding programs. Develop a financing program for proposed improvements. A financing program will include proposed monthly rate structure, implementation schedule, and system development charges.

2.4 Authorization

The City of Canyonville contracted with The Dyer Partnership Engineers & Planners, Inc. on May 13, 2014 to prepare the Water Master Plan under the terms of the State of Oregon Department of Land Conservation and Development (DLCD). The scope of this Plan was based on Task Order No. 3 that was included in Dyer's contract with the City and summarized in Section 2.3.

2.5 Past Studies and Reports

Documents that discuss the City's water system and facilities have been used in the preparation of and analyses in this Plan. A list of these studies and reports is listed below.

Wastewater Facilities Plan, Kennedy/Jenks Consultants, May 2010.

2.6 Acknowledgements

This plan is the result of contributions made by a number of individuals and agencies. We wish to acknowledge the efforts of Janelle Evans, City Administrator/Recorder; Tony Lakey, Public Works Supervisor; Mark Norris, Water Treatment Plant Operator; and Raymond Brown, Fire Chief, Canyonville South Umpqua Fire Department. The assistance of the City of Canyonville office staff was invaluable in compiling information on City services and the community.

SECTION 3:
STUDY AREA CHARACTERISTICS

Study Area Characteristics

3.1 Study Area

The City of Canyonville is located near the southern boundary of Douglas County in southwestern Oregon. This area is dominated by rugged, forested hills which are bounded by the Cascade Mountain Range to the east, the Coastal Mountain Range to the west, and the Klamath Mountain Range to the south. The town lies next to US Interstate Highway 5 (I-5), approximately 100 miles north of the Oregon/California border and approximately 200 miles south of the Oregon/Washington border as shown in Figure 3.1.1. The city is located just north of the Canyon Creek canyon, where it opens up, and south of the confluence of Canyon Creek and the South Umpqua River. Canyonville lies within the Umpqua River Basin which is a Pacific slope stream. The City of Canyonville is surrounded by farm and pasture land along the South Umpqua River Valley, with hills to the south and west.

The area encompassed within the city limits is approximately 620 acres or over 0.97 square miles. The study area for this Master Plan includes the city limits and the Urban Growth Boundary (UGB), and the City's existing water sources as shown in Figures 3.1.2 and 3.1.3, respectively.

3.2 Physical Environment

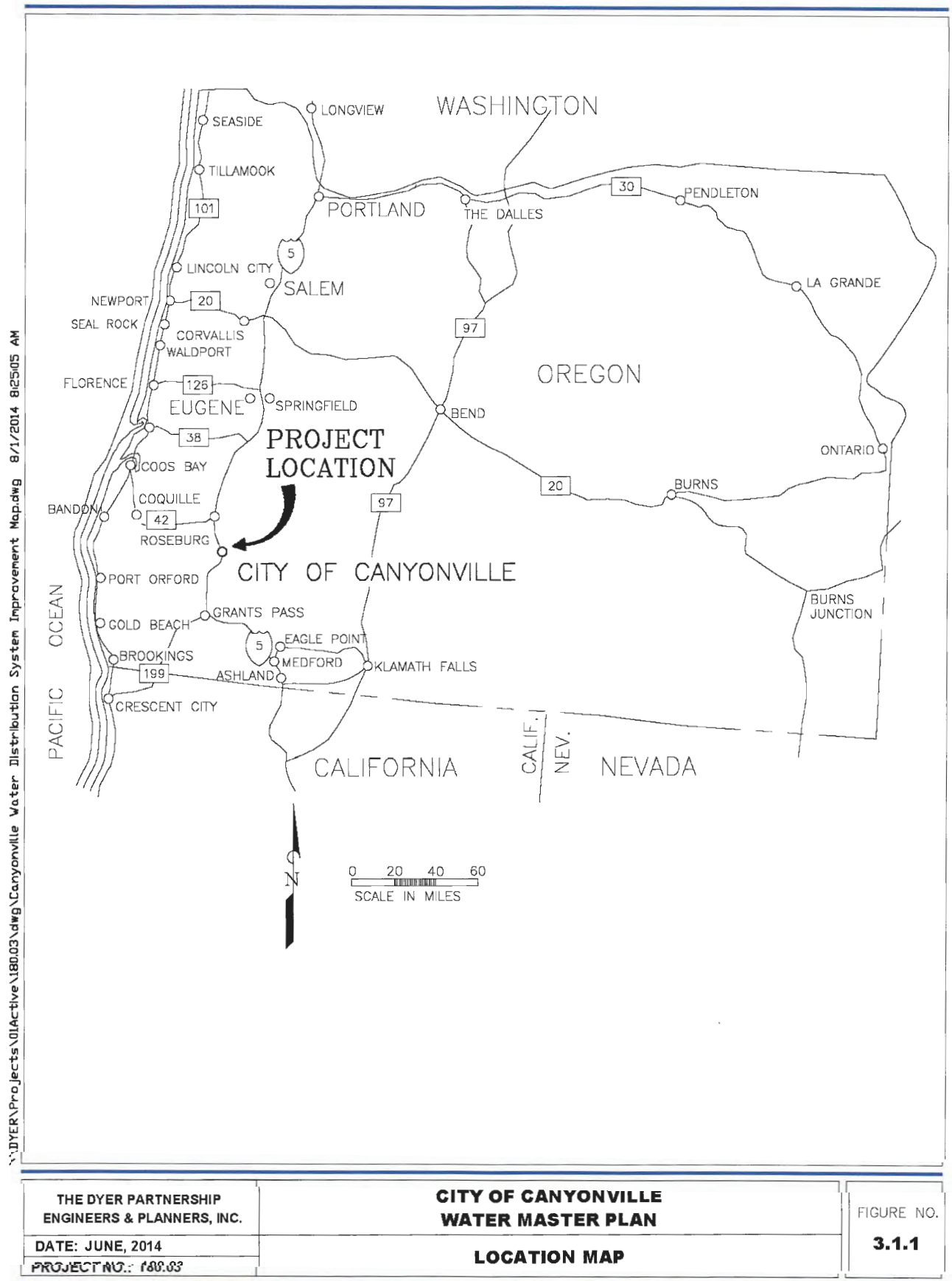
The following provides information about the physical environment in and around the City of Canyonville.

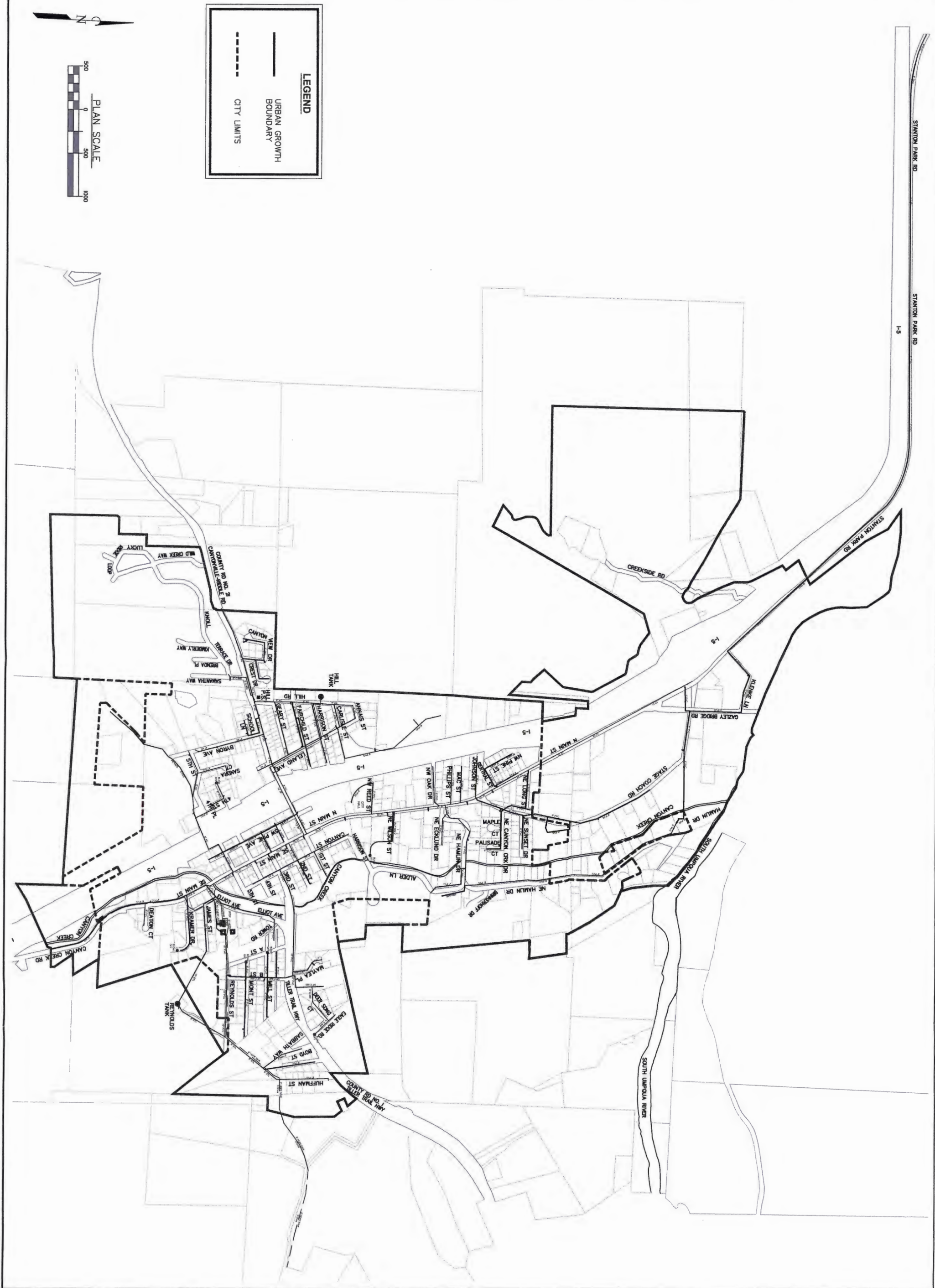
Climate

Canyonville is located in the rain shadow of the coastal mountains and generally experiences dry mild summers and cool wet winters. Like other areas in the region, Canyonville experiences the most precipitation from November through March. Moist air masses moving off the Pacific Ocean onto land, especially during the winter months, produce a moderate amount of rainfall (approximately 32.1 inches per year) that Canyonville experiences. Rainfall amounts for November, December and January average approximately 4.7 inches per month. The wettest month is December with a historic average of approximately 4.9 inches of rainfall. The driest month is July with a historic average of approximately 0.4 inches of rainfall. About 44 percent of rainfall occurs between November and January and only about 10 percent occurs from June through September. Records show that the maximum 24-hour rainfall is 5.2 inches, which occurred on October 29, 1950.

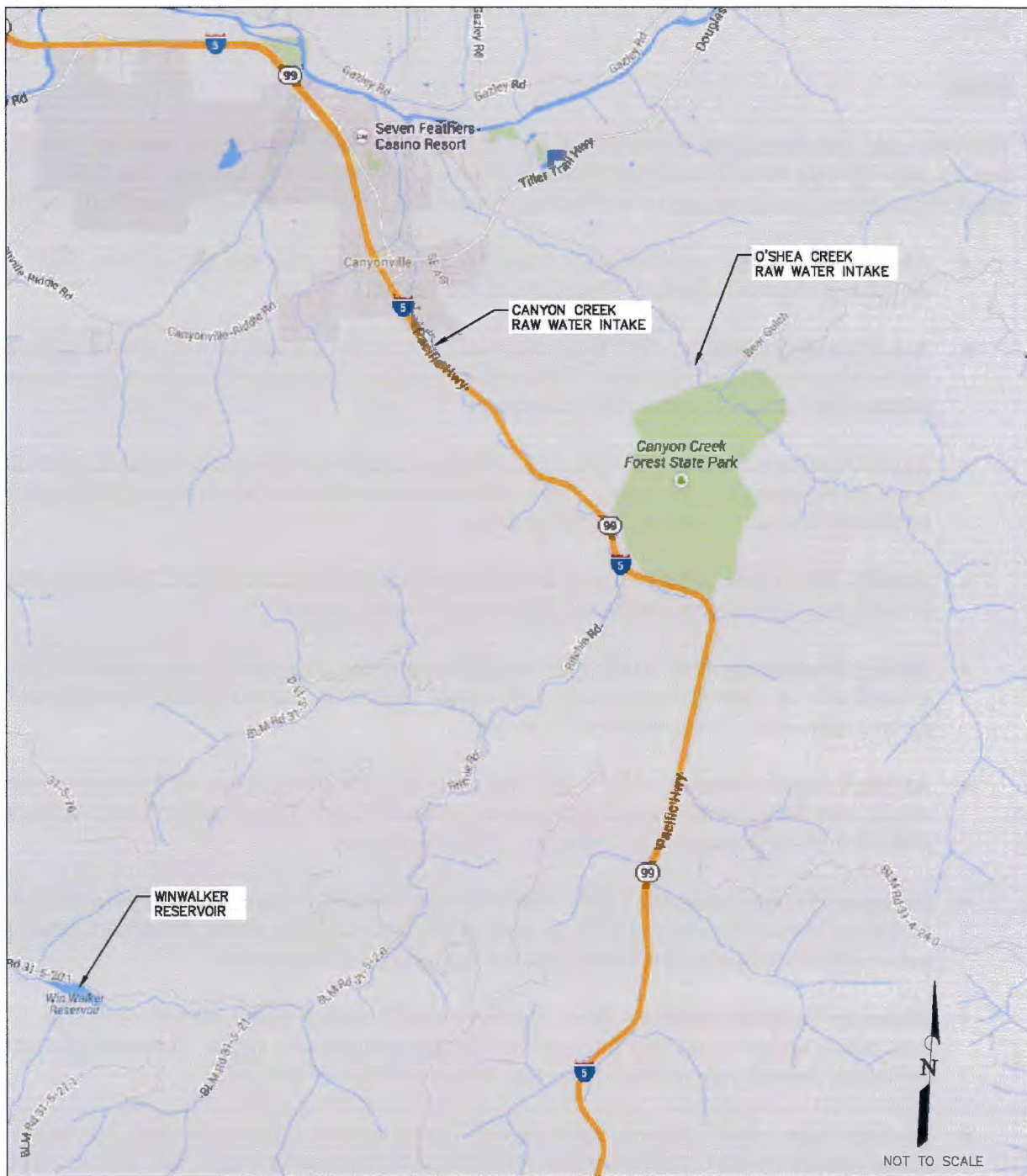
The mean annual snowfall is 2.9 inches with virtually all snowfall occurring between November and March. About two-thirds of the snowfall occurs in December and January. The extreme recorded snow depth was 10 inches. Although snowfall and snow depth in mountains is considerably higher and snowmelt adds to the flow in Canyon Creek and Umpqua River in the spring, there is no significant late-season snow pack even at the headwaters of the South Umpqua River.

Temperatures for Canyonville averages 42° F in December and 70° F in July and August. The yearly mean temperature is approximately 55° F. The average low temperature is 44° F, while the average high temperature is 65° F. Extreme temperatures range from -4 to 110° F.





\\DYER\Projects\01Active\180.03\dwg\Canyonville Water Distribution System Improvement Map.dwg 8/1/2014 8:25:05 AM



THE DYER PARTNERSHIP ENGINEERS & PLANNERS, INC.	CITY OF CANYONVILLE WATER MASTER PLAN	FIGURE NO.
DATE: JULY, 2014 PROJECT NO.: 180.03	RAW WATER SOURCES	3.1.3

Precipitation and temperature data is from the National Climatic Data Center for the years 1971 through 2014.

Soils

There are many general classifications of surficial geologic formations found in the local Canyonville area. A map showing these formations (Natural Resource Conservation Service; map date 2010; <http://websoilsurvey.nrcs.usda.gov>) is included in Appendix A. The formations are described as follows.

- **Abegg – 1C** - Abegg consists of well drained soils on high terraces and alluvial fans. These soils are formed of mixed alluvium. Slopes are 2 to 12 percent.
- **Acker-Norling complex – 5F** - The Acker-Norling complex consists of well drained soils on north facing mountain side slopes. These soils formed in colluvium and residuum derived from metamorphic rock. Slopes are 30 to 60 percent.
- **Acker-Norling complex – 6F** - The Acker-Norling complex consists of well drained soils on south facing mountain side slopes. These soils formed in colluvium and residuum derived from metamorphic rock. Slopes are 30 to 60 percent.
- **Atring – 8F** - Atring consists of well drained soils on side slopes and ridges. These soils formed in colluvium derived from sandstone. Slopes are 30 to 60 percent.
- **Atring-Vermisa complex – 12G** - The Atring-Vermisa complex consists of moderately rapid drained soils on north facing mountain side slopes. These soils formed in colluvium derived from metamorphic rock. Slopes are 60 to 90 percent.
- **Atring-Vermisa complex – 13G** - The Atring-Vermisa complex consists of well to somewhat excessively drained soils on south facing mountain side slopes. These soils formed in colluvium derived from metamorphic rock. Slopes are 60 to 90 percent.
- **Beekman-Vermisa complex – 19G** - The Beekman-Vermisa complex consists of moderately to somewhat excessively drained soils on south facing mountain side slopes. These soils formed in colluvium derived from metamorphic rock. Slopes are 60 to 90 percent.
- **Beekman-Vermisa complex – 20G** - The Beekman-Vermisa complex consists of well to somewhat excessively drained soils on south facing mountain side slopes. These soils formed in colluvium derived from metamorphic rock. Slopes are 60 to 90 percent.
- **Buckeye loam – 30F** - Buckeye loam consists of well drained soils on mountain side slopes. These soils formed in colluvium and residuum derived from metamorphic rock. Slopes are 30 to 60 percent.
- **Camas-Newberg complex – 34A** - The Camas-Newberg complex consists of excessively to somewhat excessively drained soils on flood plains. These soils are formed of mixed alluvium. Slopes are 0 to 3 percent.
- **Chapman-Chehalis complex – 37A** - The Chapman-Chehalis complex consists of well drained soils on flood plains. These soils are formed of mixed alluvium. Slopes are 0 to 3 percent.

- **Dubakella-Pearsoll complex – 68F** - The Dubakella-Pearsoll complex consists of well drained soils on north facing mountain side slopes. These soils formed in colluvium and residuum derived from sepeintine and peridotite. Slopes are 30 to 70 percent.
- **Dumont – 69E** - Dumont consists of well drained soils on mountain side slopes and ridges. These soils formed in colluvium and residuum derived from metamorphic rock. Slopes are 12 to 30 percent.
- **Dupee silty clay loam – 75E** - Dupee silty clay loam consists of somewhat poorly drained soils on footslopes and concave side slopes. These soils formed in colluvium and residuum derived from sandstone and siltstone. Slopes are 12 to 30 percent.
- **Evans loam – 78A** - Evans loam consists of well drained soils on low floodplains. These soils are formed of mixed alluvium. Slopes are 0 to 3 percent.
- **Foehlin gravelly loam – 81A** - The Foehlin gravelly loam consists of well drained soils on low terraces. These soils are formed of mixed alluvium. Slopes are 0 to 3 percent.
- **Fordice very cobbly loam – 82C** - Fordice very cobbly loam consists of well drained soils on high terraces. These soils are formed of mixed alluvium. Slopes are 0 to 12 percent.
- **Greengulch-Cedargrove complex – 87E** - The Greengulch-Cedargrove complex consists of well drained soils on ridges and footslopes. These soils formed in colluvium and residuum derived from granodiorite rock. Slopes are 3 to 30 percent.
- **Greengulch-Cedargrove complex – 88F** - The Greengulch-Cedargrove complex consists of well drained soils on north facing mountain side slopes. These soils formed in colluvium and residuum derived from granodiorite rock. Slopes are 30 to 60 percent.
- **Greengulch-Cedargrove complex – 89F** - The Greengulch-Cedargrove complex consists of well drained soils on south facing mountain side slopes. These soils formed in colluvium and residuum derived from granodiorite rock. Slopes are 30 to 60 percent.
- **Josephine gravelly loam series – 115E** - The Josephine gravelly loam series consists of well drained soils on footslopes and ridges. These soils formed in colluvium and residuum derived from sandstone, siltstone, and metamorphic rock. Slopes are 12 to 30 percent.
- **Josephine-Speaker complex – 116F** - The Josephine-Speaker complex consists of well drained soils on concave side slopes. These soils formed in colluvium and residuum derived from sandstone, siltstone, and metamorphic rock. Slopes are 30 to 60 percent.
- **Josephine-Speaker complex – 117F** - The Josephine-Speaker complex consists of well drained soils on north facing mountain side slopes. These soils formed in colluvium and residuum derived from sandstone, siltstone, and metamorphic rock. Slopes are 30 to 60 percent.
- **Kanid-Atring complex – 120G** - The Kanid-Atring complex consists of well drained soils on north facing mountain side slopes. These soils formed in colluvium derived from metamorphic rock. Slopes are 60 to 90 percent.

- **McMullin-Reston complex – 149E** - The McMullin-Reston complex consists of well drained soils on ridges. These soils formed in colluvium and residuum derived from metamorphic rock. Slopes are 3 to 30 percent.
- **Medford clay loam series – 154B** - The Medford clay loam series consists of moderately well drained soils on low terraces and alluvial fans. These soils are formed of mixed alluvium. Slopes are 0 to 7 percent.
- **Newberg fine sandy loam – 164A** - The Newberg fine sandy loam consists of somewhat excessively drained soils on flood plains. These soils are formed of mixed alluvium. Slopes are 0 to 3 percent.
- **Packard gravelly loam – 184A** - The Packard gravelly loam consists of well drained soils on high flood plains. These soils are formed of mixed alluvium. Slopes are 0 to 3 percent.
- **Pengra silt loam – 188D** - The Pengra silt loam consists of somewhat excessively drained soils on low terraces. These soils are formed of mixed alluvium. Slopes are 2 to 20 percent.
- **Pits – 191** – Pits are open excavations throughout the survey area from which the soil and commonly some of the underlying material, such as hard rock or gravel, have been removed.
- **Pollard gravelly loam – 192E** - The Pollard gravelly loam consists of well drained soils on footslopes and ridges. These soils formed in colluvium and residuum derived from sandstone, siltstone, and metamorphic rock. Slopes are 3 to 30 percent.
- **Riverwash – 210** - Riverwash consists of areas of highly stratified sand and gravel on floodplains. These soils are formed of mixed alluvium.
- **Rock outcrop – 211** - Areas of exposed volcanic, sedimentary, and metamorphic rock scattered through the survey area. Slopes are 60 percent to nearly vertical.
- **Sibold fine sandy loam – 224B** - The Sibold fine sandy loam consists of somewhat poorly drained soils on flood plains. These soils are formed of mixed alluvium. Slopes are 0 to 5 percent.
- **Speaker loam – 225D** - The Speaker loam consists of well drained soils on ridges and footslopes. These soils formed in colluvium and residuum derived from sandstone, siltstone, and metamorphic rock. Slopes are 2 to 20 percent.
- **Speaker loam – 225E** - The Speaker loam consists of well drained soils on side slopes and ridges. These soils formed in colluvium and residuum derived from sandstone, siltstone, and metamorphic rock. Slopes are 20 to 30 percent.
- **Speaker loam – 226F** - The Speaker loam consists of well drained soils on side slopes. These soils formed in colluvium and residuum derived from sandstone, siltstone, and metamorphic rock. Slopes are 30 to 60 percent.
- **Sutherlin silt loam – 235C** - The Sutherlin silt loam consists of moderately well drained soils on side slopes. These soils formed in colluvium and alluvium over sandstone and siltstone. Slopes are 30 to 50 percent.

- **Veneta loam – 255C** - The Veneta loam consists of moderately well drained soils on alluvial fans and terraces. These soils are mixed alluvium and colluvium derived from sandstone and siltstone. Slopes are 0 to 12 percent.
- **Veneta loam – 255D** - The Veneta loam consists of moderately well drained soils on alluvial fans and footslopes. These soils are mixed alluvium and colluvium derived from sandstone and siltstone. Slopes are 12 to 20 percent.
- **Vermisa-Rock outcrop – 256G** - The Vermisa-Rock outcrop consists of somewhat excessively drained soils on sideslopes and headwalls. These soils are colluvium derived from sandstone and siltstone. Slopes are 60 to 100 percent.
- **Wolfpeak sandy loam – 268E** - The Wolfpeak sandy loam consists of well drained soils on footslopes and ridges. These soils are residuum and colluvium derived from granodiorite. Slopes are 3 to 30 percent.
- **Wolfpeak sandy loam – 269F** - The Wolfpeak sandy loam series consists of well drained soils on north facing mountain side slopes. These soils are residuum and colluvium derived from granodiorite. Slopes are 30 to 60 percent.
- **Wolfpeak sandy loam – 270F** - The Wolfpeak sandy loam consists of well drained soils on south facing mountain side slopes. These soils are residuum and colluvium derived from granodiorite. Slopes are 30 to 60 percent.

Geologic Hazards

There are areas within the Canyonville study area that are susceptible to geologic hazards. These hazards include riverine flooding, earthquakes, landslides and erosion. A discussion of each hazard and expected locations is listed below.

- **Riverine Flooding.** A number of areas within the Canyonville have been designated Special Flood Hazard Areas (SFHA), as per the current Oregon Risk Map for Douglas County, as shown in Appendix A.
- **Earthquakes.** Earthquakes are the products of deep-seated geologic faulting and the subsequent release of large amounts of energy. The nearest known seismic fault is located approximately 50 miles west of Canyonville. Historical earthquake activity is significantly lower than the state average.
- **Landslides.** There was a major landslide in the Canyonville area on January 16, 1974. The landslide occurred after heavy rainfall saturated the soil. This slide temporarily blocked Canyon Creek, which was already near flood stage.
- **Erosion.** Erosion within the UGB of Canyonville does not present a significant geologic hazard.

Water Resources

Water resources within the Study Area include both surface waters and groundwater. The majority of the resources utilized within the Study Area are surface waters.

Surface Water

The City of Canyonville is located in the South Umpqua River Watershed. The South Umpqua River is approximately 104 miles in length from its mouth to its headwaters. From its headwaters, the South Umpqua drops steeply with an average gradient of 42.5 feet per mile from Castle Rock Creek to Elk Creek near Tiller. From Days Creek to Canyonville, the South Umpqua River flows west then southwest for about 7 miles through a three-fourths mile wide valley. Canyon Creek joins the South Umpqua River at Canyonville. The South Umpqua River then flows about 4 miles to Riddle where it is joined by Cow Creek, the South Umpqua's largest tributary. From Elk Creek to Cow Creek, the South Umpqua has an average gradient of 13.5 feet per mile. From its confluence with Cow Creek to its mouth, the South Umpqua is relatively flat with an average gradient of approximately 6 feet per mile.

The South Umpqua River watershed has a low water-holding capacity, with precipitation quickly flowing into the Umpqua River. There is no significant late-season snowpack at the headwaters to provide snowmelt for river flow. Its flow pattern is characterized by high winter flows and low summer flows leading to periodic flooding in the winter and water shortages in the summer. The river temperature becomes very warm in the summer and excessive algae growth is a significant water quality problem. South Umpqua River flow data at Tiller for the period from 1990 through 2008 was obtained from the U.S. Geological Survey. The lowest seven day average flows over a ten year period (7Q10 flow) for winter (November 1 through April 30) and summer (May 1 through October 31) were 45.1 cfs and 31.1 cfs, respectively.

The largest allocation of water rights is for a combination of in-stream water rights and irrigation. Domestic, industrial and manufacturing, municipal, livestock, and commercial water rights allocations combined make up the remaining water rights allocations. Total water rights allocation typically exceeds the summer flow. Because of this over-allocation, the Oregon Water Resources Department typically does not issue additional water rights above Cow Creek and can limit existing rights.

Water courses in the Study Area include these tributaries of the South Umpqua River: Canyon Creek, West Fork Canyon Creek, O'Shea Creek. The City's municipal water supply comes from an intake on the Canyon Creek. The City also has a water right permit for withdrawal of water from O'Shea Creek. The City's water rights and withdrawals are discussed later in the report (Sections 5.1).

The South Umpqua River, Days Creek, Canyon Creek, as well as eight other tributaries, are on the ODEQ 303(d) list for violating stream temperature standards. Within the watershed, the South Umpqua River is also 303(d) listed for chlorine, fecal coliform, pH, aquatic weeds/algae, and biological criteria. The following streams are considered water quality limited for habitat or flow modification: Beals Creek (habitat), Canyon Creek (flow) Days Creek (habitat and flow), O'Shea Creek (flow), St. John Creek (flow), Shively Creek (habitat), and the South Umpqua River (habitat and flow).

Stream and riparian habitat conditions vary from stream to stream. In general, riparian zones in the watershed's higher-elevation regions are dominated by conifer forests of various age classes. In the watershed's valleys, the South Umpqua River, Days Creek, and Canyon Creek are predominantly thin strips of hardwoods mixed with shrubs and blackberries. In many of the South Umpqua River Watershed's tributaries, ODFW stream habitat surveys conducted during the summers of 1992 through 1996 show inadequate levels of large woody debris (ODFW did not survey the South Umpqua River). A Summary of Water Quality Limited To Waterbodies in the Study Area is shown in Table 3.2.1.

TABLE 3.2.1
SUMMARY OF WATER QUALITY LIMITED TO WATERBODIES IN THE STUDY AREA

Parameter	River Mile (RM)	Season
Canyon Creek		
Microbiological Contaminants	0 – 1.5	Year Round
Inorganic Contaminants (Copper/Lead)	0 – 1.5	Year Round
Disinfection Byproducts	0 – 1.5	Year Round
Byproducts Precursors	0 – 1.5	Year Round
Disinfectant Residuals	0 – 1.5	Year Round
TTHM (Total Trihalomethanes)		
HAA5 (Haloacetic Acid 5)		

Groundwater

Withdrawal of groundwater is highly dependent upon the underlying geology. The City of Canyonville utilizes no groundwater for potable water use within the City.

Flora and Fauna

There are three ecoregions within the Study Area. They are the Mid-Coastal Sedimentary, the Inland Siskiyou, and the Umpqua Interior Foothills. The majority of the study area is in the Inland Siskiyou Ecoregion.

The Mid-Coastal Sedimentary Ecoregion is mountainous and lies outside the coastal fog zone; its Douglas-fir forests are intensively managed for logging. Its slopes are prone to failure when disturbed. Stream sedimentation is high. The mature forest consists of Douglas-fir and western hemlock, with salal, sword fern, vine maple, Oregon grape, and rhododendron; tanoak may be found on drier slopes to the south. Wetter slopes and riparian areas support bigleaf maple, western redcedar, grand fir, red alder, salmonberry, and oxalis, with California bay-laurel in the south.

The Inland Siskiyou Ecoregion is underlain by granitic rock, shale, or sandstone. Precipitation ranges from 35 to 70 inches. Characteristic features include mixed forests, highly dissected mountains, high density, moderate to steep narrow stream channels with waterfalls. Use is primarily forestry, recreation, mining, and rural residential development. Forests consist of white fir, tanoak, Shasta red fir, Douglas-fir, ponderosa pine and incense cedar. Climate is drier and colder because of the rain shadow cast by the Coastal Mountain Range. Storms of subtropical origin generate heavy rains and peak flows in this area, however a snowpack seldom develops. A number of streams become intermittent during the summer due to the low precipitation.

The Umpqua Interior Foothills Ecoregion consists of narrow valleys, terraces and steep foothills. Precipitation ranges from 35 to 70 inches. Vegetation is oak woodlands and coniferous forests intermingled with pastures, vineyards, orchards, and row crops and land use is rural residential, towns, and mixed agricultural use. Most of the precipitation occurs during the winter months, but, generally, no snowpack results from it. Irrigation withdrawals result in the partial dewatering of some stream during summer months.

The following fish are present in the study area of the South Umpqua River watershed: winter steelhead (*Oncorhynchus mykiss*), fall and spring chinook (*O. tshawytscha*), coho (*O. kisutch*), coastal cutthroat trout (*O. clarkii*), chum salmon (*O. keta*), and rainbow trout (*O. mykiss*). Warm water fish, including largemouth bass (*Micropterus salmoides*), mosquito fish (*Gambusia*), bluegill (*Lepomis macrochirus*) and

brown bullhead (*Ameiurus nebulosus*) have been reported in the watershed. Another species present is the Pacific lamprey (*Lamprocyba tridentata*).

Mollusks are special attention species that are known to inhabit this study area. Mollusks prefer cold, clear streams with dissolved oxygen (DO) near saturation levels. According to Frest and Johannes 1997 report, there are 46 mollusk species known to occur in Douglas County. There are five species of land snails and slugs that require surveys prior to ground disturbing activities.

Red tree voles (*Phenacomys longicaudus*), the great gray owl (*Strix nebulosa*), and northern spotted owl (*Strix occidentalis caurina*) may inhabit the study area, too.

This area may support osprey (*Pandion haliaetus*), wild turkey (*Meleagris gallopavo*), Roosevelt elk (*Cervus elaphus*), and various neotropical bird species. Osprey would generally be found along the South Umpqua River, wild turkeys inhabit savannah woodlands, meadows, and riparian areas, and neotropical birds found throughout the study area. Two bird species, the purple martin and Lewis' woodpecker, are listed at State of Oregon Critical species.

Environmentally Sensitive Areas

Canyonville is located near sensitive environmental areas. The combination of forests, rangeland and pastures provide a unique surrounding for the City and within the Study Area that should be considered and protected in facilities planning. A discussion of environmentally sensitive areas and environmental topics pertinent to public facilities planning is presented below:

Wetlands

There are no number of significant wetland areas within the City or the study area.

Riparian Zones. The transition zone between creeks and uplands are also sensitive. They should be protected for erosion control, cover for animals, and shading for reducing water temperatures. In addition to exceeding the physical tolerance levels of fish, high temperatures lower the oxygen concentration, increase disease potential for aquatic life, and produce conditions for competing fish.

South Umpqua River

The mean January flow for the South Umpqua River is 57 times greater than the mean August flow. The mountain terrains underlying much of the South Umpqua River headwaters generate flow that more quickly respond to episodes of precipitation and drought. (Jones and Stearns, 1930) The South Umpqua River generally flows westward with an average gradient of 0.00249 through this study area. This river tends to carry a calculated mean annual total sediment load of 0.34×10^6 metric tons per year at the confluence with Cow Creek as per analysis by Curtiss (1975).

The South Umpqua River has been subjected to wildfire and logging activities in the past that impacted peak flows, the frequency of landslides, and sedimentation.

O'Shea Creek

O'Shea Creek is a small tributary of the South Umpqua River. It runs through forest land in narrow, steep banked valleys to the east of the city. O'Shea Creek is within an area that is subject to wildfire and logging activities.

Canyon Creek

Canyon Creek flows from the southwest of the city. It crosses under the Interstate 5 freeway nine times before reaching the intake location. The watershed consists of narrow, steep banked valleys within forest lands. There are small mining claims in this area. The West Fork of Canyon Creek runs along a logging road, electrical transmission lines, a natural gas pipeline and the Interstate 5 freeway.

Jordan/Alder Creek Watershed

The Jordan/Alder Creek Watershed is partially within the City's UGB and so within the study area. The lower reach of this watershed is dominated by development of a truck and travel center, RV park, motels, restaurants, and self-storage units. A tributary of Jordan Creek has had a series of water impoundments constructed to supply water to the Cow Creek Band of Umpqua Tribe of Indians' Seven Feathers facilities. The middle reaches of both Jordan and Alder Creeks have residential development and the upper reaches, south of the Canyonville-Riddle Road are forestry.

Environmentally Sensitive Areas

Environmentally sensitive areas typically include wetlands, riparian areas, and habitats for environmentally sensitive species. For example, stands of old growth Douglas fir in the western part of Douglas County are considered by the Bureau of Land Management to be environmentally sensitive areas. In the immediate vicinity of Canyonville, only riparian areas, such as those in and around Canyon Creek and the South Umpqua River, would be considered sensitive areas, for which any improvements in these areas may require additional permitting and/or oversight by multiple stakeholder agencies.

Within its Comprehensive Plan, Douglas County (1997) has not identified any Natural Areas to assist in protecting ecologically distinct ecosystems, habitats, and organisms.

Air Quality and Noise

According to DEQ's 2012 Air Quality Annual Report, Douglas County (specifically Roseburg) had 340 days in 2012 characterized as having an air quality index of "Good" with the remaining 24 days characterized as "Moderate". A "Moderate" rating means that unusually sensitive people should consider reducing prolonged or heavy outdoor exertion on those days. Canyonville has consistently met the National Ambient Air Quality Standards (NAAQS), and is not listed as a maintenance or nonattainment area by the U.S. Environmental Protection Agency (EPA).

Due to Canyonville's proximity to the Interstate 5 freeway, a significant amount of noise for the area can be attributed to vehicular traffic. No other chronic noise sources have been identified.

Energy Production and Consumption

No major energy resources have been identified in the Study Area. Energy consumption is expected to increase within the Study Area due to population growth during the planning period. Pacific Power serves the Study Area with electrical energy.

Rare, Threatened and Endangered Species

A number of rare, threatened and endangered species are known to reside near or within the Study Area. A list of these species within the Study Area is provided in Table 3.2.2. This list is based on information obtained from the Oregon Natural Heritage Information Center (March 2013).

TABLE 3.2.2
LIST OF THREATENED AND ENDANGERED SPECIES IN THE STUDY AREA

Common Name	Scientific Name	Status (Federal/State) ⁽¹⁾
Foothill Yellow-Legged Frog	<i>Rana boylei</i>	SOC/SV&SC
Cascades Frog	<i>Rana cascadae</i>	SOC/SV
Green Sturgeon (Northern DPS)	<i>Acipenser medirostris</i>	SOC/--
Green Sturgeon (Southern DPS)	<i>Acipenser medirostris</i>	LT/--
Western Brook Lamprey	<i>Lampetra richardsoni</i>	--/SV
Pacific Lamprey	<i>Entosphenus tridentatus</i>	SOC/SV
River Lamprey	<i>Lampetra ayresii</i>	SOC/--
Coastal Cutthroat Trout (Oregon Coast ESU)	<i>Oncorhynchus clarkia</i>	SOC/--
Chum Salmon (Pacific Coast ESU)	<i>Oncorhynchus keta</i>	--/SC
Coho Salmon (Coastal Coho Salmon SMU/Oregon Coast ESU)	<i>Oncorhynchus kistuch</i>	LT/SV
Steelhead (Oregon Coast ESU, winter run/Coastal Winter Steelhead SMU)	<i>Oncorhynchus mykiss</i>	SOC/SV
Steelhead (Oregon Coast ESU, summer run)	<i>Oncorhynchus mykiss</i>	SOC/SV
Chinook Salmon (Oregon Coast ESU, spring run)	<i>Oncorhynchus tshawytscha</i>	--/SC
Umpqua Chub	<i>Oregonichthys kalawatseti</i>	SOC/SC
Millicoma Dace	<i>Rhinichthys cataractae</i> ssp.	SOC/SV
Eulachon	<i>Thaleichthys pacificus</i>	LT/--
Western Toad	<i>Anaxyrus boreas</i>	--/SV
Coastal Tailed Frog	<i>Ascaphus truei</i>	SOC/SV
Clouded Salamander	<i>Aneides ferreus</i>	--/SV
Oregon Slender Salamander	<i>Batrachoseps wright</i>	SOC/SV
Del Norte Salamander	<i>Plethodon elongates</i>	SOC/SV
Southern Torrent Salamander	<i>Rhyacotriton variegatus</i>	SOC/SV
Northern Red-Legged Frog	<i>Rana aurora</i>	SOC/SV
Western Pond Turtle	<i>Actinemys marmorata</i>	SOC/SC
Northern Pacific Pond Turtle	<i>Emys marmorata marmorata</i>	SOC/SC
Western Rattlesnake	<i>Crotalus oreganus</i>	--/SC
Common Kingsnake	<i>Lampropeltis getula</i>	SOC/SV
California Mountain Kingsnake	<i>Lampropeltis zonata</i>	SOC/SV
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	LT/LT
Northern Spotted Owl	<i>Strix occidentalis caurina</i>	LT/LT
White-footed Vole	<i>Arborimus albipes</i>	SOC/--
Red Tree Vole	<i>Arborimus longicaudus</i>	PS:C/SV
Townsend's Big-eared Bat	<i>Comynorhinus townsendii</i>	SOC/SC
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	SOC/SV
Long-eared Myotis Bat	<i>Myotis evotis</i>	SOC/--
Fringed Myotis	<i>Myotis thysanodes</i>	SOC/SV
Long-legged Myotis	<i>Myotis volans</i>	SOC/SV
Yuma Myotis Bat	<i>Myotis yumanensis</i>	SOC/--
Northern Goshawk	<i>Accipiter gentilis</i>	SOC/SV
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	--/SV
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>	SOC/SC
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>	--/SV
Western Snowy Plover	<i>Charadrius nivosus nivosus</i>	PS:LT/LT
Common Nighthawk	<i>Chordeiles minor</i>	--/SC
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SOC/SV

Yellow Breasted Chat	<i>Icteria virens</i>	SOC/SC
Pileated Woodpecker	<i>Dryocopus pileatus</i>	--/SV
White-Headed Woodpecker	<i>Picoides albolarvatus</i>	SOC/SC
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	SOC/SV
Lewis' Woodpecker	<i>Melanerpes lewis</i>	SOC/SC
Black-Tailed Woodpecker	<i>Ricoides arcticus</i>	--/SV
American Three-Toed Woodpecker	<i>Picoides dorsalis</i>	--/SV
Little Willow Flycatcher	<i>Empidonax traillii brewsteri</i>	--/SV
Streaked Horned Lark	<i>Eremophila alpestris strigata</i>	PT/SC
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	--/SV
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	--/SV
Red-Necked Grebe	<i>Podiceps grisegena</i>	--/SC
Mountain Quail	<i>Oreortyx pictus</i>	SOC/SV
Bald Eagle	<i>Haliaeetus leuccephalus</i>	--/SV
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	SOC/--
California Brown Pelican	<i>Pelecanus occidentalis californicus</i>	--/LE
Oregon Vesper Sparrow	<i>Poocetes gramineus affinis</i>	SOC/SC
Western Bluebird	<i>Sialia Mexicana</i>	--/SV
Slender-Billed Nuthatch	<i>Sitta carolinensis aculeate</i>	--/SV
Great Gray Owl	<i>Strix nebulosa</i>	--/SV
Western Meadowlark	<i>Sturnella neglecta</i>	--/SC
Pallid Bat	<i>Antrozous pallidus</i>	SOC/SV
Ringtail	<i>Bassariscus astutus</i>	--/SV
Gray Wolf	<i>Canis lupus</i>	PS:LE/LE
Wolverine	<i>Gulo gulo</i>	PT/LT
Hoary Bat	<i>Lasiurus cinereus</i>	--/SV
Black-Tailed Jackrabbit	<i>Lepus californicus</i>	--/SV
Canada Lynx	<i>Lynx Canadensis</i>	LT/--
Pacific Marten – Interior Population	<i>Martes caurina</i>	--/SV
California Myotis	<i>Myotis californicus</i>	--/SV
Western Small-Footed Myotis	<i>Myotis ciliolabrum</i>	SOC/--
Western Gray Squirrel	<i>Sciurus griseus</i>	--/SV
Grizzly Bear	<i>Ursus arctos horribilis</i>	LT/--
Purple Martin	<i>Progne subis</i>	SOC/SC

(1) – Federal: LE – listed threatened, LT – listed endangered, PT – proposed threatened, C – candidate, SOC – species of concern, PS – partial status; State: LE – listed threatened, SC - sensitive-critical, SV – sensitive vulnerable, SU or U – sensitive-undetermined status, C- Candidate

Wild and Scenic River System

There are no Wild and Scenic Rivers within the Study Area.

Historic Sites

Within Canyonville's city limits, there is one structure listed in the National Register of Historic Places: the Canyonville Methodist Church.

3.3 Socioeconomic Environment

The future need for water service and facilities within Canyonville depends upon, in large part, to the socioeconomic conditions within the City and surrounding area. In this section, the local economic conditions, trends, population, land use, and public facilities will be discussed.

Economic Conditions and Trends

Regional economic conditions and trends will likely affect population growth and future water consumption in the City of Canyonville. The largest employer in southern Douglas County, historically, was the timber and wood products industry, however employment in Douglas County has diversified to include construction, manufacturing, health, educational, professional and business services. According to the Oregon Employment department, Douglas County's largest employment is in the government sector, with trade, transportation, and utilities, retail, education and health services following. Douglas County witnessed an 18 percent cut in all private sector forestry and logging job during the 1990's. Many jobs were cut and never restored. Because the timber industry was the dominant employer in Douglas County up until recently, the reduction in timber production has greatly contributed to the rate of poverty over the last two decades.

The Seven Feathers Casino Resort began as the Cow Creek Bingo Hall in 1992. The Cow Creek Band of the Umpqua Tribe of Indians have developed several businesses, including the resort, hotel, motels, restaurants, RV parks, truck and travel center and other businesses that directly impact Canyonville's economy. The Cow Creek Tribe has had indirect and induced positive impacts to the City's economy as well.

Major industrial or commercial development can create a large, immediate demand for water and sewer services. On the other hand, depressed economic conditions can affect employment opportunity and the number of families moving into or out of a community.

Based on 2011 Census data, the median household income level in Canyonville was significantly less than that of Douglas County and the state of Oregon, \$34,531 vs. \$40,096 and \$51,526, respectively.

Population

The current population (Year 2013) within the City of Canyonville is 1,910 based on Portland State University's (PSU) Population Research Center's estimate.

Historic Population

The City of Canyonville has experienced a growth rate higher than most other communities in Oregon. Based on United States Census data, the City of Canyonville's population increased from 1,293 to 1,885 between 2000 and 2010. This increase equates to an average annual growth rate of 3.84 percent. During this same period, the average County growth rate was 0.70 percent.

Future Population

The Center for Population Research and Census at Portland State University (PSU) prepares annual population estimates for all incorporated cities and each county within the State of Oregon. The Canyonville certified population estimate was 1,885 residents as of July 1, 2010. This population estimate is the most current for the City and will be used as a basis for projecting future population growth as shown in Table 3.3.1.

Safe harbor population projections are based on Douglas County growth rates which are based on the "Forecast of Oregon's County Population and Components Change, 2010-2050" prepared by the Office of Economic Analysis. The City's 2010 population is 1.750% of Douglas County's population.

The consolidated population forecast growth rate of 1.75 percent per year, as proposed by Douglas County Planning Department and accepted by the Canyonville City Council, from Kennedy/Jenks Consultants' Wastewater Facilities Plan, May 2010, was also considered for facilities planning purposes. This rate was not used to project population for this study. Instead the growth rate for Douglas County as per the "Forecast of Oregon's County Population and Components Change, 2010-2050 prepared by Office of Economic Analysis, Release date March 28, 2013" was used. Table 3.3.1 summarizes the population projections over the next 20 years, using the Year 2010 Census data for the City population (1,885).

The City is expecting population growth and expansion of its urban growth boundary in the near future. An application for an urban growth boundary adjustment and annexation request has been received for the Greg Falk property, which is located adjacent to the City. Once the property has been annexed into the City, phased future development of 200 residential units can occur.

TABLE 3.3.1
CURRENT POPULATION ESTIMATE AND POPULATION PROJECTIONS

Year	2013	2015	2020	2025	2030	2035
Residential Population ¹	1,910	1,935	2,032	2,130	2,217	2,285
Residential Population ²	1,910	1,977	2,157	2,352	2,565	2,798

Residential Population¹ – based on Douglas County growth rates prepared by OEA

Residential Population² – rate from Kennedy/Jenks Consultants' Wastewater Facilities Plan, May 2010

Potable Water Use Population

For the calendar Year 2013, there were 674 potable water connections within the City. The number of equivalent dwelling units (EDUs) for these connections is 1186 (See Section 6.2 for more details). With a current City population of 1,910, the number of per capita per equivalent dwelling units is 1.61(1,910/1186 EDUs, rounded). The annual rate of growth is projected at 0.773 percent.

Land Use

Land use within Canyonville is categorized into six general categories: commercial, community service, industrial, residential, reservation or Tribal Lands, and woodland/open space/agriculture. There is an estimated 815 acres within the current UGB. The Canyonville zoning map is shown in Appendix A. The six land use categories are briefly discussed below:

Woodland-Open Space-Agriculture District. This district is intended for areas within the city or the urban growth boundary that are currently not planned to be developed, but may be rezoned and planned for urban development in the future. Permitted uses include forest management, farm use (one major animal per five acres), fish and wildlife management, development of water impoundments and canals, publicly owned recreational facilities, fire facilities (prevention, detection and suppression), nurseries (growth, sale, and display of trees, shrubs and flowers), public and semipublic buildings/structures associated with physical, social, and economic welfare of the area. This district also has permitted use for single-family dwellings (minimum average density of ten acres per dwelling), home occupations, and buildings and structures necessary to the above uses.

Community Services. This district is intended for the review and location of public and semipublic uses which, by reason of their convenience, necessity, character or effect may be appropriate in any district. Permitted uses include museums (public and private), churches, public and parochial schools, cemeteries and mortuaries, parks, playgrounds, public golf courses, government buildings or uses, hospitals,

philanthropic or eleemosynary institutions, public utility, and nonprofit campgrounds. Within this district any use or structure customarily accessory to a permitted use shall be permitted.

Commercial Districts. All three commercial districts are to accommodate the range of commercial land uses in the community. The downtown district is focused on the core commercial and civic (i.e., the central business) area of the community. The commercial retail area is located beyond the downtown district, along Main Street and includes restaurants, stores and motels. The commercial highway is located along portions of the Interstate 5 freeway.

IG – Industrial. This district is intended to provide for land use compatibility while providing a high quality environment for businesses and employees. It is also intended to provide suitable locations for heavy industrial uses (e.g., raw materials processing; and manufacturing, assembly, packaging or distribution of heavy or large goods) that would not otherwise be compatible in other districts.

LI – Light Industrial. This district is intended to provide suitable area for Light Industrial uses. The uses that are permitted are the following: manufacturing, processing and fabricating which is conducted solely in enclosed buildings; public and semi-public use; freighting or trucking yard terminal; plumbing, electrical, or paint contractor's storage, repair or sales shop; research facilities; government facilities (e.g., public safety, utilities, transportation); residential use, when used in conjunction with a permitted use and utilized for security purposes.

R – Residential. This district is intended to promote the livability, stability and improvement of the city's neighborhoods, while accommodating a wide variety of needed housing types, including attached and detached housing, multiple-family housing, senior housing, manufactured and site-built housing, group housing, and other special needs housing. The residential district also accommodates parks, schools, places of worship, and other services that are necessary to serve the neighborhoods.

Tribal Lands. Land in Trust is for the benefit of current and future generations of the tribal members. The title is held legally by the federal government, acting as trustee, in a trust status. This status means that the land is not subject to state or local laws and falls under tribal government authority. Land held in "trust" by the federal government cannot be sold, transferred, leased or used without tribal approval. However, Tribal "fee" land (private corporate ownership) is generally subject to the same zoning and subdivision regulations of the local jurisdiction where the land is located. All trust land under tribal law is zoned multi-use.

Information Resources

- 2013 Annual Drinking Water Quality Report, City of Canyonville
- City of Canyonville Zoning map,
http://www.cityofcanyonville.com/uploads/WWTP_Facilities_Plan_Chapters1-3_.pdf
- PSU 2010 Population Research Center,
<http://www.pdx.edu/prc/sites/www.pdx.edu/prc/files/2010%20SF1%20Cities%20A-C.pdf>
- Historic Sites, City of Canyonville,
<http://heritagedata.prd.state.or.us/historic/>
- Air Quality and Noise City of Canyonville,
<http://www.deq.state.or.us/aq/forms/2012AirQualityAnnualReport.pdf>

- South Umpqua River, <http://pubs.usgs.gov/sir/2011/5041/pdf/sir20115041.pdf>
- BLM South Umpqua area study, <http://www.blm.gov/or/districts/roseburg/plans/files/SUWAWQRP.pdf>
- Oregon Ecoregions, http://www.oregon.gov/OWEB/docs/pubs/wa_manual99/apdx1-ecoregions.pdf
- Natural Resource Conservation Service, <http://websoilsurvey.nrcs.usda.gov>
- Oregon Natural Heritage Information Center, <http://orbic.pdx.edu/documents/2013-rte-book.pdf>

SECTION 4: REGULATORY ENVIRONMENT

Regulatory Environment

4.1 Municipal Water Management Plans

The Oregon Water Resources Department has developed rules that govern water management planning. Included in the rules are groundwater management, hydroelectric power development, in stream flow protection, interstate cooperation, water resources protection on public riparian lands, and water storage. The Water Resources Commission has adopted a statewide policy on Conservation and Efficient Water Use (Statewide Water Resource Management; OAR 690-410). The policy requires major water users and suppliers to prepare water management plans. Municipal water suppliers are encouraged to prepare water management plans, and are required to do so if a plan is prescribed by a condition of a water use permit.

A Water System Master Plan prepared under the requirements of the Oregon Health Authority that substantially meets the requirements of OAR 690-086-0125 to 0150 may be submitted to meet the requirements of this rule. It is the intent of this Plan to meet all of the requirements of this rule.

Description of the Water System

The water system description shall include sources of water, storage facilities, transfer and exchange agreements, and intergovernmental cooperation agreements. System capacity, limitations and opportunities for expansion under existing water rights are to be included. Water use shall be discussed, including current average annual water use, peak seasonal demand, average and peak day demands, and quantities of water used from a source. Customer information is required, such as estimated numbers and general water use characteristics of residences, commercial, industrial, and other users. Also required is a schematic of the system which shows the sources of water, storage facilities, treatment facilities, major transmission and distribution lines, pump stations, interconnections with other municipal supply systems, and the service area. All of the applicable information required for a description of Canyonville's water system is included in this Master Plan.

4.2 Public Water System Regulations

Drinking water regulations were established in 1974 with the signing of the Safe Drinking Water Act (SDWA). This act and subsequent regulations were the first to apply to all public water systems in the United States. The Environmental Protection Agency (EPA) was authorized to set standards and implement the Act. With the enactment of the Oregon Drinking Water Quality Act in 1981, the State of Oregon accepted primary enforcement responsibility for all drinking water regulations within the State. Requirements are detailed in OAR Chapter 333, Division 61. Since its inception, the SDWA and associated regulations have been amended a number of times, with the most recent amendments occurring in August 1996.

One of the main elements of these drinking water regulations is the establishment of maximum contaminant levels (MCLs) for inorganic, organic, microbiological, radionuclide contaminants and turbidity. An MCL is the maximum allowable level of a contaminant in water delivered to the users of a

public water system. Concentrations above the MCL for a contaminant are considered violations and require the water supplier to perform immediate corrective action and notify the public of such violations.

Surface Water Treatment Rule (SWTR)

The Surface Water Treatment Rule (SWTR) is one amendment to the SDWA. This rule affects all public water systems using surface water sources; it established, among other requirements, that water must be treated through filtration and disinfection. This rule is required for all water providers using a surface water source unless certain water quality criteria and site-specific requirements are met. Treatment requirements, performance standards and MCLs for a water system are summarized as follows (excluding MCLs for inorganic materials, radioactive substances, and secondary contaminants):

- For this system, which uses conventional filtration, the turbidity level of representative samples of filtered water must at no time exceed 1 NTU, measured as specified in OAR 333-061-0036(4)(b). That is to say, 0 percent of the turbidity measurements can exceed 1 NTU. Turbidity is monitored continuously with results reported every four hours.
- The turbidity level of representative samples of filtered water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in OAR 333-061-0036(4)(b). That is to say, the turbidity levels can rise above 0.3 NTU no more than 5 percent of the time.
- Total coliform-positive (coliform present) samples shall not exceed more than one sample collected during a month. A set of at least three repeat samples is required for each positive sample. Repeat sampling continues until the MCL is exceeded or a set of repeat samples with negative results (coliform absent) is obtained. Confirmed presence of fecal coliform or *E. coli* requires immediate notification of the public.
- At least 99.9 percent (3-log) inactivation and/or removal of *Giardia lamblia* cysts at a point downstream at or before the first customer.
- At least 99.99 percent (4-log) inactivation and/or removal of viruses at a point downstream at or before the first customer.
- A free chlorine residual of 0.2 mg/L after 30 minutes of contact time shall be achieved under all flow conditions before the first customer.
- The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in OAR 333-061-0036(4)(b)(C), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months.

The adoption of the 1989 Surface Water Treatment Rule (SWTR) has improved the quality of drinking water and greatly reduced the number of infections caused by waterborne pathogens. The SWTR set standards to reduce water concentration of *Giardia* and viruses, with a goal to reduce the risk of infection to less than one in 10,000 people per year. However, some water sources have a high concentration of pathogens that, even when treated to the levels required by the rule, do not meet the health goal. Specifically, the rule does not control the protozoan *Cryptosporidium*, which has been linked to at least 50 deaths of *Cryptosporidium*-caused illness outbreaks in Milwaukee, Nevada, Oregon, and Georgia. Although the public health benefits of disinfection are significant and well recognized, it has been found that the disinfection byproducts also pose health risks at certain levels. The Safe Drinking Water Act

(SDWA) Amendments of 1996, mandated the establishment of a series of new drinking water regulations in response to these and other concerns. Since the enactment of the amendments, EPA has been busy developing, proposing, and finalizing regulatory actions. Some of the recent regulatory actions are summarized below.

Long Term 1 Enhanced Surface Water Treatment Rule

One of the first rules developed by EPA under the SDWA amendments was the Interim Enhanced Surface Water Treatment Rule (IESWTR). The IESWTR was promulgated to address health risks from microbial contaminants without significantly increasing the potential risks from chemical contaminants. This rule applies to public water systems that use surface water or groundwater under the direct influence of surface water (GWUDI) that serve at least 10,000 people. For water systems with a population of less than 10,000, the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) was adopted. This rule was adopted in January 2002 and includes the following provisions:

- Maximum contaminant level goal (MCLG) is set at zero.
- All systems must achieve 99% (2-log) removal of *Cryptosporidium*.
- Filtered systems must comply with strengthened combined filter effluent (CFE) turbidity performance requirements to assure 2-log removal of *Cryptosporidium*; and
- Conventional and direct filtration systems must continuously monitor the turbidity of individual filters and comply with follow-up activities based on this monitoring.
- Specific combined filter effluent (CFE) turbidity requirements depend on the type of filtration. For conventional and direct filtration, the CFE shall be less than 0.3 NTU 95 percent of the time, and at no time higher than 1 NTU.
- Perform CFE turbidity monitoring at least every four hours; record continuous individual turbidity effluent (IFE) measurements (at least every 15 minutes).
- Disinfection profiling and benchmarking provisions to ensure continued microbial protection.
- Requirements for covers on new finished water reservoirs.

Stage 1 Disinfectants/Disinfection Byproducts Rule (Stage 1 D/DBPR)

Stage 1 D/DBPR was published along with the IESWTR to control disinfectants and formation of their harmful byproducts. This rule establishes maximum residual disinfectant level goals (MRDLGs) and maximum residual disinfectant levels (MRDLs) for three disinfectants: chlorine (4.0 mg/l), chloramines (4.0 mg/l), and chlorine dioxide (0.8 mg/l). The rule also establishes maximum contaminant level goals (MCLGs) and maximum contaminant levels (MCLs) for specific disinfection byproducts as given in Table 4.2.1.

TABLE 4.2.1
MCLGs AND MCLs FOR STAGE 1 DISINFECTANTS

Disinfection By-product	MCLG (mg/l)	MCL (mg/l)	Time Period
Total trihalomethanes (TTHM)	-	0.080	Annual Average
Bromodichloromethane	0	-	-
Dibromochloromethane	0.06	-	-
Bromoform	0	-	-
Haloacetic acids (HAA5)	-	0.060	Annual Average
Dichloroacetic acid	0	-	-
Trichloroacetic acid	0.3	-	-
Chlorite	0.8	1.0	Monthly Average
Bromate	0	0.010	Annual Average

Community and non-transient non-community water system providers must monitor and control the use of disinfectants and meet the requirements for total trihalomethanes (TTHM) and the sum of five haloacetic acids (HAA5). In addition, water systems that use surface water or GWUDI and use conventional filtration treatment are also required to remove a specified percentage of organic materials, measured as total organic carbon (TOC), that may react with disinfectants to form disinfection by-products.

Furthermore, Oregon's decision to join the States of Utah, Washington and EPA Region 10 in participation in the Area Wide Optimization Program (AWOP) is anticipated to create more stringent treatment standards which the existing Canyonville Water Treatment Plant can now meet under ideal conditions. The AWOP performance goals are listed below in Table 4.2.2.

TABLE 4.2.2
AWOP PERFORMANCE GOALS

SEDIMENTATION	TURBIDITY	CRITERIA
Settled water	Less than 2 NTU, 95% of the time	Avg. annual raw water turbidity > 10 NTU
Settled water	Less than 1 NTU, 95% of the time	Avg. annual raw water turbidity <= 10 NTU
FILTRATION	TURBIDITY	CRITERIA
Filtered water	< 0.1 NTU, 95% of the time	Based on 4-hour incremental max valves (15 min. period following backwash excluded)
Filtered water	Max. 0.3 NTU following backwash	Return to < 0.1 NTU < 15 minute of backwash

AWOP is proposed as a program, the objective of which is to achieve "performance goals" without major capital expenditures. While these goals are not currently tied to regulatory compliance requirements, it is anticipated that they will be in time as are other "goals" proscribed under color of law and government regulation. Statements by the State such as "To achieve optimized treatment and provide maximum protection of public health, you must achieve the described AWOP performance goals" certainly creates a civil liability burden to do so.

Filter Backwash Recycle Rule

The Environmental Protection Agency (EPA) is required to regulate the recycling of filter backwash within the treatment process of a public water system. The provisions of this rule impact all conventional and direct filtration systems which recycle filter backwash and use surface water or GWUDI. Under the rule, the following provisions are required.

- Recycled water from filter backwash, supernatant from sludge thickening, and liquids from sludge dewatering, must pass through all filtration processes for treatment.

Specific information on the regulations concerning public water systems may be found in the Oregon Administrative Rules (OAR), Chapter 333, Division 61. The rules can be found on the Internet at <http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Rules/Documents/pwsrules.pdf>

Arsenic and Clarifications to Compliance and New Source Monitoring Rule

The Arsenic and Clarifications to Compliance and New Source Monitoring Rule was enacted January 2001, and became effective March 23, 2001. The major features of this rule included the following.

- Include health effects statements in Consumer Confidence Reports for arsenic levels from 5 to 50 ug/l and when systems are in violation of the arsenic MCL of 10 ug/l.
- All new systems/sources must collect initial monitoring samples for all IOCs, SOCs, and VOCs.
- The arsenic MCL of 10 ug/l became effective on January 23, 2006.
- One sample must be taken and analyzed after effective date of MCL. Surface water systems must take annual samples.
- A system with a sampling point result above the MCL must collect quarterly samples at that sampling point, until the system is reliably and consistently below the MCL.

4.3 Responsibilities as a Water Supplier

Per OAR 333-061-0025, water suppliers are responsible for taking all reasonable precautions to assure that the water delivered to water users does not exceed maximum contaminant levels, to make certain that water system facilities are free of public health hazards, and to verify that water system operation and maintenance are performed as required by these rules. This includes, but is not limited to, the following:

- Routinely collect and submit water samples for laboratory analyses at the frequencies prescribed by OAR 333-061-0036.
- Take immediate corrective action when the results of analyses or measurements indicate that maximum contaminant levels have been exceeded, and report the results of these analyses as prescribed by OAR 333-061-0040.
- Continue to report, as prescribed by OAR 333-061-0040, the results of analyses or measurements which indicate that maximum contaminant levels have not been exceeded.

- Notify all customers of the system, as well as the general public in the service area, when the maximum contaminant levels have been exceeded.
- Notify all customers served by the system when the reporting requirements are not being met, or when public health hazards are found to exist in the system, or when the operation of the system is subject to a permit or a variance.
- Maintain monitoring and operating records and make these records available for review when the system is inspected.
- Maintain a pressure of at least 20 pounds per square inch (psi) at all service connections at all times.
- Follow up on complaints relating to water quality from users and maintain records and reports on actions undertaken.
- Conduct an active program for systematically identifying and controlling cross connections.
- Submit plans prepared by a professional engineer registered in Oregon to the Oregon Health Authority for review and approval before undertaking the construction of new water systems or major modifications to existing water systems, unless exempted from this requirement.
- Assure that the water system is in compliance with OAR 333-061-0205 relating to certification of water system operators.
- Verify that non-community water systems utilizing surface water sources or sources under the influence of surface water are in compliance with OAR 333-061-0065(2)(c) relating to required special training.

4.4 Water System Regulations

In addition to the existing water system regulations, EPA has additional regulations for water systems. A few of those regulations are discussed below.

Stage 2 Disinfection Byproduct Rule (Stage 2 DBPR), effective March 6, 2006

The Stage 2 DBPR is being promulgated simultaneously with the Long Term 2 Enhanced Surface Water Treatment Rule to address concerns about risk tradeoffs between pathogens and DBPs. Stage 2 DBPR builds upon the Stage 1 DBPR to address higher risk public water systems for protection measures beyond those required for existing regulations. These rules strengthen protection against microbial contaminants, especially *Cryptosporidium*, and at the same time, reduce potential health risks of DBPs. The final Stage 2 DBPR contains maximum contaminant level goals for chloroform, monochloroacetic acid and trichloroacetic acid; National Primary Drinking Water Regulations, which consist of maximum contaminant levels (MCLs) and monitoring, reporting, and public notification requirements for total trihalomethanes and haloacetic acids; and revisions to the reduced monitoring requirements for bromate. This document also specifies the best available technologies for the final MCLs. EPA is also approving additional analytical methods for the determination of disinfectants and DBPs in drinking water. The Stage 2 DBPR rule is intended to reduce potential cancer and reproductive and developmental health risks from disinfection byproducts (DBPs) in drinking water. The requirements of this rule apply to

community water systems and non-transient non-community water systems that add and/or deliver water that is treated with a primary or residual disinfectant other than UV.

For public water systems serving fewer than 10,000 people, subpart V (Stage 2) compliance monitoring began October 1, 2013, with an additional two-year extension available to systems requiring capital improvements.

An initial distribution system evaluation (IDSE), conducted by the water provider, is intended to select new compliance monitoring sites that reflect locations with system high TTHM and HAA5 concentrations. Water providers would recommend new or revised monitoring sites based on their IDSE study. The results from the IDSE study would not be used for compliance purposes. For surface water systems with less than 10,000 people, water providers must monitor either quarterly (population from 500-9,999) or semi-annually (population <500) for one year at two distribution system sites per plant. These sites must be in addition to the Stage 1 DBPR compliance monitoring sites. Water providers that certify to the State that all samples taken in the last two years were below 40 mg/l TTHM / 30 mg/l HAA5 are not required to conduct the IDSE.

For long-term compliance monitoring, the principles of reduced compliance monitoring strategy (for very low DBP levels) utilized in Stage 1 DBPR would continue in the Stage 2 DBPR. Water providers would collect paired samples (TTHM and HAA5) at the site representing the highest TTHM and the highest HAA5 locations in the distribution system, as identified under the IDSE. If the highest levels of TTHM and HAA5 are observed at the same location, then only one sample would be needed. Monitoring would be either quarterly (population from 500 – 9,999) or annually (population <500). The Federal Advisory Committee also recommended that EPA propose that all wholesale and consecutive systems comply with the provisions of the Stage 2 DBPR on the same schedule of the system serving the largest population in the combined distribution system. Additional information on this regulation can be found at:

www.epa.gov/safewater/disinfection/stage2/index.html

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) was proposed and reviewed by a Federal Advisory Committee at the same time as the Stage 2 DBPR rules. The requirements of this rule pertain to all public water systems that use surface waters or GWUDI. This rule incorporates system-specific treatment requirements for one of four categories or “bins” depending upon the results of source water *Cryptosporidium* monitoring. Treatment requirements for each system would depend on the system’s existing treatment equipment and removal capabilities. To comply with additional treatment requirements, water providers would choose technologies from a “toolbox” of options. Treatment requirements for average *Cryptosporidium* are presented in Table 4.4.1.

TABLE 4.4.1
TREATMENT REQUIREMENTS FOR AVERAGE *Cryptosporidium* CONCENTRATIONS⁽³⁾

Bin No.	Average <i>Cryptosporidium</i> Concentration	Additional Treatment Requirements ⁽¹⁾
1	< 0.075/ liter	No action
2	0.075/ liter < x < 1.0/ liter	1-log treatment (any technology or technologies)
3	1.0/ liter < x < 3.0/ liter	2.0 log treatment (must achieve at least 1-log of treatment using specific technology ⁽²⁾)
4	> 3.0/ liter	2.5 log treatment (must achieve at least 1-log treatment using specific technology ⁽²⁾)

⁽¹⁾ - For systems with conventional treatment that are in full compliance with IESWTR.

(2) - Acceptable technologies include ozone, chlorine dioxide, ultraviolet (UV), membranes, bag/cartridge filters, or in-bank filtration.

(3) – September 30, 2014 - Systems must install and operate additional treatment in accordance with their bin classification or mean *Cryptosporidium* level. (States may allow up to an additional 24 months for compliance for systems making capital improvements.

For small system monitoring requirements, it is anticipated that source water *E. coli* concentrations would be utilized for *Cryptosporidium* monitoring. Observed *E. coli* concentrations above certain levels would trigger *Cryptosporidium* monitoring. The recommended *E. coli* monitoring for small systems would begin 2.5 years after rule promulgation and would include 24 samples over one year. After six years of the system characterization, a second round of monitoring is proposed.

In summary, the rules are getting tougher, with increased treatment standards, lower MCLs, and more regulated substances. Water suppliers must stay informed of upcoming standards and requirements to ensure that their system will stay in compliance. Proper preparation is critical. When upcoming MCLs are established, a supplier should begin to test for these materials to determine if compliance will be a problem. Advanced planning will allow a utility more time to make necessary modifications to treatment techniques. Additional information on recent and pending regulations can be found at <http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/index.cfm>

SECTION 5:
EXISTING WATER SYSTEM

Existing Water System

The City of Canyonville's existing water system consists of sources of raw water supply and facilities, treatment plant facilities, treated water storage, and treated water transmission mains and distribution system. These components are discussed in detail below.

5.1 Water Rights and Raw Water Supply

The nature and status of existing raw water supplies and water rights is crucial to the formulation of a successful long-range plan for the City. The following is a discussion of the sources, availability, and reliability of the City's raw water sources.

Raw Water Sources

Presently, the city of Canyonville has two available sources of raw water: Canyon Creek and O'Shea Creek. An overall map of the Study Area showing the major components of the City's water system is displayed in Figure 3.1.2, and raw water sources are displayed in Figure 3.1.3.

Canyon Creek

Canyon Creek serves as the City's primary water source year-round. The point of diversion is located just south of the City. The intake structure was constructed, approximately, in 1980. The system remains in good condition today.

Win Walker Reservoir

Water from the West Fork Canyon Creek is diverted into Win Walker Reservoir southwest of the City, approximately eight miles upstream from the point of diversion. During the winter rainy season, water is stored in the reservoir and released to maintain available flows during the dry months.

O'Shea Creek

O'Shea Creek flows through the eastern portion of Canyonville. The intake structure is located at the point of diversion, approximately two miles east of Canyonville. O'Shea Creek is used to supplement Win Walker during dry late season months.

Water Rights

All water in Oregon is publicly owned. Because of this public ownership, a water right is generally required for anyone to use water, whether it originates from surface or underground sources. Oregon's water laws are based on the principal of prior application. That is, if a person obtains a water right on a particular source before someone else, the person would then possess a "senior" water right that would permit them first use of the water during times of lower flows or droughts. A "junior" water right is one that is obtained after other water rights for a particular source have been assigned. A water right may be

both senior to some and junior to others. During periods of low water availability, a water right holder may use as much water as their water right allows as long as the use is truly beneficial and all senior water rights are satisfied. This method of resource appropriation governs all water used until the water is exhausted.

Currently the City holds water rights to 2.626 cfs. Municipal water rights total 2.626 cfs, or 1,050,916 gallons per day (gpd). These water rights are divided between Canyon Creek and O'Shea Creek. The largest single water right, 1.0 cfs, is located on Canyon Creek. In addition, the City has 300 ac-ft of in-storage water rights for the Win Walker Reservoir. All documented water rights along with identification numbers and priority dates are tabulated below in Table 5.1.1. Copies of the City's water rights certificates and permits are provided in Appendix B.

TABLE 5.1.1
WATER RIGHTS DOCUMENTATION SUMMARY

Location	Application	Permit	Certificate	Transfer	Magnitude	Priority Date
Canyon Creek	S-2075	S-1077	52545	T4258	0.010 cfs	02/10/1912
Canyon Creek	S-11362	S-7834	52542	T4212	0.030 cfs	03/11/1927
Canyon Creek	S-20182	S-15683	52541	T4260	0.022 cfs	03/28/1944
Canyon Creek	S-22168	S-17456	52543	T4259	0.15 cfs	01/02/1947
Canyon Creek	S-56739	S-43119	-	-	1.00 cfs	10/07/1977
W Fk Canyon Creek	R-61247	S-8323	-	-	300 ac-ft	02/12/1981
Win Walker Reservoir	S-61248	S46155	-	-		
Pat O'Shea Creek	S-12904	S-9597	9586	-	0.400 cfs	08/10/1929
(Pat) O'Shea Creek	S-23053	S-21909	23205	-	0.400 cfs 0.200 cfs	02/25/1948 12/17/1951

Win Walker Reservoir

Win Walker Reservoir has water rights for storage totaling 300 acre-feet or approximately 98 million gallons. 300 acre-feet equates to 0.414 cfs of instantaneous flow.

Canyon Creek

A total of 1.212 cfs of water rights is allocated to the City on Canyon Creek. The majority of other water rights on Canyon Creek are primarily for agriculture. Water rights for irrigation and domestic use, other than the City of Canyonville's, total less than 3.0 cfs and 1.0 cfs, respectively. Oregon Water Resource Department (OWRD) can reduce the use of the Canyon Creek water right in the summer to help maintain stream flow in the South Umpqua River Basin. Historically this happens four out of five years so the City must rely on the water stored behind the dam as the major source of water during summer months.

O'Shea Creek

O'Shea Creek is also referred to as Pat O'Shea Creek or Thomas Creek. A total of approximately 1.0 cfs of water rights is allocated to O'Shea Creek. O'Shea Creek is used to supplement Win Walker during dry late season months. The intake structure consists of an impoundment with a spillway that was constructed in the 1940's. There are no water storage rights on O'Shea Creek.

Watershed for Raw Water Sources

The City currently withdraws water from one watershed: the Umpqua River Basin. Information on this watershed was obtained from the Source Water Assessment Summary Brochure developed by the Oregon Department of Environmental Quality (DEQ) and Oregon Health Authority Public Health Services (OHA or PHS). For the Umpqua watershed, information was obtained from the city of Canyonville's report (PWS No. 4100169). This source water information may be found at DEQ's website at <http://www.deq.state.or.us/wq/dwp/swrpts.asp>. The boundary for the watershed is presented in Appendix A.

The City's Canyonville watershed extends upstream approximately 69 miles in a northerly direction and encompasses a total area of 35.5 square miles. The area within the watershed includes the Canyon Creek and West Fork Canyon Creek as well as numerous smaller tributaries to these streams. Potential contamination sources identified in this watershed include clear-cut and partial cut forestlands, high density roads, stream crossings, burned areas, Win Walker Reservoir, small mines, a transportation corridor (Interstate 5), and electrical transmission lines. The potential contaminant sources identified in this area all pose a relatively higher to moderate risk to the drinking water supply. In addition, the Silver Butte Mine, located just outside of the drinking water protection area was included in the inventory. This provides a quick look at the existing potential sources of contamination that could, if improperly managed or released, impact the water quality in the watershed.

5.2 Raw Water Facilities

The raw water facilities consist of diversion structures, impoundments, and raw water transmission mains. These facilities are discussed in detail below. The city of Canyonville has access to live flow on O'Shea Creek and both live flow and stored water from Canyon Creek. O'Shea Creek supplied most of the City's water prior to the construction of the Win Walker Reservoir. Treated water storage in not only the clearwell but storage reservoirs is inadequate to allow maintenance or replacement of raw water pump.

Win Walker Reservoir

The Win Walker Reservoir, as shown in Figure 5.2.1 and 5.2.2, is located on West Fork Canyon Creek, is city-owned and it's their only raw water storage facility. The concrete structure was constructed in 1983 and currently is in good condition. A copy of the inspection report can be found in Appendix A.

Water is detained during the wet winter months and released during the dry months into Canyon Creek, where it flows from the reservoir to the raw water intake, paralleling logging roads to the Interstate Highway 5 freeway. The creek follows the freeway, crossing under it nine times, before reaching the raw water intake.



FIGURES 5.2.1 WIN WALKER DAM



5.2.2 WIN WALKER IMPOUNDMENT

Canyon Creek Raw Water Intake

The intake structure on Canyon Creek for the Canyonville Water Treatment Plant (WTP), as shown in Figures 5.2.3 and 5.2.4, is located just south of the City. The intake system is in good condition and is located near an existing fish ladder structure. The intake structure consists of an impoundment with a spillway. In 2002, Canyonville completed upgrades to its water intake facility. The improved facility is equipped with a computerized monitoring system and will sound an alarm in the event of a problem, such as a low flow condition. Canyon Creek intake screen accumulates debris requiring routine cleaning. This water source is gravity flow to the water treatment plant. The transmission pipe from the intake to the vault is reported to be leaking. Fall coloring and turbidity in the rainy season are factors affecting water quality from this source. The water is transferred via 36-inch pipe to the vault, and then transferred via 10-inch AC line to the Water Treatment Plant.



FIGURE 5.2.3 INTAKE SCREEN



5.2.4 FISH LADDER

O'Shea Creek Raw Water Impoundment and Intake

The intake structure for O'Shea Creek is located approximately two miles east of Canyonville and is also used as a backup source of irrigation water by the City. O'Shea Creek is used to supplement Win Walker during dry late season months. The O'Shea impoundment requires maintenance dredging every five to ten years. The water intake and raw water transmission pipe at O'Shea Creek is gravity fed.



FIGURE 5.2.5 IMPOUNDMENT



FIGURE 5.2.6 ACCESS WALKWAY



FIGURE 5.2.7 DAM



FIGURE 5.2.8 INTAKE SCREEN

Raw Water System Deficiencies

The raw water system has the following deficiencies:

- Canyon Creek raw water intake structure screen accumulates organic debris, leaves and sediment, which requires frequent cleaning and monitoring during fall and winter seasons.
- The 36-in diameter pipe, from the raw water intake structure on Canyon Creek to the vault, leaks.
- The raw water line experiences 600 gpm during peak demand flow (based on WTP rated capacity of 600 gpm).

5.3 Water Treatment Facility

Water Treatment Plant

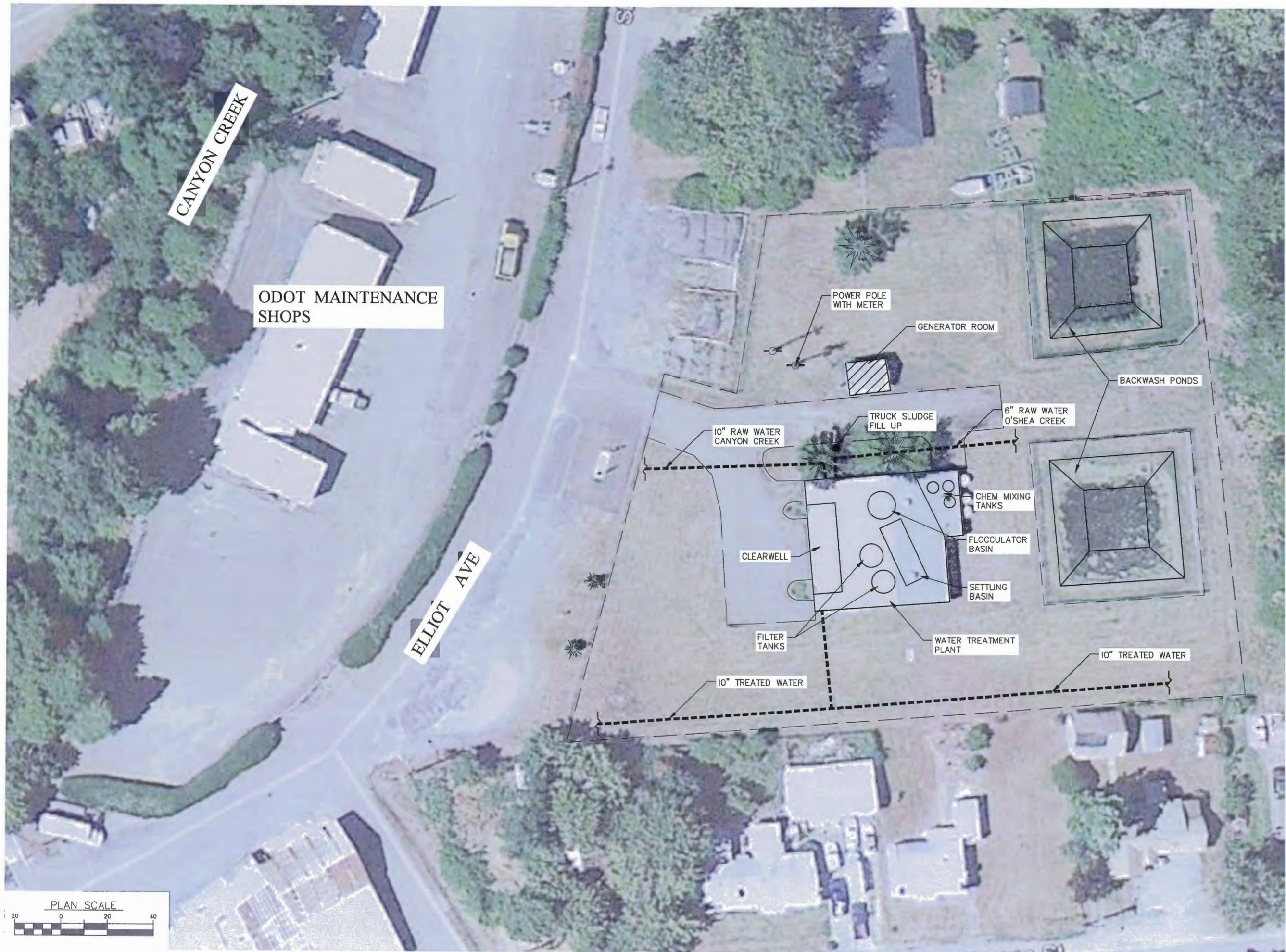
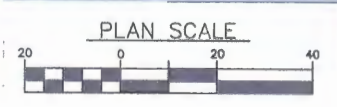
The City of Canyonville has one potable water treatment plant (WTP) as shown in the following figures. A discussion of the water treatment facilities is presented below.

The water treatment facilities consist of a water treatment plant building with two adjacent backwash ponds. The underground portion of the plant consists of a concrete clearwell. The Canyonville water treatment plant consists of a “package treatment unit” that was installed in 1978. The water treatment plant building includes a chemical storage and feed room, treatment equipment room, lab/office/electrical room, treated water pump room, and an underground clearwell. The structure’s foundation was constructed as a concrete slab on grade with thickened portions of the slab supporting the concrete wall sections. All floors in the structure are constructed of cast in place concrete. The backfill used was imported gravel. The treatment equipment includes a flocculation tank, settling tank, two filter tanks, treated water pumps, and chemical feed equipment. A schematic of the treatment plant site and treatment plant is shown in Figure 5.3.1.



FIGURE 5.3.2 WTP BUILDING – EAST ELEVATION

\\DYER\Projects\01Active\180.03\dwg\Canyonville Water Distribution System Existing Map.dwg 3/11/2015 10:39:54 AM



THE DYER PARTNERSHIP
ENGINEERS & PLANNERS

DATE: JULY, 2014

PROJECT NO.: 180.03

CITY OF CANYONVILLE

WTP EXISTING SITE PLAN



FIGURE 5.3.3 WTP BUILDING – WEST-SOUTH ELEVATION



FIGURE 5.3.4 RAW WATER FEED TO FLOCCULATION TANK



**FIGURE 5.3.5
RAW WATER BOOSTER PUMP**



FIGURE 5.3.6 TOP OF FLOCCULATION BASIN



FIGURE 5.3.7 SETTLING BASIN



**FIGURE 5.3.8
DRAINLINES ON SEDIMENTATION
BASIN**



FIGURE 5.3.9 FILTER TANK



FIGURE 5.3.10 FILTER PIPING



FIGURE 5.3.11 TURBIDIMETERS



FIGURE 5.3.12 TREATED WATER PUMP AND LEVEL CONTROL SYSTEM



FIGURE 5.3.13 CHEMICAL ROOM

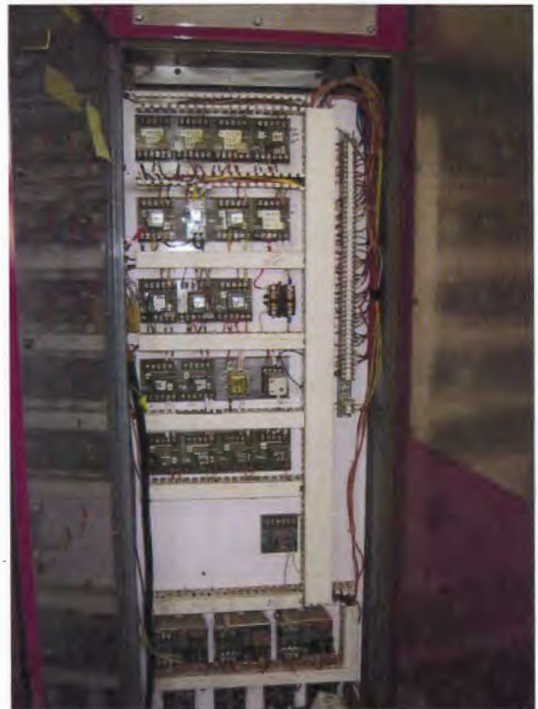


FIGURE 5.3.14 LABORATORY/OFFICE/ELECTRICAL ROOM



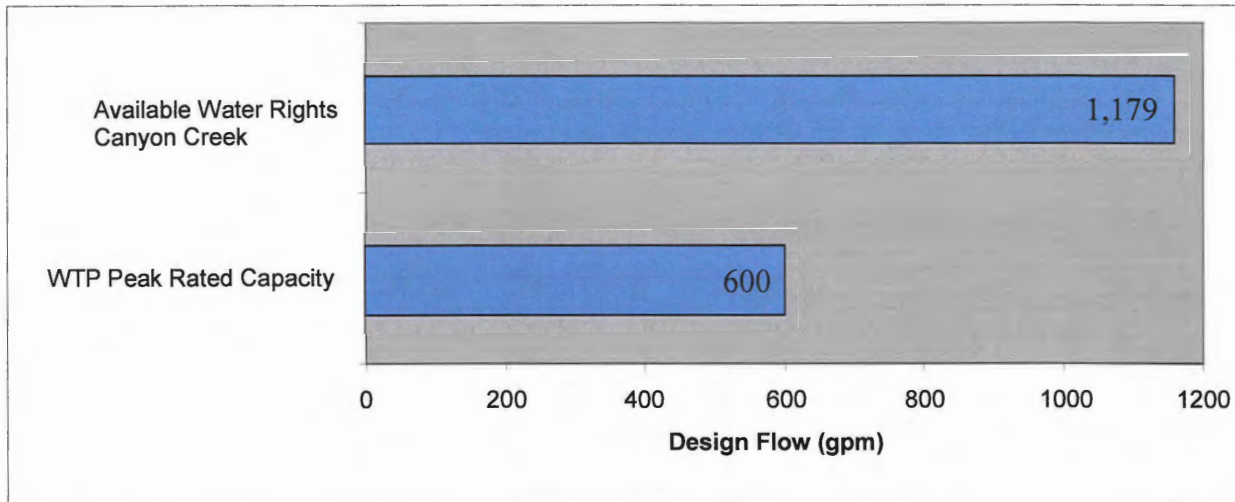
FIGURE 5.3.15 BACKWASH PONDS

**TABLE 5.3.1
EXISTING DESIGN DATA – CANYONVILLE WTP**

Parameter	Value/Description
General Design Data	
Year Constructed	1978
Year Renovated	2001 (electronic valve, mixing)
Plant Production Rate Capacity (w/backwash)	600 gpm (0.864 MGD)
Health Division Performance Rating	2.0 log for treatment, 1.0 log for disinfection for Giardia
Raw Water Chemical Feed	
Coagulant	Alum, Superfloc N-300, Kemira Superfloc
Solids Contact Clarifier	
Flocculation Chamber Rate/Detention Time	370 gpm @ 1.5 gpm / sq. ft. / 71 minutes
Sedimentation Area	14,765 gallons w/ settling tubes
Filters	
Number of Units	2
Depth & Type of Media	4' total depth of mixed media (new media installed in 2004, anthracite added annually)
Surface Area	2 @ total surface area 157 sq. ft.
Filtration Rate	628 gpm @ 4 gpm / sq. ft.
Backwash Rate	
Raw Water Booster Pump	1 Raw Water Pump that is currently not used
Treated Water Pumps	3 vertical turbine pumps, 20 hp
Clearwell Volume	43,000 gals (estimated)
Backwash Pumps	None, gravity flow to ponds
Ponds - Number/Approx. Volume	2 / 52,000 gallons per pond (estimated)
Disinfection	Sodium Hypochlorite

A summary of the design capacity of the selected hydraulic and process equipment for the Canyonville WTP is shown in Figure 5.3.16. The following figure represents available water rights for Canyon Creek only; O'Shea Creek is used to supplement Win Walker during dry late season months.

FIGURE 5.3.16
DESIGN CAPACITY OF CANYONVILLE WTP



Plant Operation

Raw water is delivered to the WTP from two sources. Both water sources are transported via gravity then brought through the treatment plant operation through 10-inch transmission pipes. Raw water is not chlorinated prior to arriving at the WTP. Raw water, upon entering WTP, is gravity fed through the treatment system. There is a raw water booster pump used for emergency purposes, and is currently not used. The raw water enters the treatment room at the WTP where aluminum sulfate, Superfloc C-573, and Superfloc N-300 are added. The dosed raw water then flows into the flocculation/basin. The flocculation basin is a single circular shaped structure. The water then moves to the separation unit where sludge precipitates and is pumped, unmetered, to the backwash ponds. Next the water travels through two filters, each having anthracite and sand as media. The filters are circular tanks that then discharge into the clearwell. The filters were cleaned and media was completely replaced in 2004. Anthracite is added annually. Clarified water is injected with chlorine solution prior to entering the clearwell. The clearwell serves two purposes: 1) temporary storage, and 2) contact time for disinfection. Treated water is then pumped and metered into the City's water transmission main, distribution system, and storage reservoirs.

Treated water production is controlled by the water level in the Reynolds Reservoir Tank via a telemetry system. When the water level in these tanks drops to a predetermined level, the WTP automatically turns on.

Backwash and clarified sludge is gravity fed into one of two backwash ponds located east and northeast of the WTP. A flow meter was installed so that backwash flow rates and volumes may be accurately recorded. The outfall line is an overflow line to the creek and can be opened to discharge the clarified backwash water into the creek.

Metering

Metering throughout the water production system includes one raw water meter, one backwash meter, and one treated water meter. These meters appear to be in good condition and are not in need of replacing.

Water Production and Backwash

A summary of the raw water treated, amount of backwash, water pumped to the City, metered consumption, and the percentage of unaccounted water (based on total water production) is given in Table 5.3.2. % nonaccount represents the water lost during transmission/process. More detailed information on these parameters for the Canyonville WTP is provided in Appendix C.

**TABLE 5.3.2
HISTORICAL WATER PRODUCTION and BACKWASH FOR THE CANYONVILLE WTP**

Time Period	Raw Water	Backwash	Water to City	Metered Consumption	% Nonaccount ⁽¹⁾
2011	93,142,738	5,894,282	87,248,456	71,967,309	18
2012	88,214,388	6,450,768	81,763,620	71,235,376	14
2013	101,164,296	7,390,028	93,774,268	79,838,348	16
Average	94,173,807	6,578,359	87,595,448	74,347,011	16

⁽¹⁾ - % Unaccounted is based on the quotient of the water consumed and water pumped to the City.

Overview of Water Treatment Plant (WTP)

In 2001 the WTP was modernized and rehabilitated as per the following items:

- Electronic valve replacement.
- Mixing upgrades, eliminated chemical day tanks.
- Eliminated chlorine gas and replaced with sodium hypochlorite.
- Water Treatment Plant building was re-roofed and the interior dry wall was replaced in damaged areas only.

Water Treatment Plant Deficiencies

The WTP is in need of specific improvements to address the following deficiencies:

- Treated water storage in not only the clearwell but storage reservoirs is inadequate to allow maintenance or replacement of raw water pump.
- Production rates decrease during freezing temperatures due to issues with cold water.
- Epoxy-coated tank supports are rusting and, due to the design, cannot be refinished in place.
- Entire system, including tanks and supports, piping and valving, shows corrosion.
- No heat or ventilation in treatment equipment area.
- No stairs, tanks are accessed by ladders.
- Capacity needs to be improved to meet increasing demand.
- Treated water has color issues in fall, although taste and odor are not a problem.
- Flocculation basin and sedimentation tanks have no redundancy.
- Water Treatment Plant does not have a full-perimeter security fence.

5.4 Treated Water Storage

The purpose of treated water storage reservoirs or tanks is to provide: 1) a sufficient amount of water to average or equalize the system's daily demand, 2) adequate pressures throughout the system, 3) sufficient storage for fire flows demand and 4) emergency storage for periods when the City is unable to supply potable water. The City's water system has a total of two storage tanks providing a nominal capacity of 1,753,000 gallons of storage. The storage tanks operate on essential two different supply zones. A summary of relevant reservoir data is provided in Table 5.4.1. A brief description of each tank is provided below.

**TABLE 5.4.1
TREATED WATER RESERVOIRS**

Tank Name	Supply Zone	Material	Year Constructed	Nominal Volume, gal	Base/Overflow Elevation, ft
Reynolds	Zone 1	Concrete	1977	1,000,000	916 / 945
Hill	Zone 2	Steel	1995	753,000	914 / 945

The following is a summary of the site observations and comments from City staff.

Supply Zone 1

Supply Zone 1 is the portion of Canyonville east of Interstate 5. Supply Zone 1 is served by Reynolds Reservoir tank with a total reserve of approximately 1,000,000 gallons. It is the largest of the two supply zones.

- **Reynolds Tank (Figure 5.4.1)** – Reynolds Tank is concrete and was constructed in 1977. This tank's interior and exterior are in good condition. The tank drains to daylight and includes an overflow. The drain and overflow is protected by a screen/flap/valve. A pressure transducer and water level gauge is used with this tank to monitor water levels. Telemetry is via a dedicated phone line. The hatch for Reynolds tank is secured and watertight with a curbed lid (shoe box style). Reynolds tank also includes of high and low water level alarms. This tank is security fenced. The tank is also under routine cleaning and inspections schedules, and is continuously disinfected. The piping to the Reynolds tank consists of bypass piping, and a separate inlet/outlet. The tank does not have baffling and is not used for contact time. The tank is pipe vented and screened, both of which are in good condition.



FIGURE 5.4.1 REYNOLDS TANK

Supply Zone 2

Supply Zone 2 encompasses the areas served by Hill Drive Reservoir. This includes residences on the west side of I-5. Hill Reservoir is approximately 753,000 gallons.

- **Hill Tank (Figure 5.4.2)** – Hill Tank is a steel tank constructed in 1995. This tank's interior and exterior are in good condition. The tank drains to daylight and includes an overflow. The drain and overflow is protected by a screen/flap/valve. A pressure transducer and water level gauge is used with this tank to monitor water levels. Telemetry is via a dedicated phone line. The hatch for Hill tank is secured and watertight with a curbed lid (shoe box style). Hill tank also consists of high and low water level alarms. This tank is security fenced. The tank is also under routine cleaning and inspections schedules, and is continuously disinfected. The piping to the Hill tank consists of bypass piping, and a separate inlet/outlet. The tank does not have baffling and is not used for contact time. The tank is pipe vented and screened, both of which are in good condition.



**FIGURE 5.4.2
HILL TANK**

Summary

Overall, the City's water storage tanks appear to be in good condition. The internal surfaces of all the tanks are scheduled to be cleaned and inspected routinely, and have approved interior coating. The City of Canyonville's total approximate tank storage volume is 1,753,000 gallons.

5.5 Service Areas

Supply Zones

The City's distribution system is currently divided into two supply zones. The supply zones are broken up between the west and east portions of Canyonville, I-5 being the dividing line. The supply zones are shown in Figure 5.5.1. A summary of each supply zone with approximate elevations served, estimated static pressures, and associated reservoir tanks and booster pump stations is provided in Table 5.5.1. Figure 5.5.1 displays supply zones 1 & 2 within the distribution system.

**TABLE 5.5.1
SUMMARY OF SUPPLY ZONES**

Pressure Zone	Supply Zone	Approx. Service Elevation Range, ft	Approx. Static Pressure Range, psi	Associated Reservoirs	Associated Pump Stations
Low Level	Zone 1	690 - 950	50 - 80	Reynolds	N/A
High Level	Zone 2	785 - 1030	50 - 80	Hill	1 st & Hill Dr.

Booster Pump Stations

Booster pump stations are utilized to boost pressures from lower level service areas to higher service areas. There is only one booster pump station and a summary of its information is shown in Table 5.5.2.

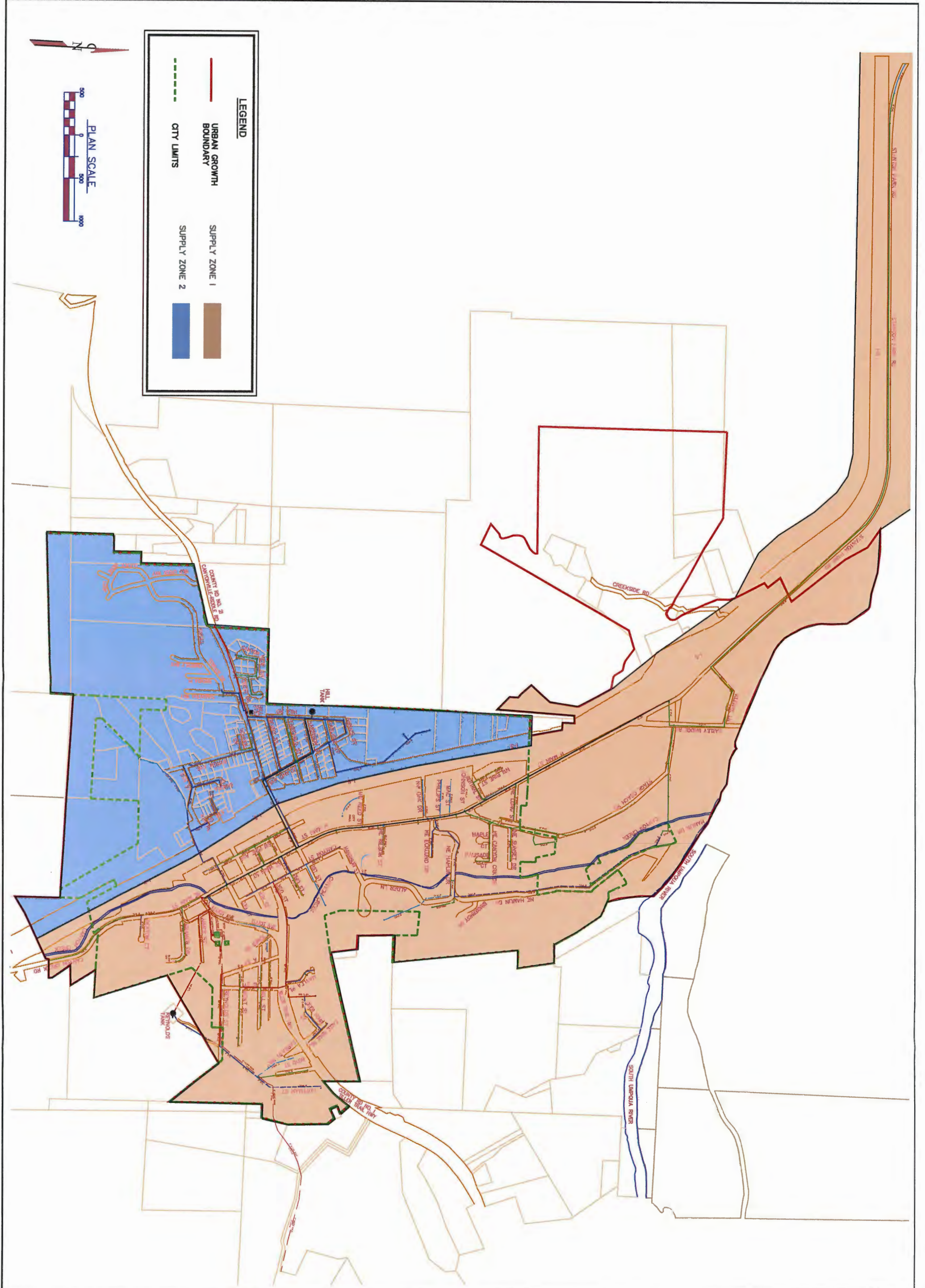
- **Hill Pump Station (Figure 5.5.2)** – Hill Pump Station is in good condition. This booster pump station consists of three pumps. The three pumps have a maximum fire flow output system design of 135 gpm at 200' TDH when concurrently run, but operate normally as lead/lag.



FIGURE 5.5.2 HILL PUMP STATION

**TABLE 5.5.2
EXISTING BOOSTER PUMP STATION**

Station	No. of Pumps	HP	Flow (gpm)	TDH (feet)
1 st & Hill Dr.	3	5, 7, 10	15, 40, 80	200



5.6 Water Distribution System

An overview of the City's water distribution system is presented in Figures 5.6.1A - J. Canyonville's water distribution system is a combination of pipe materials and sizes. The distribution system consists of a 10-inch main line from the WTP, a 12-inch main line from Hill Reservoir to Main Street and along Main Street, and 2 to 10-inch diameter distribution pipe with service lines consisting of $\frac{3}{4}$ and 1-inch diameter pipe. The most prevalent pipe size within the distribution system (34 percent) is 6-inch diameter pipe.

The water distribution system has the following deficiencies:

- The piping to the treated water reservoir on SE Reynolds Street has a section of iron pipe exposed to the elements and subject to damage from falling trees and vandalism.
- There is a section of AC pipe James Street that is subject to leakage and rupture.
- A second pump station will be needed for future development in the area of the proposed annexation east of town.
- Pipes less than 6-inch diameter have a potential of inadequate domestic and fire flow.
- Aging AC pipe is becoming brittle and susceptible to leakage.

In addition to varying by diameter, the water distribution system is also composed of a variety of pipeline materials. The material that was used to construct water lines over the years depended primarily on the accepted and available materials of the time. In the 1940s and 1950s, cast iron, steel, and galvanized piping was commonly used. Later, asbestos cement (AC) piping was utilized for water main construction into the 1970s. Today ductile iron, PVC, HDPE, and polyethylene (PE) pipe materials are used almost exclusively. Some of the pipe is of unknown material. The City's piping consists primarily of PVC for distribution pipes, and galvanized steel and polyethylene pipe for service lines.

A summary of the distribution system pipe size and material inventory (not including service lines) is given in Table 5.6.1. Current materials of choice for replacement are PVC pipe for lateral mains and PE pipe for service lines. An inventory of the service lines was not compiled due to insufficient information.

TABLE 5.6.1
DISTRIBUTION SYSTEM SIZE AND MATERIAL INVENTORY
(Length in feet)

Pipe Diameter, in.	Materials of Construction					Total	% of Total
	PVC	Ductile Iron	Asbestos-Cement	Steel/Copper	Galvanized		
2	2,322	0	0	0	681	3,003	5.5
3	457	0	0	0	0	457	0.8
4	593	0	0	0	0	593	1.1
6	15,534	324	860	1,984	0	18,701	34.2
8	8,933	0	7,827	1,394	0	18,154	33.2
10	3,493	0	534	1,605	0	5,632	10.3
12	0	8,139	0	0	0	8,139	14.9
Total	31,333	8,463	9,220	4,983	681	54,680	100
% of Total	57.3	15.5	16.9	9.1	1.2	-	100

The existing condition of the distribution system depends greatly on the materials that were used to construct the system as well as the level of workmanship at the time of construction.

Computer modeling was conducted to analyze the performance of the existing City of Canyonville water system. Hydraulic analysis software called WaterCad® by Haestad Methods was used to perform the complex calculations necessary to analyze the water system. The diameter and materials of each pipeline section were input to the computer model. A discussion on the computer modeling results of the distribution system is presented in Section 8.

5.7 Financial Management

The financial management of the City's water system was reviewed by examining the current system charges, revenue, and operations and maintenance budget.

System Charges and Revenue

The City collects water system charges to retire debt and finance the operation and maintenance of the water system. A summary of the current system charges is given below in Table 5.7.1.

**TABLE 5.7.1
MONTHLY WATER SYSTEM CHARGES**

Service	Rate for first 1,200 cubic foot used	Additional Rate per 100 cubic foot used	# Services
Single-Family Residence In-City	\$30.00	\$1.50	538
3/4 - Inch	\$40.00	\$2.00	85
1 - Inch	\$75.00	\$2.00	21
1-1/4 - Inch	\$112.50	\$2.00	N/A
1-1/2 - Inch	\$150.00	\$2.00	8
2 - Inch	\$240.00	\$2.00	16
3 - Inch	\$480.00	\$2.00	4
4 - Inch	\$750.00	\$2.00	1
6 - Inch	\$1,500.00	\$2.00	1

The City collects other revenue for the water system operation from user deposit refunds, service fees, new connections, system development charges and other miscellaneous sources. A summary of the revenue budget for the fiscal year 2012-2013 is presented in Table 5.7.2

Operation and Maintenance Budget

Each fiscal year, the City proposes, approves and adopts an operation and maintenance (O&M) budget for the water system. The Public Works Operations Fund is an internal service fund, which acts as a cost center for personnel, equipment and materials to the other internal divisions. A portion of the O&M budget is directed to the Water Reserve Fund, which was created for the distribution of funds required by the Division's Capital Improvement Plan. Additional funds, based on taxes, are distributed to the Water Debt Service Fund for the purpose of timely payments of long-term financing of the 16 Dam Bond. Some monies must also be appropriated to the General Fund. The City has an additional Water Construction Fund created to account for the receipt and distribution of funds for major replacement or additions to the



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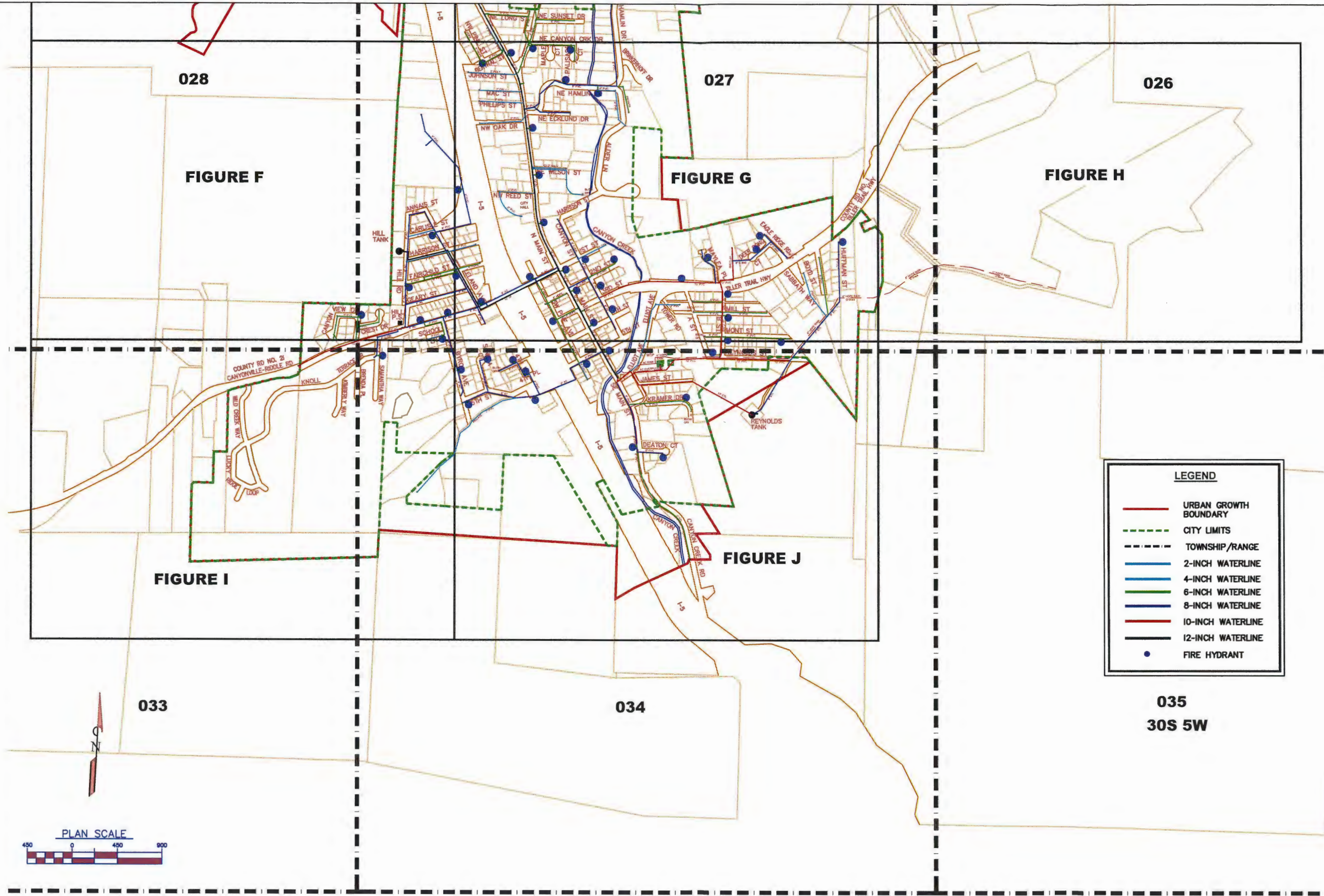


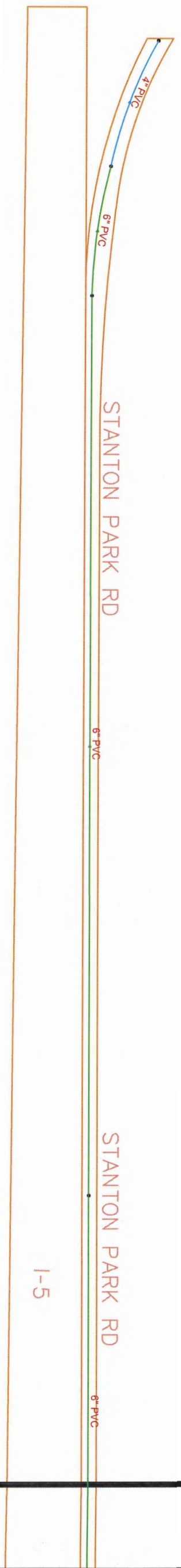
FIGURE NO.
5.6.1A.2

CITY OF CANYONVILLE
EXISTING - WATER DISTRIBUTION SYSTEM MAP

THE DYER PARTNERSHIP
ENGINEERS & PLANNERS
DATE: AUGUST, 2014
PROJECT NO.: 180.03



LEGEND	
	URBAN GROWTH BOUNDARY
	CITY LIMITS
	TOWNSHIP /RANGE
	2-INCH WATERLINE
	4-INCH WATERLINE
	6-INCH WATERLINE
	8-INCH WATERLINE
	10-INCH WATERLINE
	12-INCH WATERLINE
	FIRE HYDRANT



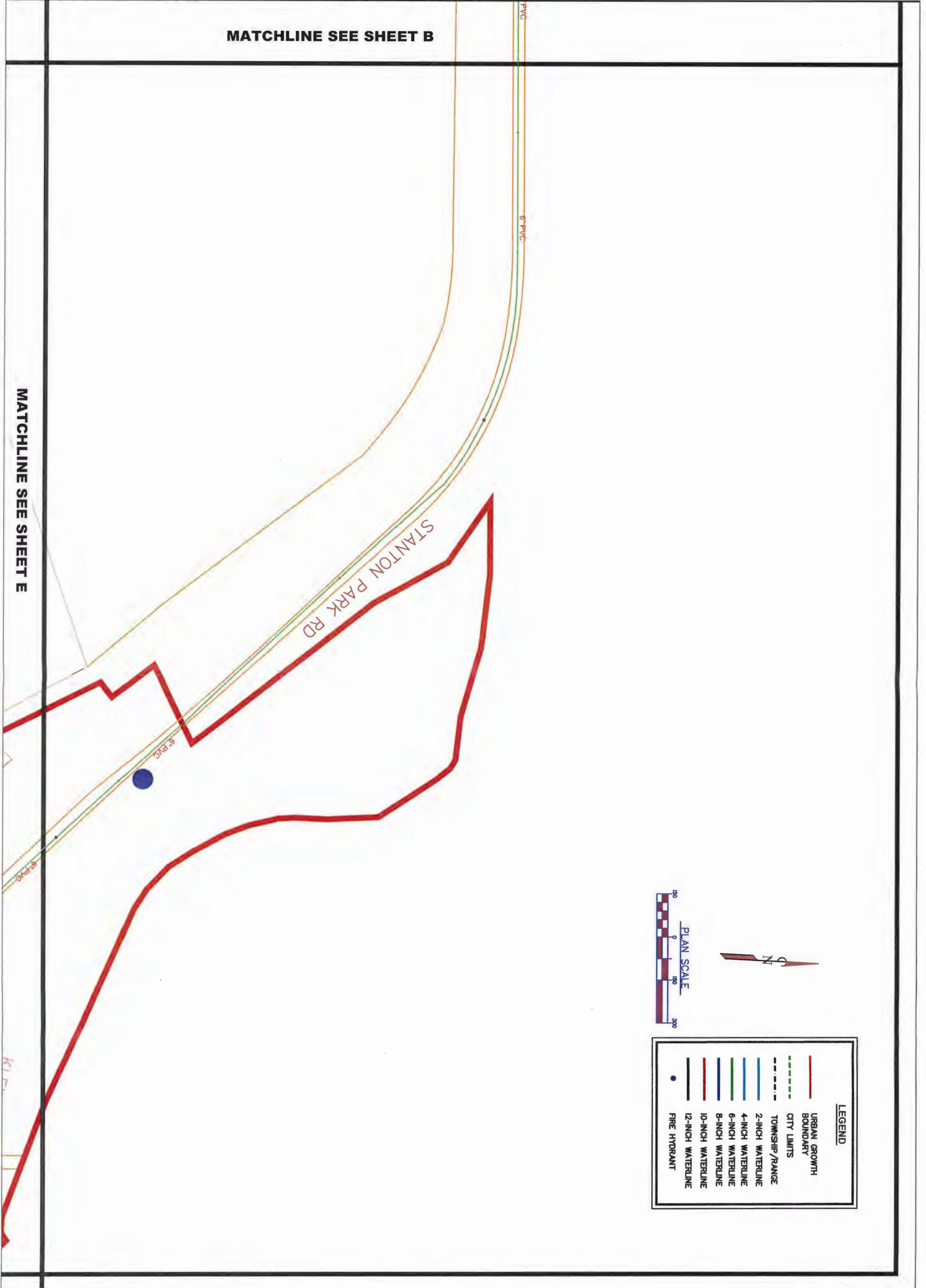
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DATE:	AUGUST, 2014
PROJECT NO.:	180.03

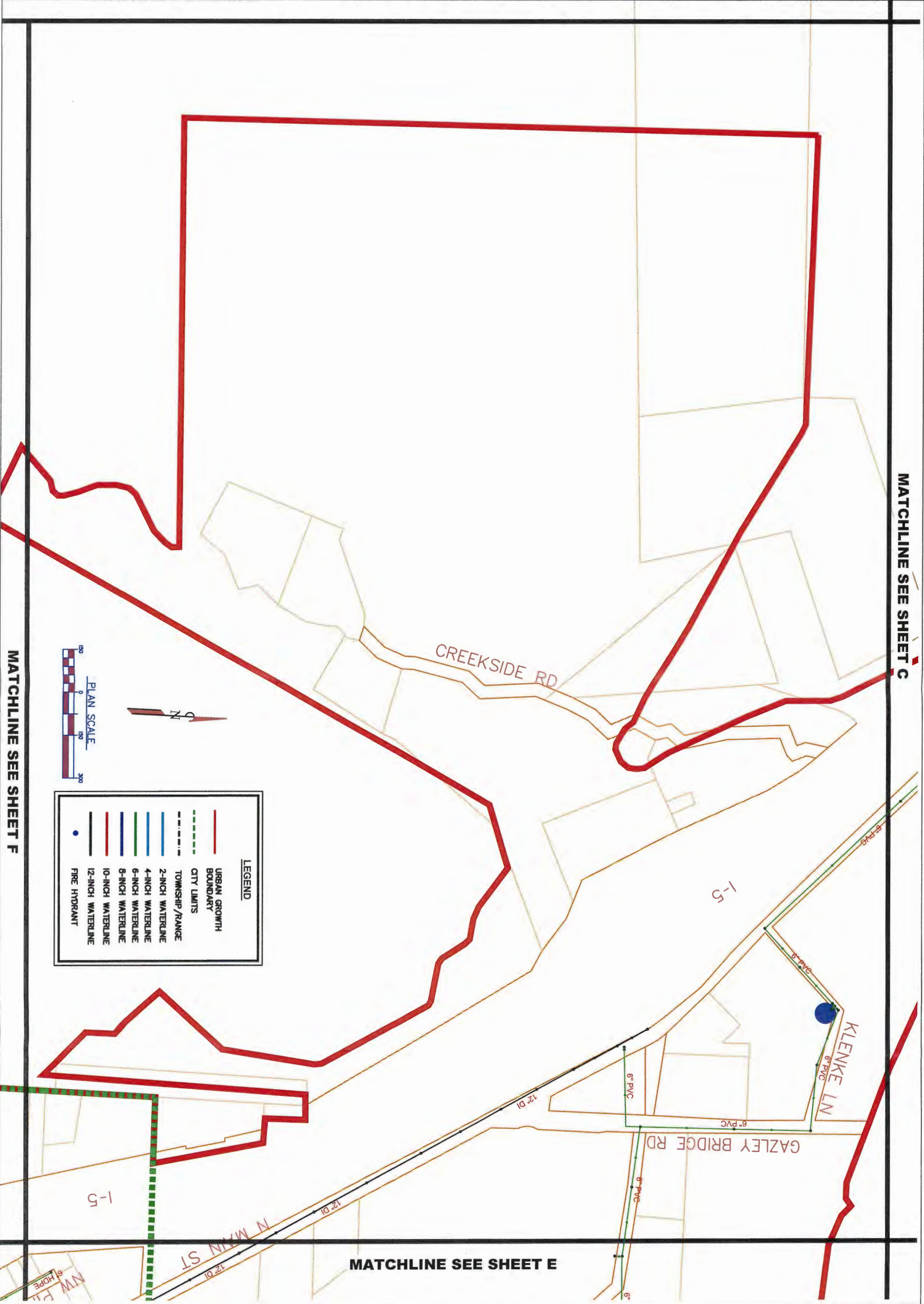
CITY OF CANYONVILLE
EXISTING - WATER DISTRIBUTION SYSTEM MAP

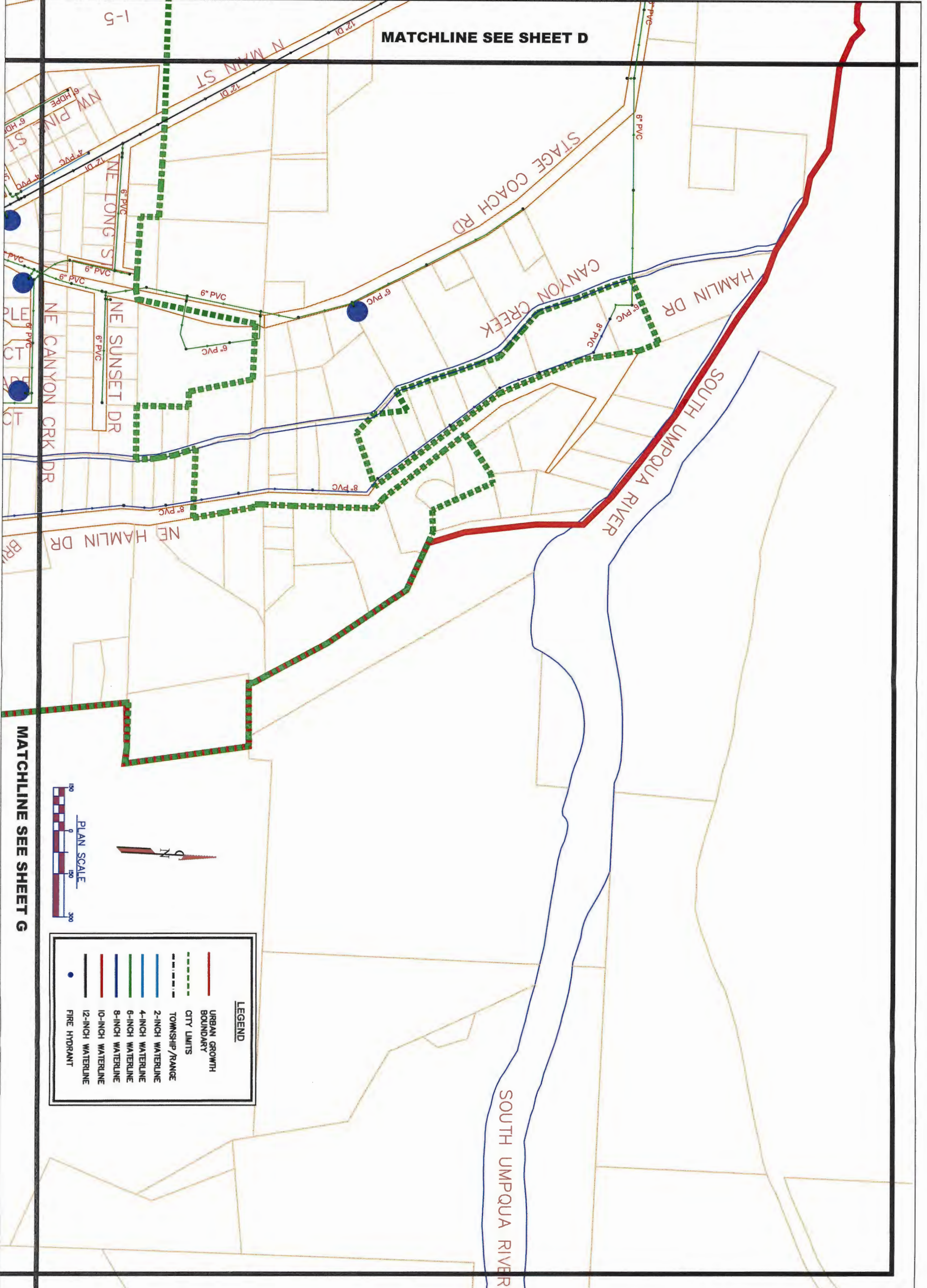
FIGURE NO.
5.6.1B



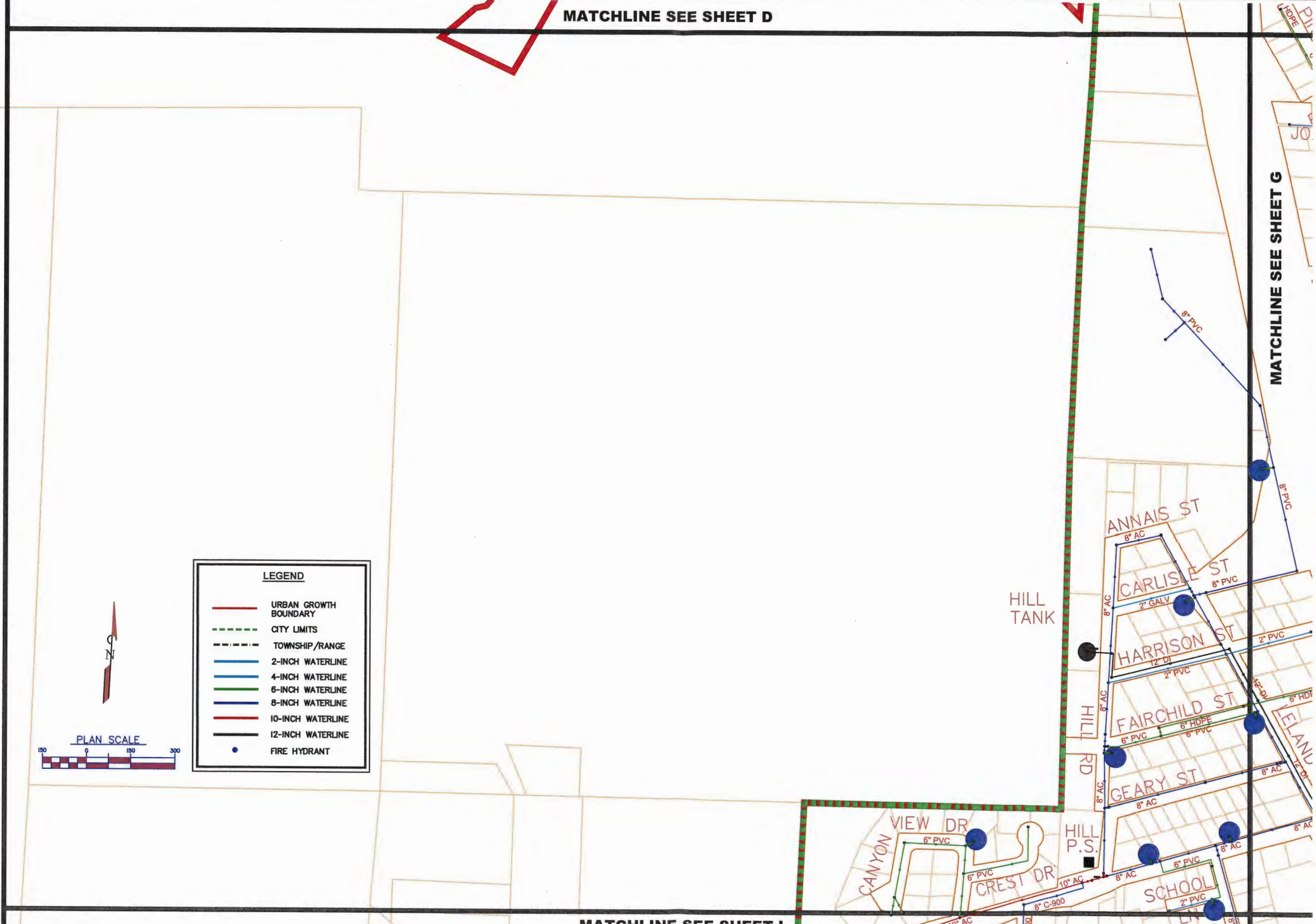
LEGEND

- URBAN GROWTH BOUNDARY
- CITY LIMITS
- TOWNSHIP / RANGE
- 2-INCH WATERLINE
- 4-INCH WATERLINE
- 6-INCH WATERLINE
- 8-INCH WATERLINE
- 10-INCH WATERLINE
- 12-INCH WATERLINE
- FIRE HYDRANT





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CITY OF CANYONVILLE		FIGURE NO.
EXISTING - WATER DISTRIBUTION SYSTEM MAP		5.6.1F
THE DYER PARTNERSHIP ENGINEERS & PLANNERS		
DATE:	AUGUST, 2014	
PROJECT NO.:	180.03	

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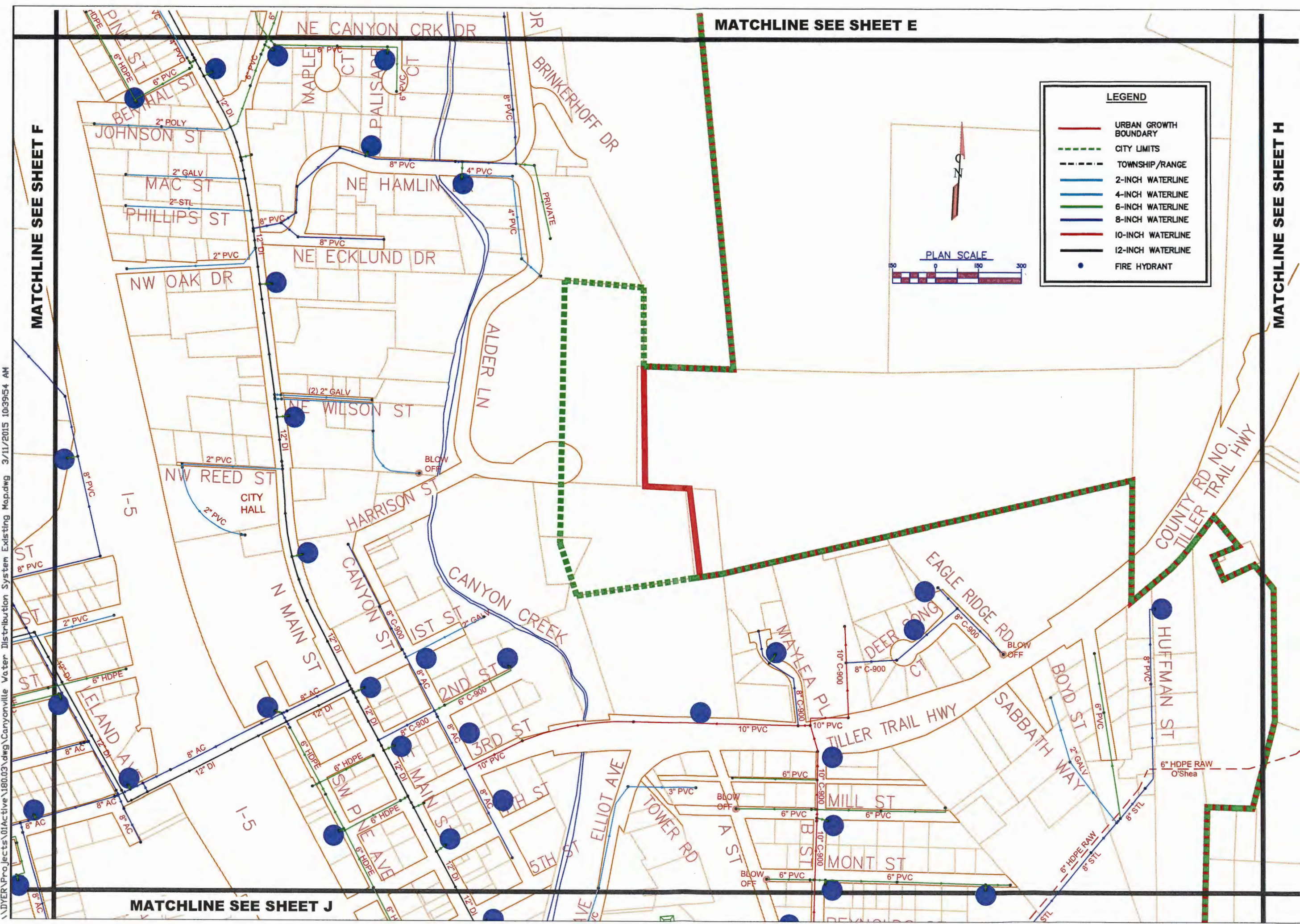
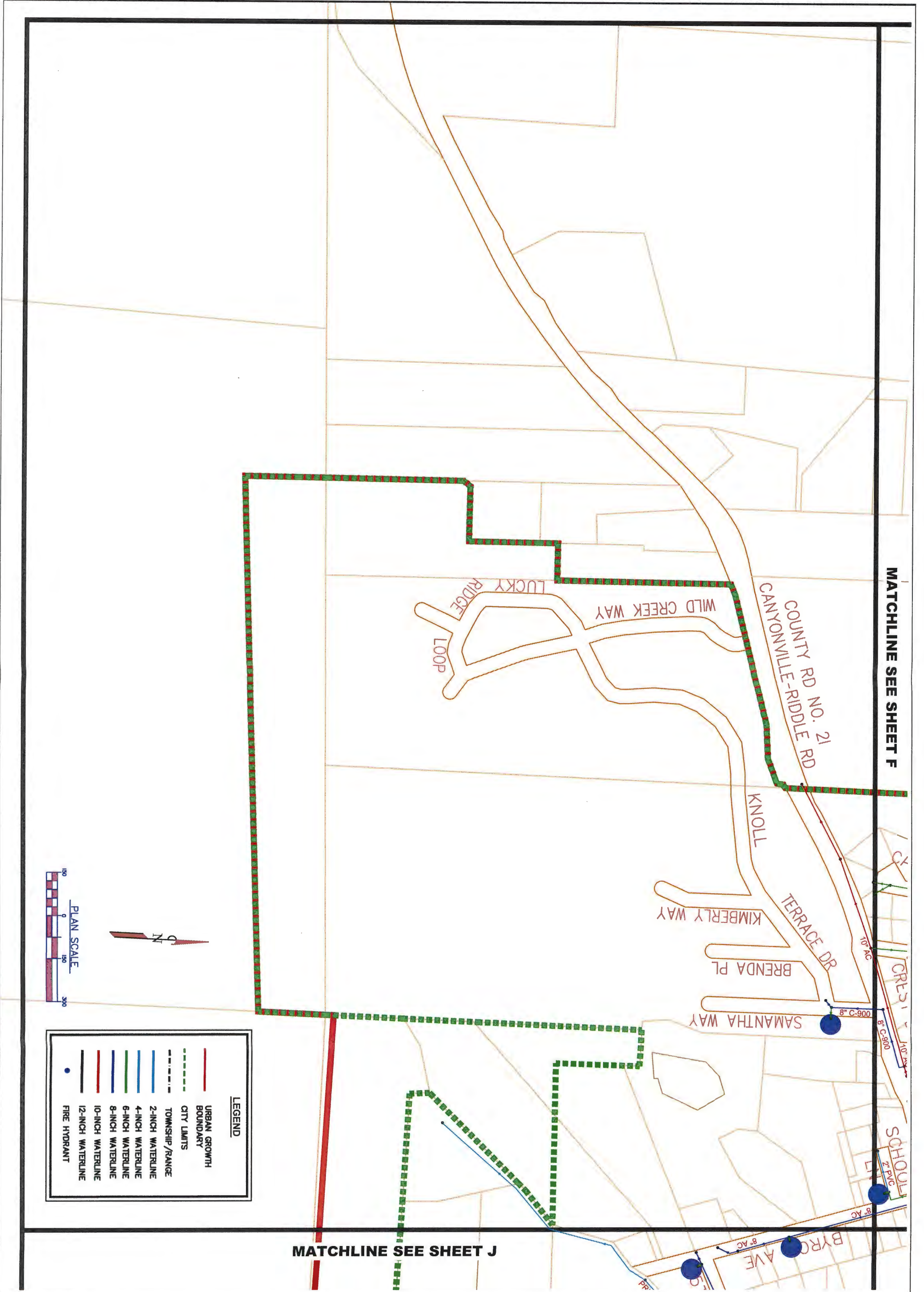


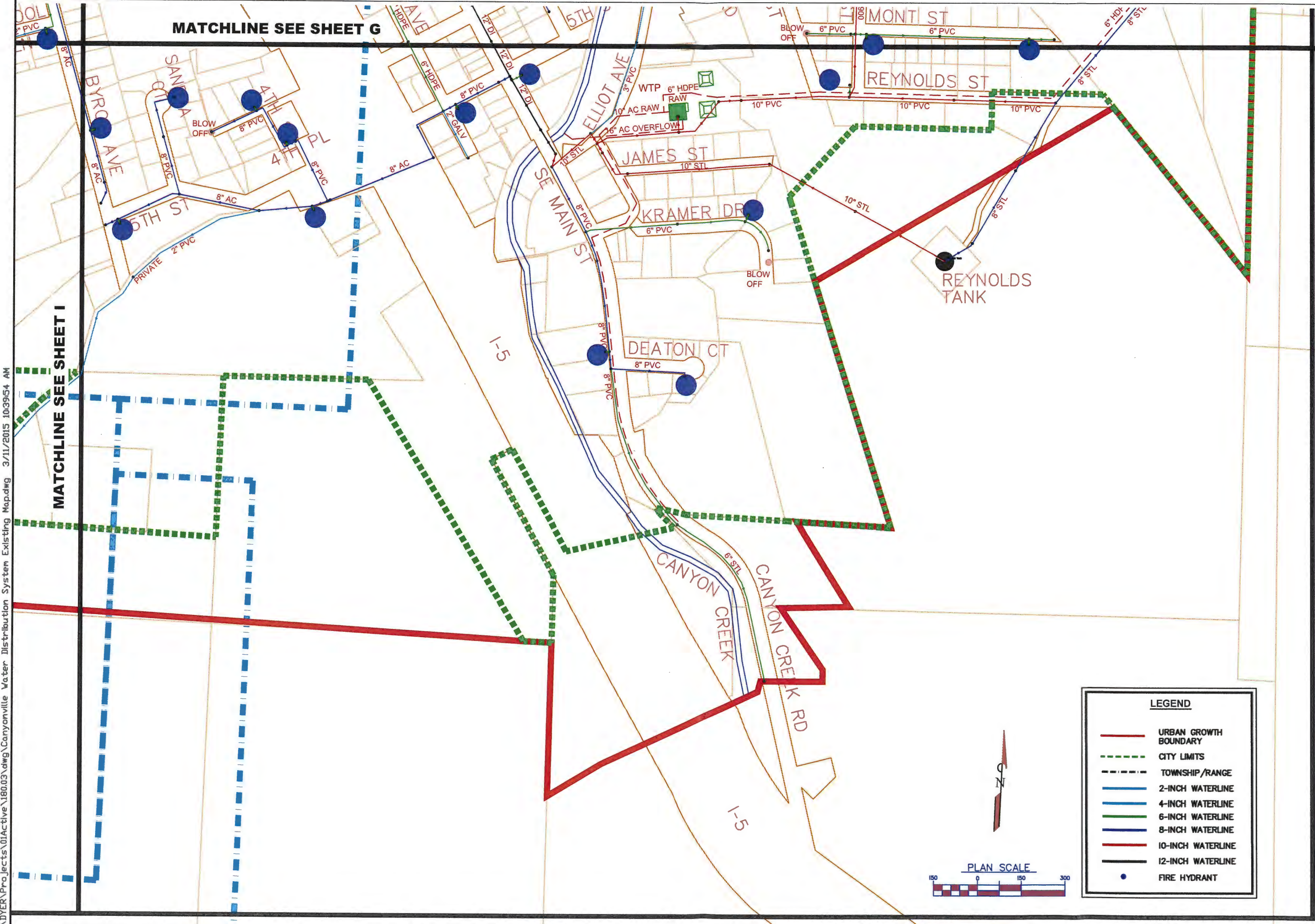
FIGURE NO. 5.6.1G	
CITY OF CANYONVILLE	
EXISTING - WATER DISTRIBUTION SYSTEM MAP	
THE DYER PARTNERSHIP ENGINEERS & PLANNERS	
DATE:	AUGUST, 2014
PROJECT NO.:	180.03





LEGEND	
—	URBAN GROWTH BOUNDARY
- - -	CITY LIMITS
- - -	TOWNSHIP/RANGE
—	2-INCH WATERLINE
—	4-INCH WATERLINE
—	6-INCH WATERLINE
—	8-INCH WATERLINE
—	10-INCH WATERLINE
—	12-INCH WATERLINE
●	FIRE HYDRANT

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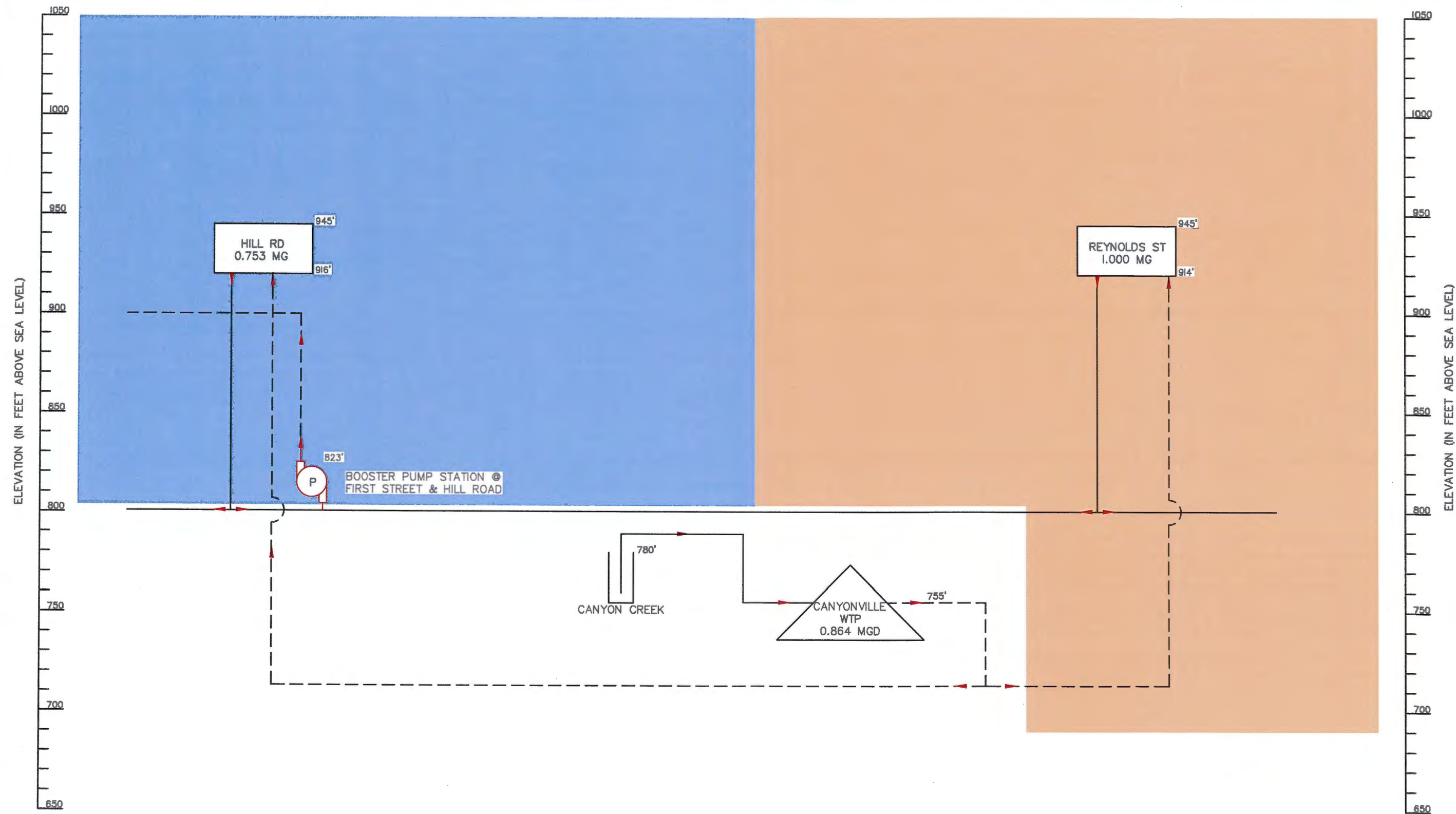


LEGEND

- URBAN GROWTH BOUNDARY
- CITY LIMITS
- TOWNSHIP/RANGE
- 2-INCH WATERLINE
- 4-INCH WATERLINE
- 6-INCH WATERLINE
- 8-INCH WATERLINE
- 10-INCH WATERLINE
- 12-INCH WATERLINE
- FIRE HYDRANT

THE DYER PARTNERSHIP ENGINEERS & PLANNERS	CITY OF CANYONVILLE		FIGURE NO.
	EXISTING - WATER DISTRIBUTION SYSTEM MAP		5.6.1J
DATE:	AUGUST, 2014		
PROJECT NO.:	180.03		

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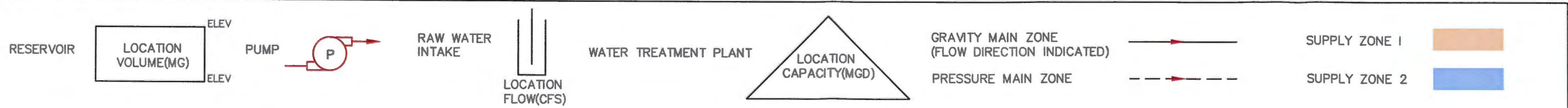


FIGURE NO. 5.6.2	
CITY OF CANYONVILLE	
EXISTING WATER DISTRIBUTION FACILITIES SYSTEM MAP	
THE DYER PARTNERSHIP ENGINEERS & PLANNERS	
DATE: JULY, 2014	
PROJECT NO.: 180.03	

water system infrastructure. A summary of the Water Operation Requirements Fund is presented in Table 5.7.2.

TABLE 5.7.2
WATER OPERATIONS REVENUE/OPERATIONS: WATER FUND (2012-2013)

Item	Amount (\$)
Operating Receipts	
Charges for Services	401,168
Miscellaneous	4,784
Total Operating Receipts	405,952
Operating Disbursements	
Personal Services	208,250
Other Operating Disbursements	127,146
Capital Outlay	1,885
Debt Service	20,672
Total Operating Disbursements	357,953
Operating Income (Loss)	47,999
Non-Operating Receipts (Disbursements)	
Interest Income	3,004
Transfers In	-
Transfers Out	30,000
Total Non-Operating Receipts (Disbursements)	26,996
Net Change in Cash Basis Fund Balance	21,003
Beginning Cash Basis Fund Balance	540,050
Ending Cash Basis Fund Balance	561,053

SECTION 6:
WATER USE AND PROJECTED DEMANDS

Water Use and Projected Demands

6.1 Description and Definitions

Water demand is defined as the quantity of water required by the system over a period of time to meet the needs of consumers, to provide filter backwashing water, and to supply the needs of firefighting and system flushing. In addition, virtually all systems have an amount of leakage or loss that cannot be feasibly or economically reduced or eliminated. Total demand, therefore, includes all consumption and lost water. Demand varies seasonally with the lowest usage in winter months and the highest usage during summer months. Variations in demand also occur with respect to time of day (diurnal) with higher usage occurring during the morning and early evening periods and lowest usage during nighttime hours.

The objective of this section is to determine the current water demand characteristics and to project future demand requirements that will establish system component adequacy and sizing needs. Water demand is described in the following terms:

Average Annual Demand (AAD). The total volume of water delivered to the system in a full year expressed in gallons. When demand fluctuates up and down over several years, an average is used.

Average Daily Demand (ADD). The total volume of water delivered to the system over a year divided by 365 days. The average use in a single day expressed in gallons per day.

Dry Season Daily Demand (DDD). The gallons per day average during the months of June through October.

Maximum Monthly Demand (MMD). The gallons per day average during the month with the highest water demand. The highest monthly usage typically occurs during a summer month.

Peak Weekly Demand (PWD). The greatest seven day average demand that occurs in a year. Expressed in gallons per day.

Maximum Day Demand (MDD). The largest volume of water delivered to the system in a single day, expressed in gallons per day. The MDD is commonly used to size facilities to provide capacity for periods of high demand. The MDD usually occurs during the warmest part of the year when agriculture, irrigation, and recreational uses of potable water are at their greatest, and are commonly associated with a holiday such as Fourth of July, or during an event such as a county fair.

Peak Hourly Demand (PHD). The maximum volume of water delivered to the system in a single hour expressed in gallons per day. Distribution systems should be designed to adequately handle the peak hourly demand. During this peak usage, storage reservoirs supply the demand in excess of the maximum day demand. Peak hour demand is commonly experienced during the early morning hours when many water users are bathing, cooking, and engaging in other activities that require widespread water use.

Demands described above, expressed in gallons per day (gpd), can be divided by the population served to come up with a demand per person or a per capita demand which is expressed in gallons per capita per day (gpcd). Per capita demands can be multiplied by future population projections to determine future water demands.

In addition to water demand parameters, various terms are used and values calculated that are related to water conservation. These water conservation terms are described below (USEPA).

Account Water. Water metered and billed to residential, commercial, industrial, and public sector customers.

Nonaccount Water. Metered and unmetered uses and losses not billed to customers.

Metered and Accounted for Water. Selected public-use water and other water metered but not billed to customers.

Unmetered Water. Water not metered or billed.

Identifiable Unauthorized Uses of Water. Accounting procedure errors, malfunctioning distribution system controls, illegal connections and theft, meter inaccuracy, and avoidable and unavoidable leaks.

Unaccounted-For Water. Water losses and leaks not accounted for.

For most communities, the known or estimated losses and leaks within a water system are not known. Rather, the amount of system loss or leakage is estimated based on an audit of water usage within the system. To the extent possible, we will utilize the above water conservation terms in this report.

6.2 Current Water Demand

For the purposes of this study, current water demand was evaluated from three different perspectives: water diverted, metered water consumption, and water sales. These different water demands are discussed in detail below.

Raw Water Diverted

As part of the auditing process, the City must account for all water diverted from each raw water source. This is typically accomplished through a metering device at or near the point of diversion. OAR 690-085-0015 requires that, "Where practical, water use shall be measured at each point of diversion." However, the rule also states that:

"...measurements may be taken at a reasonable distance from the point of diversion if the following conditions are met:

- a. The measured flow shall be corrected to reflect the flow at the point of diversion. The correction will be based on periodic flow measurements at the point of diversion taken in conjunction with flow measurements at the usual measuring point;
- b. If the measured flow includes flow contributions from more than one point of diversion, the measured flow shall be proportioned to reflect the flow at each point of diversion using the method prescribed subsection (a) of this section;

- c. A description of the correction method shall be submitted with the annual report the first time it is used and any time it is changed, or once every five years, whichever is shorter.”

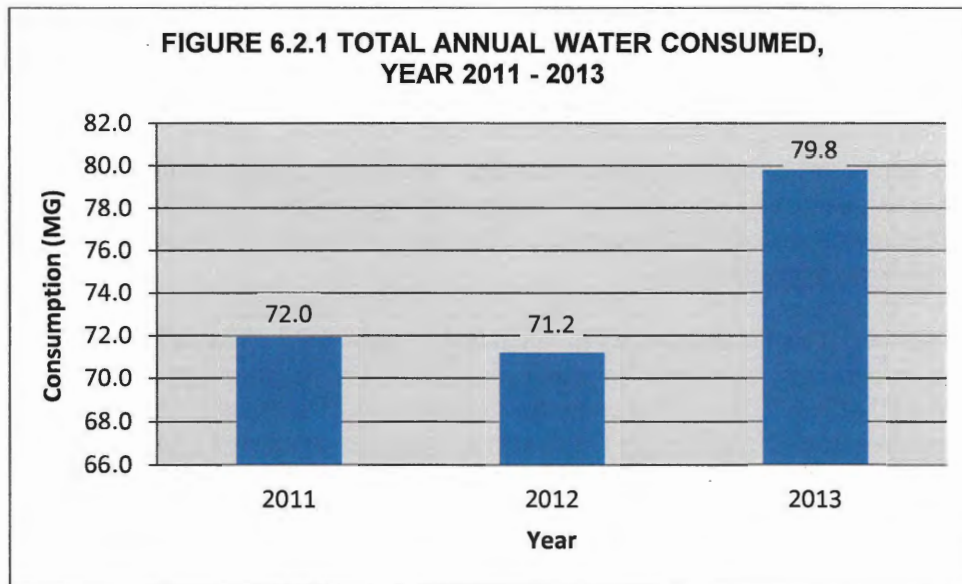
If the point of diversion is relatively close to the water treatment plant, it is common for many communities to use a single influent meter at the water plant to measure the amount of water that is diverted.

Metered Water Consumption

Water consumption or sales records allow for determination of actual water consumption by the City’s water users, calculation of an Equivalent Dwelling Unit (EDU) and provide measurement of nonaccount water when compared with plant production records.

Water Sales

For this study, water consumption is based on the City’s water meter records for the Years 2011 through 2013. A graph of the total annual amount of water sold to customers, including bulk water sales, is presented in Figure 6.2.1.



The largest amount of water consumed during the three year period was in the Year 2013. The smallest amount of water was consumed in the Year 2012. A possible explanation for lower use during the winter months might be that temperatures were cooler and the relative humidity readings were higher than the averages for the other years. Another explanation is that consumption also may have been down that year due to increases in user rates. The amount of water consumed by different users (as categorized by meter sizes) within the distribution system is discussed below under Equivalent Dwelling Units.

Equivalent Dwelling Units

An Equivalent Dwelling Unit (EDU) is based on the average daily use produced by the typical single family home specifically for the community studied. This is a standardized measure of demand that is used for planning, establishing billing rates, and to determine income for funding agency purposes.

EDU Calculation for Planning

The number of equivalent dwelling units (EDUs) is necessary to determine pipe sizes and water storage needs. This EDU calculation is based on consumption by service. This allows EDUs to be projected into the future to determine raw water needs, treatment plant capacity, storage needs, and pipe sizing.

EDU Calculation for Billing Methodology

This EDU calculation is based on the hydraulic equivalent unit. Hydraulic equivalent unit (HEU) relates the hydraulic equivalency of any meter size to a ¾-inch meter. By definition a ¾-inch meter has an HEU of 1.

<u>Meter Size</u>	<u>HEU</u>	<u>Base Rate per 1,200 cubic feet used per month</u>
¾-inch	1.0	\$40.00
1-inch	2.5	\$75.00
1-1/2-inch	5.0	\$150.00
2-inch	8.0	\$240.00
3-inch	15.0	\$480.00
4-inch	25.0	\$750.00
6-inch	50.0	\$1,500.00

EDU Calculation for Funding Agency Purposes

The term “EDU” represents something different than the value of consumption of the average single family dwelling which is unique for each community. To many funding agencies, the EDU represents the consumption and rates associated with the use of 7,500 gallons per month. In this study, the number of HEUs is equal to the number of Funding EDUs.

The estimated number of EDUs for the City is calculated in Table 6.2.1. The estimated annual residential water consumption per EDU, based on Calendar Year 2013, is 87,255 gallons per EDU per year. Based on an estimated total of 916 EDUs, the average consumption per EDU is approximately 238 gallons per day. The total number of EDUs within the City’s service area was calculated from the quotient of the total annual water consumption for each source by the annual residential usage (87,255 gallons/EDU/year). The total number of EDUs for each meter size was rounded to the nearest EDU.

TABLE 6.2.1
ESTIMATED NUMBER OF EDUs BASED ON WATER CONSUMED (Year 2013)⁽¹⁾

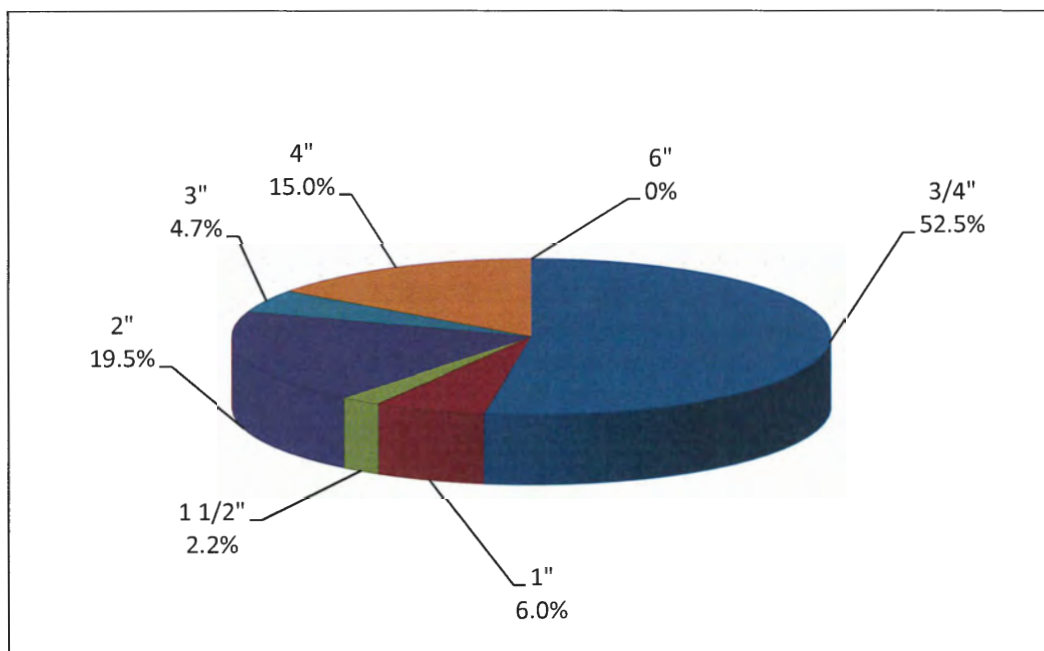
Source	Number of Connections	Estimated Water Usage		EDUs	% of Usage
		Annual, gpy	ADD, gpd		
¾"	623	41,942,948	114,912	623	52.5
1"	21	4,787,642	13,117	40	6.0
1 ½"	8	1,793,030	4,912	15	2.3
2"	16	15,570,235	42,658	119	19.5
3"	4	3,777,138	10,348	29	4.7
4"	1	11,967,357	32,787	89	15.0
6"	1	0	0	1	0.0
TOTAL	674	79,838,350	218,735	916	100

⁽¹⁾ - Number of EDUs based on 87,255 gallons per EDU per year.

It should be reiterated that Table 6.2.1 shows the average metered consumption within the system. Losses and nonaccount water are not accounted for within the metered consumption data. Water system planning requires that all water diverted from the source be analyzed and considered as total water system consumption.

Residential customers account for approximately 53 percent of all water consumed within the City. The remaining system customers utilize 47 percent of the City metered water. The distribution of water consumed within the City, by meter size, is shown in Figure 6.2.2.

FIGURE 6.2.2 PERCENT OF WATER CONSUMED BY METER SIZE



Finished Water Produced

For planning purposes, demand projections and unit design factors for water treatment should be based on the City's yearly water production data rather than on historical customer metered water consumption records, since there are leaking water mains in its water system. This methodology incorporates all system losses and unmetered usage in the projected water requirements developed later in this Master Plan. The amounts of treated water produced, pumped to the City for consumption, and utilized for backwash are discussed below.

Water Treatment Plant Production

The amount of treated water produced at a WTP is typically equal to the sum of the amount of water sent to the distribution system for consumption plus the amount of water used for backwash, and miscellaneous water usage at the WTP (e.g. for pump seals, sanitary usage, etc.). As the City does not currently record miscellaneous water usage at the WTP, this miscellaneous usage at the WTP is not known.

Water production rates were derived from the plant data for average annual demand (AAD), average daily demand (ADD), dry season daily demand (DDD), maximum monthly demand (MMD), peak weekly demand (PWD), and maximum daily demand (MDD). A definition of each of these water demand

parameters was previously given in Section 6.1. A summary of the compiled water demand parameters for the Years 2011 through 2013 is presented in Table 6.2.2. The maximum water production for the time periods reviewed was observed in the Year 2013.

TABLE 6.2.2
ANNUAL, MONTHLY, AND DAILY WATER PRODUCTION WITH BACKWASH

Time Period	AAD, gpy	ADD, gpd	DDD, gpd	MMD, gpd	MDD, gpd	PHD, gpd
2011	71,967,311	197,171	261,010	315,000	493,000	985,000
2012	71,235,374	195,165	267,703	369,000	488,000	975,000
2013	79,838,350	218,735	288,202	366,000	548,000	1,095,000
Average	74,347,012	203,690	272,305	350,000	509,667	1,018,333

AAD/ADD. Over the past three years, the overall annual average water production has ranged from 72 to 80 million gallons (MG) per year or approximately 0.20 to 0.22 MGD. The average water production over this period was 0.20 MGD or approximately 74 MG per year. The highest water production was observed in Year 2013.

DDD. The DDD value represents the daily water production during the dry season months (June through October), which includes the highest water demand months (usually July or August). Although this value is not typically calculated for water systems, it is presented in this report to allow a comparison of dry season production with available water to be diverted from the City's raw water sources. The DDD over the time period reviewed averaged approximately 0.27 MGD with a flow of 0.29 MGD observed Year 2013.

MMD. The MMD represents the highest flow produced over a month. For the City of Canyonville, the MMD typically occurs in the months of August or September. From Year 2011 through Year 2013, the MMD ranged from approximately 0.32 to 0.37 MGD. The average MMD flow for this period was 0.35 MGD.

MDD. The MDD values given in Table 6.2.2 are the highest daily water production rates for the given time periods. The MDD typically occurs during the month and peak week of maximum water production. Over the last three years, the MDD has ranged from approximately 0.49 to 0.55 MGD. The average MDD over this time period was approximately 0.51 MGD.

Peaking factors are commonly used to develop relationships between the ADD and the other planning criteria. These factors are used primarily for calculating future water demand. Peaking factors tend to be consistent from one water system to another. Typically, MMD is approximately 1.5 times the ADD while the PWD is generally between 1.5 and 2.0 times the ADD. Peaking factors between 2 and 2.5 are commonly used for MDD. As the DDD is a unique value for this study, there are no typical peaking values for comparison. A summary of the calculated flow peaking factors is presented in Table 6.2.3.

TABLE 6.2.3
SUMMARY OF TREATED WATER FLOW PEAKING FACTORS (WITH BACKWASH)

Time Period	DDD/ADD	MMD/ADD	MDD/ADD
2011	1.32	1.60	2.50
2012	1.37	1.89	2.50
2013	1.32	1.67	2.50
Average	1.34	1.72	2.50

Water Pumped to the City for Consumption

The water pumped to the City for consumption represents the amount of finished water leaving the WTP. This value does not take into account water utilized at the WTP (e.g. backwash and miscellaneous water usage), but does include metered and non-metered consumption and distribution system loss.

The amount of water pumped to the City was derived from the plant data for average annual demand (AAD), average daily demand (ADD), maximum monthly demand (MMD), and maximum daily demand (MDD). A summary of the compiled water demand parameters for water pumped to the City (Years 2011 to 2013) is presented in Table 6.2.4.

**TABLE 6.2.4
ANNUAL, MONTHLY, AND DAILY WATER PUMPED TO THE CITY**

Time Period	AAD, gpy	ADD, gpd	MMD, gpd	MDD, gpd	PHD, gpd
2011	87,248,456	239,037	360,000	598,000	1,195,000
2012	81,763,620	224,010	335,000	560,000	1,120,000
2013	93,774,268	256,916	377,000	643,000	1,285,000
Average	87,595,448	239,988	357,333	600,333	1,200,000

The peak hourly demand (PHD) is often used in the computer modeling process to ensure that the storage and distribution system will continue to function during short, peak demand situations. This value may be calculated by plotting the probability of occurrence of demand versus the various water demand values. From this logarithmic plot, the PHD value can be extrapolated.

The peak hour demand (PHD) is used to size piping to insure sufficient capacity to deliver water to customers during the highest demand hour of the day. This usage rate typically occurs on the yearly maximum demand hour of the day. A peak hour demand factor (PDH) is selected as 5.0 and is consistent with the factor observed for the other Douglas County communities.

A summary of the calculated flow peaking factors is presented in Table 6.2.5.

**TABLE 6.2.5
SUMMARY OF PEAKING FACTORS**

Time Period	MMD/ADD	MDD/ADD
2011	1.51	2.50
2012	1.50	2.50
2013	1.47	2.50
Average	1.49	2.50

Nonaccount Water

Water sold is typically less than the amount of water produced at the plant due to system leaks, unmetered use at the WTP (backwash water, turbidimeter water, wash down, etc.), unmetered use within the distribution system, inaccuracies in customer meters, and other unmetered use such as fire flows and system flushing. A comparison of the amount of water treated (sum of water pumped to the City and backwash), and the amount of water consumed is given in Table 6.2.6.

TABLE 6.2.6.
COMPARISON OF WATER PRODUCED, BACKWASH, PUMPED AND CONSUMED

Time Period	Raw Water	Backwash	Water to City	Metered Consumption	% Nonaccount ⁽¹⁾
2011	93,142,738	5,894,282	87,248,456	71,967,309	18
2012	88,214,388	6,450,768	81,763,620	71,235,376	14
2013	101,164,296	7,390,028	93,774,268	79,838,348	16
Average	94,173,807	6,578,359	87,595,448	74,347,011	16

⁽¹⁾ - % Unaccounted is based on the quotient of the water consumed and water pumped to the City.

Over the last three years, the average amount of nonaccount water pumped to the City is approximately 16 percent. Potential sources of lost treated water include the following.

- Leakage within the City's water distribution system.
- Inaccurate water meters.
- Unauthorized use or connections without meters.
- Unmetered water for fire-fighting and operations such as street cleaning, water main flushing and testing.
- Other approved, but non-metered, water uses.

The Oregon Administrative Rules (OAR) Section 690-86, states that all water systems should work to reduce system leakage levels to 15 percent or less. If the reduction of system leakage to 15 percent is found to be feasible, the water provider should work to reduce system leakage to 10 percent. With the amount of nonaccount water within its system, the City should strive to account and reduce the nonaccount water, and increase system efficiency. Reductions in lost water can result in increased revenues, reduced expenses, and improved water system performance.

Summary

The current water demand parameters for water production and water pumped to the City were compiled and are provided in Tables 6.2.7 and 6.2.8. These parameters were primarily based on the average yearly water demand data for the Study Period. These water demand criteria will serve as the basis for the planning criteria of this Master Plan.

TABLE 6.2.7
SUMMARY OF CURRENT DEMAND OF WATER PUMPED TO CITY

Demand Parameter	Total, gpd	Peaking Factor	Per Capita Demand, gpcd ⁽¹⁾
Average Daily Demand, ADD	239,988	1.00	126
Maximum Month Demand, MMD	357,333	1.49	188
Maximum Daily Demand, MDD	600,333	2.50	315
Peak Hour Demand, PHD	1,200,000	5.00	631

⁽¹⁾ - Based on an average population of 1,910; value rounded.

TABLE 6.2.8
SUMMARY OF CURRENT DEMAND OF WATER CONSUMED

Demand Parameter	Total, gpd	Peaking Factor	Per Capita Demand, gpcd ⁽¹⁾
Average Daily Demand, ADD	203,690	1.00	107
Maximum Month Demand, MMD	350,000	1.72	184
Maximum Daily Demand, MDD	509,667	2.50	267
Peak Hourly Demand, PHD	1,018,333	5.00	536

⁽¹⁾ – Based on an average population of 1,910; value rounded.

6.3 Projected Water Demand

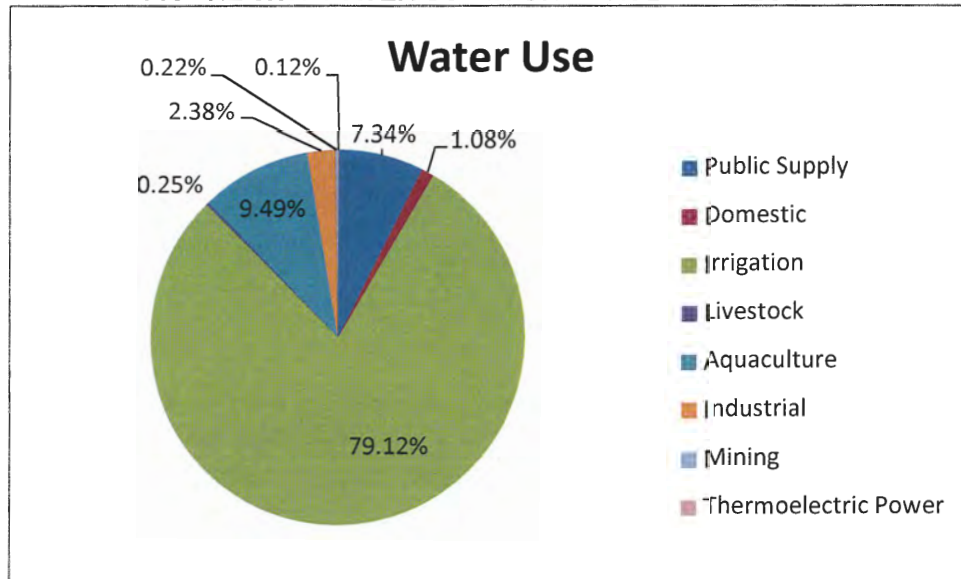
Water demands are projected into the future using the past records of water produced and water sold along with projected population estimates and anticipated additional water demand (i.e. industry). The goal of projecting future water demand is not to build larger facilities to accommodate excessive water consumption, but rather to evaluate the capability of existing components and to size new facilities for reasonable demand rates. Large amounts of leakage and excessive water consumption should not be projected into the future estimates. Rather, efforts should be made to reduce leakage and lost water to a reasonable level and utilize lower, more acceptable demand rates for planning efforts. Water demand projections should be based on acceptable water loss quantities, reasonable conservation measures, and the community's expected water use characteristics.

There is a degree of uncertainty associated with future water demand projections for any community. Uncertainties in projections exist because of the estimates used to define the community's current water use and the built-in assumptions made with respect to anticipated growth in a community. The impact of water conservation measures on a community's future water consumption is also difficult to predict.

Future Per Capita Water Usage and Growth

The U.S. Department of the Interior documented the per capita water use for Oregon in the 2005 U.S. Geological Survey – Circular 1344. According to the study, the average per capita for domestic water use for Oregon is 121 gallons per capita day (gpcd). A total of 7,220 MGD of water was used by Oregon in 2005. Total water withdrawals are separated by water-use category. The categories with their representative water use amounts are shown in Figure 6.3.1.

FIGURE 6.3.1 WATER USE IN OREGON BY CATEGORY



Based on water production records, the average per capita use in Canyonville is 107 gpcd. For this study, future water demand for water pumped to the City will be based on the current water pumped parameters (per capita usage), projected growth within the City (see Section 3.3), and anticipated unaccounted water. This methodology assumes that water demand characteristics within the City will basically remain the same as the existing per capita basis with allowances for changes in anticipated nonaccount water. The future anticipated nonaccount water is discussed below.

Anticipated Lost Water

Responsible water planning should not include the propagation of high lost water levels into water demand projections. According to OAR 690-86-150, a water system should endeavor to reduce system leakage to 15 percent or less of the total water diverted from their raw water sources. As developed previously in this section, the nonaccount water within the City is on the order of 16 percent. In order to be in compliance with OAR, Division 86 and to improve system efficiency, the City must work to reduce this level to 15 percent and, once obtained, thence strive for 10 percent.

The City should be able to reduce the percentage of nonaccount water more quickly and to lower levels (ultimately to 10 percent and less). However without knowing the source of the nonaccount water, it is difficult to determine the exact magnitude and timing of these reductions. Consequently, the above percentages of nonaccount water were utilized to be conservative in assessing the City's future water needs. If the City is not capable of reducing lost water to these levels, future demands will likely be greater than those developed within this section.

Summary of Future Water Demand

A summary of the water production demand projections is presented in Tables 6.3.1.

**TABLE 6.3.1
FUTURE WATER PRODUCTION DEMAND**

Parameter/Year	2015	2020	2025	2035	2045	2055
Total Population	1,935	2,032	2,130	2,285	2,393	2,498
Water Demand						
ADD, gpd	198,117	208,017	217,979	233,900	244,897	255,659
MMD, gpd	374,989	393,632	412,484	442,611	463,421	483,786
MDD, gpd	495,800	520,575	545,507	585,351	612,871	639,804
PHD, gpd	990,585	1,040,084	1,089,896	1,169,502	1,224,487	1,278,297

SECTION 7:
DESIGN CRITERIA AND COST BASIS

Design Criteria and Cost Basis

Section

7

7.1 Design Life of Improvements

The design life of a water system component is sometimes referred to as its useful life or service life. The selection of a design life is a matter of judgment based on such factors as the type and intensity of use, type and quality of materials used in construction, and the quality of workmanship during installation. The estimated and actual design life for any particular component may vary depending on the above factors. The establishment of a design life provides a realistic projection of service life upon which to base an economic analysis of new capital improvements.

As discussed in Section 2, the base planning period for this Master Plan is 20 years, ending in the year 2035. The planning period is the time frame during which the recommended water system is expected to provide sufficient capacity to meet the needs of all anticipated users. The required system capacity is based on population, water demand projections, and land use considerations. The planning period for a water system and the design life for its components may not be identical. For example, a properly maintained steel storage tank may have a design life of 60 years, but the projected fire flow and consumptive water demand for a planning period of 20 years determine its size. At the end of the initial 20-year planning period, water demand may be such that an additional storage tank is required; however, the existing tank with a design life of 60 years would still be useful and remain in service for another 40 years. The typical design life for system components is discussed below.

Raw Water Impoundments and Intakes

Impoundment structures including concrete impoundments should have design lives of 50 to 100 years when properly constructed and maintained. The impoundment structure at Win Walker Reservoir was constructed in 1995 and is in good condition. The gravity flow raw water intake structure on Canyon Creek was built in 1995 and is in poor condition.

Water Treatment Facility

Major structures and buildings should have a design life of approximately 50 years. The building was built in 1978 and has been re-roofed and has newer drywall; however, it lacks a heating and ventilation system. The clearwell is located under the building, limiting access for maintenance or repair. The useful life of treatment equipment can be extended when properly maintained if additional treatment capacity is not required. The treatment plant was upgraded in 2001 and should continue to meet the demands of this study period. Filter media normally has a design life of 10 to 15 years. The filter media has been maintained and updated throughout the plant's life. Flow meters typically have a design life of 10 to 15 years; no meters currently need replacement. Pumps and equipment usually have a useful life of about 20 years. In 2006, the pumps were replaced with pumps with soft starts. Valves, which usually need to be replaced after 15 to 20 years of use, need replacement. Ladders are used to access tanks and other

equipment and need to be replaced with stairs. The epoxy coated tanks need refinishing and the tank supports are rusty.

Raw and Treated Water Transmission and Distribution Piping

Water transmission and distribution piping should easily have a design life of 40 to 60 years if quality materials and workmanship are incorporated into the construction. Modern PVC and cement mortar-lined ductile iron piping can last up to 100 years when properly designed and installed.

Treated Water Storage

Distribution storage tanks should have a design life of 50 to 80 years for glass-fused-to-steel construction and 70 to 80 years for concrete and welded steel construction. Steel tanks with a glass-fused coating can have a design life similar to concrete construction. Actual design life will depend on the quality of materials, the workmanship during installation, and the timely administration of maintenance activities. Several practices, such as the use of cathodic protection, regular cleaning and frequent painting can extend or assure the service life of steel and glass-fused-to-steel reservoirs. The treated water storage tanks will require design against seismic activity to prevent damage to the tanks and/or distribution system.

7.2 Sizing and Capacity Criteria

Demand projections presented in Section 6.3 are based on population projections offered in Section 3.3. The projections assume an average 1.75 percent annual growth rate until the Year 2035. Accurately predicting growth is difficult, especially beyond 20 years into the future. As time progresses, all of the projections should be updated to reflect actual population and demand. The analysis and presentation of recommended improvement alternatives can be found in Section 8.

Raw Water Source

The water sources and reservoirs must be capable of meeting maximum daily demand of the system for a minimum 20 years of the planning period. The selection of a source is a long-term commitment that cannot be easily changed. Water rights are becoming more critical as the State's population and water demand increases and the number of viable water sources remains constant. Typically, water sources and reservoirs are evaluated to ensure there will be enough water to meet the MDD 50 years into the future.

Intake and Pumping Facilities

The raw water intake at Canyon Creek is gravity flow. The 36-inch diameter pipe from the intake to the vault leaks and needs repair. The finished water clearwell is located beneath the water treatment plant building; it is sized to meet the anticipated maximum day demand well into the future. The clearwell is currently undersized for the current Water Treatment Plant design size. A design life of 50 years is common for such facilities.

Pumps and other mechanical equipment can be expected to last no more than 20 years under normal conditions before extensive maintenance or replacement is necessary. Commonly, two pumps are installed in a pumping station, each having capacity equal to the capacity of a water treatment plant or the MDD predicted within the planning period. Duplex pumping systems can be designed to alternate after each cycle to extend the life of the equipment. If future demands increase beyond the ability of a single

pump, the second pump can serve as a lag pump in parallel to sustain higher flow rates during peak demand times.

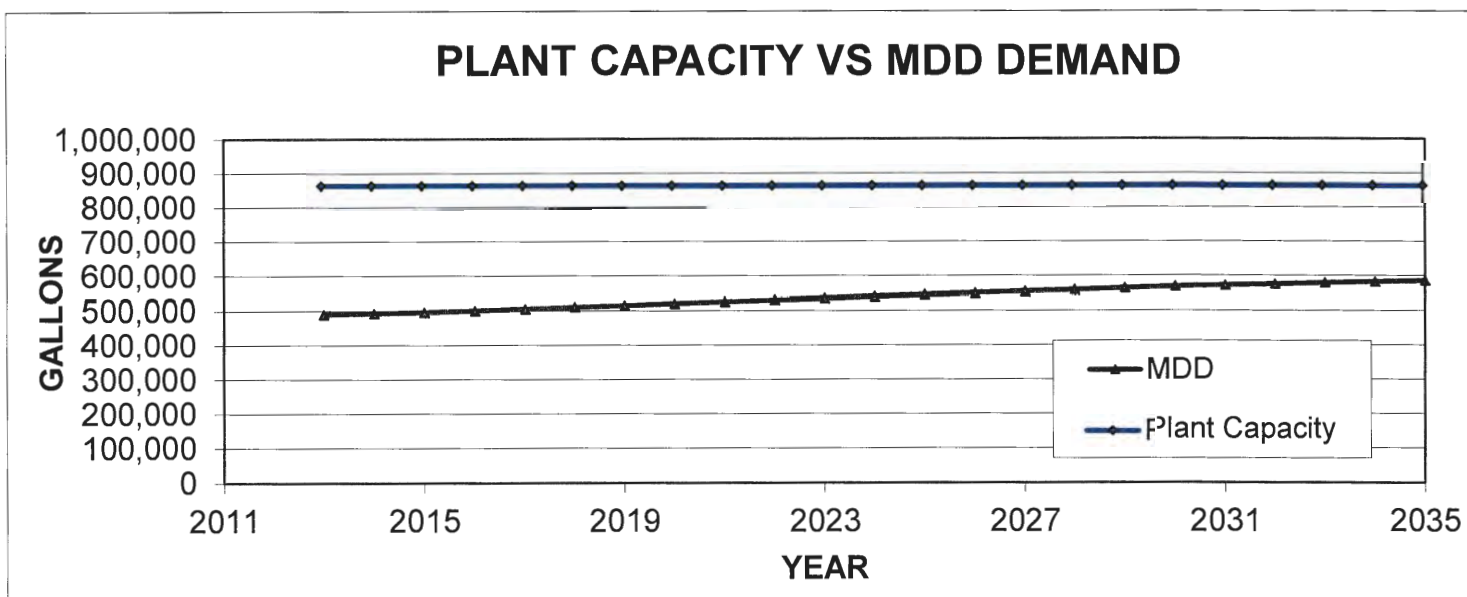
Transmission Piping

The long distances and high replacement costs of the transmission lines warrant an analysis for sizing based on demand beyond the normal 20-year period. The existing transmission lines must have the ability to handle at least the 20-year MDD. The capacity of the raw water and treated water transmission piping will be evaluated against the 20-year MDD and the 50-year MDD. The 20-year MDD yields 585,351 gallons which is still below the plant capacity of 979,200 gallons, the 50-year MDD yields 667,921 gallons which is also below the plant capacity.

Water Treatment Facility

Water treatment plants are typically designed to handle the 20-year MDD flow since these facilities can be expanded; they typically have an overall design life of around 20 years. The existing treatment plant capacity was evaluated against the 20-year MDD flow in Figure 7.2.1.

FIGURE 7.2.1
CONSUMPTION MAXIMUM DAILY DEMAND (MDD)
VS MAXIMUM PLANT CAPACITY



Treated Water Storage

Total storage capacity must include reserve storage for equalization storage, emergency storage and fire reserve. An alternative method to analyzing the treated water storage requirements suggests itemizing the potential requirements for treated water within the system. A discussion of these various needs follows.

Equalization storage is utilized to meet daily fluctuations of the supply capacity of the treatment plant and peak demand of the distribution system. Equalizing storage is typically set at 25 percent of the MDD of the water system.

Emergency storage is required to protect against a total loss of water supply such as would occur with a broken transmission main, a prolonged electrical outage, treatment plant breakdown, or source contamination. The emergency storage reserve is set at one MDD or three ADD. With one MDD storage criteria, it is assumed that supply disruption will occur on a day of maximum demand and be corrected within 24 hours. The basis for the three ADD criteria is that the supply disruption could occur at any time and would be repaired within three days.

Fire reserve storage is needed to provide sufficient water for fire suppression in the water system. The amount of fire reserve is based on the maximum flow and duration of flow needed to confine a major fire. Guidelines for determining the required fire flow and duration are generally determined using the “Fire Suppression Rating Schedule” by the Insurance Services Office (ISO) and/or the Uniform Fire Code adopted by the State of Oregon. The minimum fire flow requirements for one- and two-family dwellings having a fire flow calculation area which does not exceed 3,600 square feet shall be 1,500 gallons per minute at 20 psi residual water pressure for one (1) hour (2014 Oregon Fire Code, Section B105). For 1- and 2-family dwellings not exceeding two (2) stories in height, ISO uses a minimum fire flow of 1,000 gpm for buildings with more than 100 feet of distance between them and a minimum fire flow of 2,000 gpm for dwellings less than ten (10) feet apart. Total required fire flow may be reduced, but in no case shall the resulting fire flow be less than 1,500 gpm at 20 psi residual water pressure.

Commercial, industrial, and institutional buildings typically require higher fire flows with longer durations. Determination of these flows is unique to each building under consideration and will depend upon such factors as the square footage of the floor area and the type of construction, and is based on the International Building Code (IBC) classifications. Ideal storage capacity should be the sum of equalizing, emergency and fire reserve storage.

Another important design parameter for reservoirs is elevation. Ideally, reservoirs should be located at similar elevations to allow hydraulic balance within the distribution system. Within a given service area, the need for altitude valves, check valves, pressure reducing valves (PRVs), booster pumps, pumper trucks for extracting fire flows, and other control devices is reduced when a consistent water surface is maintained in all reservoirs. Distribution reservoirs should also be located at an elevation that maintains adequate water pressure throughout the system, with sufficient water pressures at high elevations and reasonable pressures at lower elevations. The pressure range in the system should stay within the range of 25 to 100 psi.

All of the above criteria will be used to evaluate the adequacy of existing storage and the need, if any, for future additional storage in Section 8.5 .

Distribution System

Distribution mains are typically sized for fire flow and 20-year population demand, or fire flow and saturation development demand, whichever is higher. Looped and one-way feed water mains should be at least 6 and 8 inches in diameter, respectively, to provide minimum fire flow capacity. The State of Oregon requires that a water distribution system be designed and installed to maintain a pressure of at least 20 psi at all service connections at all times. The distribution system must be sized to handle the peak hourly flows and to provide fire flows while maintaining this minimum pressure.

In addition to the above design criteria, the following general guidelines are recommended for the design of water distribution systems:

- 6-inch diameter lines - minimum size secondary water main for gridiron (looped) system,
- 8-inch diameter lines - minimum size for permanently dead-ended mains supplying fire hydrants and for minor trunk mains,
- 10-inch and larger diameter - as required for trunk (feeder) mains.

The distribution system secondary mains should be looped whenever possible. A secondary main is defined as a main not exceeding eight (8) inches in diameter which is installed to provide water service and fire protection for a local area including the immediately adjacent property. The normal size of secondary mains for single-family residential areas is 6-inch diameter pipe. However, 8-inch diameter or greater secondary mains may be required to meet both the domestic and fire protection needs of an area.

The installation of permanent dead-end mains and dependence of relatively large areas on a single main should be avoided, if practical. For the placement of a fire hydrant on a permanently dead-ended main, the minimum size of such secondary mains should be 8-inch diameter pipe. However, 6-inch diameter mains may be used for a stub-out not exceeding 500 feet in length which supplies a single fire hydrant, is not on a public street, and is for internal fire protection. On new construction, the minimum size secondary main for supplying fire hydrants within public ways should be 6-inch diameter pipe, provided 6-inch diameter mains are looped.

A computer model of the distribution system was developed as part of this Master Plan. The model utilized actual pipe sizes, system configuration, and materials as well as system pipe junction elevations and storage tank elevations. A computer model of the City's distribution system was checked to determine the maximum flow rate available at various locations within the system. The model was developed using a software program called WaterCAD® (Version 8 XM) offered by Haestad Methods.

The requirements for firefighting within the City were developed by consulting with the City's Fire Chief. The buildings within the City that require high fire flows are schools, and the minimum fire flow capability for schools is 2,900 gpm for two (2) hours. For a detailed discussion of the distribution system performance and fire flow analysis, see Section 8.5.

7.3 Basis for Cost Estimates

The cost estimates presented in this Plan include four components: construction cost, engineering cost, contingency, and legal and administrative costs. Each of the cost components is discussed in this section. The estimates presented herein are preliminary and are based on the level and detail of planning presented in this Study. As projects proceed and as site-specific information becomes available, the estimates may require updating. System improvements that are recommended in the City of Canyonville are detailed in Section 8.6 along with their associated costs.

Construction Costs

TABLE 7.3.1
ENR CONSTRUCTION COST INDEX – 2004 TO 2014 ⁽¹⁾

Year	Index	% Change
2004	7115	1.06
2005	7446	1.05
2006	7751	1.04
2007	7966	1.03
2008	8310	1.04
2009	8570	1.03
2010	8799	1.03
2011	9070	1.03
2012	9308	1.03
2013	9547	1.03
Average Annual Change =		1.04%

⁽¹⁾ – Index based on the yearend average each year at 20-city average labor rates and material prices.

Cost estimates presented in this Plan for construction performed should be projected with a minimum increase of 1.04 percent per year. Future yearly ENR indices can be used to calculate the cost of projects for their construction year based on the annual growth in the ENR index.

It is also recommended that in the event other public works projects are being performed in the same location, (i.e., sewer, street, storm, etc.), planning priority be given to combining these water projects with the projects at hand. By proceeding in this manner, the City will save money by eliminating repetitive mobilization, demolition, and road patching in the same locations.

Contingencies

A planning level contingency factor equal to approximately 15 percent of the estimated construction cost has been added. In recognition that the cost estimates presented are based on conceptual planning, allowances must be made for variations in final quantities, bidding market conditions, adverse construction conditions, unanticipated specialized investigation and studies, and other difficulties which cannot be foreseen at this time, but which may tend to increase final costs.

Engineering

The cost of engineering services for major projects typically includes special investigations, a predesign report, surveying, foundation exploration, preparation of contract drawings and specifications, bidding services, construction management, inspection, construction staking, start-up services, and the preparation of operation and maintenance manuals. Depending on the size and type of project, engineering costs may range from 15 to 25 percent of the construction cost when all of the above services are provided. The lower percentage applies to large projects without complicated mechanical systems. The higher percentage applies to small, complicated projects.

Additional engineering services may be required for specialized projects. This could include geotechnical evaluations, structural evaluations, and other specialized consulting activities.

Legal and Administrative

An allowance of three percent of construction cost has been added for legal and administrative services. This allowance is intended to include internal project planning and budgeting, grant administration, liaison, interest on interim loan financing, legal services, review fees, legal advertising, and other related expenses associated with the project.

Land Acquisition

Some projects may require the acquisition of additional rights-of-way or property for construction of a specific improvement. The need and cost for such expenditures is difficult to predict and must be reviewed as a project is developed. Effort was made to include costs for land acquisition, where expected, within the cost estimates included in this Plan.

Environmental Review

In order for a project to be eligible for Federal and/or State grants and loans, a review of anticipated environmental impacts of the proposed improvements is required. The primary goal of the environmental review is to help public officials make decisions that are based on understanding, and on consideration of the environmental consequences of their actions, and to take actions that protect, restore, and enhance the environment. To accomplish these tasks, the National Environmental Policy Act (NEPA) was promulgated. NEPA requires Federal agencies or monies originating from Federal programs to either prepare or have prepared written assessments or statements that describe: 1) the affected environment and environmental consequences of a proposed project; 2) reasonable or practicable alternatives to the proposed project; and 3) any mitigation measures necessary to avoid or minimize adverse environmental effects.

The environmental review will include one of the following four levels in order of increasing complexity.

- Determination of categorical exclusion without an environmental impact or assessment report.
- Determination of categorical exclusion with an environmental impact or assessment report.
- Preparation of an environmental impact or assessment report.
- Preparation of an environmental impact statement.

Within this plan, the cost for performing the anticipated environmental review was estimated for the projects expected to be financed with publicly financed grants and loans. The cost for the environmental review will be based on previous experience in preparing the required documents. If funding is obtained from a public funding agency, then the City will likely be required to submit some form of environmental report that examines the potential impact of the proposed improvements on local habitat and species.

Permitting

Permitting is important because many activities associated with constructing and maintaining the water system require permits to comply with State and Federal Requirements for work within wetland areas or waterways. Typically, Oregon Division of State Lands and U.S. Corps of Engineers are required in these instances. Water rights are important because in times of water shortage, the use of water under the most recently issued rights may be curtailed. Compliance with storm water, erosion control, flood plain, and other various environmental requirements are often involved with the construction of transmission lines, raw water intakes, discharge facilities, raw and finished water reservoirs, and other items. Permits with various road system agencies may be necessary to install waterlines within a road right-of-way.

SECTION 8:

ANALYSIS AND IMPROVEMENT ALTERNATIVES

Analysis and Improvement Alternatives

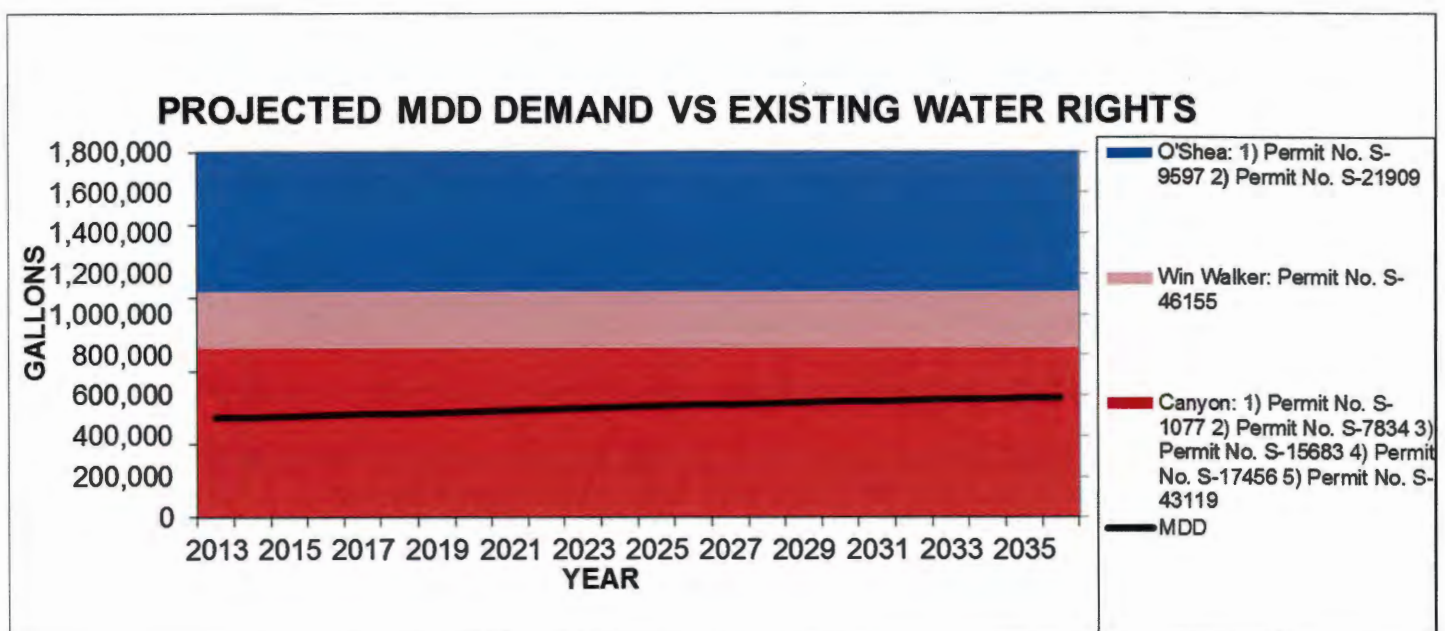
This section of the Master Plan presents detailed analyses of each component within the system and, where appropriate, provides an evaluation of proposed alternatives and recommended option(s). Preliminary cost estimates are presented in this section for the alternatives. Cost estimates for the recommended improvements are given in the Capital Improvement Plan (See Section 10.). Improvement phasing and potential impacts to ratepayers are discussed in Section 11.

8.1 Raw Water Sources and Water Rights

As presented in Section 5.1, the City has municipal water rights for 1.40 cfs on Canyon Creek, with 300 acre-feet of storage in Win Walker Reservoir, 1.0 cfs on O'Shea Creek, and 0.172 cfs of irrigation rights on Canyon Creek. Based on the present and projected water demands discussed in Sections 6.2 and 6.3, the City has not had any difficulty in meeting its water requirements even during the dry season months (June through October) because the current sources have been sufficient to handle the anticipated water demand.

Based on the projected maximum daily demand (MDD), the City's existing water rights on Canyon Creek and O'Shea Creek should be sufficient to meet the City's demand beyond the Year 2035, therefore no additional water source development is required or anticipated during the study period. A chart projecting the City's MDD and water rights is shown in Figure 8.1.1.

FIGURE 8.1.1
MAXIMUM DAILY DEMAND (MDD) AND CITY WATER RIGHTS



Groundwater Sources

Currently there are no existing groundwater resources within the Study Area and there are no plans to develop a well system in the future.

Surface Water Sources

Currently there are adequate surface water sources. Projections show adequate surface water sources far into the future.

Canyon Creek and Impoundment

Canyon Creek is a surface water source that the City has utilized as its primary water right. Win Walker Reservoir provides 300 acre-feet of storage, which is captured during the wet season. The City has a source water protection plan in place that provides information such as potential sources of contamination. The delineated drinking water protection area is primarily dominated by managed forestlands. Potential contaminate sources identified in the drinking water protection area include: Win Walker Reservoir, clear cut and partial cut forestlands, high density roads, stream crossings, burned areas, small mines, transmission line rights-of-way, natural gas pipeline, and the Interstate 5 freeway corridor.

O'Shea Creek

O'Shea Creek is used to supplement Win Walker during dry late season months. The diversion point is located approximately two and a half miles from the WTP at the O'Shea Creek impoundment. Potential contaminate sources identified in the watershed area include: O'Shea Creek impoundment, clear cut and partial cut forestlands, native surface roads, burned areas, small mines, and livestock grazing areas.

Summary

Raw water sources from Canyon Creek and Win Walker Reservoir are capable of supplying water to the population currently served and are able to meet growth beyond the study period. O'Shea Creek is used to supplement Win Walker during dry late season months.

8.2 Raw Water Improvements

Currently the raw water intakes from both Canyon Creek and O'Shea Creek are capable of diverting water at the necessary rates required to meet growth in the future. However, the raw water intake for Canyon Creek has the following problems:

- Canyon Creek raw water intake structure screen accumulates organic debris, leaves and sediment, which requires frequent cleaning and monitoring during fall and winter seasons.
- The 36-in diameter pipe leaks from the raw water intake structure on Canyon Creek to the vault.
- The Canyon Creek delivery system is vulnerable to potential contamination from the adjacent electrical transmission line, natural gas lines, and interstate highway crossings. A study should be conducted to see if water should be diverted at Win Walker Reservoir and piped to the WTP.

8.3 Water Treatment Facilities

The WTP went through a renovation project to update electronic valves and mixing in 2001. The WTP currently has the following deficiencies:

1. Treated water has color issues in the fall due to tannic acid from leaves, although taste and odor are not a problem.
2. Treatment flow rates slow during freezing temperatures.
3. The entire system shows signs of corrosion. Epoxy-coated tank supports are rusting and cannot be refinished in place due to the design.
4. Access to tanks is by ladders only, and should be replaced with stairs.
5. There is no heat or ventilation in the building.
6. The WTP does not have a full-perimeter security fence.
7. The WTP building sits over the clearwell, which could affect maintenance and repair activities.
8. Contact time is inadequate and has resulted in a violation.

8.3.1 Capacity

The rated capacity of the existing WTP is 600 gpm. Based on population projections for the next twenty years and on a maximum operating capacity of 600 gpm, WTP capacity should be adequate if no action is taken to replace it.

It is recommended that the WTP be replaced with one 700 gpm unit or two 350 gpm units. The Trident® Package Water Treatment system comes in sizes of 350 gpm and 700 gpm inflow rates. The modular design of this system allows for expansion in the future.

8.3.2 Color issues

Color is an issue that needs treatment. The Trident® Package Water Treatment system removes color, in addition to turbidity, suspended solids, iron, manganese, odor, taste, and pathogens such as *Giardia lamblia* and *Cryptosporidium*.

8.3.3 Cold temperatures

Producing water in cold weather takes longer because water becomes denser as temperatures decline. Additives will not mix with cold water readily and the particles in the water take longer to settle, which means the clarifiers are not as efficient as when water is warmer. Consequently, it takes longer for the dense water to go through the filters to remove the remaining particles. The filters may have to be backwashed more frequently, which takes more time and uses more water.

The Trident® Package Water Treatment system is designed to operate at lower temperatures, such as those experienced during normal winters in Canyonville.

8.3.4 Corrosion

The entire existing plant shows signs of corrosion and, due to the design, components of the plant cannot be treated in place or while keeping the plant in operation. The plant should be replaced with units that can be treated or replaced when their lifespan is complete.

Standard Trident® Package Water Treatment system units include two tanks per system (for redundancy) that are epoxy-coated steel.

8.3.5 Ladders

The existing plant components are accessed with ladders and do not comply with current safety standards.

The Trident® Package Water Treatment system units are equipped with stairs and walkways for equipment access.

8.3.6 Heating and Ventilation

Currently the building does not have a heating or ventilation system. The water treatment plant has been functioning adequately without it; however, lack of heat and ventilation contribute to corrosion of equipment and make the building uncomfortable for staff to work in.

It is recommended that a heating and ventilation system be installed when the WTP is upgraded.

8.3.7 Security Fencing

The security fencing currently in place does not fully encompass the WTP. The building can be easily accessed by intruders on foot or by motorized vehicles.

It is recommended that a security fence be added so that it completely bounds the perimeter of the WTP's site.

8.3.8 Clearwell

The clearwell is located beneath the WTP building. This location makes maintenance and repair work difficult. A tracer study was done to check the contact time (CT) evaluation for disinfection in March of 2012. This study resulted in a CT of 71 minutes for 19,943 gallons used. The contact chamber has an effluent flow meter. The peak hour demand flow over the past 12 months just prior to the tracer study date was 680 gpm (based on 2012 Disinfection Tracer Study). A design life of 50 years is common for such facilities.

It is recommended that the clearwell receive full maintenance during the replacement of the WTP package. Due to the violation for DBP, additional clearwell capacity is necessary to increase contact time.

The WTP has a 175 hp backup generator that is fueled by natural gas and is approximately six years old. According to staff the generator is in good condition and should last another twenty years.

8.4 Treated Water Storage

The City currently has a total treated water storage capacity of 1,753,000 gallons provided by two storage tanks, not counting an estimated total of 43,000 gallons stored in the clearwell at the WTP. Regular inspection and maintenance of each tank is required to extend the useful life of the infrastructure. The interior of each tank should be inspected and cleaned every three years and deficiencies should be repaired as required.

Design Storage Capacity

As discussed in Section 7, there are a number of ways to determine the treated water storage requirements of a given water system. Two different methods were utilized to determine the treated water reserve requirements for the City of Canyonville. Each method is briefly summarized below.

State Agency Recommended Method – Method 1

An interagency team made up of personnel from a number of different regulatory and financing agencies developed recommended sizing strategies based on state and community consumption averages and their experiences with Oregon communities (See Sections 6.3 and 7.2.). Part of these recommendations included sizing parameters for treated water reserve components.

The interagency team suggests that reserves in the system be sized for a volume that is equal to 2.5 times the ADD plus fire flow reserves (Bryan 2000). Based on this methodology, the required reserve for the City of Canyonville is summarized in Table 8.4.1. It should be noted that the sizing analysis was performed using demand figures that have been adjusted for non-account water range from 25 percent in Year 2012, 20 percent in Year 2017, 17 percent in Year 2022, and 15 percent for Year 2032. Current average demands are actually higher and would result in increased reserve requirements.

Fire Reserve = 1,500 gpm for 2 hours.

TABLE 8.4.1
STORAGE REQUIREMENTS METHOD 1

	2012	2017	2022	2027	2032	2035
	MG	MG	MG	MG	MG	MG
Emergency*	0.488	0.505	0.530	0.554	0.574	0.585
Fire Reserve	0.180	0.180	0.180	0.180	0.180	0.180
Total	0.668	0.685	0.710	0.734	0.754	0.765
Existing Storage	1.753	1.753	1.753	1.753	1.753	1.753
Excess	1.085	1.068	1.043	1.019	0.999	0.988
*Emergency = 2.5 *ADD						

Based on the State Agency methodology (Method 1), the City's existing storage is sufficient to meet current and future water storage requirements. However, additional storage is needed to meet fire flow requirements in case of an emergency fire flow event. Storage for fire flow (for a major fire event) is not the same as fire reserve storage. Fire flow provides the necessary pressures for pumping and putting water onto a fire and is based on WaterCAD modeling. Fire reserve is just a quantity reserved for firefighting as required by State Code.

Standard Methodology – Method 2

The second method used to analyze the reserve requirements for the City of Canyonville is based on methodology commonly used for determining optimum municipal reservoir storage. This methodology also typically includes input from the local fire chief as to the fire flow requirements for the City, and, for emergency storage reserve, utilizes either one MDD or three ADD. For optimum storage, the City should have enough capacity to satisfy the following demands.

Emergency Storage = 2.5 ADD.

Equalization = 0.25 x MDD.

Fire Reserve = 4,500 gpm for 2 hours.

The optimum storage methodology is based on a planning scenario that includes sufficient storage for three days of average consumption and for suppression of a major fire. As with the first methodology, the sizing analysis was performed using demand figures that have been adjusted for non-account water to range from 25 percent in Year 2012, 22 percent in Year 2017, 20 percent in Year 2022, 17 percent in Year 2027, and 15 percent from Year 2035 on. Based on this second methodology, the required storage capacity for the City of Canyonville is summarized in Table 8.4.2.

TABLE 8.4.2
DESIGN TREATED WATER STORAGE – METHOD 2

	2012	2017	2022	2027	2032	2035
	MG	MG	MG	MG	MG	MG
Equalizing	0.122	0.126	0.133	0.136	0.144	0.146
Emergency	0.488	0.505	0.530	0.554	0.574	0.585
Fire Reserve	0.540	0.540	0.540	0.540	0.540	0.540
Total	1.150	1.171	1.203	1.230	1.258	1.271
Existing	1.753	1.753	1.753	1.753	1.753	1.753
Excess	0.603	0.582	0.550	0.523	0.495	0.482

Using the Standard Methodology (Method 2), the City's existing storage is sufficient to meet current and future water storage requirements. However, additional storage is needed to meet fire flow requirements in case of an emergency fire flow event. Storage for fire flow (for a major fire event) is not the same as fire reserve storage. Fire flow provides the necessary pressures for pumping and putting water onto a fire and is based on WaterCAD modeling. Fire reserve is just a quantity reserved for firefighting as required by State Code.

Recommended Storage Capacity

A number of issues should be considered when sizing new treated water reserve components. The above analyses can be used to develop the requirements for a treated water reserve system, both now and at the end of the planning period, based on current and predicted system demands. The above methodologies do not take into consideration the remaining life of the existing reserve facilities or the expected life of new components.

Depending on the methodology used, different reserve requirements have been developed for the Canyonville water system. With either method, the existing storage capacity in Canyonville is considered sufficient, with a greater shortfall from Method 1 in comparison to Method 2. The difference between the two methods is primarily due to the fire flow reserves (180,000 gallons vs. 540,000 gallons) and emergency/equalization reserves. Ideally, the City's reservoir capacity would have optimum capacity, which is the sum of emergency, equalizing, and fire flow storage. Realistically, the existing and/or design storage is often less than optimal for a number of reasons, including cost to construct, long residence time for water within the tanks, and inability of the distribution system to deliver desired fire flow.

New Treated Water Tank

Based on the above recommended storage capacity, the City of Canyonville has sufficient treated water storage within all the planning periods examined in this study, although an additional 0.5 million gallons of storage is needed in the time after the study period to obtain the recommended capacity to have emergency fire flows within the City. Alternatives as to tank construction and location are addressed below.

Tank Construction

Tanks for storage of treated water are usually constructed with either concrete, welded and painted steel, or bolted glass fused steel. Each type of tank material has its advantages and disadvantages.

There are a number of different designs and methods for constructing a concrete tank. Some tanks use reinforced concrete while others use a prestressed, post-tensioned design. Tanks can also be constructed with poured-in-place concrete or utilize precast concrete. The advantages of concrete tanks include ability to withstand seismic forces, ability to fully or partially backfill against the tank, and less maintenance. The disadvantages of concrete tanks are the greater load this type of tank applies to the underlying soil and its cost.

Steel tanks are constructed with structural steel that is welded. Typically, the steel is manufactured off-site, and then delivered and assembled on-site. To protect against corrosion, a coating is applied to both the exterior and interior of the tank. Interiors of steel tanks are usually coated with an epoxy or enamel-type finish that has a typical life expectancy of approximately 20 years with proper care and maintenance. Glass-fused-to-steel bolted tanks have become popular, especially since periodic re-coating is not required. With this type of tank, a 10-14 mil glass coating is applied to steel to provide a protective coating. Life expectancy of this type of tank has been estimated to be over 50 years. The main advantage of both types of steel tanks is that they have lower construction and installation costs than concrete. The primary disadvantage of welded steel tanks is the associated maintenance. Cathodic protection and periodic refurbishing of the steel tank surfaces are required to maintain the tank. While the glass-fused-to-steel bolted tanks do not need periodic refurbishing of the tank walls, these types of tanks generally cost more initially than epoxy-coated bolted tanks. For smaller size tanks (<60,000 gallons), stainless steel tanks may be a viable option.

Tank Location

Site selection for treated water tanks is based on a number of factors, the most important of which are as follows:

Elevation. There generally exists an optimum preferred elevation for a reservoir, which will provide acceptable pressure to customers located within the widest range of elevations. In Canyonville's case, the optimum tank height for the majority of the City would be to match the overflow elevation of the reservoir tanks that service the low level service area (245 feet).

Topography. The optimum site is flat or gently sloping. Steep topography or areas susceptible to landslides are not desirable since such sites require extensive earthwork and associated cost. Locating tanks on cut/fill sections will require additional geotechnical investigations and site work to avoid differential settlement. Generally, the site should accommodate the tank (plus room for another tank), a perimeter access road (minimum 15 feet width), and space to store the materials to build the tank.

Proximity to Other Land Uses. Locating a tank in close proximity to other types of land use, including residential areas is considered acceptable. Paint color, reservoir height, and landscaping are all considerations for sites within residential areas.

Location Relative to Service Areas/Other Tanks. Tank sites located long distances from the primary demand centers are not favored. Generally, system hydraulics and water main costs can be minimized by the utilization of a site close to the areas of maximum water demand. In addition, the relative location of the existing treated water tanks should also be considered. While it is typically more cost-effective to construct a new tank adjacent to an existing one, a separate location may be recommended, providing system redundancy at another location and improving the hydraulics of the distribution system (See Section 8.5.).

Recommended Tank Location

Using the above site selection criteria, the following potential location was identified:

- **Brinkerhoff Dr. Tank Site.** This tank would be located in the northeastern portion of the City off Hamlin Dr. A 0.5 MG tank at this location would provide additional tank storage for Supply Zone 1 and could be used to draw from in the event that additional water is needed in any of the other supply zones. This site would require extensive excavation and the construction of an access road. The site would provide the necessary elevations for the above criteria, and would provide reserve requirements for the entire planning period.

8.5 Distribution System Modeling

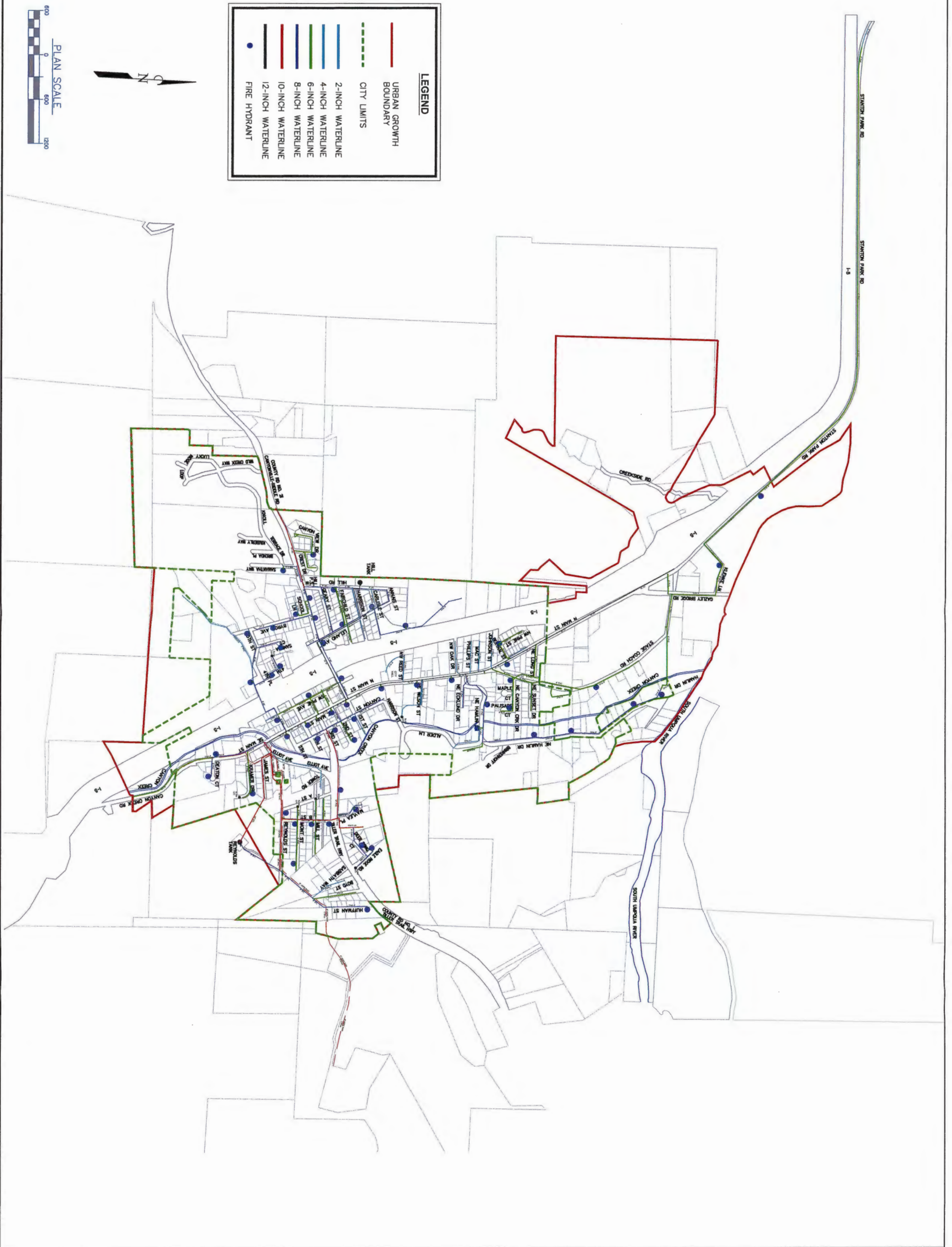
Distribution Modeling, as a part of the Master Planning effort, is used to help plan for the provision of adequate pressures and flows throughout all portions of the water distribution system. By modeling the system, existing deficiencies of pressure and flow volume may be identified, although these are usually already known due to observed or reported pressure and delivery problems. The modeling process can help identify remedies and cost-effective improvements. For future system planning, modeling is essential in order to determine the effectiveness of the proposed improvements, proper sizing and connection locations.

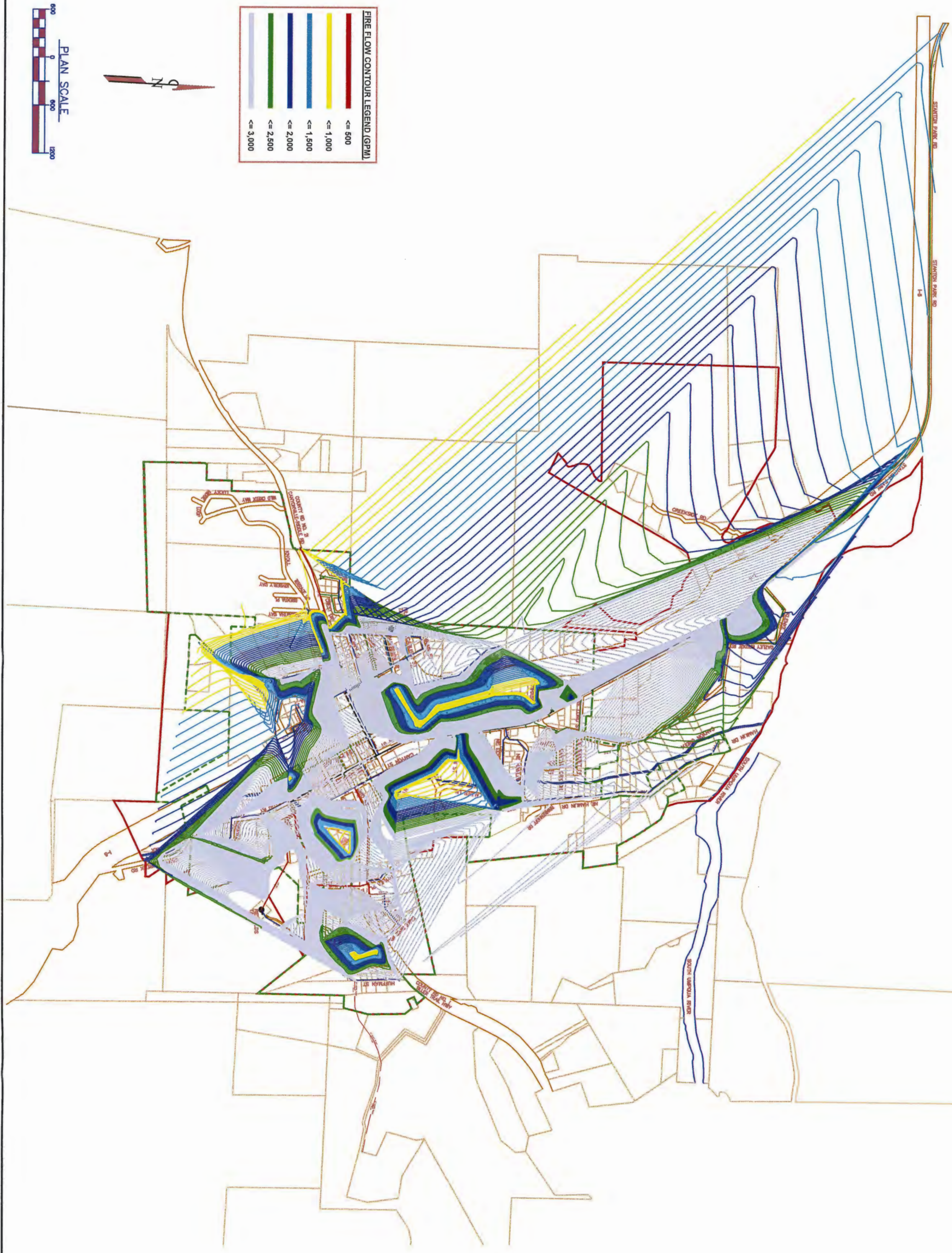
Distribution System

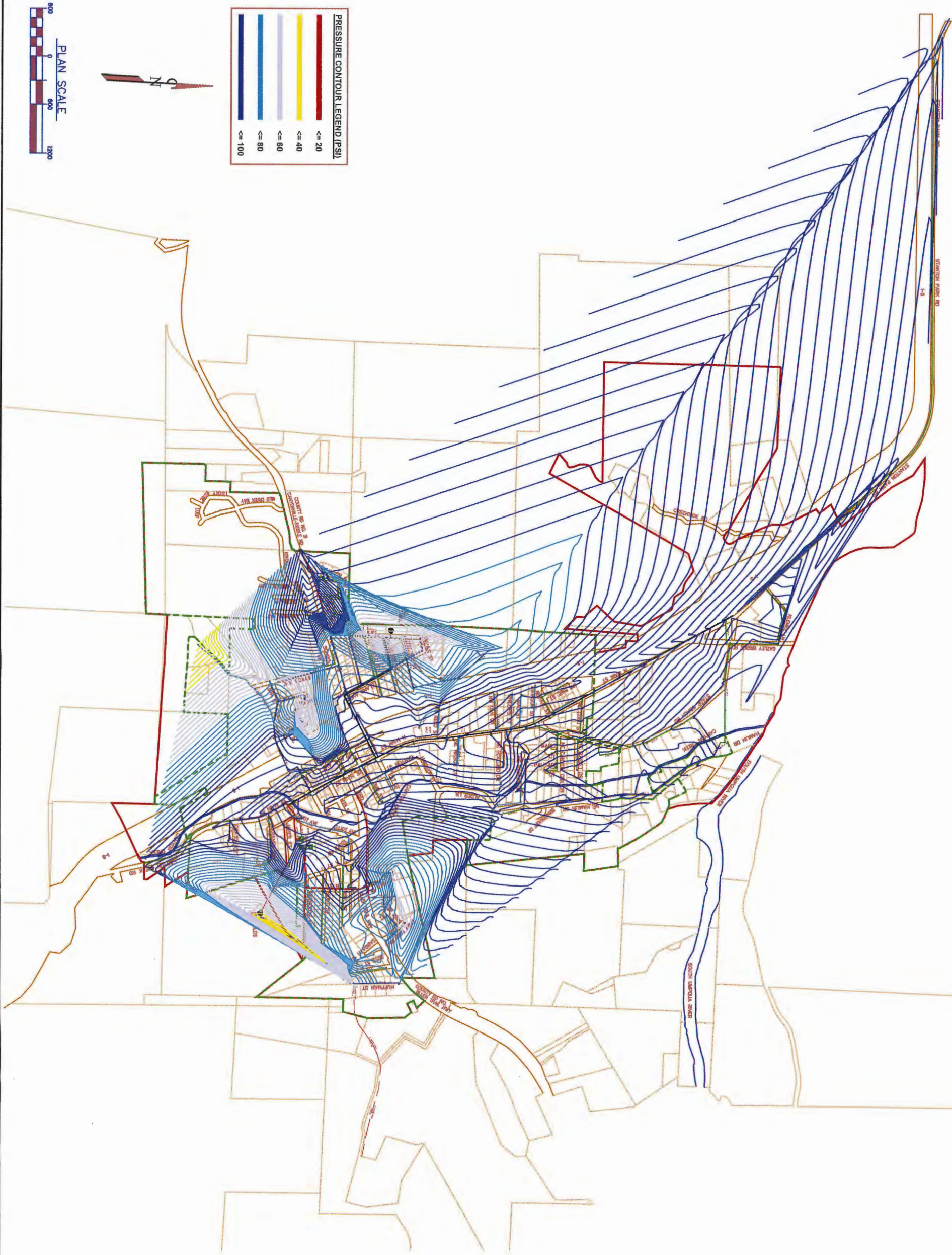
The distribution system in the City of Canyonville is comprised of a variety of pipe materials and sizes. The majority of the system consists of 6-inch diameter pipe, which is generally adequate for a well-looped system. A hydraulic model was utilized to assist in evaluating the capability of the City's existing water system in providing proper water flows (primarily fire flow) to selected areas in town. The basis for and results from the hydraulic model along with proposed water distribution system improvements are discussed below.

Basic Assumptions

The pipelines, fittings, valves and tanks of the City's actual water distribution system are represented within the computer model as "elements". The connection locations of these elements are identified as "nodes". For purposes of analysis, elements represent simplified descriptions of portions of the real system. For example, a water line running along a street has numerous fittings such as bends, tees, in-line valves, service connections and so on. The pipe section may have variable roughness due to different age or material within a run of pipe. Assumptions are made regarding the average characteristics of specific







elements. These assumptions include friction loss in each pipe element due to average roughness and fittings. In addition, water service demands are usually represented as "clustered" at nodes rather than along the entire length of the pipe as is really the case. Very small pipes which have little effect on the overall performance of the system are usually not included in the analysis. Rather, their water demand is included with other demands at node clusters. These assumptions allow a reasonable number of elements to be included in the model, permit useful decisions to be made, and allow analysis based on obtainable information (The internal characteristics of each individual line cannot be realistically determined.). Pipe elements are identified by three characteristics. These are roughness (C factor), diameter in inches (D) and length in feet (L). For municipal distribution analysis, the following "C" or roughness parameters are listed below in Table 8.5.1 and have been proven over time to result in accurate results:

TABLE 8.5.1
CANYONVILLE ANALYSIS "C" VALUES

Pipe Type	Condition	C
Asbestos Cement	Older Pipe	100
Steel	Older Pipe	130
Ductile Iron	Older Pipe	100
PVC	Older Pipe	150
PVC	Newer Pipe	160
Galvanized	Older Pipe	100
All	Badly tuberculated iron or steel	60

A minimum pressure of 20 psi is required under all service conditions by the Oregon Health Authority (OHA) to protect against backflow into the system. During fire flow simulations, this is the minimum acceptable pressure produced in any part of the service area. A maximum pressure of 90 psi at customer services should not be exceeded due to potential damage to water heaters and customer pipes and fixtures. Desirable service pressure is in the range of 40 to 60 psi.

Hydraulic Modeling

With the advent of computer hydraulic models, an entire municipal water system can be mathematically analyzed with respect to existing hydraulic characteristics and "what if" scenarios. The mapping, calibration, and analysis of the City's water distribution system using a computer hydraulic model are discussed below.

Mapping

An infrastructure map was developed using record drawings of water system-related improvement projects provided by the City. Elevation data of the City was obtained from the Google Earth program and verified using a Trimble Geo XH 6000 Series. The overall base map, showing the entire existing distribution system, was produced in AutoCAD format.

Calibration of Computer Model

The existing distribution piping network was evaluated with a computer model; specifically, Water CAD[®] for Windows Version V8i software by Haestad Methods. Water CAD[®] is a state-of-the-art software tool primarily used in the analysis and modeling of water distribution systems. This program employs mathematical algorithms based on hydraulic principles to predict system pressures and flow rates within a

water system. Fire flows are of particular interest since the magnitude of these flows dictates the necessary hydraulic capacity of the water system.

Information on the current operating parameters was entered into the computer model. Input parameters included daily system flows, pump flow rates and/or flow curves, and operating pressures at pump stations and water treatment plants. User demand was more or less allocated evenly to each node of the existing system. A more refined allocation of the demand is not necessary as the projected user demand, even at peak flows, is substantially less than fire flow requirements.

A model is a representation of an existing system used to predict the behavior of the system upon real changes. A model is only useful if it can be calibrated and validated. The accuracy of the model output with existing conditions was checked or calibrated using water pressures observed and collected in the field by the City's public works department. The hydraulic model solves for pressures and flows available in the main lines and not from hydrants. Pressures were calibrated for the system first by adjusting friction factors until the pressures in the model closely approximated measured pressures in the real system. In general, calibration is within approximately ± 10 percent, which is considered a reasonable level of accuracy given the uncertainties in the model data. A comparison of pressures is shown in the following Table 8.5.2.

TABLE 8.5.2
PRESSURE PREDICTION COMPARISON

Location	Field Test (PSI)	Computer (PSI)
Eagle Ridge subdivision	51	48
B and Reynolds St.	55	60
Ray's Food Place	79	75
1 st and Main	75	80
5 th and Main	80	82
Long St. and Main	81	81
1 st and Pine	67	74
1 st and Leland	69	65
1 st and North of Byron	61	61
Leland and Carlisle	53	48
Leland and Fairchild	60	62
SW Pine and 3 rd	71	72
5 th and Pine	84	78
1 st and Canyon	79	80
Stagecoach and Sunset Dr.	94	89
Hamlin Dr. and Alder	89	94
Byron St. (on top)	38	34
5 th and Byron St.	43	44
Main and Gazley Bridge Rd.	94	101

Data Produced by Model Analysis

Outputs generated by the program include Fire Flow Reports and Peak Hour Demand (PHD) reports for both existing system geometry and for the system expanded for future service. The fire flow reports provide information regarding the maximum available flow at any portion of the system with a 20 psi residual remaining, assuming all other locations within the system are experiencing average day demand.

The output is summarized for these reports as a color-coded graphic map of the distribution system which shows maximum flow value contours.

The PHD reports are summarized as a color-coded graphic map, which show the pressures available at all locations in the system at PHD. Simulations were made for various improvements and the flow improvements (if any) were noted.

Existing System Analysis

Schematic model diagrams representing the existing Canyonville Water Distribution System are shown as Figure 8.5.1. Demand in the system is based on the average day demand (ADD) of 195,000 gpd or 135.4 gpm which includes distribution system loss. The peak hour demand (PHD) is 975,000 gpd or 677.1 gpm. These values were determined in Section 6 of this report. Available pressures are shown in the form of pressure contours. Provision for fire flows of at least 1,000 gpm to residential areas and a minimum of 3,000 gpm to commercial areas is desired. The Fire Flow Simulation Model of the existing system assumes that the elevation of water in the storage tanks is maximum height. The simulations also assume that the water treatment plant is providing water at full capacity. The computer model provides a flow contour map which represents the available fire flow to each location in the system, assuming average day background demand and that no other location in the system drops below 20 psi. The model produces this contour map by "running" the system with each node in turn dropped to 20 psi residual and noting the resulting available flow (in addition to the assigned average day flow). The existing system available fire flow and pressure contour maps are included as Figure 8.5.2 and Figure 8.5.3.

Hydraulic Analysis of the Existing System

The existing distribution system was modeled using hydraulic computer modeling software. This model included current piping, pump stations, reservoirs, and water treatment plant. The model contained 405 pipe elements and 386 nodes or junctions. Due to adequate system pressures and a relatively well-looped distribution network, hydraulic performance of the system is adequate in most areas. Residual pressures of 20 psi were used as a constraint on the system. This is a requirement of the Oregon Health Authority. Greater fire flows may be attained due to the lack of this constraint in the physical system. It cannot be guaranteed that residual pressures will be maintained or that backflow conditions will not be encountered.

Performance of the distribution system with respect to maximum available fire flow capabilities was specifically examined at selected vital areas within the City that were identified with the assistance of the South Umpqua Fire District's Fire Chief. The locations examined were chosen for a number of reasons, including potential fire suppression (e.g. schools), representation of a portion of the City, and identification of potentially undersized lines. A list of the vital areas within the City is presented in Table 8.5.3.

**TABLE 8.5.3
LIST OF VITAL AREAS**

Occupant	Location
YMCA	Sabbath Way
Seventh-Day Adventist School	I-5 Frontage Rd.
Main Street	1st St. to Elliot
Apartment Complex	Stage Coach Rd.
Church	Alder Ln.
School	Alder Ln.
Huffman & Wright	Huffman St.
Holiday Gardens Apt. Complex	SE Main St.
Forest Glen Retirement Living	1 st St.
Canyonville Assembly of God	N Main St.
City Hall	N Main St.
Canyonville Schools	N Main St.
Canyonville Christian Academy	N Main St.
Ray's Food Place	N Main St.

Fire flow from treated water tanks is also dependent upon elevation and geographic location of the tanks within the distribution system. Elevation is important as it provides the static head or pressure to move the water. Geographical location of the treated water tanks is of importance for the distribution of fire flow with the water mains. If there is only one pipe between the reservoir and a hydrant providing access for fire suppression, then all the water must travel through this pipe.

Depending upon the desired flow capacity, this pipe may need to be significantly larger than what is required to handle normal water distribution. To reduce the pipe size required to convey fire flows, multiple pathways or pipes are provided. Ideally, water from treated water tanks is conveyed from different pipe mains for flow redundancy. For example if two separate pipelines are used to convey 4,000 gpm of water, then each pipe would be required to convey 2,000 gpm instead of 4,000 gpm. By virtue of their locations, the treated water tanks in Canyonville provide some flow redundancy.

Modeling Results

The results of the modeling analysis revealed distribution system deficiencies during fire flow events under existing conditions. In other words, certain localized areas of the distribution system lack the hydraulic capacity to deliver the full recommended fire flow rate while simultaneously supplying maximum day demands. Potential system improvements were systematically input into the model and tested to determine the most effective and economical improvements to address the deficiencies. The recommended distribution system improvements can be found in Section 8.6.

Service Pressure Criteria

Water distribution systems are typically separated into pressure zones or service levels to provide service pressures within an acceptable range to all customers. Pressure zones are usually determined by ground topography and designated by overflow elevations of water storage facilities, or outlet settings of pressure reducing facilities serving the zone. Typically, water from a reservoir will serve customers by gravity within a specified range of ground elevations so as to maintain acceptable minimum and maximum water

pressures within individual service pressure zones. Pumping facilities or pressure-reducing facilities are used to serve customers in different pressure zones from a single reservoir.

In order to achieve a fire flow reading, it is desirable to achieve 20 psi. Conformance to this pressure range may not always be possible or practical due to topographical relief, existing system configurations and economic considerations. In Appendix D, the table displays a list of fire flows and pressures at each node.

8.6 Future System Analysis

Proposed improvements are shown in Figure 8.6.1. The improvements are discussed below. Available fire flow and pressure contours for the year 2032, with all recommended improvements, are shown in Figure 8.6.2 and in Figure 8.6.3.

The existing system fire flow analysis indicates that under current conditions, the water system is capable of proving minimum fire flow of 1,500 gpm to the majority of the residential areas in the model.

Water line reinforcement within the existing Canyonville distribution system is recommended to increase fire flows within the system. This is estimated to increase fire flows locally by about 300 to 500 gallons per minute. The following are recommended improvements:

- 8-inch on Stanton Park Rd. between Klenke Ln. and the Douglas Forest Protective Association (DFPA) (replaces 4-inch and 6-inch lines).
- 8-inch on Stanton Park Rd. from Riepe Ct. and Klenke Ln. (new 8-inch line ties into 12-inch).
- 6-inch on NW Johnson St. from west to end of line to intersection with N. Main St., (replaces 2-inch line).
- 6-inch on NW Mac St. from west to end of line to intersection with N. Main St., (replaces 2-inch line).
- 6-inch on NW Phillips St. from west to end of line to intersection with N. Main St., (replaces 2-inch line).
- 6-inch on NW Oak St. from west to end of line to intersection with N. Main St., (replaces 2-inch line).
- 6-inch on Alder Ln. from Hamlin to the new school, (replaces 4-inch lines).
- 6-inch on NW Oak St. from west to end of line to intersection with N. Main St., (replaces 2-inch line).
- 6-inch on NW Wilson St., (replaces 2-inch line).
- 6-inch on NW Reed St. from intersection with N. Main St. to west end, (replaces 2-inch line).
- 6-inch on NW Harrison St., (replaces 2-inch line).
- 6-inch on E 1st St. from Canyon Creek, (replaces 2-inch line).
- 6-inch on SE Elliot Ave. from Gross Lp. to A St., (replaces 2-inch line).
- 6-inch on SW Pine Ave. from SE 5th St to end, (replaces 2-inch line).
- 6-inch on Boyd St., (replaces 2-inch line).

Proposed Improvements

Based on the results from the computer hydraulic model and discussions with City staff and the Fire Chief, several proposed improvements were recommended for the City's distribution system. All recommended improvements reflect both the possible future inclusion of the Falk Development and also its new tank. These proposed improvements are discussed below.

1. Stanton Park Rd.

The existing 6-inch diameter line that runs from the intersection of Klenke Ln. and Stanton Park Rd. to Stanton Park needs to be replaced due to inadequate fire flow availability. A new 8-inch diameter PVC line will provide the necessary flows for fire flow. The existing 4-inch diameter line currently running from Stanton Park to the end of the line at the DFPA (Douglas Forest Protective Association), will also need to be upsized to a new 6-inch water line to increase fire flows.

2. Stanton Park Rd.

A new 8-inch diameter PVC line will need to be installed to connect the existing 12-inch diameter Ductile Iron water line from the intersection of Stanton Park Rd. and Riepe Ct. to the intersection of Klenke Ln and Stanton Park Rd. This new line will increase fire flows along Klenke Ln. and Gazley Bridge Rd. and flows to the north along Stanton Park Rd.

3. NW Johnson St.

The existing 2-inch water line that runs from the west end of NW Johnson St. to the intersection of NW Johnson St. and N. Main St. is undersized for adequate fire flows and will need to be replaced with a 6-inch PVC line.

4. NW Mac St.

The existing 2-inch water line that runs from the west end of NW Mac St. to the intersection of NW Mac St. and N. Main St. is undersized for adequate fire flows and will need to be replaced with a 6-inch PVC line.

5. NW Phillips St.

The existing 2-inch water line that runs from the west end of NW Phillips St. to the intersection of NW Phillips St. and N. Main St. is undersized for adequate fire flows and will need to be replaced with a 6-inch PVC line.

6. NW Oak St.

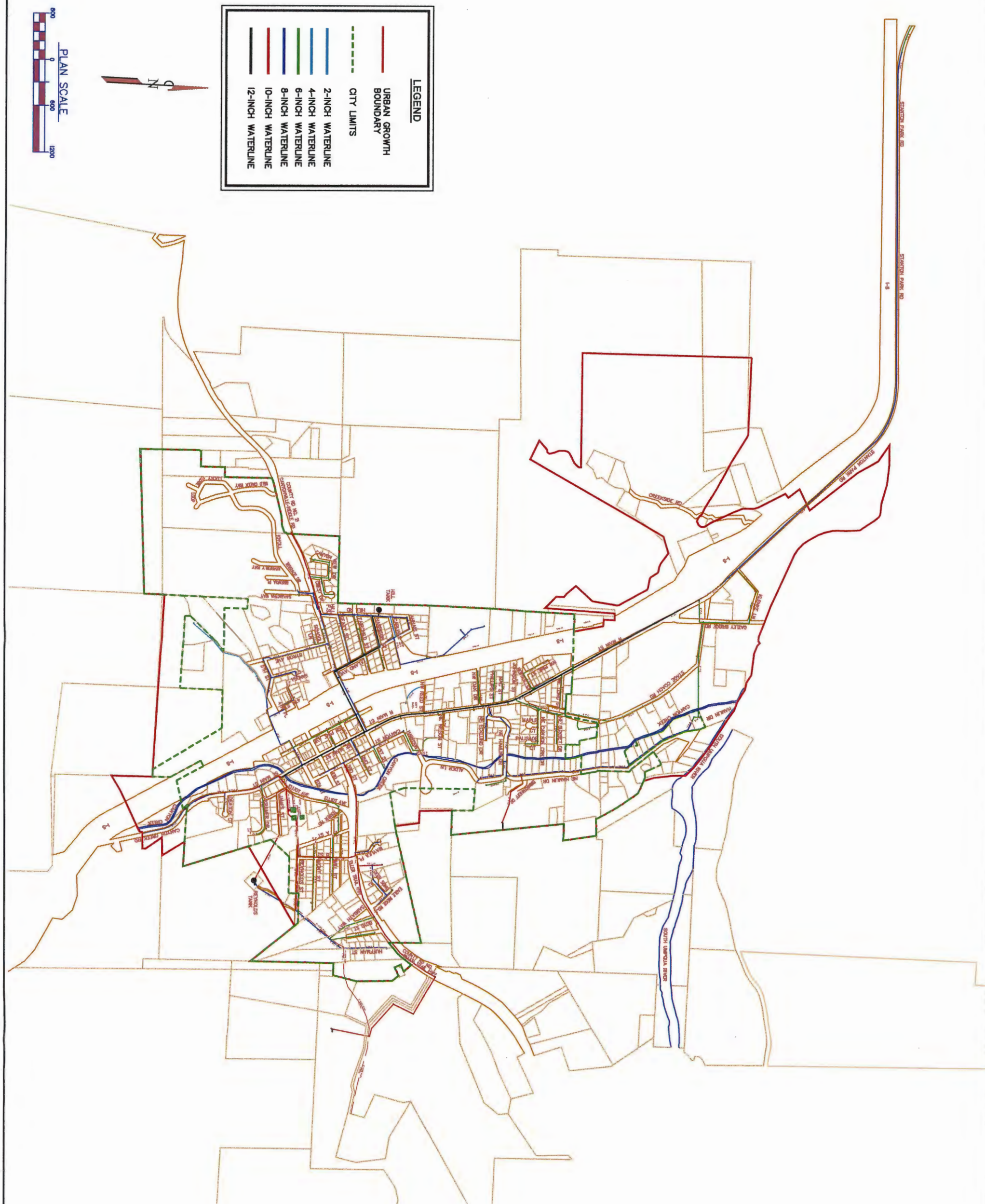
The existing 2-inch water line that runs from the west end of NW Oak St. to the intersection of NW Oak St. and N. Main St. is undersized for adequate fire flows and will need to be replaced with a 6-inch PVC line.

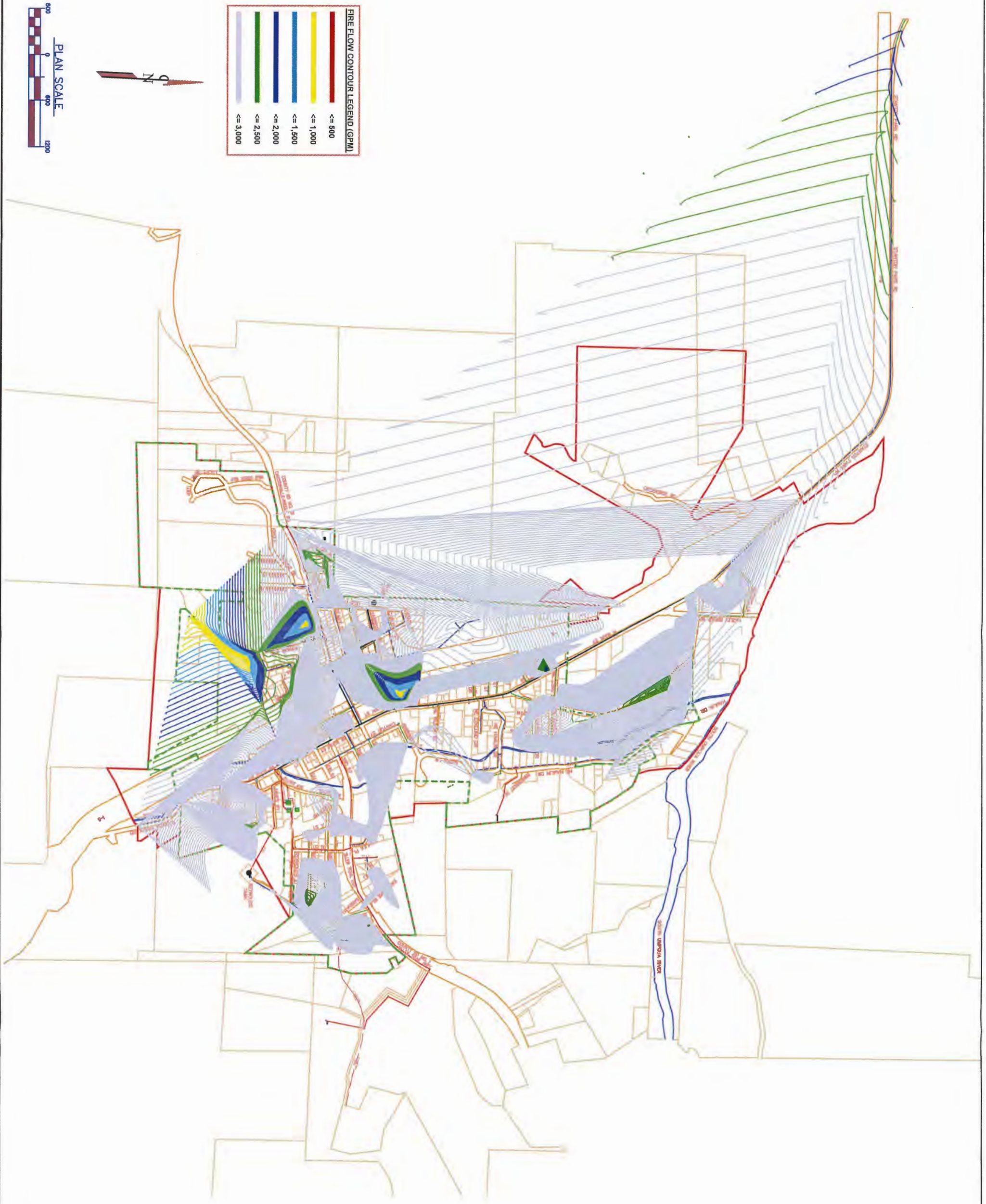
7. Alder Ln.

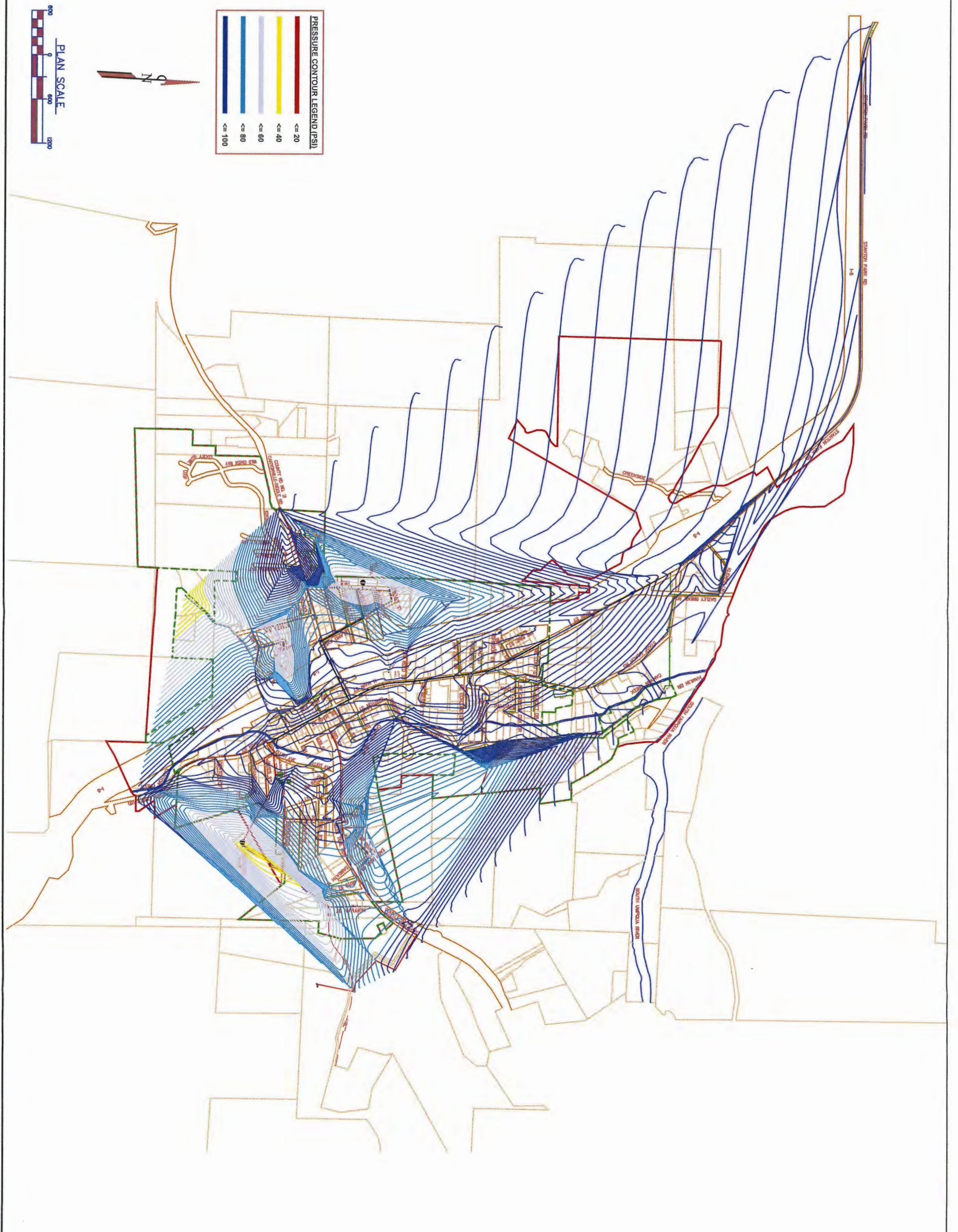
The existing 4-inch PVC that runs from a point on Hamlin to a point Alder Ln. will need to be replaced with a 6-inch PVC line to provide adequate fire flow.

8. NE Wilson St.

The existing 2-inch PVC along NE Wilson St. is undersized and will need to be replaced with a new 6-inch PVC line to provide adequate fire flow. The line will be also run along Harrison to Canyon St. to loop the water lines together.







9. NW Reed St.

The existing 2-inch PVC water line along NW Reed St. will need to be replaced with a new 6-inch PVC to provide adequate fire flow.

10. NW Carlisle St.

The existing 2-inch water line running from the west end of the street to a point near the I-5 Freeway is leaking and needs to be replaced with a new 2-inch PVC water line.

11 NW Harrison St.

The existing 2-inch PVC water line on NW Harrison St. will need to be replaced with a new 6-inch PVC water line to provide the necessary fire flow to this region.

12. E 1st St.

The existing 2-inch water line from Canyon St. to Canyon Creek needs to be replaced with a new 6-inch PVC water line because of fire flow, age, and possible leakage issues.

13. SE Elliot Ave.

The existing 3-inch water line running from Gross Loop east along Elliot Ave. continuing past the tennis courts to A St. currently does not provide the necessary fire flow and needs to be replaced with a new 6-inch PVC water line.

14. SW Pine Ave.

The existing 2-inch galvanized water line, from SE 5th St. south to the end, needs to be replaced with a new 6-inch PVC water line, due to inadequate flow and the age of the line. The increase in size will increase flows.

15. Boyd St.

The existing 2-inch galvanized water line, from SE 5th St. south to the end, needs to be replaced, due to inadequate flow and because of the age of the line, with a new 6-inch PVC water line, which will increase flows. The line will be extended to County Rd. No. 1 for future tie in.

16. Byron Ave.

A new 8-inch diameter PVC line will need to be installed to connect the existing 8-inch diameter water line from the intersection of SW Byron Ave. and SW 5th St. to the end of the existing 8-inch diameter water line on SW Byron Ave. This will improve flows and decrease stagnant water issues.

17. SE James St.

The existing 10-inch steel water line, from the Water Treatment Plant to Reynolds Tank, needs to be replaced with a new 10-inch ductile iron (DI) water line, because the existing pipe is prone to leakage and breakage.

18. Reynolds Tank Access Rd.

The existing 8-inch steel water line, from Reynolds Tank to Reynolds St., needs to be removed because the current pipe alignment has portions of pipe that are exposed to damage and leakage. A new 8-inch PVC water line should be installed in a better location.

19. New 500,000 gallon Tank and 10-inch water line

A new 500,000 gallon tank will need to be constructed on top of the ridge off Brinkerhoff Dr. This tank will increase fire flow availability throughout the northern regions of Canyonville and provide additional water availability for future growth. A new 10-inch water line will need to be constructed from the proposed new 500,000 gallon tank on Brinkerhoff Dr. to the existing 8-inch PVC water line along NE Hamlin Dr.

20. Hill Tank

Hill Tank needs to have the interior and exterior surfaces recoated, door seals and gaskets replaced, concrete spalling repaired, new level indicator installed, cathodic protection, ladders installed, screens, and vents inspected and replaced as needed, telemetry updated, security fencing repaired, and installation of a seismic shut-off valve. In addition, site preparation will be necessary to provide room for temporary storage tanks during this work.

21. Reynolds Tank

Reynolds Tank needs full crack repair, interior and exterior surfaces recoated, door seals and gaskets replaced, concrete spalling repaired, new level indicator installed, cathodic protection, ladders installed, screens, and vents inspected and replaced as needed, telemetry updated, security fencing repaired, and installation of a seismic shutoff valve. In addition, demolition of the remains of the original small tank will be necessary to provide room for temporary storage tanks during this work.

22. Hill Rd. Pump Station

The existing pump station needs additional pumps, which are required to provide the necessary fire flows to the Hill Rd. region as shown by the fire flow model.

23. Water Treatment Plant

The existing water treatment plant was built in 1978 and the epoxy-coated tanks are corroded, but can't be refinished because of design issues. Plant capacity should be improved to meet increasing demand. Treatment flow rates drop during periods of freezing temperatures. The plant lacks redundancy of equipment and tanks. The building lacks an HVAC system and new drywall should be installed. The new water treatment system should replace the ladders used to access the tanks with stairs.

24. Canyon Creek Raw Water Intake

The 36-inch existing pipe from the intake to the vault leaks and needs repair.

25. Canyon Creek Raw Water Transmission Line

Currently water is transported from Win Walker Reservoir to the raw water intake through the natural stream channel. This mode of transportation is quite vulnerable to potential sources of contamination.

Piping the water from the reservoir to the WTP would eliminate that possibility. The City has a source water protection plan in place.

26. Fire Hydrants

Fifteen (15) fire hydrants are needed in locations not included within listed improvement areas.

SECTION 9:
CAPITAL IMPROVEMENT PLAN

Capital Improvement Plan

9.1 Background

A capital improvement plan (CIP) is a long-term program for replacement of existing or installation of new infrastructure required to improve a system's function or maintenance. The Capital Improvement Plan for water and wastewater systems provides City Council, staff and residents with a systematic approach to dealing with its short-term and long-term infrastructure needs and demands.

Under ORS 223.309(1), a capital plan, public facilities plan, master plan or comparable plan must be prepared before the adoption of system development charges (SDCs). This plan must list the capital improvements that may be funded with improvement fee revenues and include the estimated cost and timing of each improvement. Oregon Revised Statutes discuss which improvements may be funded by SDC revenues (ORS 223.307) and what type of projects qualify for credit purposes. The capital improvement plan may be modified at any time pursuant to ORS 223.309 (2).

Water system improvements recommended for the City of Canyonville are provided in this Plan along with associated costs. The recommended improvements for the City's Capital Improvement Plan were derived from the analysis presented in Sections 8, 9, and 10.

9.2 Project Phasing

To assist the City in its planning efforts, the proposed Capital Improvements have been assigned to one of two phases, with Phase I being the most critical projects and Phase 2 being lower priority projects. A brief description of each Phase and the types of projects within that phase is provided below.

Phase I projects are considered the most critical and should be undertaken as soon as funding is available. These projects include improvements that are considered to maintain the quality of the system, increase fire flow, reduce unaccounted water losses, extend the life of the existing tanks, and install needed telemetry for the entire system.

Phase II projects are projects that were considered, but the cost to benefit analysis is low. These improvements include further system improvements to upgrade the existing system and to address future system needs. These projects may become "critical" in the future if development or water quality issues arise.

The phase of each improvement will be presented and discussed with city staff and council. The cost estimates presented in this Plan reflect the basis previously described in Section 7.3. The estimates presented herein are preliminary and are based on the level and detail of planning presented in this Plan. As projects proceed and as site-specific information becomes available, the estimates may require updating.

Compilation of an environmental report is typically a requirement of government organizations that fund infrastructure improvements. The purpose of this environmental report is to consider any adverse effects

that the project may have on the surrounding environment, and to propose mitigation measures to minimize these impacts. The estimated cost for compiling an environmental report for each Phase is included in this CIP.

A brief description of each phase of improvements including recommended improvements, associated costs, and estimated percentage and cost eligibility for improvement system development charges (See Section 13.), is discussed below. Detailed cost estimates for the CIP project are in Appendix F.

Phase I Improvements

Phase I improvements called for in this CIP represent the highest priority projects that require action in order to ensure the effective treatment and delivery of water for the City's residents and customers. These improvements include a new water treatment plant, distribution system improvements to improve fire flow and storage, and improvements to the pump station, a new pump station as necessary for fire flow and to meet ISO requirements, and tank maintenance projects. Figure 9.2.1 graphically shows the Distribution System Improvements. Figure 9.2.2 shows the locations of the proposed new fire hydrants and existing.

Project Descriptions

1. Water Treatment Plant Improvements (Total Cost: \$2,272,000)

The water treatment plant needs the following improvements: replace package plant to improve color issues, speed up treatment flow rates, chlorine contact time, remedy corrosion issues, improve access to tanks and equipment, provide heat and ventilation, and provide security fencing.

2. Raw Water Intake Improvements (Total Cost: \$44,000)

The raw water intake vault structure needs repair work and the intake screen needs improvements to reduce debris accumulation.

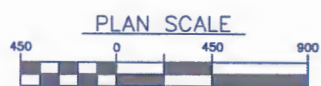
3. 10-inch Water Main Upsizing Improvements (Total Cost: \$391,000)

Based on computer modeling of the City's water distribution system, fire flows available to certain areas are below those required:

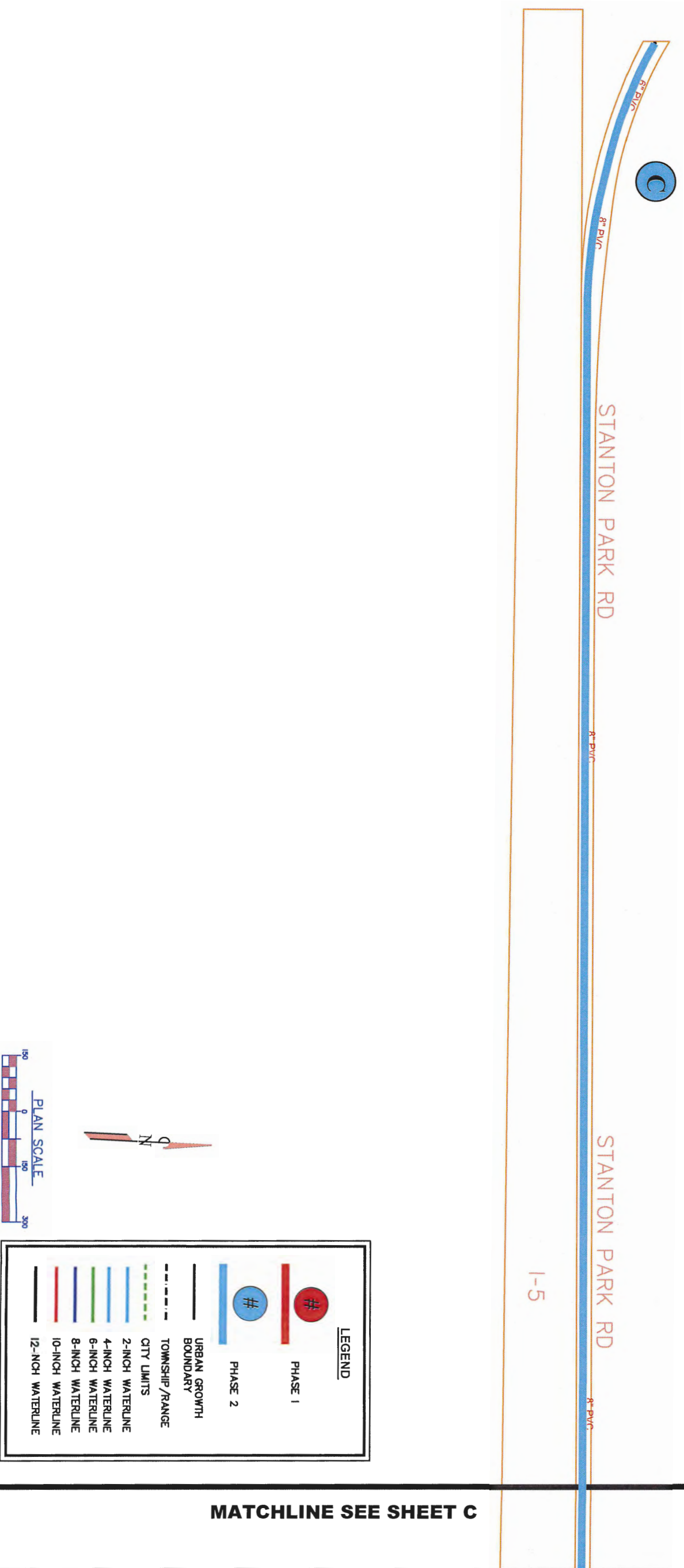
James St., Gross Lp. to Reynolds Tank: Replace existing 10-inch line with the a 10-inch line. The existing 10-inch diameter line is leaking and in poor condition. The total improvement length is approximately 1,825 feet.

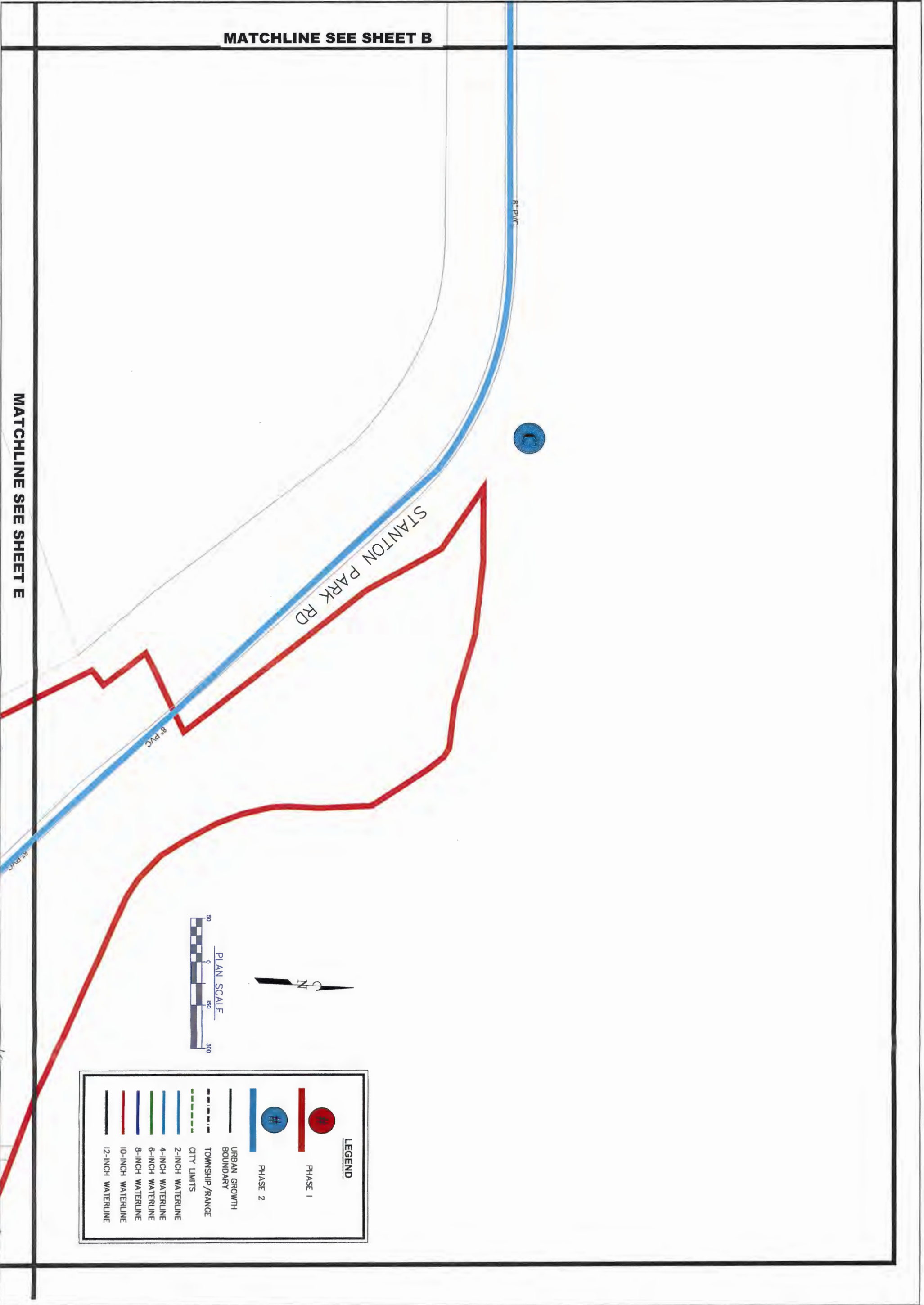
4. 8-inch Water Main Upsizing Improvements (Total Cost: \$621,000)

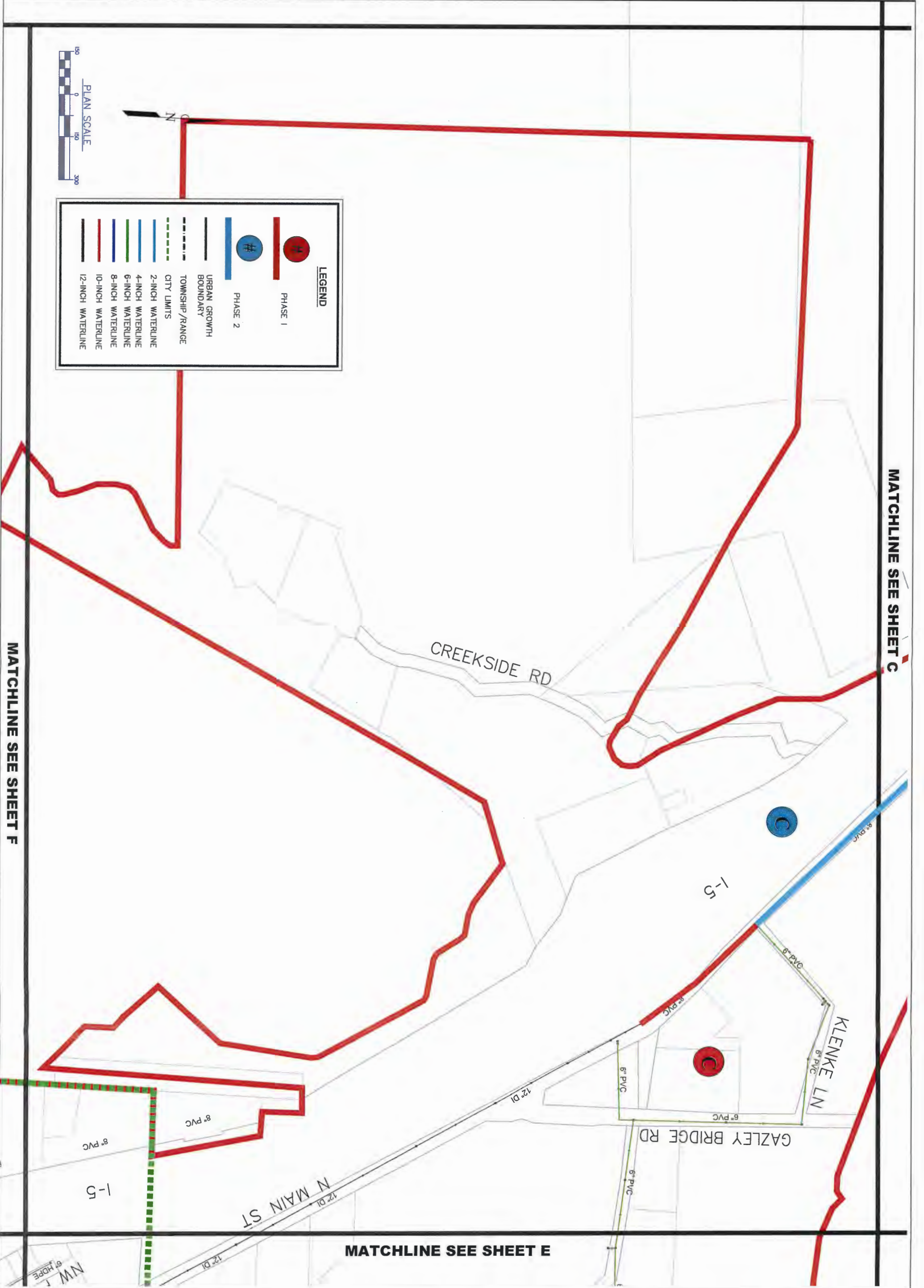
Based on computer modeling of the City's water distribution system, fire flows available to certain areas are below those required:

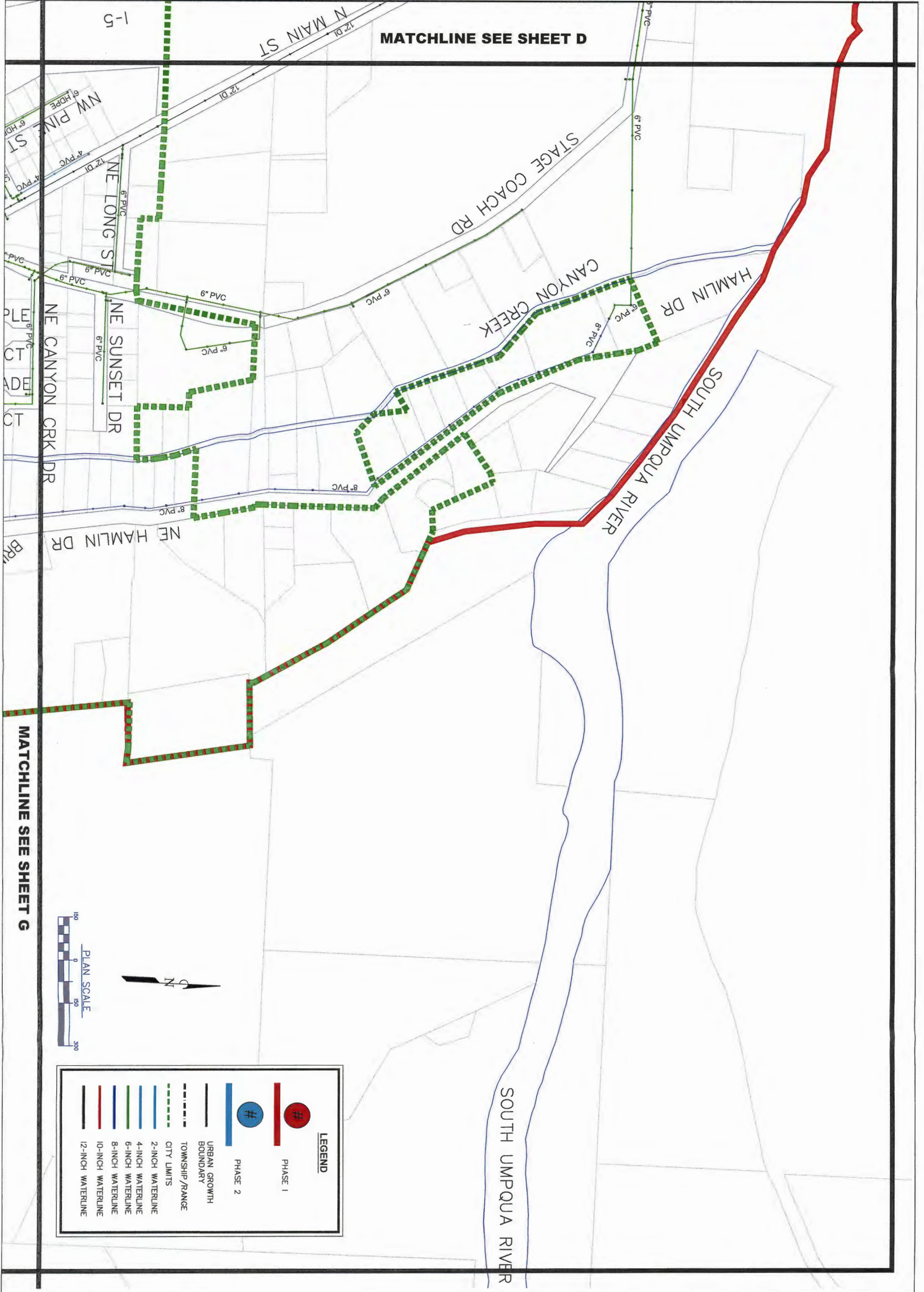


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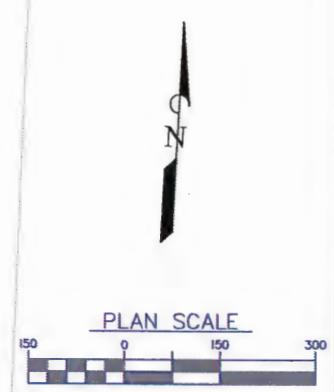








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LEGEND

PHASE I

PHASE 2

URBAN GROWTH BOUNDARY

TOWNSHIP/RANGE

CITY LIMITS

2-INCH WATERLINE

4-INCH WATERLINE

6-INCH WATERLINE

8-INCH WATERLINE

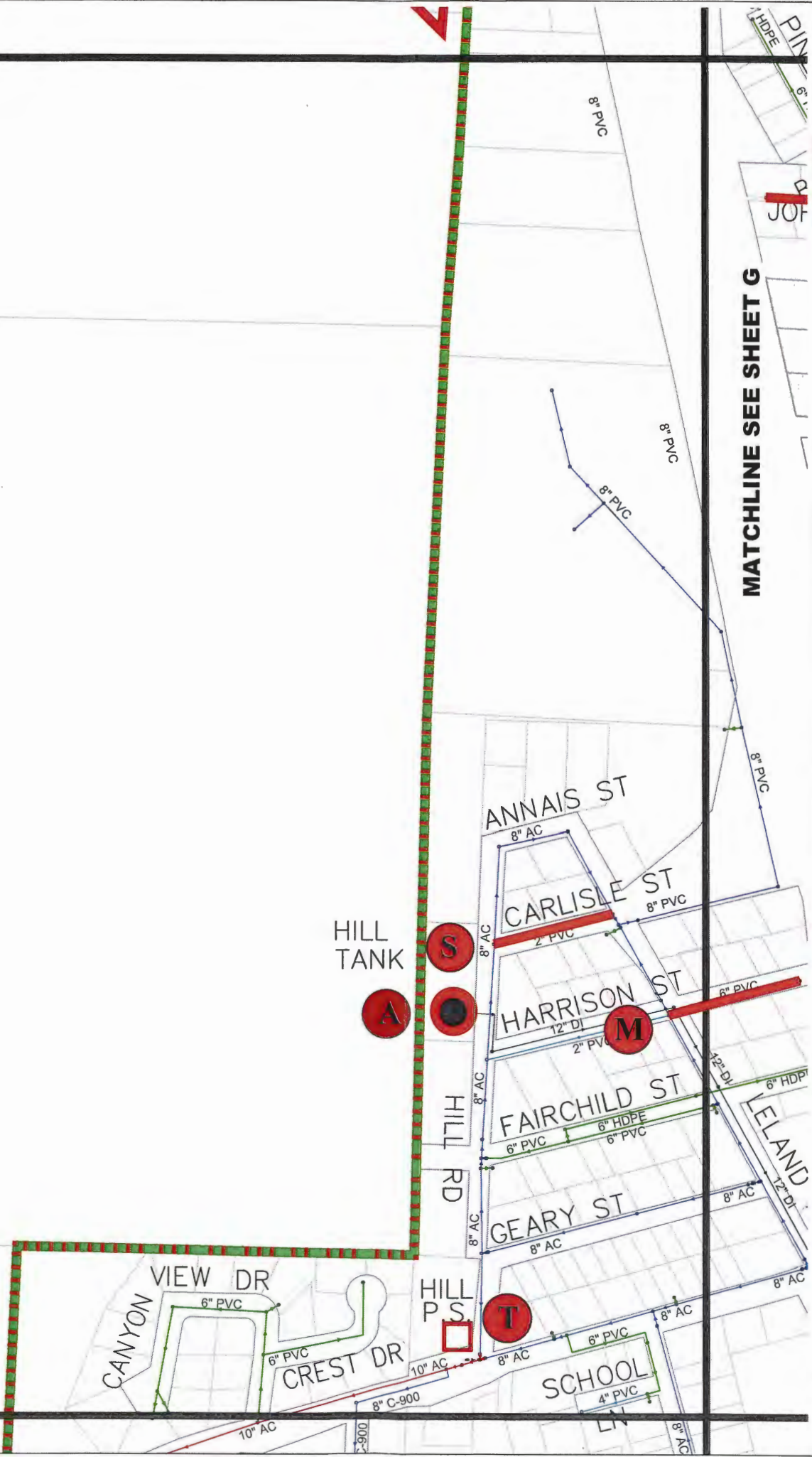
10-INCH WATERLINE

12-INCH WATERLINE

MATCHLINE SEE SHEET D

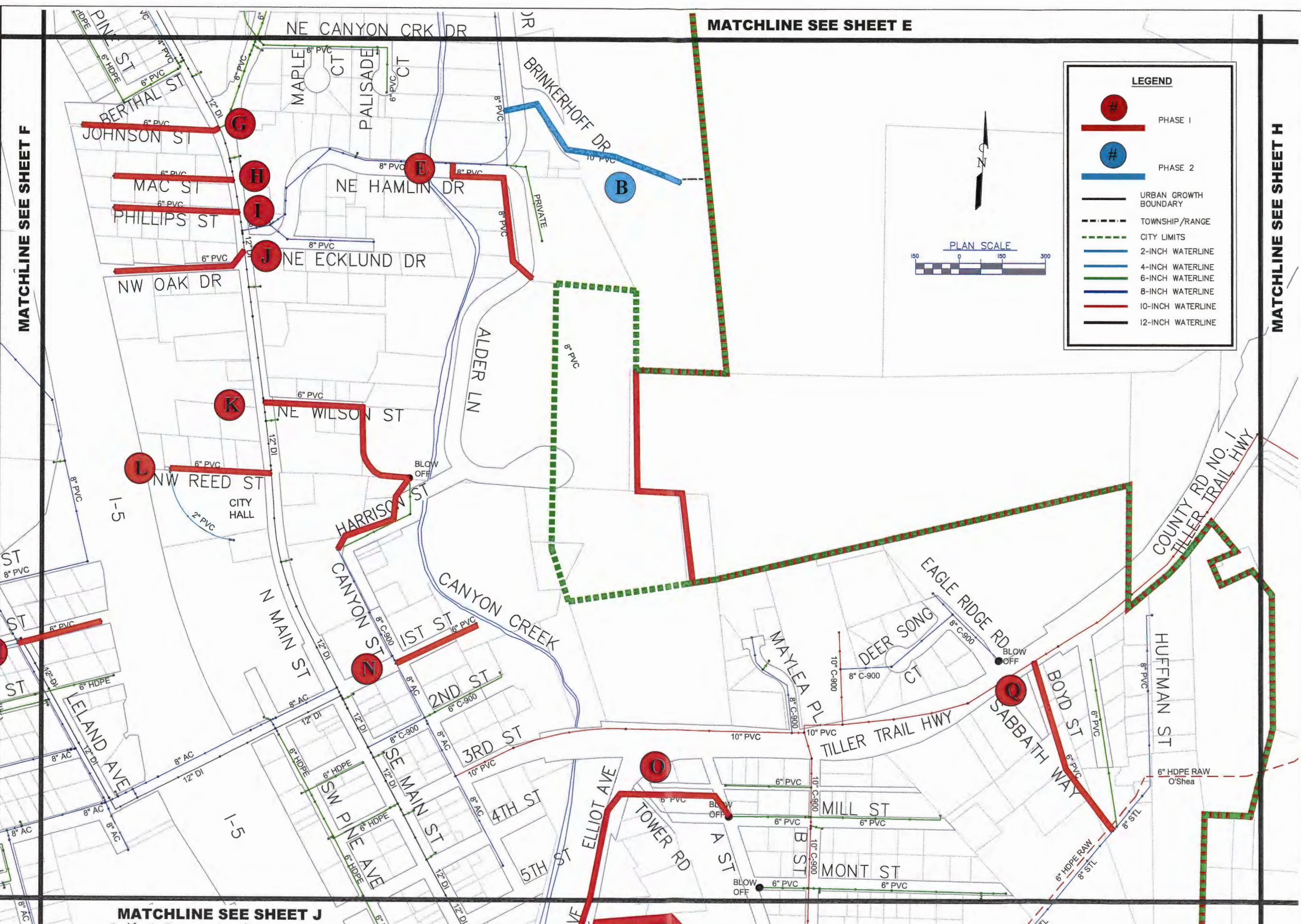
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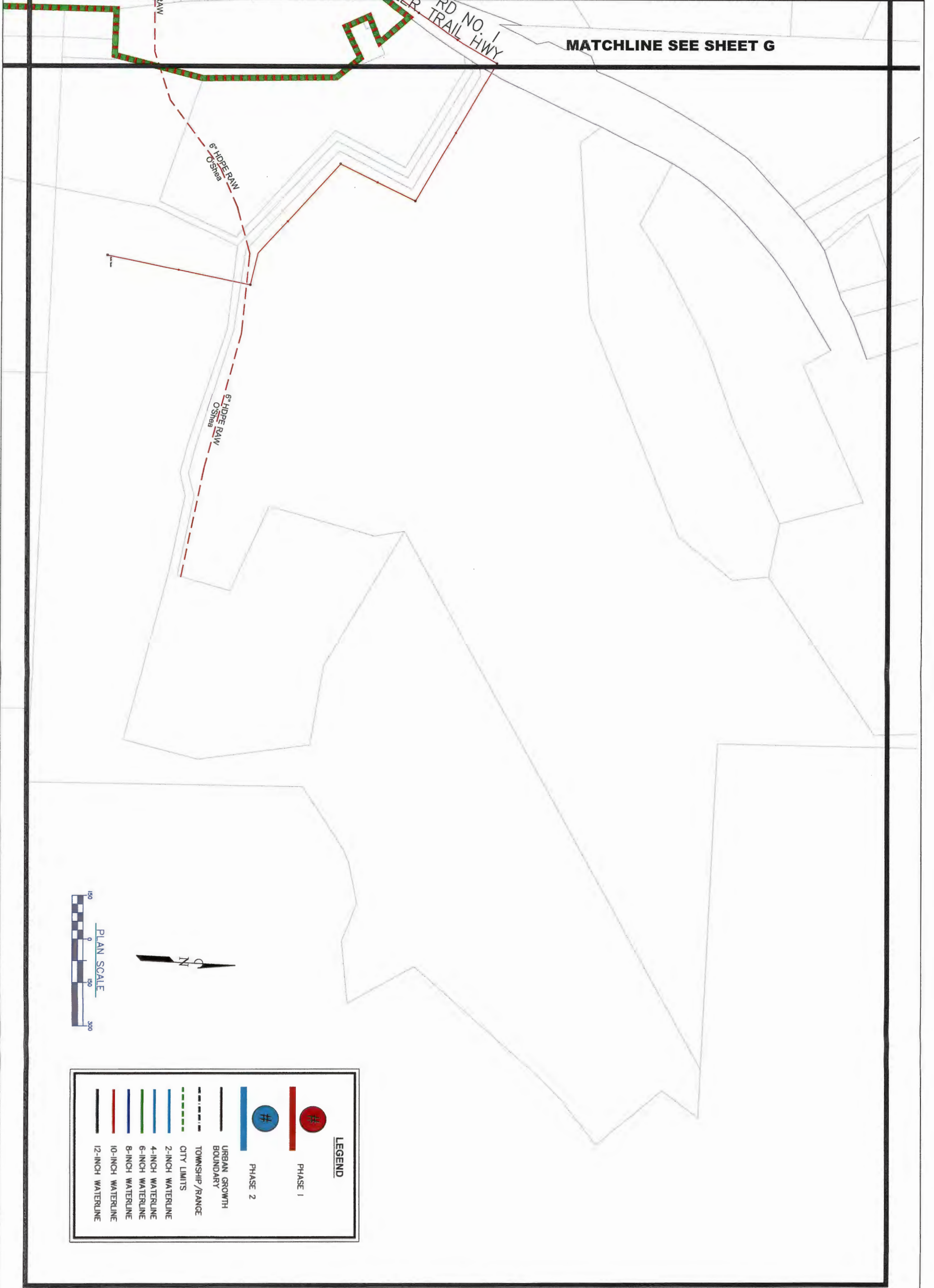
CITY OF CANYONVILLE		FIGURE NO. 9.2.1F
IMPROVEMENTS - WATER DISTRIBUTION SYSTEM MAP		
THE DYER PARTNERSHIP ENGINEERS & PLANNERS		
DATE:	AUGUST, 2014	PROJECT NO.: 180.03

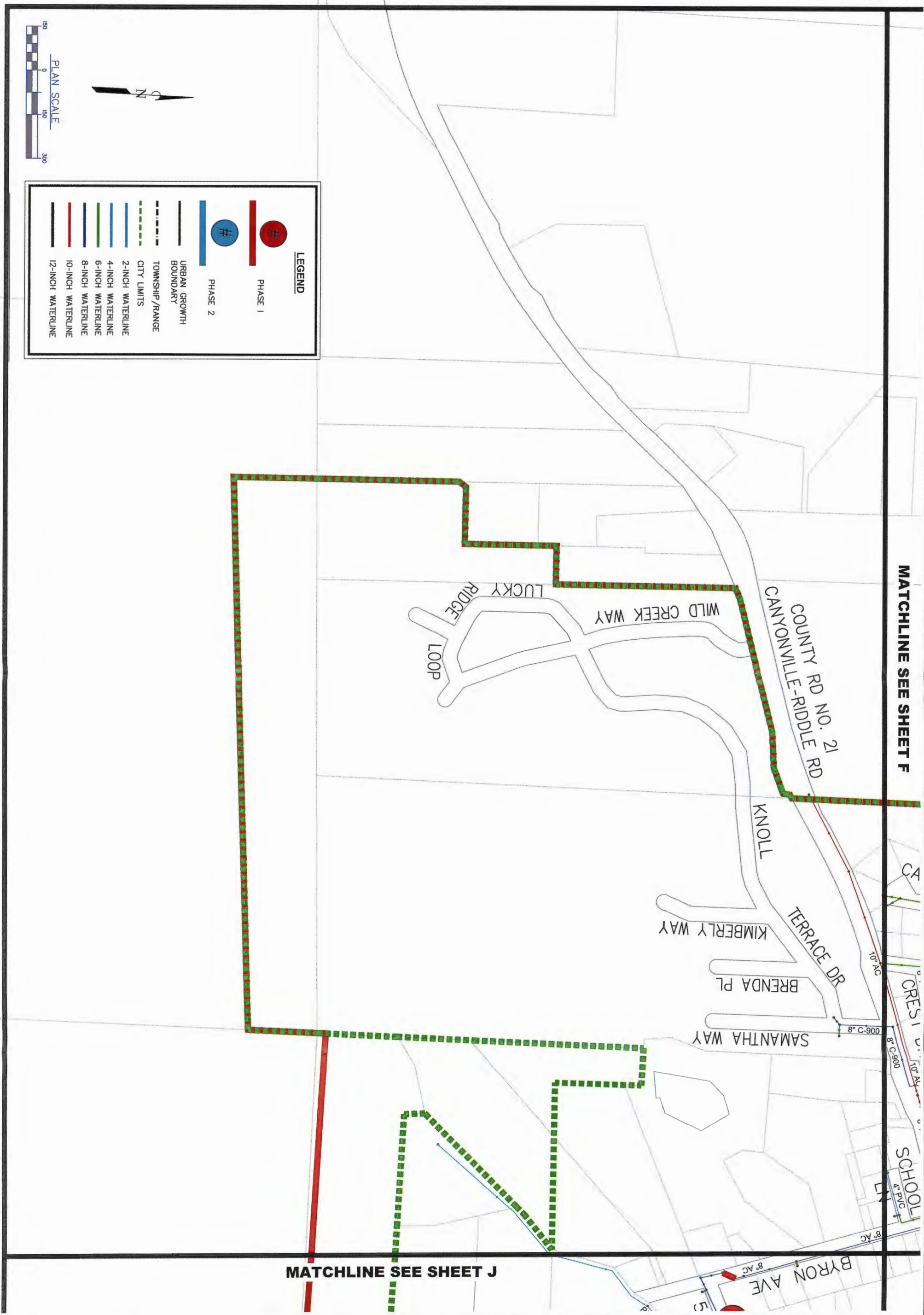
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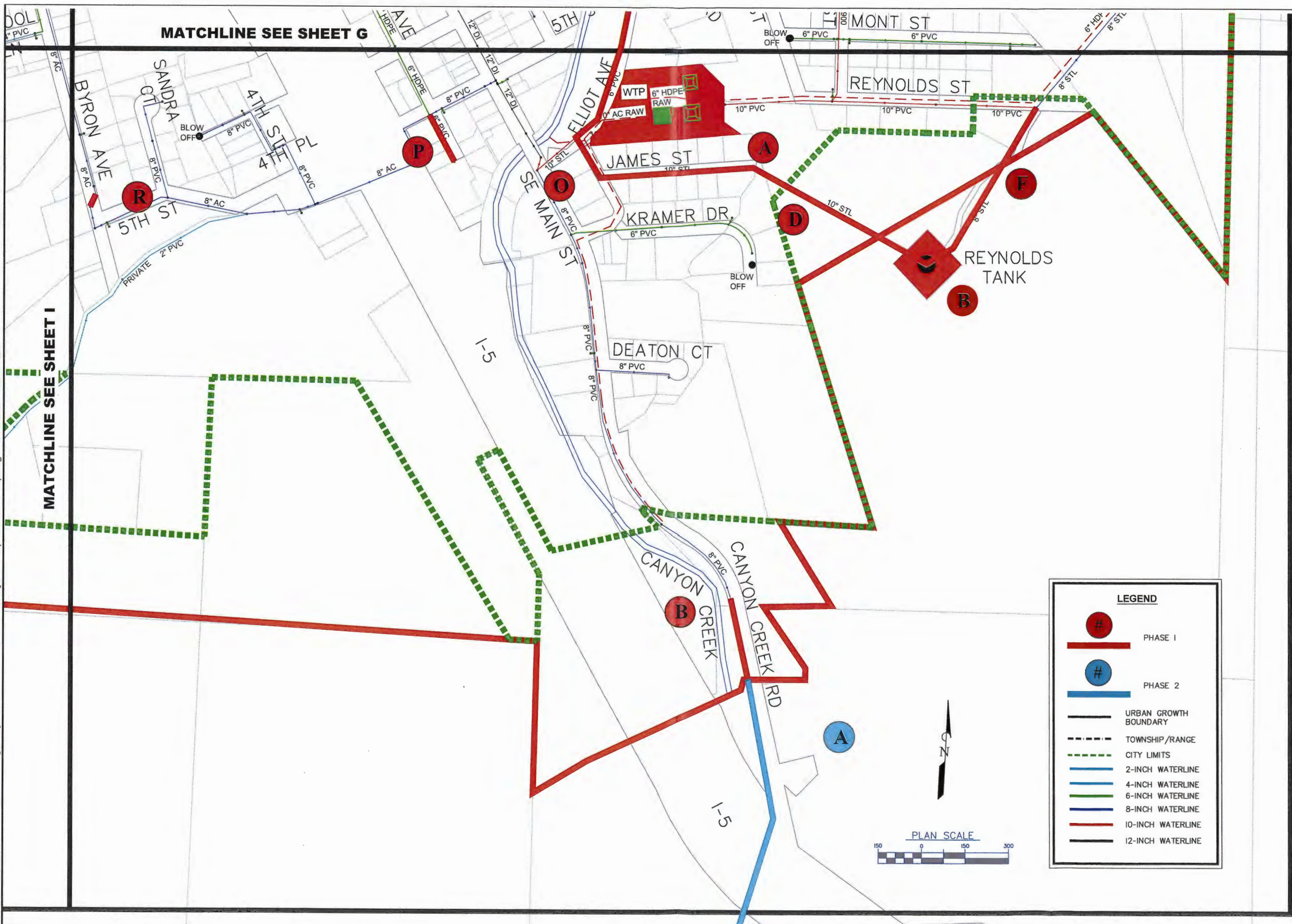
LEGEND

	PHASE 1
	PHASE 2
	URBAN GROWTH BOUNDARY
	TOWNSHIP/RANGE
	CITY LIMITS
	2-INCH WATERLINE
	4-INCH WATERLINE
	6-INCH WATERLINE
	8-INCH WATERLINE
	10-INCH WATERLINE
	12-INCH WATERLINE

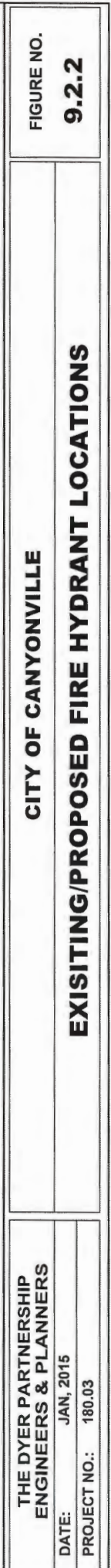




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CITY OF CANYONVILLE		FIGURE NO.
IMPROVEMENTS - WATER DISTRIBUTION SYSTEM MAP		9.2.1J
THE DYER PARTNERSHIP ENGINEERS & PLANNERS		
DATE:	AUGUST, 2014	
PROJECT NO.:	180.03	



Stanton Park Rd., Klenke Ln. to Riepe Ct.: This will connect an existing 12-inch with the new 8-inch line. The new 8-inch diameter line will begin at the existing 12-inch water main located at the intersection of Stanton Park Rd. and Riepe Ct. The line will continue north to the intersection of Stanton Park Rd. and Klenke Ln.

The total improvement length is approximately 290 feet.

Alder Lane, from point on Hamlin to point on Alder Lane: The existing 4-inch line is undersized for adequate fire flows and needs to be replaced with an 8-inch line.

The total improvement length is approximately 680 feet.

Reynolds Tank Access Rd., from Reynolds Tank to Reynolds St.: The existing 8-inch line needs replacement due to leakage and exposure to damage. The 8-inch line is adequate for fire flows. A new 8-inch diameter line will begin at Reynolds Tank and continue east to Reynolds St. following a new route that is located where it is not exposed to soil movement or trees falling on the line.

The total improvement length is approximately 775 feet.

SW Byron Ave., from SW 5th St. to point on Byron: This will connect existing 8-inch lines. The new 8-inch diameter line will begin at the existing 8-inch water main located at the intersection of SW Byron Ave. and 5th St. The line will continue north to the end point of the existing 8-inch line on Byron.

The total improvement length is approximately 80 feet.

5. **6-inch Water Main Upsizing Improvements (Total Cost: \$1,222,000)**

Based on computer modeling of the City's water distribution system, fire flows available to certain areas are below those required:

NW Johnson St., from west end of Johnson to N. Main St.: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.

The total improvement length is approximately 450 feet.

NW Mac St., from west end of NW Mac to N. Main St.: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.

The total improvement length is approximately 485 feet.

NW Phillips St., from the west end of NW Phillips to N. Main St.: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.

The total improvement length is approximately 420 feet.

NW Oak St., from the west end of NW Oak to N. Main St.: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.

The total improvement length is approximately 400 feet.

NE Wilson St., from N. Main to end, along Harrison to Canyon St.: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.

The total improvement length is approximately 550 feet.

NW Reed St., from N. Main to end: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.

The total improvement length is approximately 425 feet.

NW Harrison St., from west end to east end: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.
The total improvement length is approximately 525 feet.

E 1st St., from Canyon St to Canyon Creek: The existing 2-inch line is undersized for adequate fire flows and needs to be replaced with a 6-inch line.
The total improvement length is approximately 480 feet.

SE Elliot Ave., from Gross Lp. to A St.: The existing 3-inch water mains must be upsized in order to deliver adequate fire flow. This line will begin from Gross Loop and run east along Elliot Ave. past the tennis courts to A St..
The total improvement length is approximately 1,350 feet.

SW Pine Ave., from SE 5th St. to end.: The existing 2-inch galvanized waterline must be upsized in order to deliver adequate fire flow. This line will begin from SE 5th St. and run southeast along SW Pine Ave. to the end of the street.
The total improvement length is approximately 200 feet.

Boyd St., from SE 5th St. south to the County Rd. No. 1: The existing 2-inch galvanized line is old and undersized for adequate fire flows and needs to be replaced with a 6-inch line.
The total improvement length is approximately 650 feet.

6. 2-inch Water Line Replacement Improvements (Total Cost: \$76,000)

NW Carlisle St., from west end to end near I-5 freeway: The existing 2-inch galvanized line is old and leaking and needs to be replaced with a new 2-inch line.
The total improvement length is approximately 605 feet.

7. Hill Pump Station Improvements (Total Cost: \$143,000)

Hill Pump Station: The existing pump station needs new pumps to meet fire flow for the Canyon View and Crest Drive areas, as shown by computer modeling of fire flows and by the poor fire flows the Fire Chief reported for that area.

9. Fire Hydrant Improvements (Total Cost: \$187,000)

Various locations: The City is lacking fire hydrants in various locations in addition to the areas previously addressed.

10. Repair, Maintenance, and Cathodic Protection for Water Reservoirs (Total Cost: \$411,000)

The Reynolds and Hill Tanks are in need of inspection, interior and exterior recoating, possible replacement of door seals and gaskets, and repair of concrete spalling to protect and extend the tank's service life. In addition, telemetry should be updated, seismic shutoff valves should be installed, and security fencing should be repaired. The City has the tanks regularly inspected but may wish to perform a preliminary survey of the tanks by a corrosion engineer before embarking on this improvement. This preliminary study is estimated to cost from \$4,000 to \$6,000.

A summary of the Phase I improvements is presented in Table 9.2.1.

**TABLE 9.2.1
SUMMARY OF PHASE 1 WATER SYSTEM PROJECTS**

No. as per Fig. 9.3.1	Project Description	Total Project Cost
A	Water Treatment Plant	\$2,272,000
B	Raw Water Intake	\$44,000
C	Stanton Park, connection	\$114,000
D	James St.	\$391,000
E	Alder Lane, Hamlin	\$173,000
F	Reynolds Tank Access Rd.	\$308,000
G	NW Johnson St.	\$126,000
H	NW Mac St.	\$100,000
I	NW Phillips St.	\$73,000
J	NW Oak St.	\$132,000
K	NE Wilson St.	\$127,000
L	NW Reed St.	\$63,000
M	NW Harrison St.	\$100,000
N	E 1 st St.	\$124,000
O	SE Elliot Ave.	\$201,000
P	SW Pine St.	\$64,000
Q	Boyd St.	\$112,000
R	Byron	\$26,000
S	NW Carlisle St.	\$76,000
T	Hill Pump Station Improvements	\$143,000
U	Fire Hydrant Improvements	\$187,000
V	Hill Tank	\$170,000
W	Reynolds Tank	\$241,000
	Total	\$4,956,000

Phase II Improvements

Phase II improvements of this CIP represent projects that should be considered, but in further study may be found to not provide enough of a benefit to support that cost. If the security of water quality in Canyon Creek becomes an issue or if the rate of development drastically changes, these projects should be studied. These projects include a new 0.5 MG tank, raw water piping from the reservoir to the Water Treatment Plant (WTP), and installation of a new water main where few services presently exist. These improvements are discussed in detail below.

Project Descriptions

1. 12-inch Raw Water Line Installation

Currently water is released from Win Walker Reservoir and travels from the reservoir to the raw water intake via Canyon Creek. Canyon Creek travels through forest land and is paralleled by a forest access road, a gas line, and an electric transmission line before it arrives at Interstate Highway 5, the freeway that is a major route between California and Washington states. Canyon Creek runs along the freeway and is crossed by it seven times before reaching the raw water

intake. Canyon Creek is vulnerable to forest fires, spills from leaking lines or transformers, spills from vehicular accidents, and possible terrorist activity. The City has a program in place to deal with any of these possible threats to Canyon Creek's water quality. The total improvement length is approximately 42,250 feet.

2. New 0.5 Million Gallon Tank

Installation of a new tank is needed as per fire flow requirements and ISO standards. This tank may not be necessary if the proposed Falk subdivision includes a tank that is sized and located such that it provides the necessary fire flows and pressures.

3. 8-inch Water Main Upsizing Improvements

Based on Fire Chief Ray Brown's comments and on computer modeling of the City's water distribution system, fire flows available to certain areas are below those required:

Stanton Park Rd., from Klenke Ln. to DFPA: The existing 6-inch diameter line that runs from the intersection of Klenke Ln. and Stanton Park Rd. to Stanton Park needs to be replaced due to inadequate fire flow availability. A new 8-inch diameter PVC line will provide the necessary flows for fire flow. The existing 4-inch diameter line currently running from Stanton Park to the end of the line at the DFPA (Douglas Forest Protective Association), will also need to be upsized to a new 6-inch water line to increase fire flows. This water line belongs to the City of Canyonville, but is located outside city-limits and the UGB. The total improvement length is approximately 7,740 feet.

A summary of the Phase II improvements is presented in Table 9.2.3.

**TABLE 9.2.3
SUMMARY OF PHASE II WATER SYSTEM PROJECTS**

No. as per Fig. 9.3.1	Project Description
A	Canyon Creek Raw Water Line
B	New 0.5 MG Tank
C	Stanton Park Rd.

SECTION 10:
IMPROVEMENT PHASING AND FINANCING

Improvement Phasing and Financing

Most communities are unable to finance major infrastructure improvements without some form of governmental funding assistance such as low-interest loans or grants. In this Section, a number of major Federal and State funding programs and local funding mechanisms that are appropriate for the recommended improvements are discussed.

10.1 Grant and Loan Programs

Some level of outside funding assistance in the form of grants or low interest loans may be necessary to make the proposed improvement projects affordable for the City of Canyonville and its citizens. The amount and types of outside funding will dictate the amount of local funding that the City must secure. In evaluating grant and local programs, the major objective is to select a program, or a combination of programs, which are most applicable and available for the intended project.

A brief description of the major Federal and State funding programs that are typically utilized to assist qualifying communities in the financing of infrastructure improvement programs is given below. Each of the government assistance programs has particular prerequisites and requirements. These assistance programs promote such goals as aiding economic development, benefiting areas of low to moderate-income families, and providing for specific community improvement projects. With each program having its specific requirements, not all communities or projects may qualify for each of these programs.

10.1.1 Economic Development Administration (EDA) Public Works Grant Program

The EDA Public Works Grant Program, administered by the U.S. Department of Commerce, is aimed at projects which directly create permanent jobs or remove impediments to job creation in the project area. Thus, to be eligible for this grant, a community must be able to demonstrate the potential to create jobs from the project. Potential job creation is assessed with a survey of businesses to demonstrate the prospective number of jobs that might be created if the proposed project were completed.

Proposed projects must be located within an EDA-designated Economic Development District. Priority consideration is given to projects that improve opportunities for the establishment or expansion of industry and that create or retain private sector jobs in both the near-term and the long-term. Communities that can demonstrate that the existing system is at capacity (i.e. moratorium on new connections) have a greater chance of being awarded this type of grant. EDA grants are usually in the range of 50 to 80 percent of the project cost; therefore some type of local funding is also required. Grants typically do not exceed one million dollars.

10.1.2 Water and Waste Disposal Loans and Grants (Rural Development)

The Rural Development Administration (Rural Development) manages the loans and grants for wastewater programs that used to be overseen by the Farmers Home Administration. While these programs are administered by a new agency, the program requirements are essentially the same. The

Rural Utilities Service (RUS) is one of three entities that comprise the USDA's Rural Development mission area. The RUS supports various programs that provide financial and technical assistance for development and operation of safe and affordable water supply systems and sewer and other forms of waste disposal facilities.

Rural Development has the authority to make loans to public bodies and non-profit corporations to construct or improve essential community facilities. Grants are also available to applicants who meet the median household income (MHI) requirements. Eligible applicants must have a population of less than 10,000. Priority is given to public entities in areas smaller than 5,500 people to restore a deteriorating water supply, or to improve, enlarge, or modify a water facility and/or inadequate waste facility. Preference is given to requests that involve the merging of small facilities and those serving low-income communities.

In addition, borrowers must meet the following stipulations:

- Be unable to obtain needed funds from other sources at reasonable rates and terms,
- Legal capacity to borrow and repay loans, to pledge security for loans, and to operate and maintain the facilities or services,
- Financially sound and able to manage the facility effectively,
- Financially sound facility based on taxes, assessments, revenues, fees, or other satisfactory sources of income to pay all facility costs including operation and maintenance, and to retire the indebtedness and maintain a reserve,
- Water and waste disposal systems must be consistent with any development plans of state, multi-jurisdictional area, county, or municipality in which the proposed project is located. All facilities must comply with federal, state, and local laws including those concerned with zoning regulations, health and sanitation standards, and the control of water pollution.

Loan and grant funds may be used for the following types of improvements:

- Construct, repair, improve, expand, or otherwise modify waste collection, pumping, treatment, or other disposal facilities. Facilities to be financed may include such items as sewer lines, treatment plants (including stabilization ponds), storm sewer facilities, sanitary landfills, incinerators, and necessary equipment.
- Legal and engineering costs connected with the development of facilities,
- Other costs related to the development of the facility, including the acquisition of rights-of-way and easements, and the relocation of roads and utilities,
- Finance facilities in conjunction with funds from other agencies or those provided by the applicant.

Interim commercial financing will normally be used during construction and Rural Development funds will be available when the project is completed. If interim financing is not available or if the project cost is less than \$50,000, multiple advances of Rural Development funds may be made as construction progresses.

The maximum term on all loans is 40 years. However, no repayment period will exceed any statutory limitation on the organization's borrowing authority, nor the useful life of the improvement of the facility to be financed. Interest rates are set quarterly and are based on current market yields for municipal obligations. Current interest rates may be obtained from any Rural Development office.

The following rates currently apply for the Rural Development program:

Market rate. Those applicants pay the market rate whose median household income (MHI) of the service area is more than the \$41,230 (Oregon non-metropolitan MHI). The market rate is currently 3.375%.

Intermediate rate. The intermediate rate is paid by those applicants whose MHI of the service area is less than \$41,230 but greater than \$32,984. The intermediate rate is currently 3.0%.

Poverty line rate. Those applicants whose MHI of the service area is below \$32,984 (80% of the non-metropolitan MHI) pay the lowest rate. Improvements must also be to correct a regulatory violation or health risk issue to qualify for this lowest rate. The current poverty line rate is 2.25%.

Maximum grant amounts, based on MHI, are provided in Table 10.1.2. The grants are calculated on the basis of eligible costs that do not include the costs attributable to reserve capacity or interim financing. In addition, grant funds cannot be used to reduce total user costs below that of comparable communities funded by RUS.

**TABLE 10.1.2
RURAL DEVELOPMENT GRANT FUNDS/INTEREST RATES
BASED ON MEDIAN HOUSEHOLD INCOME**

Median Household Income (MHI)	Maximum Grant ^(a)	Interest Rate ^(b)
<\$32,684	75%	2.25%
\$32,984 - \$41,230	45%	3.00%
>\$41,230	0%	3.375%

^(a) MHI<32,984 may be considered for a grant up to 75% of eligible project cost if the project is needed to alleviate a health or sanitary problem.

^(b) Rates are current as of this quarter.

Eligibility for the Rural Water and Waste Disposal grants and loans is currently based on 2000 Census data. The 2000 MHI for the city of Canyonville is \$27,674. The MHI for 2012 is \$37,779. At this MHI, Canyonville may be eligible for a maximum grant of up to 45 percent. The City may be eligible for a Rural Development loan at rate of 3.0 percent.

Eligibility for the RD grants and loans are currently based on 2010 Census data and Canyonville qualifies for this assistance. The MHI for households in Canyonville, based on 2010 Census data, is \$37,336. At this MHI, the City is eligible for a maximum grant of up to 75 percent and a loan at the poverty rate, if they are in violation.

Other restrictions and requirements may be associated with these loans and grants. If the City becomes eligible for grant assistance, the grant will apply only to eligible project costs and is only available after a City has incurred long-term debt resulting in an annual debt service obligation equal to one-half of one

percent of the MHI. To receive a Rural Utilities Service loan, the City must secure bonding authority, usually in the form of general obligation or revenue bonds.

Applications for financial assistance are made at area offices of Rural Development. For additional information on Rural Development loans and grant programs, call 1-541-673-0136 or visit the RUS website at http://www.rurdev.usda.gov/UWEP_HomePage.html. The Oregon Rural Development website is http://www.rurdev.usda.gov/OR_Home.html.

10.1.3 Technical Assistance and Training Grants (TAT)

Available through the USDA Rural Utilities Service (RUS) as part of the Water and Waste Disposal programs, technical assistance grants are intended to provide technical assistance to associations on a wide range of issues relating to the delivery of water and waste disposal services.

Rural communities with populations of less than 10,000 persons are eligible along with private, nonprofit organizations that have been granted tax-exempt status by the IRS. TAT funds may be used for the following activities:

- Identify and evaluate solutions to water and/or waste-related problems for associations in rural areas.
- Assist entities with preparation of applications for Water and Waste Disposal loans and grants.
- Provide training to association personnel in order to improve the management, operation and maintenance of water and/or waste disposal facilities.
- Pay expenses related to providing the technical assistance and/or training.

Grants may be made for up to 100% of the eligible project costs. Applications are filed with any USDA Rural Development office. For additional information on Rural Development loans and grant programs, call 1-541-673-0136 or visit the RUS website at <http://www.rurdev.usda.gov/UWP-wwtat.htm>.

10.1.4 (Oregon) Community Development Block Grant (CDBG) Program

The Community Development Block Grant Program section of the Infrastructure Finance Authority (IFA) administers the CDBG Program. Grants and technical assistance are available to develop livable urban communities for persons of low and moderate incomes by expanding economic opportunities and providing housing and suitable living environments.

Non-metropolitan cities and counties in rural Oregon can apply for and receive grants. Oregon tribes, urban cities (Ashland, Bend, Corvallis, Eugene, Gresham, Hillsboro, Medford, Portland, Salem and Springfield) and counties (Clackamas, Multnomah, Washington) receive funds directly from HUD.

All projects must meet one of three national objectives:

1. The proposed activities must benefit low- and moderate-income individuals.
2. The activities must aid in the prevention or elimination of slums or blight.
3. There must be an urgent need that poses a serious and immediate threat to the health or welfare of the community.

Funding amounts are based on:

- The applicant's need;
- the availability of funds; and

- other restrictions defined in the program's guidelines.

The following are the maximum grants possible for any individual project, by category:

- Economic Development: \$750,000
- Microenterprise: \$100,000
- Public Works
 - Water and Wastewater Improvements: \$3,000,000 except preliminary/engineering planning grants: \$150,000
 - Downtown Revitalization: \$400,000
 - Off-site Infrastructure: \$225,000
- Community/Public Facilities: \$1,500,000
- Community Capacity/Technical Assistance: no specific per-award-limit but limited overall funds
- Emergency Grants: \$500,000
- Regional Housing Rehabilitation: \$400,000
- Emergency Projects: \$500,000

For additional information on the CDBG programs, call 1-866-467-3466 or visit the IFA website at <http://www.orinfrastructure.org/Learn-About-Infrastructure-Programs/Interested-in-a-Community-Development-Project/Community-Development-Block-Grant/>.

10.1.5 Special Public Works Fund

The Special Public Works Fund (SPWF) provides funds for publically-owned facilities that support economic and community development in Oregon. Special Public Works Funds provide funding for construction and/or improvement of infrastructure needed to support industrial, manufacturing and certain types of commercial development. Funds are available to public entities for:

- Planning;
- designing;
- purchasing;
- improving and constructing publically owned facilities;
- replacing publically owned essential community facilities; and
- emergency projects as a result of a disaster.

Public agencies that are eligible to apply for funding are:

- Cities;
- counties;
- county service districts (organized under ORS Chapter 451);
- tribal councils;
- ports;
- districts as defined in ORS 198.010; and
- airport districts (ORS 838).

Facilities and infrastructure projects that are eligible for funding are:

- Airport facilities;
- buildings and associated equipment;
- restoration of environmental conditions on publically owned industrial lands;
- port facilities, wharves and docks;

- the purchase of land, rights-of-way and easements necessary for a public facility;
- telecommunications facilities;
- railroads;
- roadways and bridges;
- solid waste disposal sites;
- storm drainage systems;
- wastewater systems; and
- water systems.

Loans

Loans for development (construction) projects range from less than \$100,000 to \$10 million. The Infrastructure Finance Authority offers very attractive interest rates that reflect tax-exempt market rates for highly qualified borrowers. Initial loan terms can be up to 25 years or the useful life of the project, whichever is less.

Grants

Grants are available for construction projects that create or retain traded-sector jobs. They are limited to \$500,000 or 85 percent of the project cost, whichever is less, and are based on up to \$5,000 per eligible job created or retained.

Limited grants are available to plan industrial site development for publically owned sites and for feasibility studies.

For additional information on IFA programs, call 1- 503-986-0123 or visit the IFA website at <http://www.orinfrastructure.org/Learn-About-Infrastructure-Programs/Interested-in-a-Community-Development-Project/Special-Public-Works-Fund/>.

10.1.6 Water/Wastewater Financing Program

Water/Wastewater Financing is available for construction and/or improvement of water and wastewater systems to meet state and federal standards. This loan program funds the design and construction of public infrastructure needed to ensure compliance with the Safe Drinking Water Act or the Clean Water Act.

The public entities that are eligible to apply for the program are:

- Cities;
- counties;
- county service districts (organized under ORS Chapter 451);
- tribal councils;
- ports; and
- special districts as defined in ORS 198.010.

The proposed project must be owned and operated by a public entity as listed above. Allowable funded project activities may include:

- Reasonable costs for construction improvement or expansion of drinking water system, wastewater system or storm water system;
- water source, treatment, storage and distribution;
- wastewater collection, treatment and disposal facilities;
- storm water system;

- purchase of rights-of-way and easements necessary for construction;
- design and construction engineering; or
- planning/technical assistance for small communities.

To be eligible for funding:

- A system must have received, or is likely to soon receive, a Notice of Non-Compliance by the appropriate regulatory agency or is for a facility plan or study required by a regulatory agency; and
- a registered Professional Engineer will be responsible for the design and construction of the project.

Funding and Uses

Loan and grant amounts are determined by a financial analysis of the applicant's ability to afford a loan (debt capacity, repayment sources and other factors).

Loans

Program guidelines, project administration, loan terms and interest rates are similar to the Special Public Works Fund program. The maximum loan term is 25 years or the useful life of the infrastructure financed, whichever is less. The maximum loan amount is \$10 million per project through a combination of direct and/or bond-funded loans. Recently IFA, was offering lower, reduced interest rates for municipalities whose household income is less than the statewide median income. The current terms of this loan are for 25 years at 1.94 percent interest.

Loans are generally repaid with utility revenues or voter-approved bond issues. A limited tax general obligation pledge also may be required. "Creditworthy" borrowers may be funded through the sale of state revenue bonds.

Grants

Grant awards up to \$750,000 may be awarded based on a financial review.

An applicant is not eligible for grant funds if the applicant's annual median household income is equal to or greater than 100 percent of the state average median household income for the same year.

Funding for Technical Assistance

The Infrastructure Finance Authority offers technical assistance with financing for municipalities with populations of less than 15,000. The funds may be used to finance preliminary planning, engineering studies and economic investigations.

Technical assistance projects must be in preparation for a construction project that is eligible and meets the established criteria.

- Grants up to \$20,000 may be awarded per project.
- Loans up to \$50,000 may be awarded per project.

Interested applicants should contact the Oregon Business Development Department (OBDD) prior to submitting an application. Applications are accepted year-round. For additional information on this IFA program, call 1-503-986-0123 or visit the IFA website at <http://www.orinfrastructure.org/Learn-About-Infrastructure-Programs/Interested-in-a-Water-or-Wastewater-Improvement-Project/water-wastewater-financing/>.

10.1.7 Department of Environmental Quality, Clean Water State Revolving Fund (CWSRF)

The Clean Water State Revolving Fund loan program is administered by DEQ and provides low-cost loans for the planning, design or construction of various projects that prevent or mitigate water pollution. The Oregon Department of Environmental Quality administers the program. Eligible agencies include Indian tribal governments, cities, counties, sanitary districts, soil and water conservation districts, irrigation districts, various special districts and certain intergovernmental entities.

Multiple types of loans are available for planning, design, construction, emergencies, urgent repairs and local community projects. A portion of the funds are reserved for small communities, planning or green projects.

Interest rates for the loan program change quarterly based on a percentage of the national municipal bond rate. Those percentages vary from 25 percent to 65 percent of the bond rate. Current CWSRF interest rates range from just over 1.0% to 2.0%, depending on the term of the loan. Different interest rates and other financial requirements apply to different loans. Rates are adjusted quarterly, based on the average Bond Buyer Rates of the previous quarter as published by the Federal Reserve. A 0.50% administrative fee may be added to the loan interest rate. When a loan is signed, the interest rate is fixed for the life of the loan.

Below are the approximated interest rates.

**TABLE 10.1.7
CWSRF INTEREST RATES**

Loan Type	Repayment Term	Annual Interest Rate
Planning	5 years	0.90 %
Design/Construction	5 years	0.90 %
Design/Construction	10 years	1.1 %
Design/Construction	15 years	1.3 %
Design/Construction	30 years	1.6 %

All eligible proposed projects are ranked based on their application information. Points are assigned based on specific ranking criteria, which include: 1) the anticipated benefit for water quality or public health; 2) potential water quality or public health consequences of not funding the project; and 3) other considerations such as education and outreach. State rules for CWSRF are designed to make loans more affordable for small cities by adjusting the annual loan fee, loan interest rates and providing principal forgiveness. Small cities of less than 10,000 population having less than the Oregon MHI receive first priority.

The Intended Use Plan is one part of Oregon's annual SRF capitalization grant application. This plan includes lists of eligible projects ranked in priority order. Projects which are allocated funds are placed on the Funded List. Unfunded projects are placed on the Planning List to receive funds if any of the Funded List projects do not complete the loan process. Projects identified on the Funded List from prior years which have not been initiated are placed on a Supplemental List.

Obtaining SRF funding requires an approved Wastewater Facilities Plan, the submission of an application, preparation of an environmental report on the project, a land use compatibility statement from a county planning official, and a copy of the user charge system. There are additional

requirements depending on the nature of the project. An applicant needs to contact a DEQ Project Officer to discuss the project and find out what is required.

For additional information on this and other DEQ programs, call Bob Haberman at 1-800-844-8467 or visit the DEQ website at <http://www.deq.state.or.us/wq/loans/loans.htm>.

10.1.8 Oregon Department of Energy, Small Scale Energy Loan Program (SELP)

The SELP program offers loans to projects whose purpose is to promote energy conservation and renewable energy resource development. Eligible applicants include cities, counties, special districts, individuals, and non-profit groups. Loans will cover up to 100% of construction costs, including engineering, fees, and studies. The finished project must at least break even in power costs.

The program offers low-interest loans for projects that:

- Conserve natural gas, electricity, oil, or other source of energy,
- produce energy from renewable resources such as water, wind, geothermal, solar, biomass, waste materials or waste heat,
- use recycled materials to create products.

Interested parties should contact the Oregon Office of Energy for details. For additional information on the Office of Energy programs, call 1-503-378-4040 or visit the Office of Energy website at <http://oregon.gov/ENERGY/>

10.1.9 Oregon Department of Energy, Business Energy Tax Credit

The Business Energy Tax Credit was revamped in 2001 to allow public entities to participate. The State of Oregon Department of Energy offers a tax credit of 35% of project costs, taken over a five-year period, for qualifying capital improvements that reduce energy use. Requirements for projects are similar to that of the SELP program. Public entities do not pay taxes and so are not eligible for a direct tax credit, but may sell their credit to private businesses at a discounted rate, usually about 28%. Lighting retrofits, Variable Frequency Drives (VFD), efficient motors, and controls are typical projects that qualify for funding.

10.2 Local Funding Sources

The amount and type of local funding obligations for infrastructure improvements will depend, in part, on the amount of grant funding anticipated and the requirements of potential loan funding. Local revenue sources for capital expenditures include *ad valorem* taxes, various types of bonds, wastewater service charges, connection fees, and system development charges. Local revenue sources for operating costs include *ad valorem* taxes and wastewater service charges. The following sections identify those local funding sources and financing mechanisms that are most common and appropriate for the improvements identified in this study.

10.2.1 General Obligation Bonds

A general obligation (G.O.) bond is backed by the full faith and credit of the issuer. For payment of the principal and interest on the bond, the issuer may levy *ad valorem* general property taxes. Such taxes are not needed if revenue from assessments, user charges or other sources are sufficient to cover debt service.

Oregon Revised Statutes limit the maximum term to 40 years for cities. Except in the event that Rural Development Administration will purchase the bonds, the realistic term for which general obligation bonds should be issued is 15 to 20 years. Under the present economic climate, the lower interest rates will be associated with the shorter terms.

Financing of wastewater system improvements by general obligation bonds is usually accomplished by the following procedure:

- Determination of the capital costs required for the improvement,
- An election authorizing the sale of general obligation bonds,
- Following voter approval, the bonds are offered for sale,
- The revenue from the bond sale is used to pay the capital costs associated with the projects.

From a fundraising viewpoint, general obligation bonds are preferable to revenue bonds in matters of simplicity and cost of issuance. Since the bonds are secured by the power to tax, these bonds usually command a lower interest rate than other types of bonds. General obligation bonds lend themselves readily to competitive public sale at a reasonable interest rate because of their high degree of security, their tax-exempt status, and their general acceptance.

These bonds can be revenue-supported, wherein a portion of the user fee is pledged toward payment of the debt service. Using this method, the need to collect additional property taxes to retire the obligated bonds is eliminated. Such revenue-supported general obligation bonds have most of the advantages of revenue bonds, but also maintain the lower interest rate and ready marketability of general obligation bonds. Because the users of the water system pay their share of the debt load based on their water usage rates, the share of that debt is distributed in a fair and equitable manner.

Advantages of general obligation bonds over other types of bonds include:

- The laws authorizing general obligation bonds are less restrictive than those governing other types of bonds.
- By the levying of taxes, the debt is repaid by all property benefited and not just the system users.
- Taxes paid in the retirement of these bonds are IRS-deductible.
- General obligation bonds offer flexibility to retire the bonds by tax levy and/or user charge revenue.

The disadvantage of general obligation bond debt is that it is often added to the debt ratios of the underlying municipality, thereby restricting the flexibility of the municipality to issue debt for other purposes. Furthermore, general obligation bonds are normally associated with the financing of facilities that benefit an entire community and must be approved by a majority vote and often necessitate extensive public information programs. A majority vote often requires waiting for a general election in order to obtain an adequate voter turnout. Waiting for a general election may take years, and too often a project needs to be undertaken in a much shorter amount of time.

10.2.2 Revenue Bonds

Revenue bonds offer some advantages over general obligation bonds and are becoming a more frequently used option. Revenue bonds are payable solely from charges made for the services provided. These bonds cannot be paid from tax levies or special assessments; their only security is the borrower's promise to operate the system in a way that will provide sufficient net revenue to meet the debt service and other obligations of the bond issue.

Many communities prefer revenue bonding, as opposed to general obligation bonding, because it insures that no tax will be levied. In addition, debt obligation will be limited to system users since repayment is derived from user fees. Another advantage of revenue bonds is that they do not count against a municipality's direct debt, but instead are considered "overlapping debt." This feature can be a crucial advantage for a municipality near its debt limit or for the rating agencies, which consider very closely the amount of direct debt when assigning credit ratings. Revenue bonds also may be used in financing projects extending beyond normal municipal boundaries. These bonds may be supported by a pledge of revenues received in any legitimate and ongoing area of operation, within or outside the geographical boundaries of the issuer.

Successful issuance of revenue bonds depends on the bond market evaluation of the revenue pledged. Revenue bonds are most commonly retired with revenue from user fees. Recent legislation has eliminated the requirement that the revenues pledged to bond payment have a direct relationship to the services financed by revenue bonds. Revenue bonds may be paid with all or any portion of revenues derived by a public body or any other legally available monies. In addition, if additional security to finance revenue bonds is needed, a public body may mortgage grant security and interests in facilities, projects, utilities or systems owned or operated by a public body.

Normally, there are no legal limitations on the amount of revenue bonds to be issued, but excessive issue amounts are generally unattractive to bond buyers because they represent high investment risks. In rating revenue bonds, buyers consider the economic justification for the project, reputation of the borrower, methods and effectiveness for billing and collecting, rate structures, provision for rate increases as needed to meet debt service requirements, track record in obtaining rate increases historically, adequacy of reserve funds provided in the bond documents, supporting covenants to protect projected revenues, and the degree to which forecasts of net revenues are considered sound and economical.

Municipalities may elect to issue revenue bonds for revenue-producing facilities without a vote of the electorate (ORS 288.805-288.945). In this case, certain notice and posting requirements must be met and a 60-day waiting period is mandatory. A petition signed by 5% of the municipality's registered voters may cause the issue to be referred to an election.

10.2.3 Improvement Bonds

Improvement (Bancroft) bonds can be issued under an Oregon law called the Bancroft Act. The bonds are an intermediate form of financing that is less than full-fledged G.O. or revenue bonds, but is quite useful especially for smaller issuers or for limited purposes.

An improvement bond is payable only from the receipts of special benefit assessments, not from general tax revenues. Such bonds are issued only where certain properties are recipients of special benefits not occurring to other properties. For a specific improvement, all property within the improvement area is assessed on an equal basis, regardless of whether it is developed or undeveloped. The assessment is designed to apportion the cost of improvements, approximately in proportion to the afforded direct or indirect benefits, among the benefited property owners. This assessment becomes a direct lien against the property, and owners have the option of either paying the assessment in cash or applying for improvement

bonds. If the improvement bond option is taken, the city sells Bancroft improvement bonds to finance the construction, and the assessment is paid over 20 years in 40 semi-annual installments with interest. Cities and special districts are limited to improvement bonds not exceeding three percent of true cash value.

With improvement bond financing, an improvement district is formed, the boundaries are established, and the benefited properties and property owners are determined. The engineer usually determines an approximate assessment, either on a square foot or a front-foot basis. Property owners are then given an opportunity to object to the project assessments. The assessments against the properties are usually not levied until the actual cost of the project is determined. Since this determination is normally not possible until the project is completed, funds are not available from assessments for the purpose of making monthly payments to the contractor. Therefore, some method of interim financing must be arranged, or a pre-assessment program, based on the estimated total costs, must be adopted. Commonly, warrants are issued to cover debts, with the warrants to be paid when the project is complete.

The primary disadvantage to this source of revenue is that the property to be assessed must have a true cash value at least equal to 50 percent of the total assessments to be levied. As a result, owners of undeveloped property usually require a substantial cash payment. In addition, the development of an assessment district is very cumbersome and expensive when facilities for an entire community are contemplated. In comparison, G.O. bonds can be issued in lieu of improvement bonds, and are usually more favorable.

10.2.4 Capital Construction (Sinking) Fund

Sinking funds are often established by budget for a particular construction purpose. Budgeted amounts from each annual budget are carried in a sinking fund until sufficient revenues are available for the needed project. Such funds can also be developed with revenue derived from system development charges or serial levies.

A City may wish to develop sinking funds for each sector of the public services. This fund can be used to rehabilitate or maintain existing infrastructure, construct new infrastructure elements, or to obtain grant and loan funding for larger projects.

The disadvantage of a sinking fund is that it is usually too small to undertake any significant projects. Also, setting aside money generated from user fees without a designated and specified need is not generally accepted in municipal or public utility budgeting processes.

10.2.5 Connection Fees

Most cities charge connection fees to cover the cost of connecting new development to water systems. Based on recent legislation, connection fees can no longer be programmed to cover a portion of capital improvement costs.

10.2.6 System Development Charges

A system development charge (SDC) is essentially a fee collected as each piece of property is developed, and which is used to finance the necessary capital improvements and municipal services required by the development. Such a fee can only be used to recover the capital costs of infrastructure. Operating, maintenance, and replacement costs cannot be financed through system development charges.

Two types of charges are permitted under the Oregon Systems Development Charges Act, improvement fees and reimbursement fees. SDCs charged before construction are considered improvement fees and

are used to finance capital improvements to be constructed. After construction, SDCs are considered reimbursement fees and are collected to recapture the costs associated with capital improvements already constructed or under construction. A reimbursement fee represents a charge for utilizing excess capacity in an existing facility paid for by others. The revenue generated by this fee is typically used to pay back existing loans for improvements.

Under the Oregon SDC Act, methodologies for deriving improvement and reimbursement fees must be documented and available for review by the public. A capital improvement plan must also be prepared which lists the capital improvements that may be funded with improvement fee revenues, and the estimated cost and timing of each improvement. Thus, revenue from the collection of SDCs can only be used to finance specific items listed in a capital improvement plan. In addition, SDCs cannot be assessed on portions of the project paid for with grant funding.

10.2.7 Local Improvement District (LID)

Improvement bonds issued for local improvement districts (LIDs) are used to administer special assessments for financing local improvements in cities, counties, and some special districts. Common improvements financed through an LID include storm and sanitary sewers, street paving, curbs, sidewalks, water mains, recreational facilities, street lighting, and off-street parking. The basic principle of special assessment is that it is a charge imposed upon property owners who receive special benefits from an improvement beyond the general benefits received by all citizens in the community. A public agency should consider three “principles of benefit” when deciding to use special assessment: 1) direct service, 2) obligation to others, and 3) equal sharing/basis. Cities are limited to improvement bonds not exceeding three percent of true cash value.

The Oregon Legislature has provided cities with a procedure for special assessment financing (ORS 223.387-399), which applies when city charter or ordinance provisions do not specify otherwise. To establish an LID, an improvement district is formed, the boundaries are established, and the benefited properties and property owners are determined. An approximate assessment to each property is determined based on the above three principles of benefit, and is documented in a written report. Property owners are then given an opportunity to object to the project assessments. The assessments against the properties are usually not levied until the actual cost of the project is determined. Since this determination is normally not possible until the project is completed, funds are not available from assessments for the purpose of making monthly payments to the contractor. Therefore, some method of interim financing must be arranged based on the estimated total costs.

The primary disadvantage to this source of revenue is that the property to be assessed must have a true cash value at least equal to 50 percent of the total assessments to be levied. As a result, owners of undeveloped property usually require a substantial cash payment. In addition, the development of an assessment district is very cumbersome and expensive.

10.2.8 Ad Valorem Taxes

Ad valorem property taxes are often used as a revenue source for utility improvements. Property taxes may be levied on real estate, personal property or both. Historically, ad valorem taxes were the traditional means of obtaining revenue to support all local governmental functions.

A marked advantage of these taxes is the simplicity of the system; it requires no monitoring program for developing charges, additional accounting and billing work is minimal, and default on payments is rare. In addition, ad valorem taxation provides a means of financing that reaches all property owners that

benefit from a system, whether a property is developed or not. The construction costs for the project are shared proportionally among all property owners based on the assessed value of each property.

Ad valorem taxation, however, is less likely to result in individual users paying their proportionate share of the costs as compared to their benefits.

10.2.9 User Fees

User fees can be used to retire general obligation bonds and are commonly the sole source of revenue to retire revenue bonds and to finance operation and maintenance costs. User fees represent monthly charges to all residences, businesses, and other users that are connected to the water system. These fees are established by resolution and can be modified, as needed, to account for increased or decreased operating and maintenance costs. The monthly charges are usually based on the class of user (e.g. single family dwelling, multiple family dwelling, schools, etc.) and the quantity of water through a user's connection.

10.2.10 Assessments

Under special circumstances, the beneficiary of a public works improvement may be assessed for the cost of a project. For example, the city may provide some improvements or services that directly benefit a particular development. The city may choose to assess the industrial or commercial developer to provide up-front capital to pay for the administered improvements.

10.3 Financing Strategy

A financing strategy or plan must provide a mechanism to generate capital funds in sufficient amounts to pay for the proposed improvements over the relatively short duration in design and construction, generally two years. The financing strategy must also identify the manner in which annual revenue will be generated to cover the expense for long-term debt repayment and the on-going operation and maintenance of the system. The objectives of a financial strategy include the following:

- Identify the capital improvement cost for the project and the estimated expense for operation and maintenance.
- Evaluate the potential funding sources and select the most viable program.
- Determine the availability of outside funding sources and identify the local cost share.
- Determine the cost to system users to finance the local share and the annual cost for operation and maintenance.

With any of the proposed funding sources within the financial strategy, the City is advised to confirm specific funding amounts with the appropriate funding agencies prior to making local financing arrangements.

10.3.1 Proposed Financing Plan

A financial strategy to address financing of the Phase I Improvements within the Capital Improvement Plan is discussed below.

10.3.2 Low Interest Loans

Four types or programs of project funding were identified as viable for funding the City's proposed Phase I improvements: 1) Rural Development Rural Water and Waste Disposal Grants and Loans; 2)

Infrastructure Finance Authority Water/Wastewater Financing Program; 3) Drinking Water State Revolving Fund; and 4) Private Financing. Based on these funding programs, four alternative funding packages were compiled and evaluated. A summary of the funding alternatives for these improvements is given in Table 10.3.2.

TABLE 10.3.2
FUNDING ALTERNATIVES FOR PHASE I IMPROVEMENTS

Funding Source	Grant Amount, \$ ⁽¹⁾	Loan Amount, \$ ⁽¹⁾	Loan Term, yrs	Interest Rate, %	Rate Increase, \$/EDU/mth
Rural Development (RD)/IFA Water/Wastewater Grants & Loans					
RD 15/85 (Grant/Loan)	1,700,000	3,951,000	40	3.5	\$16.83
IFA Water/Wastewater Grants & Loans					
IFA Grant/Loan	750,000	750,000	25	3.4	\$4.10
Drinking Water SRF Loan					
Drinking Water SRF		5,651,000	30	2.1	\$23.27
Private Loan					
Private Funding		5,651,000	25	4.75	\$35.57

⁽¹⁾ – Amount based on current dollars.

The projected rate increases anticipated from the funding options range from \$4.10 to \$35.57 per EDU per month. These rate increases are very similar in magnitude and should be investigated further at a “One-Stop” meeting with the funding agencies and in discussions with private funding sources. For the purposes of this financing plan, further evaluation will be made with the most conservative value, which is \$35.57 per EDU per month.

10.3.3 Loan Financing Requirements

The financing plan for the Phase I improvements is based on the City securing authorization to issue bonds of approximately \$5,651,000. A breakdown of approximate monthly water user costs for the improvements, based on present worth costs and including current water Operations and Management (O&M) budget and debt reserve, is given in Table 10.3.3. A dam bond debt payment of \$19,200 per year is the only existing debt service. The dam bond total is for \$92,000 and will end by 2023. For this table, it was assumed that the City’s debt service for the Phase I Improvements would be \$5,651,000 with IFA financing.

TABLE 10.3.3
APPROXIMATE MONTHLY USER COSTS

Item	Annual Cost	Monthly User Cost/EDU
Total EDUs = 916		
Debt Service on \$5,651,000	\$185,015	\$16.83
Debt Service @ 10%	\$18,502	\$1.68
O&M Cost & Exist. Debt – Year 2014 Budget	\$362,600	\$34.87
Total	\$566,117	\$53.38

The estimated total monthly average cost to each EDU is anticipated to be approximately \$53.38. A loan for improvements is conditional upon the determination of Rural Development and IFA of the City’s eligibility for funding. The loan funds will not be offered by Rural Development if the City does not

acquire authorization to issue bonds in the minimum amount required by the agency.

The City has the option of two different types of bonding, as discussed in detail above general obligation (G.O.) bonds or revenue bonds. The G.O. bond option will require the City to hold an election and receive a favorable majority vote. This option would enable the City to levy a tax and/or user fees to make bond payments. The revenue bond option offers the City the ability to issue bonds without a vote of the electorate, if certain notice and posting requirements are met. Revenue bonds ensure no tax will be levied and require payment from user fee revenue.

The interest rate for this funding is quite low, resulting in the lowest annual payments and cost per EDU. Actual financing may be dictated by availability or changes in programs from the date of this plan.

10.4 System Development Charges

In addition to the proposed financing strategy consisting of grants and low interest loans, the City should revise its system development charges (SDC) to assist in financing necessary capital improvements to the water system required by growth and development.

As mentioned in Section 9, SDCs may be developed and assessed as reimbursement and/or improvement fees. The reimbursement fee approach is based on the premise that new customers are entitled to water service at the same cost as existing customers. Consequently, the reimbursement SDC is calculated as the average water system investment per customer. Calculation of a reimbursement SDC is beyond the scope of this study as research and documentation is needed to determine the total investment made to the City's water system, contributed capital, and debt service payments.

An SDC improvement fee is based on the projected improvements needed to increase system capacity. Approximately 5 percent of the proposed improvement costs were attributed to future growth demands. With an SDC improvement fee, new users of the City's water system would be assessed approximately 5 percent of the projected cost to design and construct these improvements. The present cost for the future improvements presented in Section 9 is estimated to be \$5,651,000. The number of projected EDUs is calculated as follows.

Estimated SDCs Based on Improvement Fee

Year 2012

Total Number of Billable EDUs	= 916 EDUs
Amount of Billable Water/EDU	= 87,160 gallons/EDU/year
Total Billable Amount of Water	= 79,838,350 gallons/year
Population in Year 2012	= 1,915 people
Billable Amount of Water/Population	= 41,691 gallons/year/person
Present Worth Cost for Proposed Improvements	= \$5,651,000

Estimated growth of EDUs based upon population growth is a factor of 0.773%.

10.5 Affordability

One major consideration in deciding on any proposed capital improvements is the users' ability to support the full cost of utility service, including debt repayment. Several measures of household affordability or ability to pay have been proposed or are currently being utilized. The majority of affordability indicators are largely a function of income and employment. A summary of affordability measures and thresholds from selected studies is provided in Table 10.5.1. The Environmental Protection Agency (EPA no date) compiled this information for assessing affordability issues with the Safe Drinking Water Act.

One of the most common affordability indicators is the ratio of annual user charges to the median household income. The threshold of affordability for this ratio varies from 1.5 to 2.5 percent of median household income. OBDD utilizes 1.25 percent of the median household income as a threshold for qualifying for grant monies.

**TABLE 10.5.1
SUMMARY OF AFFORDABILITY MEASURES AND THRESHOLDS**

Source	Indicator(s)	Threshold
Future Investment in Drinking Water & Wastewater Infrastructure (2002)	Ratio of annual user charge & median household income	2.5% of MHI
Rural Utilities Service Water & Waste Disposal Loans & Grants	Debt service portion of annual user charge & median household income (MHI)	>0.5% & MHI below poverty line or >1.0% & MHI between 80 & 100% of statewide non-metropolitan MHI
Department of Housing & Urban Development	Ratio of water & sewer bills, & household income	1.3 to 1.4%
National Consumer Law Center "The Poor and the Elderly – Drowning in the High Cost of Water", circa 1991	Ratio of sum of water & sewer bills & household income	>2.00 %
EPA Economic Guidance for Water Quality Standards Workbook	Ratio of annual user charge & median household income	<0.8% - no hardship expected 0.8 – 1.5% - mid-range >1.5% may be unreasonable burden
Affordability Criteria For Small Drinking Water Systems: An EPA Science Advisory Board Report (2002)	Discussion of affordability threshold, expenditure baselines, and differences in cost, income, and benefits	1. >1.0% must provide additional security. 2. >25% - system probably cannot issue debt
National Drinking Water Advisory Council Affordability Recommendations (2003)	EPA national affordability threshold given size category	grounds for consideration of measures other than median income
State of Idaho Assessment Tools for SRF Loans	Ratio of annual user charge & median household income	1.5% MHI

Abbreviations: AUC – annual user charge
MHI – median household income

One limitation of using the ratio of annual user charges to the median household income is determination of a representative median household income for a community. Currently, most funding agencies still utilize the 2000 Census data for making this determination. We have chosen to use the Consumer Price Index (CPI) for all urban consumers (CPI-U) to approximate current MHI. The underlying assumption is that wages in the area have increased in a similar manner to that of the CPI. Data for the CPI-U were taken for the years 2000 through 2007 for the month of September. A linear curve was fit to the data in order to project the CPI for September 2007. Data is not yet available for September 2010. As a check, the latest CPI referred to was July 2002. The CPI for July 2007 is higher than the projected CPI for September 2000. In order to be conservative, the higher July 2007 CPI was utilized.

10.6 Recommendations

The following recommendations are made to the City Council to implement the elements of this Water Master Plan.

- Submit Plan to the Oregon Health Division and Department of Water Resources for review and approval. In addition, a request to the Health Division for a Master Plan review exemption

should be submitted which will allow the City to avoid Health Division plan review on water main improvements shown in the Plan.

- Submit system information to private funding sources for consideration of private financing.
- Submit necessary applications to the funding agencies requesting loans and grants to finance the Phase I Improvements.
- Following favorable review by the selected financing agencies, secure the authority to issue revenue or general obligation bonds in the amount needed to finance the Phase I Improvements.
- Authorize detailed design of recommended improvements and preparation of plans and specifications for the Phase I improvements. Secure the necessary special use permits for construction.
- Receive construction bids and award contracts for Phase I Improvements.

10.7 Project Implementation

A tentative schedule, identifying the key activities and approximate implementation date for the Water Master Plan over the next three years, is presented in Table 10.7.1.

**TABLE 10.7.1
PROJECT IMPLEMENTATION SUMMARY**

Item No.	Key Activity	Implementation Date
1	Adopt Water Master Plan	May 2015
2	Submit Plan to Health Division & Department of Water Resources	February 2016
3	Approval of Plan by Health Division & Department of Water Resources	March 2016
4	Start Environmental Evaluation/Notice	September 2016
5	Submit Application for Financing for Phase I and Associated Environmental Evaluation/Notice for Project	September 2016
6	Obtain Financing for Phase I Improvements	October 2016
7	Start Preparation of Plans, Specifications for Phase I	November 2016
8	Complete Design & Preparation of Plans, Specifications, & Contract	August 2017
9	Health Division Approval of Plans & Specifications	September 2017
10	Advertise for Phase I Construction Bids	October 2017
11	Receive Construction Bids for Phase I	November 2017
12	Start Construction of Phase I	December 2017
13	Complete Construction of Phase I Improvements	December 2018

APPENDIX A

Cost Estimates

Water Rights

Fire Flows

Hazard Maps

Umpqua Watershed Boundary

Soil Maps

Win Walker Dam Inspection

COST ESTIMATES

Stanton Park Road (N) - Replace 6" with 8", from Klenke to DFPA

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$238,000	\$ 238,000
2	Waterline Demolition & Abandonment	LS	1	\$15,500	\$ 15,500
3	Site Preparation	LS	1	\$8,000	\$ 8,000
4	Rock Excavation	CY	50	\$90	\$ 4,500
5	Foundation Stabilization	CY	50	\$75	\$ 3,750
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	915	\$25	\$ 22,875
7	AC Pavement Trench R & R - Hwy	LF	7800	\$130	\$ 1,014,000
8	Painted Striping	LF	7800	\$5	\$ 39,000
9	8-inch Waterline, Class C Backfill	LF	7740	\$50	\$ 387,000
10	2" Service Line - Class B, C, or Direct Place	LF	25	\$50	\$ 1,250
11	1" Service Line - Class B, C, or Direct Place	LF	150	\$30	\$ 4,500
12	2" Connections	EA	5	\$1,200	\$ 6,000
13	1" Service Connections	EA	6	\$375	\$ 2,250
14	12" x 8" Reducer	EA	1	\$1,225	\$ 1,225
15	12" End Cap	EA	1	\$350	\$ 350
16	8" End Cap	EA	1	\$200	\$ 200
17	8" Tee	EA	1	\$800	\$ 800
18	8" x 6" Tee	EA	12	\$700	\$ 8,400
19	8" Gate Valves	EA	7	\$1,500	\$ 10,500
20	6" Gate Valves	EA	17	\$970	\$ 16,490
21	6" Blind Flange	EA	15	\$200	\$ 3,000
22	8" Miscellaneous Fittings	EA	3	\$600	\$ 1,800
23	Combination Air Release Valve	EA	1	\$2,215	\$ 2,215
24	New Fire Hydrant Assembly	EA	5	\$2,650	\$ 13,250
25	Bollards	EA	4	\$500	\$ 2,000
26	Waterline Markers	EA	17	\$50	\$ 850
27	Landscaping	LS	1	\$15,500	\$ 15,500
28	Traffic Control	LS	1	\$20,000	\$ 20,000
29	Sign Post Replacement	EA	3	\$200	\$ 600
Total Construction Cost					\$ 1,844,000
Engineering					\$ 313,000
Contingency					\$ 323,000
Administration					\$ 55,000
Total Project Cost					\$ 2,535,000

Stanton Park Rd. (S) - Install new 10" line from Riepe Ct to Klenke Ln

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$10,000	\$ 10,000
2	Waterline Demolition & Abandonment	LS	1	\$1,000	\$ 1,000
3	Site Preparation	LS	1	\$1,300	\$ 1,300
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$75	\$ 375
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	30	\$25	\$ 750
7	AC Pavement Trench R & R - Hwy	LF	300	\$130	\$ 39,000
8	Painted Striping	LF	300	\$5	\$ 1,500
9	8-inch Waterline, Class C Backfill	LF	290	\$50	\$ 14,500
10	1" Service Line - Class B, C, or Direct Place	LF	50	\$30	\$ 1,500
11	1" Service Connections	EA	2	\$375	\$ 750
12	12" x 10" Reducer	EA	1	\$1,450	\$ 1,450
13	8" Gate Valves	EA	1	\$1,500	\$ 1,500
14	8" Miscellaneous Fittings	EA	3	\$600	\$ 1,800
15	12" Culvert Replacement	LF	20	\$45	\$ 900
16	Landscaping	LS	1	\$1,500	\$ 1,500
17	Traffic Control	LS	1	\$5,000	\$ 5,000
Total Construction Cost					\$ 83,000
1	Contingency				\$ 14,000
	Administration				\$ 15,000
2					\$ 2,000
Total Project Cost					\$ 114,000

No.: 2
Phase: 1

NW Johnson St - Replace 2" with 6" from west end to Main St.

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$11,000	\$ 11,000
2	Waterline Demolition & Abandonment	LS	1	\$1,500	\$ 1,500
3	Site Preparation	LS	1	\$1,500	\$ 1,500
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$75	\$ 375
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	25	\$25	\$ 625
7	AC Pavement Trench R & R - NonHwy	LF	300	\$80	\$ 24,000
8	AC Pavement Trench R & R - Hwy	LF	30	\$130	\$ 3,900
9	Painted Striping	LF	10	\$5	\$ 50
10	6-inch Waterline, Class C Backfill	LF	450	\$45	\$ 20,250
11	12" x 6" Tapping Sleeve	EA	1	\$5,100	\$ 5,100
12	6" Tapping Valve	EA	1	\$825	\$ 825
13	2" Service Line - Class B, C, or Direct Place	LF	60	\$50	\$ 3,000
14	1" Service Line - Class B, C, or Direct Place	LF	200	\$30	\$ 6,000
15	2" Connections	EA	2	\$1,200	\$ 2,400
16	1" Service Connections	EA	8	\$375	\$ 3,000
17	6" End Cap	EA	1	\$100	\$ 100
18	6" Gate Valves	EA	1	\$970	\$ 970
19	6" Miscellaneous Fittings	EA	3	\$500	\$ 1,500
20	Landscaping	LS	1	\$1,500	\$ 1,500
21	Traffic Control	LS	1	\$3,200	\$ 3,200
Total Construction Cost					\$ 91,000
Engineering					\$ 16,000
Contingency					\$ 16,000
Administration					<u>\$ 3,000</u>
Total Project Cost					\$ 126,000

NW Mac St - Replace 2" with 6" from west end to Main St.

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$9,000	\$ 9,000
2	Waterline Demolition & Abandonment	LS	1	\$600	\$ 600
3	Site Preparation	LS	1	\$1,200	\$ 1,200
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$75	\$ 375
6	Aggregate Base	Ton	245	\$25	\$ 6,125
7	AC Pavement Trench R & R - NonHwy	LF	35	\$80	\$ 2,800
8	AC Pavement Trench R & R - Hwy	LF	10	\$130	\$ 1,300
9	Painted Striping	LF	10	\$5	\$ 50
10	6-inch Waterline, Class C Backfill	LF	485	\$45	\$ 21,825
11	12" x 6" Tapping Sleeve	EA	1	\$5,100	\$ 5,100
12	6" Tapping Valve Assembly	EA	1	\$825	\$ 825
13	1" Service Line - Class B, C, or Direct Place	LF	300	\$30	\$ 9,000
14	1" Service Connections	EA	12	\$375	\$ 4,500
15	6" End Cap	EA	1	\$100	\$ 100
16	6" Gate Valves	EA	1	\$970	\$ 970
17	6" Miscellaneous Fittings	EA	3	\$500	\$ 1,500
18	New Fire Hydrant Assembly	EA	1	\$2,650	\$ 2,650
19	Landscaping	LS	1	\$1,200	\$ 1,200
20	Traffic Control	LS	1	\$3,200	\$ 3,200
Total Construction Cost					\$ 73,000
Engineering					\$ 12,000
Contingency					\$ 13,000
Administration					\$ 2,000
Total Project Cost					\$ 100,000

No.: 4
Phase: 1

NW Phillips St - Replace 2" with 6" from west end to Main St.

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$6,000	\$ 6,000
2	Waterline Demolition & Abandonment	LS	1	\$800	\$ 800
3	Site Preparation	LS	1	\$800	\$ 800
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$75	\$ 375
6	Aggregate Base	Ton	240	\$25	\$ 6,000
7	AC Pavement Trench R & R - NonHwy	LF	35	\$80	\$ 2,800
8	AC Pavement Trench R & R - Hwy	LF	10	\$130	\$ 1,300
9	Painted Striping	LF	10	\$5	\$ 50
10	6-inch Waterline, Class C Backfill	LF	420	\$45	\$ 18,900
11	12" x 6" Tapping Sleeve	EA	1	\$5,100	\$ 5,100
12	6" Tapping Valve Assembly	EA	1	\$825	\$ 825
13	1" Service Line - Class B, C, or Direct Place	LF	100	\$30	\$ 3,000
14	1" Service Connections	EA	4	\$375	\$ 1,500
15	6" End Cap	EA	1	\$100	\$ 100
17	6" Miscellaneous Fittings	EA	1	\$500	\$ 500
19	Landscaping	LS	1	\$800	\$ 800
20	Traffic Control	LS	1	\$3,200	\$ 3,200
Total Construction Cost					\$ 53,000
Engineering					\$ 9,000
Contingency					\$ 9,000
Administration					\$ 2,000
Total Project Cost					\$ 73,000

No.: 5
Phase: 1

NW Oak St - Replace 2" with 6" from west end to Main St.

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$12,000	\$ 12,000
2	Waterline Demolition & Abandonment	LS	1	\$1,600	\$ 1,600
3	Site Preparation	LS	1	\$2,300	\$ 2,300
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$75	\$ 375
6	Aggregate Base	Ton	40	\$25	\$ 1,000
7	AC Pavement Trench R & R - NonHwy	LF	380	\$80	\$ 30,400
8	AC Pavement Trench R & R - Hwy	LF	20	\$130	\$ 2,600
9	Painted Striping	LF	10	\$5	\$ 50
10	6-inch Waterline, Class C Backfill	LF	400	\$45	\$ 18,000
11	12" x 6" Tapping Sleeve	EA	1	\$5,100	\$ 5,100
12	6" Tapping Valve Assembly	EA	1	\$825	\$ 825
13	1" Service Line - Class B, C, or Direct Place	LF	250	\$30	\$ 7,500
14	1" Service Connections	EA	10	\$375	\$ 3,750
15	6" End Cap	EA	1	\$100	\$ 100
16	6" Gate Valves	EA	1	\$970	\$ 970
17	6" Miscellaneous Fittings	EA	3	\$500	\$ 1,500
18	New Fire Hydrant Assembly	EA	1	\$2,650	\$ 2,650
19	Landscaping	LS	1	\$1,600	\$ 1,600
20	Traffic Control	LS	1	\$3,200	\$ 3,200
Total Construction Cost					\$ 96,000
Engineering					\$ 16,000
Contingency					\$ 17,000
Administration					\$ 3,000
Total Project Cost					\$ 132,000

Alder Ln - Replace 4" with 6" from Hamlin to 3" on Alder

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$16,000	\$ 16,000
2	Waterline Demolition & Abandonment	LS	1	\$1,100	\$ 1,100
3	Site Preparation	LS	1	\$5,000	\$ 5,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	AC Pavement Trench R & R - NonHwy	LF	680	\$80	\$ 54,400
7	8-inch Waterline, Class C Backfill	LF	680	\$50	\$ 34,000
8	1" Service Line - Class B, C, or Direct Place	LF	75	\$30	\$ 2,250
9	1" Service Connections	EA	3	\$375	\$ 1,125
10	8" Temporary End Cap	EA	1	\$100	\$ 100
11	8" Tee	EA	1	\$800	\$ 800
12	8" Gate Valves	EA	2	\$1,500	\$ 3,000
13	6" Gate Valves	EA	2	\$970	\$ 1,940
14	8" Miscellaneous Fittings	EA	3	\$600	\$ 1,800
15	Fire Hydrant Reconnection	EA	1	\$750	\$ 750
16	Landscaping	LS	1	\$1,500	\$ 1,500
17	Traffic Control	LS	1	\$1,700	\$ 1,700
Total Construction Cost					\$ 126,000
Engineering					\$ 21,000
Contingency					\$ 22,000
Administration					<u>\$ 4,000</u>
Total Project Cost					\$ 173,000

No.: 7
Phase: 1

NE Wilson St - Replace 2" with 6" from Main St to end

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$11,000	\$ 11,000
2	Waterline Demolition & Abandonment	LS	1	\$800	\$ 800
3	Site Preparation	LS	1	\$2,300	\$ 2,300
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	275	\$25	\$ 6,875
7	AC Pavement Trench R & R - NonHwy	LF	300	\$80	\$ 24,000
7	AC Pavement Trench R & R - Hwy	LF	25	\$130	\$ 3,250
8	Painted Striping	LF	10	\$5	\$ 50
9	6-inch Waterline, Class C Backfill	LF	550	\$45	\$ 24,750
10	1" Service Line - Class B, C, or Direct Place	LF	150	\$30	\$ 4,500
11	1" Service Connections	EA	6	\$375	\$ 2,250
12	12" x 6" Tee	EA	1	\$1,300	\$ 1,300
13	8" x 6" Reducer	EA	1	\$500	\$ 500
14	6" End Cap	EA	1	\$100	\$ 100
15	6" Gate Valves	EA	3	\$970	\$ 2,910
16	6" Miscellaneous Fittings	EA	4	\$500	\$ 2,000
17	New Fire Hydrant Assembly	EA	1	\$2,650	\$ 2,650
18	Landscaping	LS	1	\$400	\$ 400
19	Traffic Control	LS	1	\$1,200	\$ 1,200
Total Construction Cost					\$ 92,000
Engineering					\$ 16,000
Contingency					\$ 16,000
Administration					\$ 3,000
Total Project Cost					\$ 127,000

NW Reed St - Replace 2" with 6" north to school

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$6,000	\$ 6,000
2	Waterline Demolition & Abandonment	LS	1	\$400	\$ 400
3	Site Preparation	LS	1	\$800	\$ 800
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	250	\$25	\$ 6,250
7	AC Pavement Trench R & R - Hwy	LF	25	\$130	\$ 3,250
8	Painted Striping	LF	10	\$5	\$ 50
9	6-inch Waterline, Class B Backfill	LF	425	\$35	\$ 14,875
10	1" Service Line - Class B, C, or Direct Place	LF	125	\$30	\$ 3,750
11	1" Service Connections	EA	5	\$375	\$ 1,875
12	12" x 6" Tee	EA	1	\$1,300	\$ 1,300
13	6" End Cap	EA	1	\$100	\$ 100
14	6" Gate Valves	EA	2	\$970	\$ 1,940
15	6" Miscellaneous Fittings	EA	3	\$500	\$ 1,500
16	New Fire Hydrant Assembly	EA	1	\$2,650	\$ 2,650
17	Landscaping	LS	1	\$200	\$ 200
18	Traffic Control	LS	1	\$400	\$ 400
Total Construction Cost					\$ 46,000
Engineering					\$ 8,000
Contingency					\$ 8,000
Administration					\$ 1,000
Total Project Cost					\$ 63,000

No.: 9

Phase: 1

NW Carlisle St - Replace 2" galvanized with 2" PVC from west end to near I-5

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$7,000	\$ 7,000
2	Waterline Demolition & Abandonment	LS	1	\$500	\$ 500
3	Site Preparation	LS	1	\$1,000	\$ 1,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	200	\$25	\$ 5,000
7	AC Pavement Trench R & R - NonHwy	LF	100	\$80	\$ 8,000
8	2-inch Waterline, Class C Backfill	LF	605	\$30	\$ 18,150
9	1" Service Line - Class B, C, or Direct Place	LF	250	\$30	\$ 7,500
10	1" Service Connections	EA	10	\$375	\$ 3,750
11	8" x 2" Saddle	EA	1	\$400	\$ 400
12	2" End Cap	EA	2	\$50	\$ 100
13	2" Gate Valve	EA	1	\$500	\$ 500
14	2" Miscellaneous Fittings	EA	3	\$200	\$ 600
15	Landscaping	LS	1	\$500	\$ 500
16	Traffic Control	LS	1	\$1,100	\$ 1,100
Total Construction Cost					\$ 55,000
Engineering					\$ 9,000
Contingency					\$ 10,000
Administration					\$ 2,000
					\$ 76,000

No.: 10
Phase: 1

NW Harrison St - Replace 2" with 6" from west end to east end

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$9,000	\$ 9,000
2	Waterline Demolition & Abandonment	LS	1	\$600	\$ 600
3	Site Preparation	LS	1	\$3,000	\$ 3,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	130	\$25	\$ 3,250
7	AC Pavement Trench R & R - NonHwy	LF	300	\$80	\$ 24,000
8	6-inch Waterline, Class C Backfill	LF	300	\$45	\$ 13,500
9	1" Service Line - Class B, C, or Direct Place	LF	200	\$30	\$ 6,000
10	1" Service Connections	EA	8	\$375	\$ 3,000
11	8" x 6" Tee	EA	1	\$700	\$ 700
12	6" End Cap	EA	2	\$100	\$ 200
13	6" Gate Valve	EA	2	\$970	\$ 1,940
14	6" Miscellaneous Fittings	EA	3	\$500	\$ 1,500
15	New Fire Hydrant Assembly	EA	1	\$2,650	\$ 2,650
16	Bollards	EA	2	\$500	\$ 1,000
17	Landscaping	LS	1	\$1,000	\$ 1,000
18	Traffic Control	LS	1	\$1,100	\$ 1,100
Total Construction Cost					\$ 73,000
Engineering					\$ 12,000
Contingency					\$ 13,000
Administration					\$ 2,000
Total Project Cost					\$ 100,000

E 1st St - Replace 2" with 6" from Canyon to bridge

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$11,000	\$ 11,000
2	Waterline Demolition & Abandonment	LS	1	\$800	\$ 800
3	Site Preparation	LS	1	\$4,000	\$ 4,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	5	\$25	\$ 125
7	AC Pavement Trench R & R - NonHwy	LF	480	\$80	\$ 38,400
8	6-inch Waterline, Class C Backfill	LF	480	\$45	\$ 21,600
8	2" Service Line - Class B, C, or Direct Place	LF	50	\$50	\$ 2,500
9	2" Connections	EA	2	\$1,200	\$ 2,400
11	8" x 6" Tee	EA	1	\$700	\$ 700
12	6" End Cap	EA	2	\$100	\$ 200
13	6" Gate Valve	EA	1	\$970	\$ 970
14	6" Miscellaneous Fittings	EA	2	\$500	\$ 1,000
15	New Fire Hydrant Assembly	EA	1	\$2,650	\$ 2,650
16	Bollards	EA	2	\$500	\$ 1,000
17	Landscaping	LS	1	\$500	\$ 500
18	Traffic Control	LS	1	\$1,100	\$ 1,100
Total Construction Cost					\$ 90,000
Engineering					\$ 15,000
Contingency					\$ 16,000
Administration					\$ 3,000
Total Project Cost					\$ 124,000

No.: 12
Phase: 1

SE Elliot Ave - Replace 3" with 6" from Gross Lp to tennis courts

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$18,000	\$ 18,000
2	Waterline Demolition & Abandonment	LS	1	\$1,200	\$ 1,200
3	Site Preparation	LS	1	\$6,000	\$ 6,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	160	\$25	\$ 4,000
7	AC Pavement Trench R & R - NonHwy	LF	300	\$80	\$ 24,000
8	6-inch Waterline, Class C Backfill	LF	1200	\$45	\$ 54,000
9	6-inch Waterline, Class B Backfill	LF	150	\$35	\$ 5,250
10	1" Service Line - Class B, C, or Direct Place	LF	200	\$30	\$ 6,000
11	1" Service Connections	EA	8	\$375	\$ 3,000
12	10" x 6" Tapping Sleeve	EA	1	\$4,300	\$ 4,300
13	6" Tapping Valve	EA	1	\$825	\$ 825
14	8" x 6" Reducer	EA	1	\$500	\$ 500
15	6" Tee	EA	3	\$500	\$ 1,500
16	6" Gate Valve	EA	5	\$970	\$ 4,850
17	6" Miscellaneous Fittings	EA	4	\$500	\$ 2,000
18	Fire Hydrant Reconnection	EA	1	\$750	\$ 750
19	New Fire Hydrant Assembly	EA	2	\$2,650	\$ 5,300
20	Bollards	EA	3	\$500	\$ 1,500
21	Landscaping	LS	1	\$500	\$ 500
22	Traffic Control	LS	1	\$2,100	\$ 2,100
Total Construction Cost					\$ 146,000
Engineering					\$ 25,000
Contingency					\$ 26,000
Administration					\$ 4,000
Total Project Cost					\$ 201,000

SW Pine St. - Replace 2" Galv. with 6" from 5th to south end

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$6,000	\$ 6,000
2	Waterline Demolition & Abandonment	LS	1	\$400	\$ 400
3	Site Preparation	LS	1	\$2,000	\$ 2,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	AC Pavement Trench R & R - NonHwy	LF	200	\$80	\$ 16,000
7	6-inch Waterline, Class C Backfill	LF	200	\$45	\$ 9,000
8	2" Service Line - Class B, C, or Direct Place	LF	25	\$50	\$ 1,250
9	1" Service Line - Class B, C, or Direct Place	LF	50	\$30	\$ 1,500
10	2" Connections	EA	1	\$1,200	\$ 1,200
11	1" Service Connections	EA	2	\$375	\$ 750
12	8" x 6" Tapping Sleeve	EA	1	\$3,700	\$ 3,700
13	6" Tapping Valve	EA	1	\$825	\$ 825
14	6" End Cap	EA	1	\$100	\$ 100
15	6" Gate Valve	EA	1	\$970	\$ 970
16	6" Miscellaneous Fittings	EA	3	\$500	\$ 1,500
17	Landscaping	LS	1	\$500	\$ 500
18	Traffic Control	LS	1	\$1,100	\$ 1,100
Total Construction Cost					\$ 47,000
Engineering					\$ 8,000
Contingency					\$ 8,000
Administration					\$ 1,000
Total Project Cost					\$ 64,000

Boyd St. - Replace 2" Galv. with 6" from 5th to south end					
Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$10,000	\$ 10,000
2	Waterline Demolition & Abandonment	LS	1	\$700	\$ 700
3	Site Preparation	LS	1	\$3,000	\$ 3,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	5	\$50	\$ 250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	50	\$25	\$ 1,250
7	AC Pavement Trench R & R - NonHwy	LF	240	\$80	\$ 19,200
8	AC Pavement Trench R & R - Hwy	LF	50	\$130	\$ 6,500
9	6-inch Waterline, Class C Backfill	LF	250	\$45	\$ 11,250
10	6-inch Waterline, Class B Backfill	LF	400	\$35	\$ 14,000
11	1" Service Line - Class B, C, or Direct Place	LF	125	\$30	\$ 3,750
12	1" Service Connections	EA	5	\$375	\$ 1,875
13	8" x 6" Tee	EA	1	\$700	\$ 700
14	6" Tee	EA	1	\$500	\$ 500
15	6" End Cap	EA	1	\$100	\$ 100
16	6" Gate Valve	EA	2	\$970	\$ 1,940
17	6" Miscellaneous Fittings	EA	3	\$500	\$ 1,500
18	Fire Hydrant Reconnection	EA	1	\$750	\$ 750
19	Landscaping	LS	1	\$2,500	\$ 2,500
20	Traffic Control	LS	1	\$2,100	\$ 2,100
Total Construction Cost					\$ 82,000
Engineering					\$ 14,000
Contingency					\$ 14,000
Administration					\$ 2,000
Total Project Cost					\$ 112,000

SW Byron Ave - New 8", connecting to 8" on 5th						
Item	Description	Unit	Quantity	Unit Price	Total	
1	Construction Facilities & Temporary Controls	LS	1	\$2,000	\$	2,000
2	Waterline Demolition & Abandonment	LS	1	\$200	\$	200
3	Site Preparation	LS	1	\$1,000	\$	1,000
4	Rock Excavation	CY	5	\$90	\$	450
5	Foundation Stabilization	CY	5	\$50	\$	250
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	50	\$25	\$	1,250
7	AC Pavement Trench R & R - NonHwy	LF	80	\$80	\$	6,400
8	8-inch Waterline, Class C Backfill	LF	80	\$50	\$	4,000
9	8" 90 Elbow	EA	1	\$400	\$	400
10	8" Miscellaneous Fittings	EA	3	\$600	\$	1,800
11	Landscaping	LS	1	\$500	\$	500
12	Traffic Control	LS	1	\$1,100	\$	1,100
Total Construction Cost					\$	19,000
Engineering					\$	3,000
Contingency					\$	3,000
Administration					\$	1,000
Total Project Cost					\$	26,000

James St. - Replace steel 10" line from valve on Gross Lp up to Reynolds tank

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$37,000	\$ 37,000
2	Waterline Demolition & Abandonment	LS	1	\$3,500	\$ 3,500
3	Site Preparation	LS	1	\$11,000	\$ 11,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	10	\$75	\$ 750
6	Aggregate Base (Gravel Shoulder/Driveway)	Ton	50	\$25	\$ 1,250
7	AC Pavement Trench R & R - NonHwy	LF	560	\$80	\$ 44,800
8	10-inch Waterline, PVC, Class C Backfill	LF	560	\$65	\$ 36,400
9	10-inch Waterline, DIP, Rst. Jnt., Class B Backfi	LF	740	\$165	\$ 122,100
10	10" 45 Degree Elbow	EA	1	\$600	\$ 600
11	10" 45 Degree Elbow - Restrained Joint	EA	1	\$800	\$ 800
12	10" Gate Valves	EA	2	\$1,750	\$ 3,500
13	6" Gate Valve	EA	1	\$970	\$ 970
34	10" x 6" Tee	EA	1	\$950	\$ 950
14	10" Miscellaneous Fittings	EA	3	\$700	\$ 2,100
15	12" Culvert Replacement	LF	20	\$45	\$ 900
16	Concrete Anchor Wall	EA	4	\$600	\$ 2,400
17	New Fire Hydrant Assembly	EA	2	\$2,650	\$ 5,300
18	Bollards	EA	2	\$500	\$ 1,000
19	Landscaping	LS	1	\$7,500	\$ 7,500
20	Traffic Control	LS	1	\$1,100	\$ 1,100
Total Construction Cost					\$ 284,000
Engineering					\$ 48,000
Contingency					\$ 50,000
Administration					\$ 9,000
Total Project Cost					\$ 391,000

No.: 17
Phase: 1

Reynolds Tank Access - Replace steel 10" line from Reynolds tank to Reynolds St.					
Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$29,000	\$ 29,000
2	Waterline Demolition & Abandonment	LS	1	\$900	\$ 900
3	Site Preparation	LS	1	\$5,000	\$ 5,000
4	Rock Excavation	CY	5	\$90	\$ 450
5	Foundation Stabilization	CY	10	\$75	\$ 750
6	Aggregate Base	Ton	300	\$25	\$ 7,500
8	10-inch Waterline, PVC, Class C Backfill	LF	560	\$65	\$ 36,400
9	10-inch Waterline, DIP, Rst. Jnt., Class B Backfi	LF	740	\$165	\$ 122,100
10	10" 45 Degree Elbow	EA	1	\$600	\$ 600
11	10" 45 Degree Elbow - Restrained Joint	EA	1	\$800	\$ 800
12	10" Gate Valves	EA	2	\$1,750	\$ 3,500
13	6" Gate Valve	EA	1	\$970	\$ 970
14	10" Miscellaneous Fittings	EA	2	\$575	\$ 1,150
15	12" Culvert Replacement	LF	20	\$43	\$ 860
16	Concrete Anchor Wall	EA	4	\$600	\$ 2,400
17	New Fire Hydrant Assembly	EA	1	\$2,650	\$ 2,650
18	Landscaping	LS	1	\$7,500	\$ 7,500
19	Traffic Control	LS	1	\$1,100	\$ 1,100
Total Construction Cost					\$ 224,000
Engineering					\$ 38,000
Contingency					\$ 39,000
Administration					\$ 7,000
Total Project Cost					\$ 308,000

New 0.5 Million Tank (Brinkerhoff) and piping

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$178,000	178,000
2	Clearing and Grubbing	LS	1	\$15,000	15,000
3	Rock Excavation	CY	200	\$90	18,000
4	Excavation for Tank	CY	100	\$13	1,300
5	Granular Fill	CY	200	\$35	7,000
6	0.5 MG Tank	LS	1	\$575,000	575,000
7	Road Excavation and Grading	LS	1	\$150,000	150,000
8	Aggregate Base	Ton	2000	\$25	50,000
9	AC Pavement Trench R & R - NonHwy	LF	300	\$80	24,000
10	12-inch PVC Waterline	LF	50	\$75	3,750
11	12-inch DIP Waterline	LF	50	\$125	6,250
12	8-inch PVC Waterline, Class C Backfill	LF	200	\$50	10,000
13	8-inch DIP Rst. Jnt. Waterline, Class B Backfill	LF	855	\$150	128,250
14	8-inch DIP Rst. Jnt. Waterline, Class C Backfill	LF	300	\$175	52,500
15	12-inch Gate Valve	EA	2	\$2,000	4,000
16	8-inch Gate Valve	EA	2	\$1,500	3,000
17	8-inch Check Valve	EA	1	\$3,000	3,000
18	12-inch 90° PVC Elbow - RJ	EA	1	\$1,100	1,100
19	8-inch 90° PVC Elbow - RJ	EA	3	\$1,000	3,000
20	12-inch 90° DIP Elbow	EA	1	\$1,500	1,500
21	8-inch 90° DIP Elbow	EA	1	\$1,000	1,000
22	12-inch Tee	EA	1	\$1,500	1,500
23	10-inch Tee	EA	1	\$1,200	1,200
24	8-inch Tee	EA	1	\$800	800
25	Miscellaneous Fittings & Appurtanences	LS	1	\$15,000	15,000
26	Concrete Anchor Wall	EA	10	\$600	6,000
27	4' x 4' Vault	LS	1	\$10,000	10,000
28	Security Fencing W/Gate	LF	250	\$100	25,000
29	Vehicular Access	LS	1	\$10,000	10,000
30	Telemetry	LS	1	\$25,000	25,000
31	Seismic Shutoff Valve Assembly	LS	1	\$25,000	25,000
32	Landscaping	LS	1	\$10,000	10,000

Total Construction Cost \$ 1,365,000

Engineering \$ 273,000

Geotechnical Engineering \$ 45,000

Permitting \$ 5,000

Property Acquisition / ROW \$ 400,000

Contingency \$ 246,000

Administration \$ 41,000

Total Project Cost \$ 2,375,000

Hill Tank Maintenance - Maintenance as listed

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$16,000	\$ 16,000
2	Demolition	LS	1	\$3,000	\$ 3,000
3	Aggregate Base	Ton	100	\$25	\$ 2,500
4	Tank Maintenance	LS	1	\$50,000	\$ 50,000
5	Telemetry	LS	1	\$25,000	\$ 25,000
6	Security Fencing - Repair	LF	575	\$20	\$ 11,500
7	Seismic Shutoff Valve	LS	1	\$7,000	\$ 7,000
8	Landscaping	LS	1	\$5,000	\$ 5,000
Total Construction Cost					\$ 120,000
Engineering					\$ 24,000
Contingency					\$ 22,000
Administration					\$ 4,000
Total Project Cost					\$ 170,000

Reynolds Tank Maintenance - *Maintenance as listed*

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$22,000	\$ 22,000
2	Demolition	LS	1	\$10,000	\$ 10,000
3	Site Preparation/Clearing & Grubbing	LS	1	\$15,000	\$ 15,000
4	Aggregate Base	Ton	250	\$25	\$ 6,250
5	Temporary Water Storage Tanks	LS	1	\$12,600	\$ 12,600
6	Temporary Bypass Piping	LS	1	\$6,500	\$ 6,500
7	Tank Maintenance	LS	1	\$50,000	\$ 50,000
8	Telemetry	LS	1	\$25,000	\$ 25,000
9	Security Fencing - Repair	LF	575	\$20	\$ 11,500
10	Seismic Shutoff Valve	LS	1	\$7,000	\$ 7,000
11	Landscaping	LS	1	\$5,000	\$ 5,000
Total Construction Cost					\$ 171,000
Engineering					\$ 34,000
Contingency					\$ 31,000
Administration					<u>\$ 5,000</u>
Total Project Cost					\$ 241,000

No.: 21

Phase: 1

City of Canyonville		Capital Improvement Plan			
Water Master Plan					
Hill St. PS - New (larger) Pump Skid					
Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$13,000	\$ 13,000
2	Demolition	LS	1	\$3,000	\$ 3,000
3	Site Preparation	LS	1	\$1,500	\$ 1,500
4	New Duplex Pump Assembly	EA	1	\$65,000	\$ 65,000
5	New Isolating Couplers	EA	4	\$300	\$ 1,200
6	New 10" Gate Valve	EA	2	\$1,750	\$ 3,500
7	Flow Meter	EA	1	\$9,200	\$ 9,200
8	SCADA	LS	1	\$5,000	\$ 5,000
9	Landscaping	LS	1	\$500	\$ 500
Total Construction Cost				\$	102,000
Engineering				\$	20,000
Contingency				\$	18,000
Administration				\$	3,000
Total Project Cost				\$	143,000

Water Treatment Plant Rehabilitation -

Item	Description	Unit	Quantity	Unit Price	Total
1	Construction Facilities & Temporary Controls	LS	1	\$201,000	\$ 201,000
2	Demolition	LS	1	\$40,000	\$ 40,000
3	Remove and Replace Windows (access)	LS	2	\$10,000	\$ 20,000
4	Temporary Portable Water Treatment Plant	LS	1	\$100,000	\$ 100,000
5	Concrete Pad (Repair and Equipment Support)	LS	1	\$50,000	\$ 50,000
6	Miscellaneous Structural Improvements	LS	1	\$50,000	\$ 50,000
7	New Heating & Ventilation System	LS	1	\$25,000	\$ 25,000
8	New Access System (stairs, ramps, handrails)	LS	1	\$20,000	\$ 20,000
9	New Water Treatment System Package	LS	1	\$500,000	\$ 500,000
10	New Chemical Feed System	LS	1	\$45,000	\$ 45,000
11	New Laboratory Equipment	LS	1	\$25,000	\$ 25,000
12	New Control System	LS	1	\$10,000	\$ 10,000
13	New Instrumentation / Controls	LS	1	\$10,000	\$ 10,000
14	Electrical Modifications	LS	1	\$30,000	\$ 30,000
15	Mechanical Modifications	LS	1	\$10,000	\$ 10,000
16	New Computer System	LS	1	\$10,000	\$ 10,000
17	Upgrade Backwash Lagoons	LS	1	\$10,000	\$ 10,000
18	Chlorine Contact Chamber	LS	1	\$343,000	\$ 343,000
19	Security System	LS	1	\$5,000	\$ 5,000
20	Security Fencing - Install new	LF	325	\$100	\$ 32,500
21	Security Fencing - Repair	LF	805	\$20	\$ 16,100
22	SCADA	LS	1	\$40,000	\$ 40,000
23	Landscaping	LS	1	\$10,000	\$ 10,000
Total Construction Cost					\$ 1,603,000
Engineering					\$ 321,000
Permits					\$ 12,000
Contingency					\$ 288,000
Administration					\$ 48,000
Total Project Cost					\$ 2,272,000

Raw Water Intake - Canyon Creek						
Item	Description	Unit	Quantity	Unit Price	Total	
1	Construction Facilities & Temporary Controls	LS	1	\$4,000	\$	4,000
2	Temporary Bypass Pumping	LS	1	\$5,000	\$	5,000
3	36" Pipe Repair	LS	1	\$15,000	\$	15,000
4	Landscaping	LS	1	\$1,000	\$	3,500
Total Construction Cost					\$	28,000
Engineering					\$	5,000
Permitting					\$	5,000
Contingency					\$	5,000
Administration					\$	1,000
Total Project Cost					\$	44,000

Raw Water Transmission Line - Canyon Creek						
Item	Description	Unit	Quantity	Unit Price	Total	
1	Construction Facilities & Temporary Controls	LS	1	\$550,000	\$	550,000
2	Site Preparation	LS	1	\$256,000	\$	256,000
3	Rock Excavation	CY	500	\$90	\$	45,000
4	Foundation Stabilization	CY	100	\$75	\$	7,500
5	Aggregate Base (Gravel Shoulder/Driveway)	Ton	1000	\$25	\$	25,000
6	12-inch HDPE Waterline	LF	42250	\$60	\$	2,535,000
7	12" Gate Valve	EA	10	\$2,000	\$	20,000
8	12" Miscellaneous Fittings	EA	35	\$800	\$	28,000
9	Bridge Crossings	EA	7	\$100,000	\$	700,000
10	Landscaping	LS	1	\$50,000	\$	50,000
Total Construction Cost					\$	4,217,000
Engineering					\$	717,000
Permitting					\$	200,000
Contingency					\$	740,000
Administration					\$	126,000
Total Project Cost					\$	6,000,000

WATER RIGHTS

52545
52546
52547

Permit No. 1077

CERTIFICATE NO. 43855

APPLICATION FOR A PERMIT TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF OREGON

I, T C Shaw, E W Elliott, Mrs. Mary Odle

(Name of Applicant.)

of Canyonville, County of Douglas
 (Postoffice)

State of Oregon, do hereby make application for a permit to appropriate the following described public waters of the State of Oregon, subject to existing rights:

If the applicant is a corporation, give date and place of incorporation

1. The source of the proposed appropriation is

(Name of stream)

Canyon Creek

2. The amount of water which the applicant intends to apply to beneficial use is

one

cubic feet per second.

3. The use to which the water is to be applied is

(Irrigation, power, mining, manufacturing,

Irrigation

domestic supplies, etc.)

4. The point of diversion is located twenty rods west and fourteen rods south of the

(Give distance and bearing to section corner)

Joseph Roberts' Donation land claim

being within the South West Quarter of Sec. 27, Tp. 30 S
 (Give smallest legal subdivision) (No. N. or S.)

No. 5 W.

R. Douglas, W. M., in the county of
 (No. E. or W.)

5. The ditch to be one miles in
 (Main ditch, canal or pipe line)

length, terminating in the SW quarter of Sec. 22, Tp. 30 S, R. 5 W
 (Smallest legal subdivision) (No. N. or S.) (No. E. or W.)

W. M., the proposed location being shown throughout on the accompanying map.

6. The name of the ditch, canal or other works is

The Elliott and Shaw Ditch

DESCRIPTION OF WORKS

Diversion Works—

7. (a) Height of dam three feet, length on top 40 feet, length at bottom 30 feet; material to be used and character of construction

(Loose rock, concrete,

Wood and stone

masonry, rock and brush, timber crib, etc., wasteway over or around dam)

Timber

(b) Description of headgate

(Timber, concrete, etc., number and size of openings)

*A different form of application is provided where an appropriation is to be made by the enlargement of existing works, or where storage works are contemplated. These forms can be secured without charge, together with instructions, by addressing the State Engineer, Salem, Oregon.

1077(a)

Canal System—

8. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line).....feet; width on bottom.....feet; depth of water.....feet; grade.....feet fall per one thousand feet.

(b) At.....miles from headgate: Width on top (at water line).....feet; width on bottom.....feet; depth of water.....feet; grade.....feet fall per one thousand feet.

FILL IN THE FOLLOWING INFORMATION WHERE THE WATER IS USED FOR:

Irrigation—

9. The land to be irrigated has a total area of 28.....acres, located in each smallest legal subdivision, as follows:

4 acres in the SW quarter of Sec. 27 and

(Give area of land in each smallest legal subdivision which you intend to irrigate)

24 acres in the NW quarter of Sec. 27

Township No. 30 S. Range No. 5 W. W. M.

(If more space required, attach separate sheet)

Power, Mining, Manufacturing, or Transportation Purposes—

10. (a) Total amount of power to be developed.....theoretical horsepower.

(b) Total fall to be utilized.....feet.
(Head)

(c) The nature of the works by means of which the power is to be developed.....

(d) Such works to be located in.....of Sec.....
(Legal subdivision)

Tp....., R....., W. M.
(No. N. or S.) (No. E. or W.)

(e) Is water to be returned to any stream?.....
(Yes or No.)

(f) If so, name stream and locate point of return
....., Sec....., Tp....., R....., W. M.
(No. N. or S.) (No. E. or W.)

(g) The use to which power is to be applied is

(h) The nature of the mines to be served.....

Municipal Supply—

11. To supply the city of _____
 _____ County, having a present population of _____, and an
 (Name of)
 estimated population of _____ in 19____.

(Answer questions 12, 13, 14, and 15 in all cases)

12. Estimated cost of proposed works, \$ _____
 13. Construction work will begin on or before 1 yr. from date of approval
 14. Construction work will be completed on or before 2 yrs. from date of approval
 15. The water will be completely applied to the proposed use on or before _____
3 yrs. from date of approval

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the Board of Control, accompany this application.

T C Shaw

(Name of applicant)

E W Elliott

Mrs. Mary Odle

Signed in the presence of us as witnesses:

(1)	Victor Shaw	Canyonville, Oreg.
	(Name)	(Address of witness)
(2)	Clara M Shaw	Canyonville, Oreg.
	(Name)	(Address of witness)

Remarks: _____

STATE OF OREGON, }
 County of Marion } ss.

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for correction or completion, as follows: _____

In order to retain its priority, this application must be returned to the State Engineer, with corrections, on or before _____, 19____.

WITNESS my hand this _____ day of _____, 19____.

State Engineer.

Application No. 2075

Permit No. 1077

PERMITTO APPROPRIATE THE PUBLIC WATERS OF
THE STATE OF OREGON

Division No. 2 District No.

This instrument was first received in the office
of the State Engineer at Salem, Oregon, on the

10 day of February

1912, at 8:00 clock A.M.

Returned to applicant for correction

Corrected application received

Approved

Mar 25 1912

Recorded in Book No. 5 of Permits on

Page 1077

John H Lewis

DFM HGB State Engineer.

1 map 7.20

STATE OF OREGON,

County of Marion

} ss.

This is to certify that I have examined the foregoing application and do hereby grant the same, subject to the following limitations and conditions: The appropriation for irrigation purposes shall be limited to one-eightieth of one cu. ft. per sec. for each acre irrigated. The use hereunder shall conform to any reasonable rotation system ordered by the proper State officers.

The priority date of this permit is February 10, 1912

The amount of water appropriated shall be limited to the amount which can be applied to beneficial use and not to exceed 35/100 (0.35) cubic feet per second. or its equivalent in case of rotation.

Actual construction work shall begin on or before March 25, 1913

and shall thereafter be prosecuted with reasonable diligence and be completed on or before

June 1, 1914

Complete application of the water to the proposed use shall be made on or before

October 1, 1914

WITNESS my hand this 25th day of March, 1912.

John H Lewis

State Engineer.

STATE OF OREGON

COUNTY OF

DOUGLAS

CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF CANYONVILLE

of City Hall, PO Box 765 Canyonville, State of Oregon 97417, has made proof to the satisfaction of the Water Resources Director, of a right to the use of the waters of Canyon Creek

a tributary of South Umpqua River for the purpose of
municipal use

under Permit No. 1077 and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from February 10, 1912

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.01 cubic foot per second, if available at the original point of diversion, SE 1/4 SW 1/4, Section 27, T30S, R5W, WM; 14 rods South and 20 rods West from the NE Corner, J. Robert DLC 59 and further limited to use only during the *

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NW 1/4 SE 1/4 as projected within J. Reynolds DLC 58, Section 34, T30S, R5W, WM; 1754 feet South and 1197 feet East from SE Corner, Joseph Roberts DLC 59.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to----- of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

* irrigation season and not to exceed 1.6 acre feet

SEE NEXT PAGE

ALL
Section 27
E 1/2
Section 28
NE 1/4
Section 33
N 1/2
N 1/2 SE 1/4
Section 34
Township 30 South, Range 5 West, WM

This certificate is issued to confirm a change in use and point of diversion approved by an order of the Water Resources Director entered December 4, 1979 and together certificates of water right recorded at pages 52544, 52546 and 52547, Volume 47, State Record of Water Right Certificates, supersedes Certificate 48132.

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described. and is subject to minimum flows established by the Water Policy Review Board with an effective date prior to this right.

WITNESS the signature of the Water Resources Director, affixed

this date. December 4, 1984

*...../s/ William H. Young.....
Water Resources Director*

Recorded in State Record of Water Right Certificates, Volume 47 , page 52545

5465C

BEFORE THE WATER RESOURCES DIRECTOR OF OREGON

DOUGLAS COUNTY

IN THE MATTER OF THE APPLICATION)
OF CITY OF CANYONVILLE FOR)
APPROVAL OF A CHANGE IN POINT OF)
DIVERSION AND USE OF WATER _ _ _)

ORDER APPROVING
TRANSFER NO. 4258

On July 23, 1979, an application was filed in the office of the Water Resources Director by City of Canyonville for approval of a change in point of diversion and use heretofore made, pursuant to the provisions of ORS 540.510 to 540.530.

The certificate recorded at page 48132, Volume 41, State Record of Water Right Certificates, in the name of T.C. Shaw, E.W. Elliott and Mrs. Mary Odle, describes a right for the use of not to exceed 0.01 cubic foot per second of water from Canyon Creek for irrigation of a certain 0.62 acre in SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W. M., with a date of priority of February 10, 1912.

Water for the said right is diverted, through the Elliott and Shaw Ditch, from a point located 231 feet South and 330 feet West from the Northeast Corner of Joseph Roberts DLC 59, being within the SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W. M.

The applicant herein proposes to change the point of diversion therefrom, without loss of priority, to a point located 1754 feet South and 1197 feet East from the Southeast Corner of Joseph Roberts DLC 59, being within the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 34, Township 30 South, Range 5 West, W. M. The applicant herein also proposes to transfer the water right from the lands above described and use heretofore made of water, without loss of priority, to municipal use for the City of Canyonville within Section 27, E $\frac{1}{2}$ Section 28, NE $\frac{1}{4}$ Section 33, and N $\frac{1}{2}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$ Section 34, Township 30 South, Range 5 West, W. M.

Notice of the application, pursuant to ORS 540.520(2), was published in The News-Review, a newspaper printed and having general circulation in Douglas County, Oregon, for a period of three weeks in the issues of September 26, October 3 & 10, 1979.

Mr. M. John Youngquist, Watermaster, has filed a statement to the effect that the proposed changes in point of diversion and use heretofore made may be made without injury to existing rights.

No objections having been filed and it appearing that the proposed changes in point of diversion and use heretofore made may be made without injury to existing rights, the application should be approved.

NOW, THEREFORE, it hereby is ORDERED that the requested change in point of diversion and use heretofore made, as described herein, without loss of priority, are approved.

It is FURTHER ORDERED that the quantity of water diverted at the new point of diversion shall not exceed the quantity of water available at the old point of diversion under the subject right, and shall be further limited to use only during the irrigation season each year.

It is FURTHER ORDERED that the following provisions shall be effective when in the judgment of the watermaster it becomes necessary to install headgates and measuring devices;

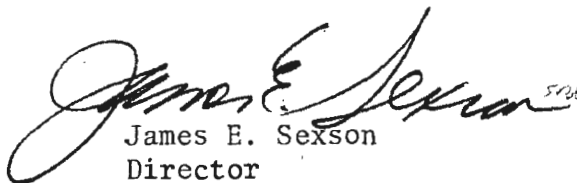
That the diversion works shall include an in line flow meter, a weir, or other suitable device for measuring the water to which the applicant is entitled;

That the type and plans of the measuring device be approved by the watermaster before the beginning of construction work and that the weir or measuring device be installed under the general supervision of said watermaster.

It is FURTHER ORDERED that NO time need be fixed for completion as the changes in point of diversion and use heretofore made are completed.

It is FURTHER ORDERED that the certificate of water right recorded at page 48132, Volume 41, State Record of Water Right Certificates, is canceled; and in lieu thereof a new certificate be issued covering the balance of the right NOT involved in this proceeding; and upon proof satisfactory to the Water Resources Director of completion of works and beneficial use of water to the extent intended under the provisions of this order, a confirming certificate of water right shall be issued to the applicant herein.

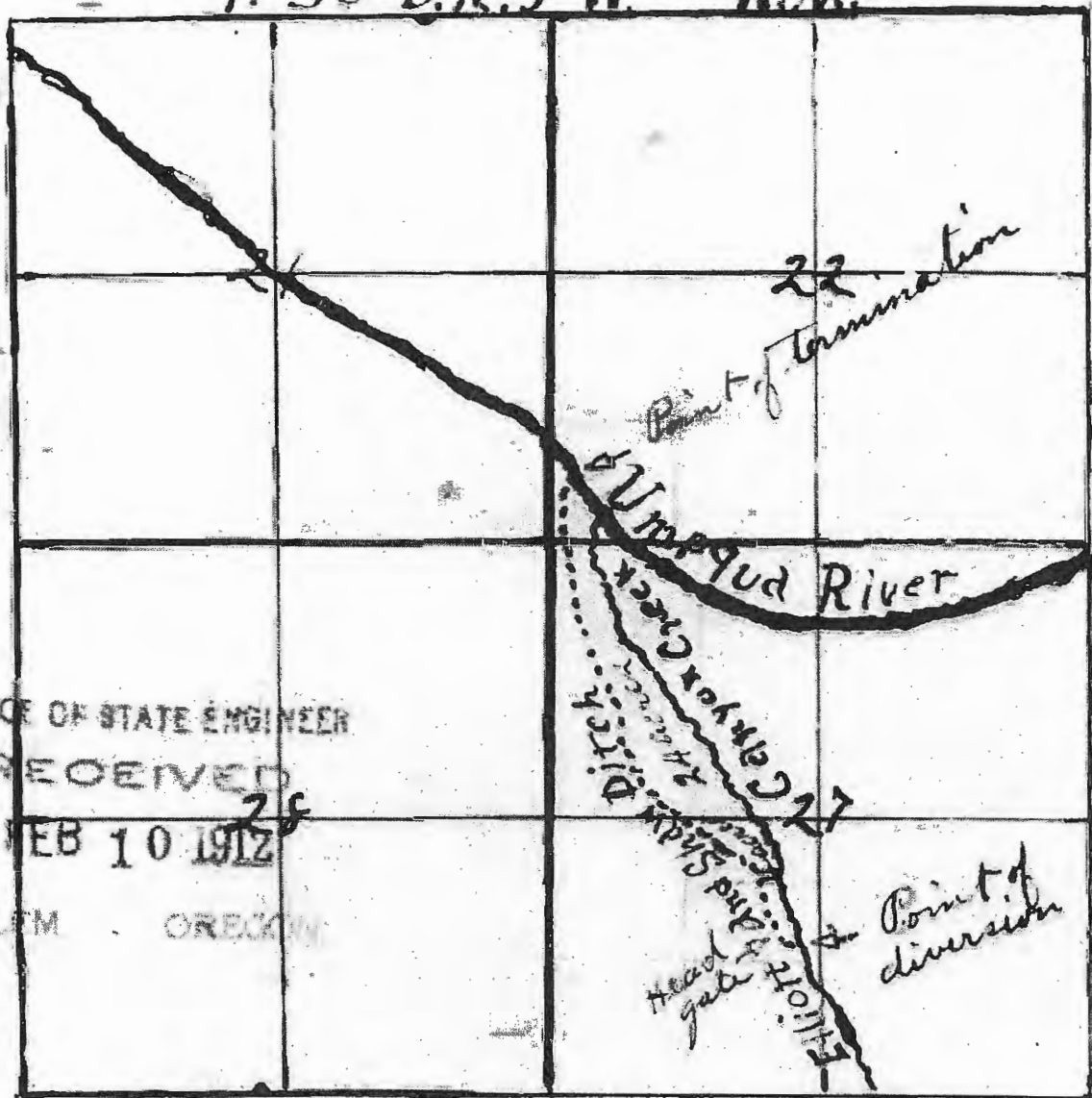
Dated at Salem, Oregon this 4th day of December, 1979.


James E. Sexson
Director

2075

57081

T. 30 S. R. 5 W. W.M.



5010

OFFICE OF STATE ENGINEER
RECEIVED
FEB 10 1912
SALEM OREGON

Division No. 2075
Permit No. 1077

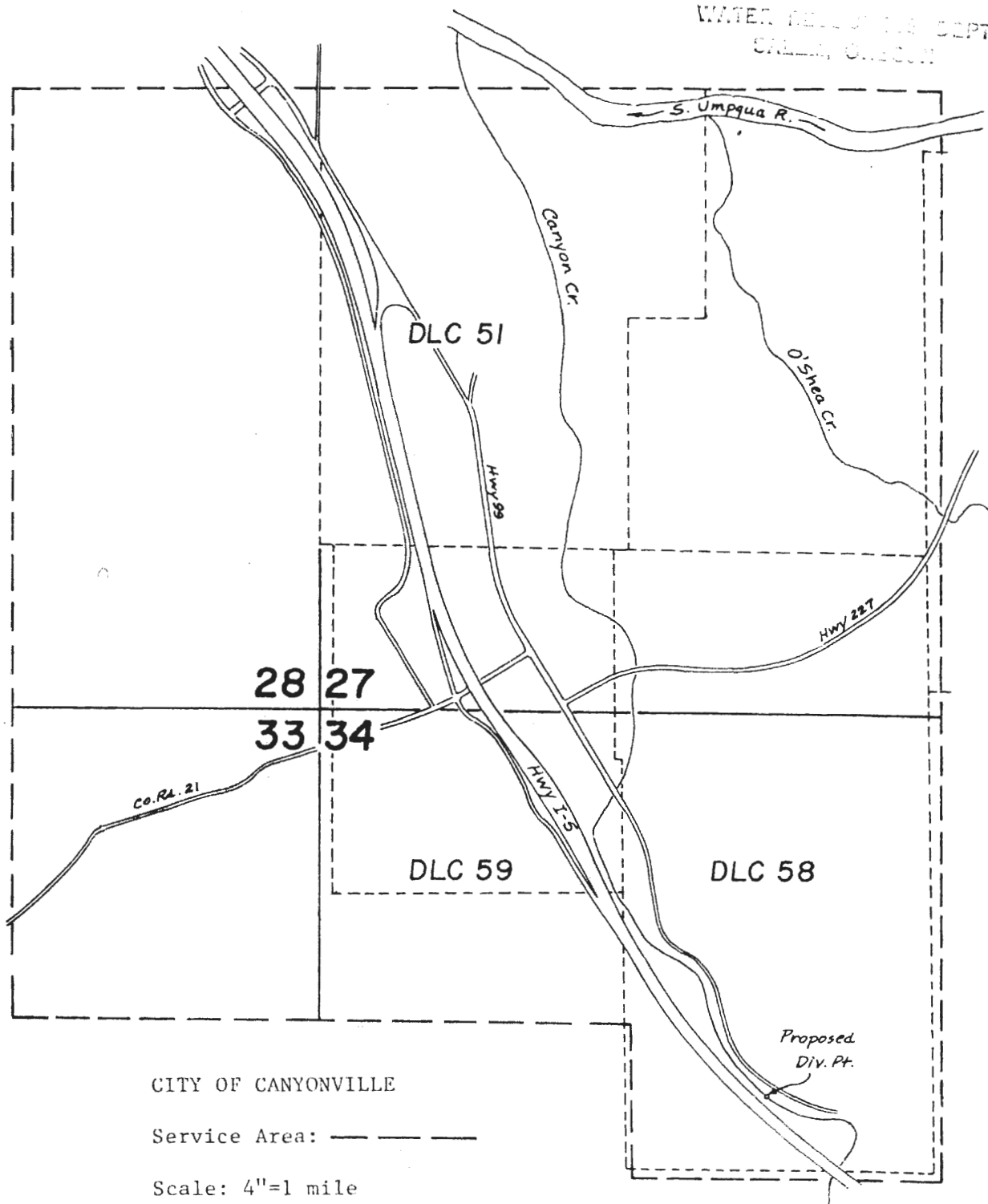
S 5023-

T. 30 S. R. 5 W. W.M.

RECEIVED

JUL 12 1979

WATER RESOURCES DEPT
SANTA FE, OREGON



CITY OF CANYONVILLE

Service Area: ———

Scale: 4"=1 mile

Proposed Div. Pt: 1754' S. and 1197' E. from the
S.E. corner of D.L.C. No. 59

T- 4258

T. 30 S. R. 5 W. W.M., Sec. 27

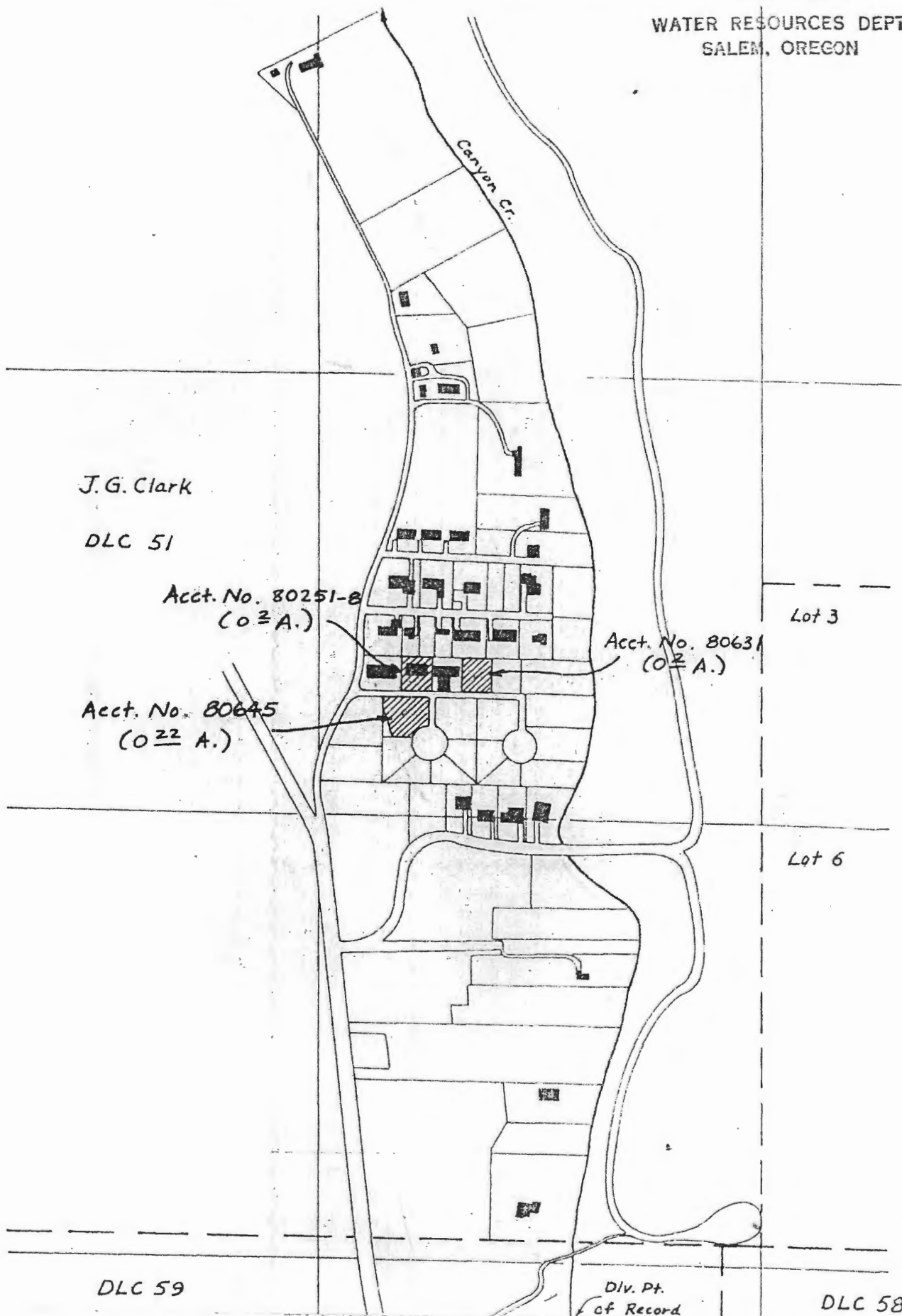
Scale: 1" = 400' (Douglas Co. - 76 17C-1)

T-4258

RECEIVED

JUL 23 1979

WATER RESOURCES DEPT
SALEM, OREGON



* Permit No. 7.8.3.4

APPLICATION FOR A PERMIT

CERTIFICATE NO. 7819
52542

To Appropriate the Public Waters of the State of Oregon

I, A. M. Shaffer
(Name of applicant)
of Canyonville,
(Postoffice) Douglas County of Oregon,
State of Oregon, do hereby make application for a permit to appropriate the
following described public waters of the State of Oregon, subject to existing rights:

If the applicant is a corporation, give date and place of incorporation

1. The source of the proposed appropriation is Canyon Creek
(Name of stream)

, tributary of South Umpqua River

2. The amount of water which the applicant intends to apply to beneficial use is

0.025 cubic feet per second.

3. The use to which the water is to be applied is Domestic Supplies
(Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. The point of division is located S. 48° 17' W. 10.48 chains, from the SE. Cor. of the
(Give distance and bearing to section corner)
Jas C. Clark, D. L. C. No. 51

being within the SE₄ of SW₄ of Sec. 27, Tp. 30 S.,
(Give smallest legal subdivision) (No. N. or S.)

R. 5 W., W. M., in the county of Douglas
(No. E. or W.)

5. The 1" pipe line to be 250 feet
(Main ditch, canal or pipe line)

none in length, terminating in the SE₄ of SW₄ of Sec. 27, Tp. 30 S.,
(Smallest legal subdivision) (No. N. or S.)

R. 5 W., W. M., the proposed location being shown throughout on the accompanying map.
(No. E. or W.)

6. The name of the ditch, canal or other works is A. M. Shaffer Pump

DESCRIPTION OF WORKS

DIVERSION WORKS—

7. (a) Height of dam none feet, length on top _____ feet, length at bottom _____
feet; material to be used and character of construction _____
(Loose rock, concrete, masonry,
rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of heddgate _____
(Timber, concrete, etc., number and size of openings)

* A different form of application is provided where storage works are contemplated. These forms can be secured without charge, together with instructions, by addressing the State Engineer, Salem, Oregon.

CANAL SYSTEM—

8. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line) feet; width on bottom feet; depth of water feet; grade feet fall per one thousand feet.

(b) At miles from headgate: Width on top (at water line) feet; width on bottom feet; depth of water feet; grade feet fall per one thousand feet.

FILL IN THE FOLLOWING INFORMATION WHERE THE WATER IS USED FOR
IRRIGATION—

9. The land to be irrigated has a total area of acres, located in each smallest legal subdivision, as follows:
(Give area of land in each smallest legal subdivision which you intend to irrigate)

(If more space required, attach separate sheet)

POWER, MINING, MANUFACTURING, OR TRANSPORTATION PURPOSES—

10. (a) Total amount of power to be developed theoretical horsepower.

(b) Total fall to be utilized feet.
(Head)

(c) The nature of the works by means of which the power is to be developed

(d) Such works to be located in of Sec.
(Legal subdivision)

Tp., R., W. M.
(No. N. or S.) (No. E. or W.)

(e) Is water to be returned to any stream?
(Yes or No)

(f) If so, name stream and locate point of return
....., Sec., Tp., R., W. M.
(No. N. or S.) (No. E. or W.)

(g) The use to which power is to be applied is

(h) The nature of the mines to be served

MUNICIPAL SUPPLY—

11. To supply the city of _____
 _____ County, having a present population of _____,
 (Name of)
 and an estimated population of _____ in 192_____.

(Answer questions 12, 13, 14, and 15 in all cases)

12. Estimated cost of proposed works, \$ 300.00
 13. Construction work will begin on or before July 1928
 14. Construction work will be completed on or before July 1928
 15. The water will be completely applied to the proposed use on or before July 1928

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the State Engineer, accompany this application.

A. M. Shaffer
 (Name of applicant)
 Canyonville, Oregon

Signed in the presence of us as witnesses:

- (1) Jesse Radford Canyonville, Oregon
 (Name) (Address of witness)
 (2) F. J. Blattner Canyonville, Oregon
 (Name) (Address of witness)

Remarks: _____

STATE OF OREGON, }
 County of Marion, } ss.

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for correction or completion, as follows: _____

In order to retain its priority, this application must be returned to the State Engineer, with corrections, on or before _____, 192_____.

WITNESS my hand this _____ day of _____, 192_____.

STATE ENGINEER.

16 Application No. 11362
Permit No. 7834

PERMIT
TO APPROPRIATE THE PUBLIC
WATERS OF THE STATE
OF OREGON

District No.

*This instrument was first received in the
office of the State Engineer at Salem, Oregon,*

on the 11th day of March

1927, at 1:30 o'clock P.M.

Returned to applicant for correction:

Corrected application received:

Approved:

April 4th, 1927

Recorded in Book No. 26 of
Permits, on page 7834

R H E A L U P E R
STATE ENGINEER.
1 map ACFP \$ 6.00

STATE OF OREGON, }
County of Marion, } ss.

*This is to certify that I have examined the foregoing application and do hereby grant the same,
subject to the following limitations and conditions: If for irrigation, this appropriation shall be limited*

*to one-eightieth of one cubic foot per second, or its equivalent, for each acre irrigated, and shall be subject
to such reasonable rotation system as may be ordered by the proper state officer.*

*The right herein granted is limited to the appropriation of water from Canyon
Creek for domestic purposes.*

*The amount of water appropriated shall be limited to the amount which can be applied to bene-
ficial use and not to exceed 0.03 cubic feet per second, or its equivalent in case of
rotation. The priority date of this permit is March 11, 1927*

*Actual construction work shall begin on or before April 4, 1928 and shall
thereafter be prosecuted with reasonable diligence and be completed on or before June 1, 1929*

*Complete application of the water to the proposed use shall be made on or before
October 1, 1930*

WITNESS my hand this 4th day of April, 1927

R H E A L U P E R
STATE ENGINEER.

Permits for power development are subject to the limitation of franchise as provided in Section 5728, Oregon Laws, and the
payment of annual fees as provided in Section 5803, Oregon Laws.

This form approved by the State Water Board, March 11, 1909.

STATE OF OREGON

COUNTY OF DOUGLAS

CERTIFICATE OF WATER RIGHT

This Is to Certify, *That* CITY OF CANYONVILLE

of City Hall, PO Box 765, Canyonville, , State of Oregon 97417 , has made proof to the satisfaction of the Water Resources Director, of a right to the use of the waters of Canyon Creek

a tributary of South Umpqua River for the purpose of
municipal use

under Permit No. 7834 and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from March 11, 1927

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.03 cubic foot per second, if available at the original point of diversion, SE 1/4 SW 1/4, Section 27, T30S, R5W, WM; 460.3 feet South and 516.3 feet West from SE Corner, James G. Clark DLC 51

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NW 1/4 SE 1/4 as projected within J. Reynolds DLC 58, Section 34, T30S, R5W, WM; 1754 feet South and 1197 feet East from SE Corner, J. Roberts DLC 59.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to----- of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

SEE NEXT PAGE

ALL
Section 27

E 1/2
Section 28

NE 1/4
Section 33

N 1/2
N 1/2 SE 1/4
Section 34
Township 30 South, Range 5 West, WM

This certificate is issued to confirm a change in use and point of diversion approved by an order of the Water Resources Director entered January 28, 1980 and supersedes certificate of water right recorded at page 7819, Volume 8, State Record of Water Right Certificates.

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described, and is subject to minimum flows established by the Water Policy Review Board with an effective date prior to this right.

WITNESS the signature of the Water Resources Director, affixed

this date. December 4, 1984

...../s/ William H. Young.....
Water Resources Director

Recorded in State Record of Water Right Certificates, Volume 47 , page 52542

BEFORE THE WATER RESOURCES DIRECTOR OF OREGON

DOUGLAS COUNTY

IN THE MATTER OF THE APPLICATION)
OF CITY OF CANYONVILLE FOR APPROVAL)
OF CHANGES IN POINT OF DIVERSION)
AND USE OF WATER)
- - - - -

ORDER APPROVING
TRANSFER NO. 4212

On April 30, 1979, an application was filed in the office of the Water Resources Director by City of Canyonville for approval of changes in point of diversion and use heretofore made of water from Canyon Creek, pursuant to the provisions of ORS 540.510 to 540.530.

The certificate recorded at page 7819, Volume 8, State Record of Water Right Certificates, in the name of A. M. Shaffer, describes a right for the use of not to exceed 0.03 cubic foot per second from Canyon Creek for domestic supplies in SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M., with a date of priority of March 11, 1927.

Water for the said right is diverted from a point located 460.3 feet South and 516.3 feet West from the Southeast Corner of James G. Clark D.L.C. No. 51, being within the SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M.

The applicant herein proposes to change the point of diversion therefrom, without loss of priority, to a point located 1754 feet South and 1197 feet East from the Southeast Corner of Joseph Roberts D.L.C. No. 59, being within the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 34, Township 30 South, Range 5 West, W.M. The applicant also proposes to transfer the water right from the lands above described and use heretofore made of water, without loss of priority, to municipal use for the City of Canyonville within Section 27, E $\frac{1}{2}$ Section 28, NE $\frac{1}{4}$ Section 33 and N $\frac{1}{2}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$ Section 34, Township 30 South, Range 5 West, W.M.

Notice of the application, pursuant to ORS 540.520(2), was published in the Canyon Creek Current, a newspaper printed and having general circulation in Douglas County, Oregon, for a period of three weeks in the issues of June 14, 21 and 28, 1979.

Mr. M. John Youngquist, Watermaster, has filed a statement to the effect that the proposed changes in point of diversion and use heretofore made of water may be made without injury to existing rights.

No objections having been filed and it appearing that the proposed changes in point of diversion and use of water may be made without injury to existing

rights, the application should be approved.

NOW, THEREFORE, it hereby is ORDERED that the requested changes in point of diversion and use of water, as described herein, without loss of priority, are approved.

It is FURTHER ORDERED that the quantity of water diverted at the new point of diversion shall not exceed the quantity of water available at the old point of diversion under the subject right.

It is FURTHER ORDERED that the following provisions shall be effective when in the judgment of the watermaster it becomes necessary to install headgates and measuring devices:

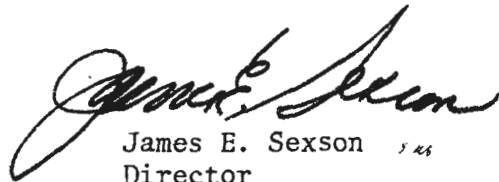
That the diversion works shall include an in line flow meter, a weir, or other suitable device for measuring the water to which the applicant is entitled;

That the type and plans of the measuring device be approved by the watermaster before the beginning of construction work and that the weir or measuring device be installed under the general supervision of said watermaster.

It is FURTHER ORDERED that NO time need be fixed for completion as the changes in point of diversion and use of water are completed.

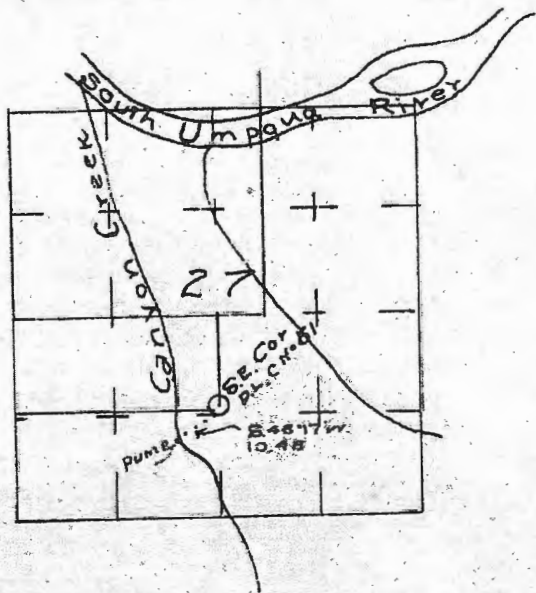
It is FURTHER ORDERED that the certificate recorded at page 7819, Volume 8, State Record of Water Right Certificates, is canceled; and upon proof satisfactory to the Water Resources Director of completion of works and beneficial use of water to the extent intended under the provisions of this order, a confirming certificate of water right shall be issued to the applicant herein.

Dated at Salem, Oregon this 28th day of January, 1980.


James E. Sexson
Director

Application No. 11362

Permit No. 7834



A.M. SHAFFER PUMP

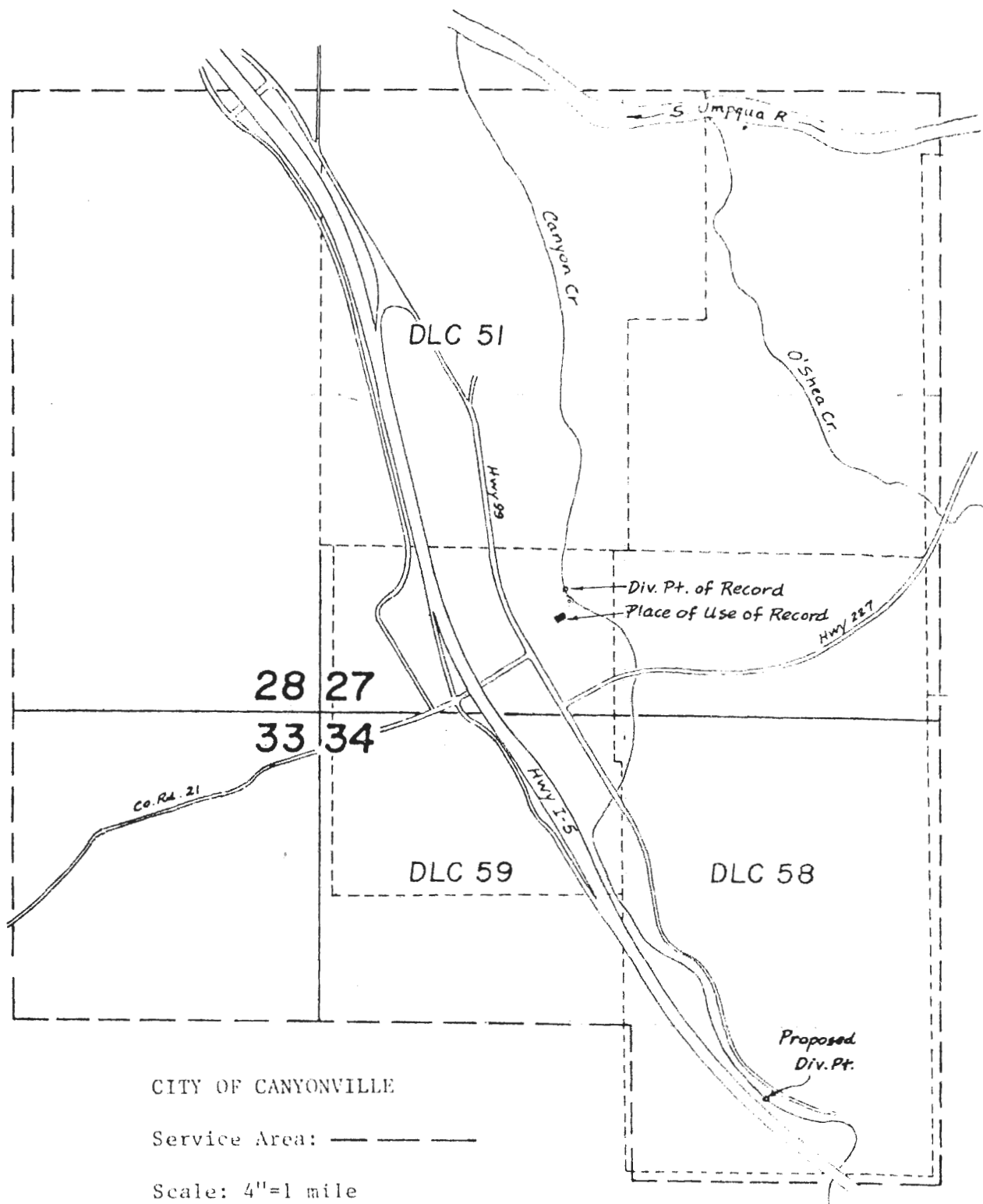
SEC. 27

TP. 30S. R. 5W.

Douglas County, Oregon.

Scale 40 chs. to 1 inch.

T. 30 S. R. 5 W. W.M.



CITY OF CANYONVILLE

Service Area: ---

Scale: 4"=1 mile

Proposed Div. Pt: 1754' S. and 1197' E. from the
S.E. corner of D.L.C. No. 50

RECEIVED
APR 30 1979
WATER RESOURCES DEPT.
SALEM, OREGON

BEFORE THE WATER RESOURCES DIRECTOR OF OREGON

DOUGLAS COUNTY

IN THE MATTER OF THE APPLICATION)
OF CITY OF CANYONVILLE FOR APPROVAL)
OF CHANGES IN POINT OF DIVERSION)
AND USE OF WATER)

ORDER APPROVING
TRANSFER NO. 4212

On April 30, 1979, an application was filed in the office of the Water Resources Director by City of Canyonville for approval of changes in point of diversion and use heretofore made of water from Canyon Creek, pursuant to the provisions of ORS 540.510 to 540.530.

The certificate recorded at page 7819, Volume 8, State Record of Water Right Certificates, in the name of A. M. Shaffer, describes a right for the use of not to exceed 0.03 cubic foot per second from Canyon Creek for domestic supplies in SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M., with a date of priority of March 11, 1927.

Water for the said right is diverted from a point located 460.3 feet South and 516.3 feet West from the Southeast Corner of James G. Clark D.L.C. No. 51, being within the SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M.

The applicant herein proposes to change the point of diversion therefrom, without loss of priority, to a point located 1754 feet South and 1197 feet East from the Southeast Corner of Joseph Roberts D.L.C. No. 59, being within the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 34, Township 30 South, Range 5 West, W.M. The applicant also proposes to transfer the water right from the lands above described and use heretofore made of water, without loss of priority, to municipal use for the City of Canyonville within Section 27, E $\frac{1}{2}$ Section 28, NE $\frac{1}{4}$ Section 33 and N $\frac{1}{2}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$ Section 34, Township 30 South, Range 5 West, W.M.

Notice of the application, pursuant to ORS 540.520(2), was published in the Canyon Creek Current, a newspaper printed and having general circulation in Douglas County, Oregon, for a period of three weeks in the issues of June 14, 21 and 28, 1979.

Mr. M. John Youngquist, Watermaster, has filed a statement to the effect that the proposed changes in point of diversion and use heretofore made of water may be made without injury to existing rights.

No objections having been filed and it appearing that the proposed changes in point of diversion and use of water may be made without injury to existing

rights, the application should be approved.

NOW, THEREFORE, it hereby is ORDERED that the requested changes in point of diversion and use of water, as described herein, without loss of priority, are approved.

It is FURTHER ORDERED that the quantity of water diverted at the new point of diversion shall not exceed the quantity of water available at the old point of diversion under the subject right.

It is FURTHER ORDERED that the following provisions shall be effective when in the judgment of the watermaster it becomes necessary to install headgates and measuring devices:

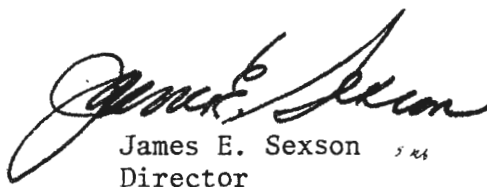
That the diversion works shall include an in line flow meter, a weir, or other suitable device for measuring the water to which the applicant is entitled;

That the type and plans of the measuring device be approved by the watermaster before the beginning of construction work and that the weir or measuring device be installed under the general supervision of said watermaster.

It is FURTHER ORDERED that NO time need be fixed for completion as the changes in point of diversion and use of water are completed.

It is FURTHER ORDERED that the certificate recorded at page 7819, Volume 8, State Record of Water Right Certificates, is canceled; and upon proof satisfactory to the Water Resources Director of completion of works and beneficial use of water to the extent intended under the provisions of this order, a confirming certificate of water right shall be issued to the applicant herein.

Dated at Salem, Oregon this 28th day of January, 1980.


James E. Sexson
Director

525 41

2

48939

* APPLICATION FOR A PERMIT

CERTIFICATE NO. 15683

To Appropriate the Public Waters of the State of Oregon

I, Geo. J. McClane
(Name of applicant)
 of Canyonville
(Post office), County of Douglas
 State of Oregon, do hereby make application for a permit to appropriate the
 following described public waters of the State of Oregon, **SUBJECT TO EXISTING RIGHTS:**

If the applicant is a corporation, give date and place of incorporation

1. The source of the proposed appropriation is Canyon Creek
(Name of stream)
 a tributary of South Umpqua River

2. The amount of water which the applicant intends to apply to beneficial use is Garden
 cubic feet per second. A Gasoline Pump one ins. discharge 2400 per hour
(If water is to be used from more than one source, give quantity from each)

**3. The use to which the water is to be applied is Irrigating garden
(Irrigation, power, mining, manufacturing, domestic supplies, etc.)
two acres

4. The point of diversion is located 765 ft. / and / ft. west from the
(N. or S.) (E. or W.)
 corner of South East corner of the James G. Clark D.L.C. No. 51 in Section Twenty
(Section or subdivision)
seven in township thirty south of Range 5 west of the W. M.
(If preferable, give distance and bearing to section corner)

(If there is more than one point of diversion, each must be described. Use separate sheet if necessary)
 being within the James G. Clark Donation Claim NESW of Sec. 27, Tp. Thirty S.
(Give smallest legal subdivision) (N. or S.)
 R. 5 West, W. M., in the county of Douglas
(E. or W.)

5. The Iron Pipe line to be 300 ft.
(Main ditch, canal or pipe line) (Miles or feet)
 in length, terminating in the James G. Clark Ln Claim of Sec. 27, Tp. 30 South,
(Smallest legal subdivision) (N. or S.)
 R. W, W. M., the proposed location being shown throughout on the accompanying map.
(E. or W.)

DESCRIPTION OF WORKS

Diversion Works—

6. (a) Height of dam feet, length on top feet, length at bottom
 / feet; material to be used and character of construction
(Loose rock, concrete, masonry,
 rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate
(Timber, concrete, etc., number and size of openings)

(c) If water is to be pumped give general description 1 in. discharge sintefugal
(Size and type of pump)
pump run by Gasoline Engine
(Size and type of engine or motor to be used, total head water is to be lifted, etc.)

* A different form of application is provided where storage works are contemplated.

** Applications for permits to appropriate water for the generation of electricity, with the exception of municipalities, must be made to the Hydro-electric Commission. Either of the above forms may be secured, without cost, together with instructions by addressing the State Engineer, Salem, Oregon.

7. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line) feet; width on bottom feet; depth of water feet; grade feet fall per one thousand feet.

(c) Length of pipe, ... ft.; size at intake, ... in.; size at ft.
from intake in.; size at place of use in.; difference in elevation between
intake and place of use, ... ft. Is grade uniform? Estimated capacity,
..... sec. ft.

[illegible]

(a) Character of soil

(b) Kind of crops raised

9. (a) Total amount of power to be developed theoretical horsepower.
 (b) Quantity of water to be used for power sec. ft.
 (c) Total fall to be utilized feet.
 (Head)
 (d) The nature of the works by means of which the power is to be developed

(e) Such works to be located in of Sec.
(Legal subdivision)

Tp., R., W. M.
(No. N. or S.) (No. E. or W.)

(f) Is water to be returned to any stream?
(Yes or No)

(g) If so, name stream and locate point of return
....., Sec., Tp., R., W. M.
(No. N. or S.) (No. E. or W.)

(h) The use to which power is to be applied is

(i) *The nature of the mines to be served*

Municipal or Domestic Supply—

10. (a) To supply the city of _____
_____ County, having a present population of _____
(Name of)
and an estimated population of _____ in 19____.

(b) If for domestic use state number of families to be supplied _____

(Answer questions 11, 12, 13, and 14 in all cases)

- 11. Estimated cost of proposed works, \$ 275.00
- 12. Construction work will begin on or before April 15 - 44
- 13. Construction work will be completed on or before April 30 -44
- 14. The water will be completely applied to the proposed use on or before _____

Geo. J. McClane
(Signature of applicant)

Signed in the presence of us as witnesses:

- (1) _____
(Name) (Address of witness)
- (2) _____
(Name) (Address of witness)

Remarks: _____

STATE OF OREGON, }
County of Marion, } ss

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for _____ completion

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before April 30, 1944.

WITNESS my hand this 31st day of March, 1944.

CHAS. E. STRICKLIN
STATE ENGINEER

By
Ed K. Humphrey, Assistant

PERMIT
TO APPROPRIATE THE PUBLIC
WATERS OF THE STATE
OF OREGON

Division No. District No.

This instrument was first received in the
office of the State Engineer at Salem, Oregon
on the 28th day of March
1944, at 1:00 o'clock P. M.

Returned to applicant:

Corrected application received:

Approved:

May 1, 1944

Recorded in book No. 38 of
Permits on page 15683

STATE ENGINEER

Drainage Basin No. 16 Page 36
Fees Paid \$9.50

STATE OF OREGON

County of Marion,

PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same,
SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use
and shall not exceed 0.03 cubic feet per second measured at the point of diversion from the
stream, or its equivalent in case of rotation with other water users, from
Canyon Creek

The use to which this water is to be applied is Irrigating garden

If for irrigation, this appropriation shall be limited to 1 80th of one cubic foot per
second or its equivalent for each acre irrigated and shall be further limited to a
diversion of not to exceed 2 1/2 acre feet per acre for each acre irrigated during the
irrigation season of each year,

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The priority date of this permit is March 28, 1944

Actual construction work shall begin on or before May 1, 1945 and shall
thereafter be prosecuted with reasonable diligence and be completed on or before
October 1, 1946

Complete application of the water to the proposed use shall be made on or before
October 1, 1947

WITNESS my hand this 1st day of May, 1944.

CHAS. E. STRICKLIN

STATE ENGINEER

STATE OF OREGON

COUNTY OF DOUGLAS

CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF CANYONVILLE

of City Hall, PO Box 765, Canyonville, , State of Oregon 97417 , has made proof to the satisfaction of the Water Resources Director, of a right to the use of the waters of Canyon Creek

a tributary of South Umpqua River
municipal use

for the purpose of

under Permit No. 15683 and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from March 28, 1944 that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.022 cubic foot per second, if available at the original point of diversion, NE 1/4 SW 1/4, as projected within James G. Clark DLC 51, Section 27, T30S, R5W, WM. and further limited to use only during the irrigation season and * or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NW 1/4 SE 1/4 as projected within J. Reynolds DLC 58, Section 34, T30S, R5W, WM; 1754 feet South and 1197 feet East from SE Corner, J. Roberts DLC 59.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to----- of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

* not to exceed 4.3 acre feet

SEE NEXT PAGE

ALL
Section 27

E 1/2
Section 28

NE 1/4
Section 33

N 1/2
N 1/2 SE 1/4
Section 34

Township 30 South, Range 5 West, WM

This certificate is issued to confirm a change in use and point of diversion approved by an order of the Water Resources Director entered December 4, 1979 and together with certificate of water right recorded at page 48939, Volume 42, State Record of Water Right Certificates, supersedes certificate 15621

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described. and is subject to minimum flows established by the Water Policy Review Board with an effective date prior to this right.

WITNESS the signature of the Water Resources Director, affixed

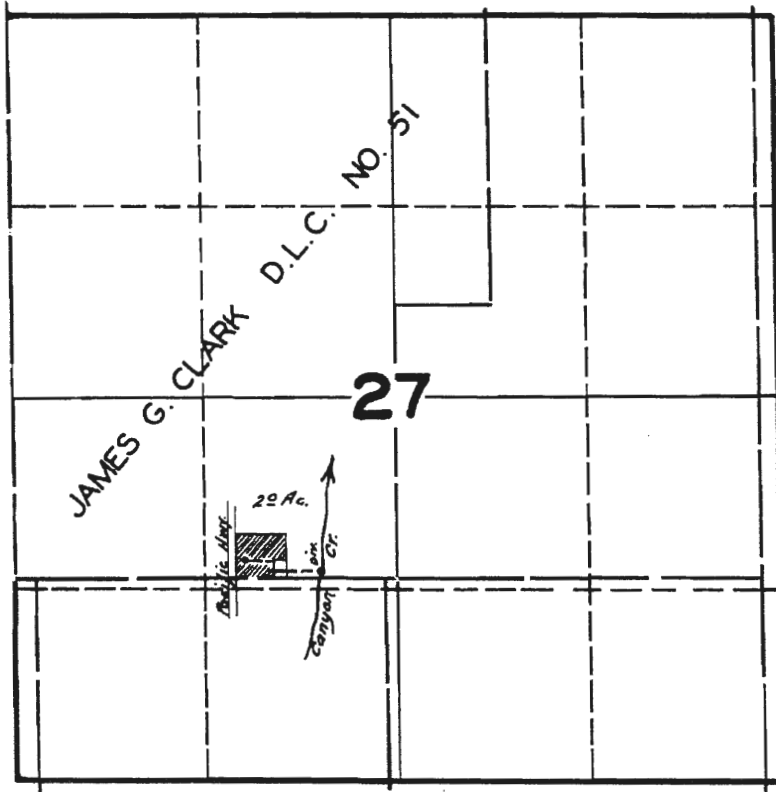
this date. December 4, 1984

...../s/ William H. Young.....
Water Resources Director

Recorded in State Record of Water Right Certificates, Volume 47 , page 52541

5319C

T.30S.R.5W.W.M.



FINAL PROOF SURVEY
UNDER

Application No. 20182 Permit No. 15683

IN NAME OF

GEO. J. MC. CLANE

Surveyed JULY 13, 1945 by [Signature]

BEFORE THE WATER RESOURCES DIRECTOR OF OREGON

DOUGLAS COUNTY

IN THE MATTER OF THE APPLICATION)
OF CITY OF CANYONVILLE FOR APPROVAL)
OF CHANGES IN POINT OF DIVERSION &)
USE HERETOFORE MADE OF WATER)

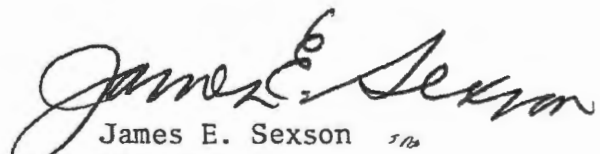
ORDER AMENDING
ORDER APPROVING
TRANSFER NO. 4260

The administrative Order of the Water Resources Director dated December 4, 1979, and recorded at pages 567 and 568, Volume 32, Special Order Record, approving water right transfer application No. 4260, in the name of City of Canyonville, was in error in paragraph 2 on page 567 in stating the amount of water appurtenant to a certain 1.74 acres described by the certificate recorded at page 15621, Volume 13, State Record of Water Right Certificates. The Order listed an amount of water of not to exceed 0.22 cubic foot per second from Canyon Creek for irrigation of 1.74 acres in NE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M., when it should have stated: "... the use of not to exceed 0.022 cubic foot per second from Canyon Creek for irrigation of 1.74 acres in NE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M."

NOW, THEREFORE, it is ORDERED that paragraph 2 on page 567 of the Administrative Order of the Water Resources Director entered December 4, 1979, approving water right transfer application No. 4260, in the name of City of Canyonville, be and the same hereby is amended to read:

"The certificate recorded at page 15621, Volume 13, State Record of Water Right Certificates, in the name of George J. McClane, describes a right which includes the use of not to exceed 0.022 cubic foot per second from Canyon Creek for irrigation of 1.74 acres in NE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M., with a date of priority of March, 28, 1944."

Dated at Salem, Oregon this 15th day of January, 1980.


James E. Sexson *5/10*
Director

T. 30 S. R. 5 W. W.M., Sec. 27

P#15683

Scale: 1" = 400' (Douglas Co. - 76 17C - 1)

RECEIVED

JUL 23 1979

WATER RESOURCES DEPT
SALEM, OREGON

J.G. Clark

DLC 51

Lot 3

Lot 6

Acct. No.	Acreage
80239-0	.26
80239-1	.17
80239-2	.30
80239-3	.10
80239-4	1.17

1.74 ac

DLC 59

Div. Pt.
of Record

DLC 58

59994, 59995, 59996 Cert. 49002 + 52543
 59993, 50130 Permit No. 17150
 CERTIFICATE NO. 49002
 SUBMIT NO. 18652
 45752

* APPLICATION FOR PERMIT

To Appropriate the Public Waters of the State of Oregon

49002
50897

I, John Hamlin (Name of applicant)
 of Canyonville, Oregon (Mailing address),
 State of Oregon, do hereby make application for a permit to appropriate the
 following described public waters of the State of Oregon, **SUBJECT TO EXISTING RIGHTS:**

If the applicant is a corporation, give date and place of incorporation

1. The source of the proposed appropriation is Canyon Creek (Name of stream)
 a tributary of South Umpqua River

2. The amount of water which the applicant intends to apply to beneficial use is .07
 cubic feet per second.
 (If water is to be used from more than one source, give quantity from each)

**3. The use to which the water is to be applied is Irrigation
 (Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. The point of diversion is located ft. (N. or S.) and ft. (E. or W.) from the
 corner of between points which bear N 61°56'E 2350 ft. and S 79°05'E
2208.8 from the 1/4 sec. cor. between secs. 27 and 28
 (Section or subdivision)

(If preferable, give distance and bearing to section corner)

(If there is more than one point of diversion, each must be described. Use separate sheet if necessary)
 being within the SE 1/4 of Sec. 27, Tp. 30 S
 (Give smallest legal subdivision) (N. or S.)
 R. 5 W, W. M., in the county of Douglas
 (E. or W.)

5. The pipeline to be 400 ft
 (Main ditch, canal or pipe line) (Miles or feet)
 in length, terminating in the SE 1/4 of Sec. 27 of Sec. 27, Tp. 30 S
 (Smallest legal subdivision) (N. or S.)
 R. 5 W, W. M., the proposed location being shown throughout on the accompanying map.
 (E. or W.)

DESCRIPTION OF WORKS

Diversion Works—

6. (a) Height of dam feet, length on top feet, length at bottom
 feet; material to be used and character of construction
 (Loose rock, concrete, masonry,
 rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate
 (Timber, concrete, etc., number and size of openings)

(c) If water is to be pumped give general description 3 H.P. Electric Motor Pump 3" intake
 (Size and type of pump)
portable gas driven outfit to be used until power lines installed.
 (Size and type of engine or motor to be used, total head water is to be lifted, etc.)

*A different form of application is provided where storage works are contemplated.

**Application for permits to appropriate water for the generation of electricity, with the exception of municipalities, must be made to the Hydroelectric Commission. Either of the above forms may be secured, without cost, together with instructions by addressing the State Engineer, Salem, Oregon.

Municipal or Domestic Supply—

10. (a) To supply the city of
 County, having a present population of
(Name of)
 and an estimated population of in 19.....

(b) If for domestic use state number of families to be supplied

(Answer questions 11, 12, 13, and 14 in all cases)

11. Estimated cost of proposed works, \$.....
 12. Construction work will begin on or before Dec. 1, 1947.....
 13. Construction work will be completed on or before Dec. 1, 1949.....
 14. The water will be completely applied to the proposed use on or before Dec. 1, 1952.....

(Sgd) John Hamlin.....
(Signature of applicant)

Remarks:

STATE OF OREGON, }
 County of Marion, } ss

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before, 194.....

WITNESS my hand this day of, 194.....

STATE ENGINEER

Application No. 22168Permit No. 17456

PERMIT
TO APPROPRIATE THE PUBLIC
WATERS OF THE STATE
OF OREGON

Division No. _____ District No. _____

This instrument was first received in the
office of the State Engineer at Salem, Oregon,
on the 2nd day of January,

1947 at 8:30 o'clock A. M.

Returned to applicant:

Corrected application received:

Approved:

April 15, 1947Recorded in book No. 43 ofPermits on page 17456CHAS. R. STRICKLIN
STATE ENGINEERDrainage Basin No. 16 Page 36AFees Paid \$2.50

PERMIT

STATE OF OREGON, }
County of Marion, } ss

This is to certify that I have examined the foregoing application and do hereby grant the same,
SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use
and shall not exceed 0.07 cubic feet per second measured at the point of diversion from the
stream, or its equivalent in case of rotation with other water users, from CANYON Creek

The use to which this water is to be applied is irrigation

If for irrigation, this appropriation shall be limited to 1/80th of one cubic foot per
second or its equivalent for each acre irrigated and shall be further limited to a
diversion of not to exceed 2 1/2 acre feet per acre for each acre irrigated during the
irrigation season of each year,

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The priority date of this permit is January 2, 1947

Actual construction work shall begin on or before April 15, 1948 and shall
thereafter be prosecuted with reasonable diligence and be completed on or before
October 1, 1949

Complete application of the water to the proposed use shall be made on or before

October 1, 1950

WITNESS my hand this 15th day of April, 1947.

CHAS. R. STRICKLIN
STATE ENGINEER

STATE OF OREGON

COUNTY OF DOUGLAS

CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF CANYONVILLE

of City Hall, PO Box 765, Canyonville, , State of Oregon 97417 , has made proof to the satisfaction of the Water Resources Director, of a right to the use of the waters of Canyon Creek

a tributary of South Umpqua River
municipal use

for the purpose of

under Permit No. 17456 and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from January 2, 1947

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.015 cubic foot per second if available at the original point of diversion, SE 1/4 NW 1/4 as projected within James G. Clark DLC 51, Sec. 27, T30S, R5W, WM; 110 feet South and 420 feet West from interior "L" corner James G. Clark *

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NW 1/4 SE 1/4 as projected within J. Reynolds DLC 58, Section 34, T30S, R5W, WM; 1754 feet South and 1197 feet East from SE Corner, J. Roberts DLC 59.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to----- of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

- * DLC 51 and further limited to use only during the irrigation season and not to exceed 2.5 acre feet

SEE NEXT PAGE

ALL
Section 27

E 1/2
Section 28

NE 1/4
Section 33

N 1/2
N 1/2 SE 1/4
Section 34

Township 30 South, Range 5 West, WM

This certificate is issued to confirm a change in use and point of diversion approved by an order of the Water Resources Director entered January 28, 1980 and together with certificate of water right recorded at page 49002, Volume 42, State Record of Water Right Certificates, supersedes Certificate 48343

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described. and is subject to minimum flows established by the Water Policy Review Board with an effective date prior to this right.

WITNESS the signature of the Water Resources Director, affixed

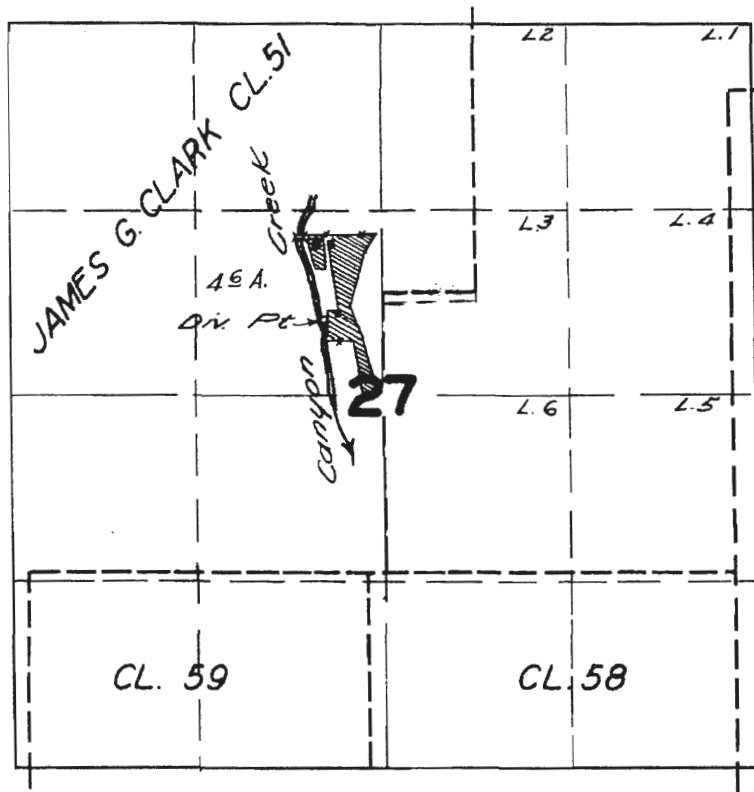
this date. December 4, 1984

...../s/ William H. Young.....
Water Resources Director

Recorded in State Record of Water Right Certificates, Volume 47 , page 52543

5321C

T.30S.R.5W.W.M.



FINAL PROOF SURVEY
UNDER

Application No. **22168**.. Permit No. **17456**..
IN NAME OF

.....**JOHN HAMLIN**.....

Surveyed **MAY 23 1950**., by **H.L. COFFMAN**..

BEFORE THE WATER RESOURCES DIRECTOR OF OREGON

DOUGLAS COUNTY

IN THE MATTER OF THE APPLICATION)
OF CITY OF CANYONVILLE FOR APPROVAL)
OF CHANGES IN POINT OF DIVERSION)
AND USE OF WATER)
- - - - -

ORDER APPROVING
TRANSFER NO. 4259

On July 23, 1979, an application was filed in the office of the Water Resources Director by City of Canyonville for approval of changes in point of diversion and use heretofore made of water from Canyon Creek, pursuant to the provisions of ORS 540.510 to 540.530.

The certificate recorded at page 48343, Volume 41, State Record of Water Right Certificates, in the name of John Hamlin, describes a right which includes the use of not to exceed 0.015 cubic foot per second from Canyon Creek for irrigation of a certain 1.0 acre in SE $\frac{1}{4}$ N $\frac{1}{4}$ W of Section 27, as projected within James G. Clark D.L.C. No. 51, Township 30 South, Range 5 West, W.M., with a date of priority of January 2, 1947.

Water for the said right is diverted from a point located 110 feet South and 420 feet West from the interior "L" Corner of James G. Clark D.L.C. No. 51, being within the SE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 27, Township 30 South, Range 5 West, W.M.

The applicant herein proposes to change the point of diversion therefrom, without loss of priority, to a point located 1754 feet South and 1197 feet East from the Southeast Corner of Joseph Roberts D.L.C. No. 59, being within the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 34, Township 30 South, Range 5 West, W.M. The applicant also proposes to transfer the water right from the lands above described and use heretofore made of water, without loss of priority, to municipal use for the City of Canyonville within Section 27, E $\frac{1}{2}$ Section 28, NE $\frac{1}{4}$ Section 33 and N $\frac{1}{2}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$ Section 34, Township 30 South, Range 5 West, W.M.

Notice of the application, pursuant to ORS 540.520(2), was published in the Canyon Creek Current, a newspaper printed and having general circulation in Douglas County, Oregon, for a period of three weeks in the issues of September 13, 20 and 27, 1979.

Mr. M. John Youngquist, Watermaster, has filed a statement to the effect that the proposed changes in point of diversion and use heretofore made of water may be made without injury to existing rights.

No objections having been filed and it appearing that the proposed changes in point of diversion and use may be made without injury to existing rights, the application should be approved.

NOW, THEREFORE, it hereby is ORDERED that the requested changes in point of diversion and use of water, as described herein, without loss of priority, are approved.

It is FURTHER ORDERED that the quantity of water diverted at the new point of diversion shall not exceed the quantity of water available at the old point of diversion under the subject right, and shall be further limited to use only during the irrigation season of each year.

It is FURTHER ORDERED that the following provisions shall be effective when in the judgment of the watermaster it becomes necessary to install headgates and measuring devices:

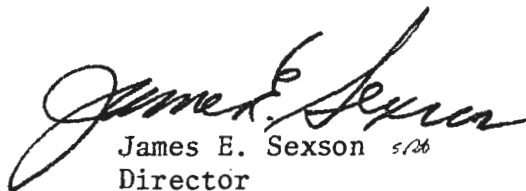
That the diversion works shall include an in line flow meter, a weir, or other suitable device for measuring the water to which the applicant is entitled;

That the type and plans of the measuring device be approved by the watermaster before the beginning of construction work and that the weir or measuring device be installed under the general supervision of said watermaster.

It is FURTHER ORDERED that NO time need be fixed for completion as the changes in point of diversion and use of water are completed.

It is FURTHER ORDERED that the certificate recorded at page 48343, Volume 41, State Record of Water Right Certificates, is canceled; and in lieu thereof a new certificate be issued covering the balance of the right NOT involved in this proceeding; and upon proof satisfactory to the Water Resources Director of completion of works and beneficial use of water to the extent intended under the provisions of this order, a confirming certificate of water right shall be issued to the applicant herein.

Dated at Salem, Oregon this 28th day of January, 1980.


James E. Sexson 5/26
Director

Application No. 56739Permit No. 43119

STATE OF OREGON WATER RESOURCES DEPARTMENT

Application for Permit to Appropriate Surface Water

RECEIVED
1977
WATER RESOURCES DEPT
SALEM, OREGON

I, City of Canyonville
 of City Hall - P.O. Box 765, Canyonville
(Mailing Address) (City)

State of Oregon, 97417 Phone No. 839-4680 do hereby
(Zip Code)

make application for a permit to appropriate the following described waters of the State of Oregon:

1. The source of the proposed appropriation is Canyon Creek
 a tributary of South Umpqua

2. The point of diversion is to be located 1,754 ft. S and 1197 ft. E
(N. or S.) (E. or W.)
 from the Southeast corner of Joseph Roberts Donation, Land Claim No. 59 in
Section 34, Township 30 South, Range 5 West, W.M., Douglas County, Oregon
(Public Land Survey Corner)
(If there is more than one point of diversion, each must be described)

being within the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of
 Sec. 34 Tp. 30S R. 5W, W. M., in the county of Douglas
(N. or S.) (E. or W.)

3. Location of area to be irrigated, or place of use if other than irrigation.

Township	Range	Section	List $\frac{1}{4}$ $\frac{1}{4}$ of Section	List use and/or number of acres to be irrigated
30S	5W	27	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of NE $\frac{1}{4}$	Municipal
30S	5W	27	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of NW $\frac{1}{4}$	Municipal
30S	5W	27	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of SW $\frac{1}{4}$	Municipal
30S	5W	27	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of SE $\frac{1}{4}$	Municipal
30S	5W	28	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of NE $\frac{1}{4}$	Municipal
30S	5W	28	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of SE $\frac{1}{4}$	Municipal
30S	5W	33	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of NE $\frac{1}{4}$	Municipal
30S	5W	34	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of NE $\frac{1}{4}$	Municipal
30S	5W	34	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of NW $\frac{1}{4}$	Municipal
30S	5W	34	NE $\frac{1}{4}$ NW $\frac{1}{4}$ of SE $\frac{1}{4}$	Municipal

4. The amount of water which the applicant intends to apply to beneficial use is 1.0

cubic feet per second, during the period of June - October, Pat O'Shea Creek will supply approximately 0.1 cfs and Canyon Creek will supplement the Pat O'Shea Creek supply with approximately 0.60 cfs. The period of November - May will be totally supplied by the Pat O'Shea Creek Source.

5. The use to which the water is to be applied is Municipal Water Supply to supplement the City's
primary source of O'Shea Creek.

6.

DESCRIPTION OF WORKS

Include dimensions and type of construction of diversion dam and headgate, length and dimensions of supply ditch or pipeline, size and type of pump and motor, type of irrigation system to adequately describe the proposed distribution system.

The diversion and intake structure will utilize the existing fish

ladder owned by the Oregon State Highway Division and operated by the Oregon

State Fish and Wildlife Commission. From the diversion structure the water

will be delivered through a ten (10) inch diameter gravity asbestos-cement

or polyvinyl chloride transmission main to the City's new water treatment

plant, which is located 2,900 lineal feet Northeasterly from the diversion

and intake structure.

If for domestic use state number of families to be supplied

7. Construction work will begin on or before December 31, 1977

8. Construction work will be completed on or before April 30, 1978

9. The water will be completely applied to the proposed use on or before June 30, 1978

Application No. 56739

Permit No. 43119

43119

Remarks: See Attached Map.

x *David Hill*
Signature of Applicant
Mayer

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for completion.

In order to retain its priority, this application must be returned to the Water Resources Director with corrections on or before May 1, 1978.

RECEIVED

APR 28 1978

WATER RESOURCES DEPT
SALEM, OREGON

WITNESS my hand this 1st day of March, 1978.

James E. Sexson Water Resources Director

By *Chs. Turner*

This instrument was first received in the office of the Water Resources Director at Salem, Oregon, on the 7th day of October, 1977, at 8:00 o'clock A.M.

Application No. 56739

Permit No. 43119

43119

Application No. 56739

Permit No. 43119

Permit to Appropriate the Public Waters of the State of Oregon

This is to certify that I have examined the foregoing application and do hereby grant the same **SUBJECT TO EXISTING RIGHTS INCLUDING THE EXISTING FLOW POLICIES ESTABLISHED BY THE WATER POLICY REVIEW BOARD** and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 1.0 cubic feet per second measured at the point of diversion from the stream, or its equivalent in case of rotation with other water users, from Canyon Creek.

The use to which this water is to be applied is municipal.

If for irrigation, this appropriation shall be limited to of one cubic foot per second or its equivalent for each acre irrigated.

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The priority date of this permit is October 7, 1977

Actual construction work shall begin on or before June 22, 1979 and shall

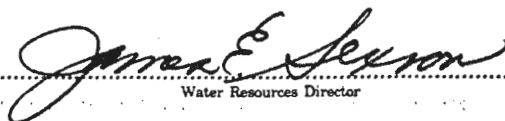
thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1980

Extended to Oct. 1985 Extended to October 1, 1990, 10-1-95

Complete application of the water to the proposed use shall be made on or before October 1, 1981

Extended to Oct. 1985 Extended to October 1, 1990, 10-1-95

WITNESS my hand this 22nd day of June, 1978


Water Resources Director



STATE OF OREGON

DOUGLAS COUNTY

PERMIT TO APPROPRIATE THE PUBLIC WATERS

This is to certify that I have examined Application R-61247 and do hereby grant the same SUBJECT TO EXISTING RIGHTS AND THE FOLLOWING LIMITATIONS AND CONDITIONS:

This permit is issued to City of Canyonville of PO Box 765, Canyonville, Oregon 97417, Phone 839-4680, for the construction of the Canyonville Reservoir and storage of water from West Fork Canyon Creek to be appropriated under Application 61248, Permit 46155, for municipal use.

The dam will be located in the SW 1/4SE 1/4 of Section 20, Township 31 South, Range 5 West, WM, in the county of Douglas.

The maximum height will be 58.5 feet above the stream bed or ground surface at the centerline. The top width will be 12 feet, slope of upstream face vertical, slope of downstream face 0.7:1, and height of dam above water line when full 8.0 feet.

The area submerged by the reservoir, when full, will be 18 acres, and the maximum depth of water will be 52 feet.

The location and dimensions of the spillway are: Over dam; bottom width is 59 feet, top width is 59 feet, and the depth is eight feet.

The location and dimension of the outlet or bypass, and control works are: 70 feet from right abutment at elevation 1,590.0 (stream bed at elevation 1,580). Between 1,580 and 1,590 there will be a four-foot by four-foot sluice gate.

The structure is in channel.

The dam will be concrete construction.

The right hereunder shall be limited to the storage of 300 acre-feet.

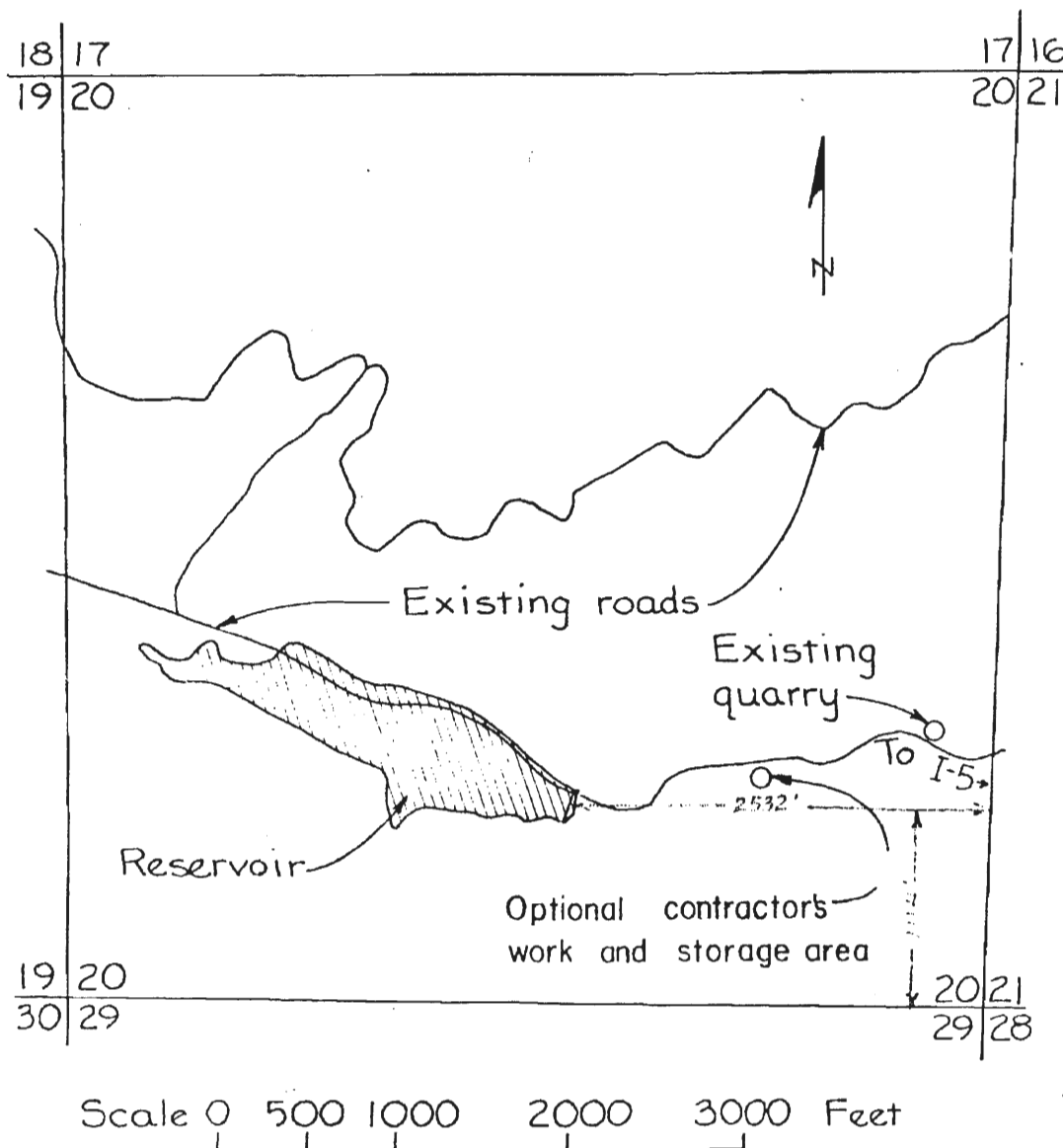
The priority date of this permit is February 12, 1981.

Actual construction work shall begin on or before February 8, 1983 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1983.

WITNESS my hand this 8th day of February, 1982.

/s/ JAMES E. SEXSON

WATER RESOURCES DIRECTOR



REFERENCE:

This inset is based on air photo of T31S, R5W, W.M. 1979.

RECEIVED
 NOV 9 - 1981
 WATER RESOURCES DEPT.
 SALEM, OREGON

INSET MAP

Application No. R-61247, 61248
 Permit No. R 8323 46155



STATE OF OREGON

DOUGLAS COUNTY

PERMIT TO APPROPRIATE THE PUBLIC WATERS

This is to certify that I have examined Application 61248 and do hereby grant the same SUBJECT TO EXISTING RIGHTS INCLUDING THE APPROPRIATE MINIMUM FLOW POLICIES ESTABLISHED BY THE WATER POLICY REVIEW BOARD and the following limitations and conditions:

This permit is issued to City of Canyonville of PO Box 765, Canyonville, Oregon 97417, Phone 839-4680, for the use of the waters of Canyonville Reservoir to be constructed under Application R-61247, Permit R-8323, a tributary of Canyon Creek, for the purpose of municipal use; that the priority of the right dates from February 12, 1981 and is limited to the amount of water which can be applied to beneficial use and shall not exceed 300.0 acre-feet stored water only measured at the point of diversion from the stream, or its equivalent in case of rotation with other water users.

The POINT OF DIVERSION is to be located: 1,114 feet north and 2,532 feet west from the southeast corner of Section 20, being within the SW 1/4SE 1/4 of Section 20, Township 31 South, Range 5 West, WM, in the county of Douglas.

A description of the place of use under the permit, and to which such right is appurtenant, is as follows:

Township 30 South	Range 5 West, WM	Section 27	All	Municipal
		Section 28	NE 1/4	
			SE 1/4	
		Section 33	NE 1/4	
		Section 34	NE 1/4	
			NW 1/4	
			N 1/2SE 1/4	

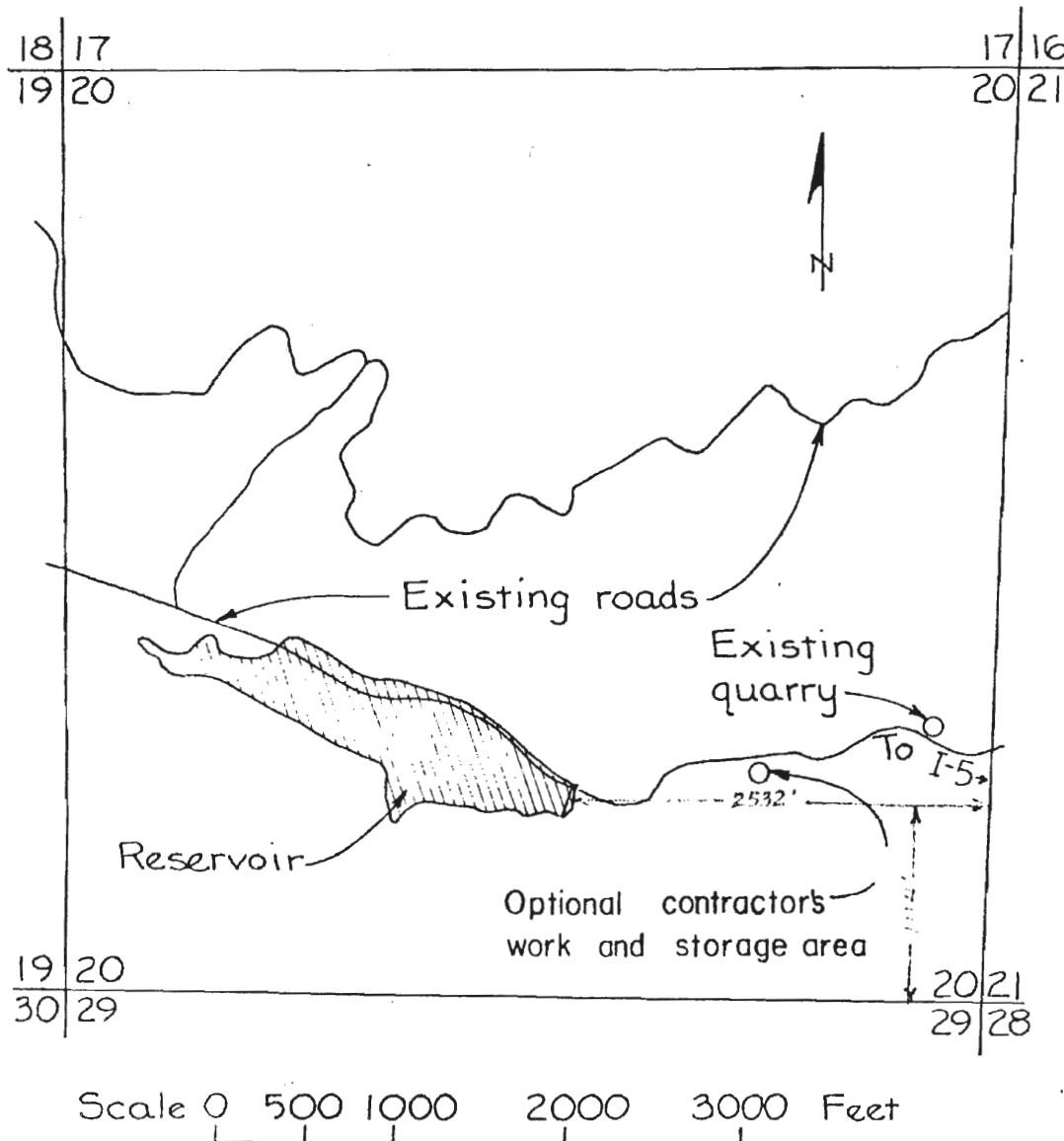
Actual construction work shall begin on or before February 8, 1983 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1983. Extended to October 1, 1988
Extended to October 1, 1993

Complete application of the water to the proposed use shall be made on or before October 1, 1984. Extended to October 1, 1988 Extended to October 1, 1993

WITNESS my hand this 8th day of February, 1982.

B+C to 10-1-98

/s/ JAMES E. SEXSON
WATER RESOURCES DIRECTOR



REFERENCE:

This inset is based on air photo of T31S, R5W, W.M. 1979.

RECEIVED
NOV 9 - 1981
WATER RESOURCES DEPT.
SALEM, OREGON

INSET MAP

Application No. R-61247, 61248
Permit No. R 8323 46155

BEFORE THE WATER RESOURCES DIRECTOR OF OREGON

MARION COUNTY

IN THE MATTER OF APPLICATION FOR)
 EXTENSION OF TIME IN WHICH TO)
 COMPLETE CONSTRUCTION WORK AND) ORDER
 MAKE COMPLETE APPLICATION OF WATER)
 UNDER CERTAIN SURFACE WATER PERMITS)

The owners of the following water permits issued by the Water Resources Director have submitted applications for extensions of time limits within which to begin and/or complete the construction work and/or make complete application of water to beneficial use under their respective permits.

The Water Resources Director is authorized under the provisions of ORS 537.230 to grant extensions of time for good cause shown, within which to complete work to perfect a water right under a permit;

The statements in the applications for extensions filed regarding completion of the projects indicate that each has shown such reasonable diligence as entitles them to an extension of time; and

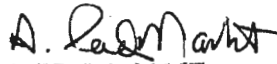
No protest or objections to the granting of an extension under any of the following permits have been filed by any subsequent permit holders;

NOW, THEREFORE, it is hereby ORDERED that extensions of time are granted as follows:

<u>PERMITTEE</u>	<u>APPL. NUMBER</u>	<u>PERMIT NUMBER</u>	<u>BASIN NUMBER</u>	<u>NEW TIME LIMITS TO:</u>	
				<u>COMPLETE CONST.</u>	<u>APPLY WATER</u>
THE DALLES IRRIGATION DISTRICT	33152	28546	4	10-1-98	10-1-98
CITY OF SEASIDE WATER DEPARTMENT	40261	30117	1	10-1-97	10-1-97
CITY OF CARLTON	46505	34661	2	10-1-98	10-1-98
SOUTH UMPQUA WATER ASSOCIATION	46924	35103	16	10-1-98	10-1-98
THE DALLES IRRIGATION DISTRICT	47024	35177	4	10-1-98	10-1-98
DESCHUTES VALLEY WATER DISTRICT	48909	36515	5	10-1-98	10-1-98
CITY OF ENTERPRISE	49101	36777	8	10-1-98	10-1-98
WILLIAM L. MYERS	49922	49917	1	10-1-95	10-1-95
CITY OF AMITY	50474	39599	2	10-1-98	10-1-98
CITY OF DEPOE BAY	50753	45419	18	10-1-96	10-1-96
CITY OF ENTERPRISE	51178	39123	8	10-1-98	10-1-98
CITY OF FOREST GROVE	54203	40615	2	10-1-98	10-1-98
CITY OF ROSEBURG WATER DEPARTMENT	55991	41514	16	10-1-98	10-1-98
THE DALLES IRRIGATION DISTRICT	57319	43315	4	10-1-98	10-1-98

CITY OF GATES	59946	45022	2	10-1-97	10-1-97
MIDDLE FORK IRRIGATION DISTRICT	60092	51367	4	10-1-94	
CITY OF RIDDLE	60959	45405	16	10-1-98	10-1-98
CITY OF CANYONVILLE	61248	46155	16	10-1-98	10-1-98
BURNT RIVER IRRIGATION DISTRICT	61650	50606	9	10-1-92	
BURNT RIVER IRRIGATION DISTRICT	61650	50606	9	10-1-93	10-1-93
EAST FORK IRRIGATION DISTRICT	63241	46707	4		10-1-94
WILLAMETTE INDUSTRIES, INC.,					
ALBANY PAPER MILL	64514	47184	2	10-1-94	10-1-94
DIAMOND LAKE IMPROVEMENT COMPANY FOR U.S.					
UMPQUA NATIONAL FOREST	68001	49425	16	10-1-97	10-1-97
CITY OF GATES	69720	50686	2	10-1-97	10-1-97

Dated at Salem, Oregon this 12 day of APRIL, 1994.


A. REED MARBUT
 dr/ Martha O. Pagel
 Director
 Water Resources Department

RECEIVED

FEB 18 1948

STATE ENGINEER
SALEM, OREGONPermit No. 21909

APPLICATION FOR PERMIT

To appropriate the Public Waters of the State of Oregon

I, City of Canyonville, Oregon, By Arthur Boyer, City Engineer
 of Canyonville
 State of Oregon, do hereby make application for a permit to appropriate the

following described public waters of the State of Oregon, SUBJECT TO EXISTING RIGHTS:

If the applicant is a corporation, give date and place of incorporation Feb 10, 1926

1. The source of the proposed appropriation is Pat O'Shea Creek and reservoir
to be constructed, a tributary of The South Umpqua River

2. The amount of water which the applicant intends to apply to beneficial use is 0.4 to 0.6
 cubic feet per second.

3. The use to which the water is to be applied is Municipal
 (Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. The point of diversion is located ft. 4942^{1300 ft} and ft. 6451^{East} from the Sec.
 corner of Sec's 26, 27, 34 & 35 T30 S. R. 5W. W.M. = for proposed Dam
(S. 57° 03' E 136.97 chs. from the Sec. Cor. of Sec's 26, 27, 34 & 35
T30 S. R. 5W. W.M. 1/4 old Permit App 12804 Permit 9597 City of Canyonville or town of Canyonville
 (If preferable, give distance and bearing to section corner)

(If there is more than one point of diversion, each must be described. Use separate sheet if necessary.)
 being within the SE 1/4 of the SW 1/4 of Sec. 36, Tp. 30 S
 (Give smallest legal subdivision) (N or S)

R. 5W, W. M., in the county of Douglas
 (E. or W.)

5. The Pipe Line to be 1 mi
 (Main ditch, canal or pipe line) (Miles or feet)
 in length, terminating in the SW 1/4 of the NE 1/4 of Sec. 34, Tp. 30 S
 (Smallest legal subdivision) (N or S)

R. 5W, W. M., the proposed location being shown throughout on the accompanying map.
 (E. or W.)

DESCRIPTION OF WORKS

Diversion Works— Present DAM To be used at Present Time

6. (a) Height of dam 30 feet, length on top 50 feet, length at bottom
27 feet; material to be used and character of construction Concrete
 (Loose rock concrete masonry)
 rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate
 (Timber, concrete, etc., number and size of openings)

(c) If water is to be pumped give general description
 (Size and type of pump)

(Size and type of engine or motor to be used, total head water is to be lifted, etc.)

*A different form of application is provided where storage works are contemplated

**Application for permits to appropriate water for the generation of electricity, with the exception of municipalities, must be made to the Hydroelectric Commission. Either of the above forms may be secured, without cost, together with instructions by addressing the State Engineer, Salem, Oregon.

21909

Canal System or Pipe Line

7. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line) _____ feet; width on bottom _____ feet; depth of water _____ feet; grade _____ feet fall per one thousand feet.

(b) At _____ miles from headgate: width on top (at water line) _____ feet; width on bottom _____ feet; depth of water _____ feet; grade _____ feet fall per one thousand feet.

(c) Length of pipe, 10,500 ft.; size at intake, 6 in.; size at _____ ft. from intake 6 in.; size at place of use 6" at tank in.; difference in elevation between intake and place of use, 61 ft. Is grade uniform? yes Estimated capacity, not over 24 sec. ft.

8. Location of area to be irrigated, or place of use ^{Served}

Township	Range	Section	Forty-acre Tract	Number Acres To Be Irrigated
30S	5	34	SW ¹ 4NW ⁴ SE ⁴ 4NW ⁴ NW ⁴ 4NW ⁴ NE ⁴ 4NW ⁴ NW ⁴ 4NE ⁴ SW ⁴ 4NE ⁴ NE ⁴ 4SW ⁴ NW ⁴ SE ⁴	Representing Residential Area at Canyonville which while it be not made in these tracts it is within tract 34
30S	5	27	NW ⁴ 4SW ⁴ NE ⁴ 4SW ⁴ SW ⁴ 4SW ⁴ SE ⁴ 4SW ⁴	
The City of Canyonville owns Sec 36, T32S, R51W, 11N1 acquired from Douglas County				

(If more space required, attach separate sheet)

(a) Character of soil _____

(b) Kind of crops raised _____

Power or Mining Purposes—

9. (a) Total amount of power to be developed _____ theoretical horsepower.

(b) Quantity of water to be used for power _____ sec. ft.

(c) Total fall to be utilized _____ feet.

(d) The nature of the works by means of which the power is to be developed _____

(e) Such works to be located in _____ of Sec. _____

Tp. _____ R. _____ W. M.

(f) Is water to be returned to any stream? _____

(g) If so, name stream and locate point of return _____

_____, Sec. _____ Tp. _____ R. _____ W. M.

(h) The use to which power is to be applied is _____

(i) The nature of the mines to be served _____

Municipal or District Engineer

10. (a) To supply the city of Canyonville, Ore.
Douglas County having a present population of 2000
 and an estimated population of 2500 in 1960.

(b) If the applicant has state number of families to be supplied 250

Under sections 11, 12, 13 and 14 of the act

11. Estimated cost of proposed works, 2 Pipe Line was laid in 1947 over old line loc'n
 12. Construction work will begin on or before _____
 13. Construction work will be completed on or before _____
 14. The water will be completely applied to the proposed use on or before 15 Nov in use

City of Canyonville
City of Canyonville

by John Humphrey City Engineer

Remarks: The water is being used inside city & some to be used
in rural districts & for riparian rights the water to come
out of pipe line

This 6" Pipe line is now taking water out of concrete
reservoir, built in O'Shea Creek for city - when new,
proposed concrete dam is completed this 2" line will
take water out of it - The 6" line laid in 1947 is
a steel pipe.

STATE OF OREGON, }
 County of Marion, } ss

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for _____ revision.

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before February 11, 1952.

WITNESS my hand this 11th day of January, 1952

John Humphrey
 City Engineer

CHAS. J. HARRIS

STATE ENGINEER

Ed K. Humphrey, Assistant
 bc

PERMIT

STATE OF OREGON,

County of Marion,

This is to certify that I have examined the foregoing application and do hereby grant the same, **SUBJECT TO EXISTING RIGHTS** and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 1.0 cubic feet per second measured at the point of diversion from the stream, or its equivalent in case of rotation with other water users, from Pat O'Shea Creek

The use to which this water is to be applied is municipal

If for irrigation, this appropriation shall be limited to ----- of one cubic foot per second

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The priority date of this permit is February 25, 1948 for 0.4 cfs
December 17, 1951 for 0.6 cfs

Actual construction work shall begin on or before June 30, 1954 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1954

Complete application of the water to the proposed use shall be made on or before October 1, 1954

WITNESS my hand this 30th day of June 1954

Chas. E. Stricklin
STATE ENGINEER

Permits for power development are subject to the payment of annual fees as provided in sections 1 and 3, chapter 74, Oregon Laws 1933

Application No. 24253
Permit No. 21909

PERMIT

TO APPROPRIATE THE PUBLIC
WATERS OF THE STATE
OF OREGON

Division No. District No.

This instrument was first received in the
office of the State Engineer at Salem, Oregon,
on the 25 day of February,
1948, at 8:00 o'clock A. M.

Returned to applicant:

Corrected application received:

Approved:

June 30, 1954 of
Recorded in book No. 55

Permits on page

CHAS. E. STRICKLIN
STATE ENGINEER

Drainage Basin No. 16 Page 263

Fees Paid 20.00

STATE OF OREGON
COUNTY OF DOUGLAS
CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF CANYONVILLE

of Canyonville, State of Oregon, has made proof to the satisfaction of the STATE ENGINEER of Oregon, of a right to the use of the waters of Pat O'Shea Creek a tributary of South Umpqua River for the purpose of municipal under Permit No. 21909 of the State Engineer, and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from February 25, 1948, for 0.4 c.f.s. & December 17, 1951, for 0.2 c.f.s. that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.6 cubic foot per second

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 36, Township 30 South, Range 5 West, W.M.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to - - - - - of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

N $\frac{1}{4}$ SW $\frac{1}{4}$, as projected within Clark DLC #51
Lot 8 (SW $\frac{1}{4}$ SW $\frac{1}{4}$)
S $\frac{1}{4}$ SW $\frac{1}{4}$, as projected within Roberts DLC #59
Section 27
NW $\frac{1}{4}$, as projected within Roberts DLC #59
W $\frac{1}{4}$ NW $\frac{1}{4}$, as projected within Reynolds DLC #58
NW $\frac{1}{4}$ SW $\frac{1}{4}$, as projected within Reynolds DLC #58
Lot 6 (NW $\frac{1}{4}$ NW $\frac{1}{4}$)
Lot 7 (SW $\frac{1}{4}$ NW $\frac{1}{4}$)
Lot 8 (NW $\frac{1}{4}$ NW $\frac{1}{4}$)
Section 34
Township 30 South, Range 5 West, W. M.

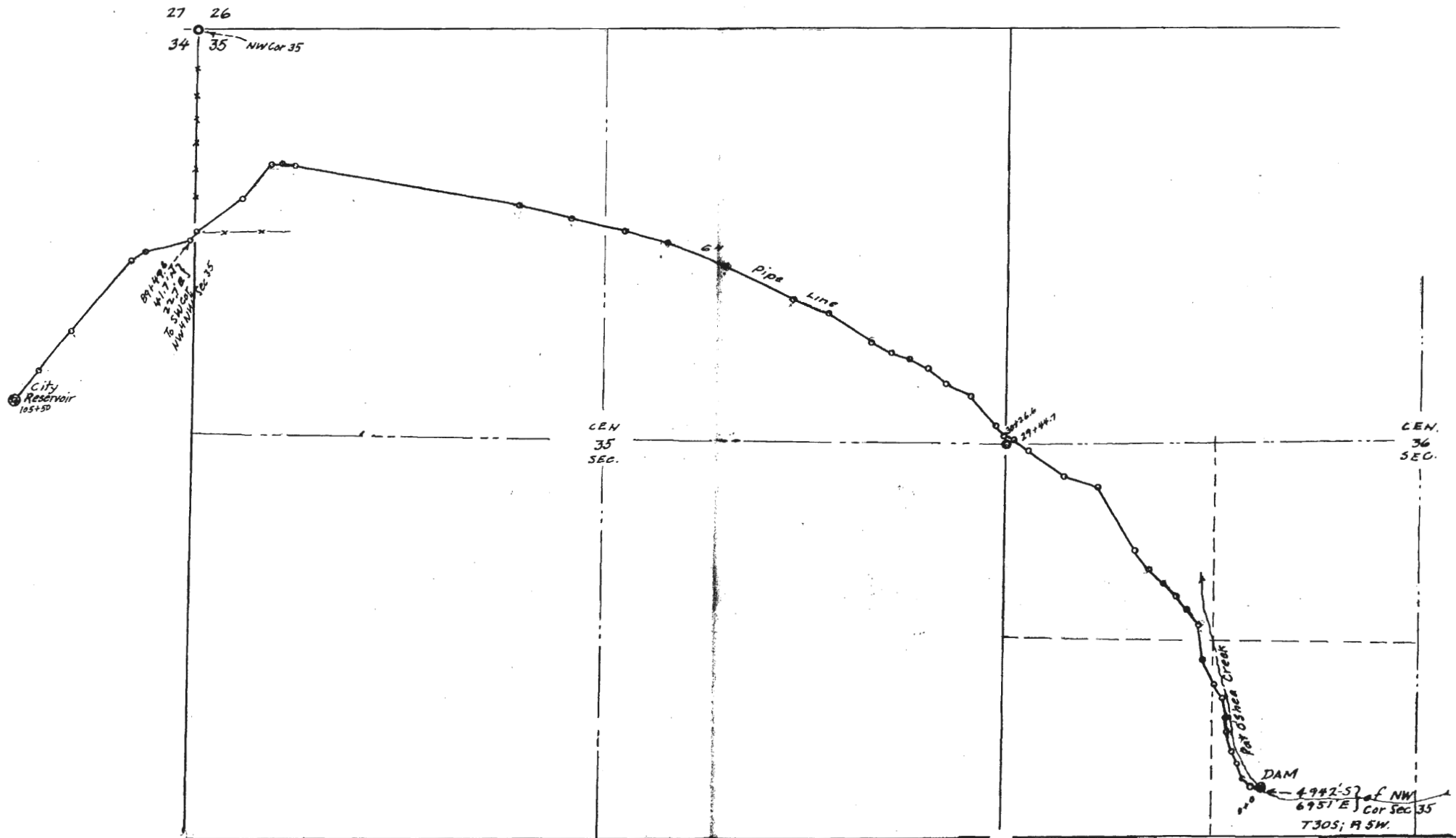
The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described.

WITNESS the signature of the State Engineer, affixed

this 16th day of October, 19 57.

LEWIS A. STANLEY

State Engineer



RECEIVED
FEB 1949
STATE ENGINEER
SALEM, OREGON

CITY OF CANYONVILLE ORE., DOUGLAS COUNTY
6" WATER LINE, PROPOSED DAM TO CITY RESERVOIR
FEB 1949

Application No. 23053
Permit No.

23053 16-36B

APPLICATION FOR A PERMIT

To appropriate the Public Waters of the State of Oregon

I, City of Canyonville
(Name of applicant)
 of Canyonville
(Postoffice), County of Douglas
 State of Oregon, do hereby make application for a permit to appropriate the following described public waters of the State of Oregon, subject to existing rights:

If the applicant is a corporation, give date and place of incorporation Jan. 1901

1. The source of the proposed appropriation is Pat O'Shea Creek also known as
(Name of stream)
Thomas Creek, a tributary of South Umpqua River

2. The amount of water which the applicant intends to apply to beneficial use is 0.4
 cubic feet per second.

(If water is to be used from more than one source, give quantity from each)

3. The use to which the water is to be applied is Municipal
(Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. The point of diversion is located ft. and ft. from the
(N. or S.) (E. or W.)
 corner of S. 57° 03' E. 136.97 chains from the Cor. of Secs. 26, 27, 34 and 35,
(Section or subdivision)
Twp. 30 S., R. 5 W.
(If preferable, give distance and bearing to Sec. Cor.)

(If there are more than one points of diversion, each must be described. Use separate sheet if necessary)

being within the SE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 36, Tp. 30 S
(Give smallest legal subdivision) (No. N. or S.)
R. 5 W, W. M., in the county of Douglas
(No. E. or W.)

5. The Main pipe line to be 2 $\frac{1}{2}$ miles
(Main ditch, canal or pipe line) (No. miles or feet)
 in length, terminating in the SE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 27, Tp. 30 S
(Smallest legal subdivision) (No. N. or S.)
R. 5 W, W. M., the proposed location being shown throughout on the accompanying map.
(No. E. or W.)

6. The name of the ditch, canal or other works is _____

DESCRIPTION OF WORKS

DIVERSION WORKS—

7. (a) Height of dam 4 feet, length on top 26 feet, length at bottom 16 feet; material to be used and character of construction Concrete
(Loose rock, concrete, masonry, Wasteway over dam rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate Iron Valve, 1 opening 6 inch.
(Timber, concrete, etc., number and size of openings)

* A different form of application is provided where storage works are contemplated. These forms can be secured without charge, together with instructions, by addressing the State Engineer, Salem, Oregon.

MUNICIPAL SUPPLY—

11. To supply the city of Canyonville
Douglas County, having a present population of 400
 (Name of)
 and an estimated population of 400 in 19231

(Answer questions 12, 13, 14, and 15 in all cases)

12. Estimated cost of proposed works, \$ 9,000
 13. Construction work will begin on or before July, 1930
 14. Construction work will be completed on or before July, 1931
 15. The water will be completely applied to the proposed use on or before July, 1931

City of Canyonville

(Name of applicant)

Mayor W. W. Willis

Recorder H. J. Hask

Signed in the presence of us as witnesses:

- (1) F. J. Blattner Canyonville, Oregon.
 (Name) (Address of witness)
 (2) E. Dillenbaugh "
 (Name) (Address of witness)

Remarks: The waters is to be piped 2 miles in 4 inch pipe, to concrete
reservoir about 50,000 gal. cap. from this point 2500 feet in 6 inch pipe
and distributed.

STATE OF OREGON, }
 County of Marion, } ss.

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before _____, 192_____.

WITNESS my hand this _____ day of _____, 192_____.

STATE ENGINEER

Application No. 12904

Permit No. 9 5 9 7

PERMIT
TO APPROPRIATE THE PUBLIC
WATERS OF THE STATE
OF OREGON

Division No. District No.

This instrument was first received in the
office of the State Engineer at Salem, Ore-

gon, on the 10th day of Aug.

192 9, at 8:00 o'clock A. M.

Returned to applicant:

Corrected application received:

Approved:

June 16, 1930

Recorded in book No. 32 of

Permits on page 9 5 9 7

R. H. E. A. L. U. P. E. R.
STATE ENGINEER

16 p. 386 b.

\$10.00

STATE OF OREGON, }
County of Marion, } ss.**PERMIT**

This is to certify that I have examined the foregoing application and do hereby grant the same,
subject to the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use
and shall not exceed 0.4 cubic feet per second, or its equivalent in case of rotation with other
water users, from Pat O'Shea Creek, tributary of South Umpqua River.

The use to which this water is to be applied is Municipal

If for irrigation, this appropriation shall be limited to of one cubic foot per
second or its equivalent for each acre irrigated and shall be subject to such reasonable rotation system
as may be ordered by the proper state officer.

The priority date of this permit is August 10, 1929

Actual construction work shall begin on or before June 16, 1931 and shall
thereafter be prosecuted with reasonable diligence and be completed on or before
October 1, 1932

Complete application of the water to the proposed use shall be made on or before
October 1, 1933

WITNESS my hand this 16th day of June, 19230

R. H. E. A. L. U. P. E. R.
STATE ENGINEER.

Permits for power development are subject to the limitation of franchise as provided in section 5728, Oregon Laws, and the payment
of annual fees as provided in section 5803, Oregon Laws.

FIRE FLOWS

Label	Elevation (ft)	Fire Flow (Available) (gpm)	Pressure (psi)
J-1	780.00	2,571	71
J-2	775.00	3,155	74
J-3	773.00	4,237	74
J-4	771.00	4,415	75
J-5	764.00	5,380	78
J-6	781.00	3,632	71
J-7	771.00	4,377	75
J-9	760.00	5,380	80
J-10	763.00	2,616	79
J-11	785.00	2,034	69
J-12	784.00	2,034	70
J-13	810.00	1,833	58
J-14	749.00	5,380	85
J-15	748.00	5,223	85
J-16	750.00	6,249	84
J-17	757.00	6,572	81
J-18	777.00	6,832	73
J-19	808.00	7,648	59
J-20	807.00	7,169	60
J-21	837.00	6,245	47
J-22	899.00	5,293	20
J-23	909.00	4,532	16
J-24	910.00	6,581	15
J-26	835.00	10,000	48

J-27	764.00	9,324	78
J-28	755.00	6,879	82
J-29	752.00	6,384	83
J-32	897.00	2,456	21
J-33	857.00	2,456	38
J-34	820.00	2,456	54
J-35	816.00	2,456	56
J-36	843.00	1,646	44
J-37	837.00	1,765	47
J-38	838.00	1,764	46
J-39	815.00	2,551	56
J-40	799.00	6,062	63
J-41	798.00	7,633	64
J-42	797.00	7,634	64
J-43	798.00	6,062	64
J-44	791.00	4,141	67
J-45	784.00	7,639	70
J-46	784.00	7,639	70
J-47	784.00	7,487	70
J-48	783.00	7,641	70
J-49	782.00	7,641	70
J-50	779.00	3,340	72
J-51	795.00	3,403	65
J-52	806.00	2,376	60
J-53	781.00	7,651	71

J-54	777.00	3,282	73
J-55	787.00	7,664	68
J-56	789.00	7,682	67
J-57	805.00	8,014	61
J-58	840.00	6,430	45
J-59	766.00	6,954	77
J-60	747.00	6,628	86
J-61	752.00	6,462	83
J-62	755.00	5,933	82
J-63	755.00	5,256	82
J-64	749.00	5,618	85
J-65	750.00	5,073	84
J-66	757.00	4,784	81
J-67	755.00	4,784	82
J-68	757.00	4,764	81
J-69	758.00	4,219	81
J-70	763.00	3,224	79
J-71	764.00	3,224	78
J-72	766.00	3,055	77
J-73	770.00	1,557	76
J-74	777.00	2,247	73
J-75	784.00	1,722	70
J-76	784.00	1,712	70
J-77	801.00	1,712	62
J-78	816.00	1,712	56

J-79	816.00	1,712	56
J-80	884.00	1,712	26
J-81	884.00	1,712	26
J-82	850.00	1,712	41
J-83	784.00	1,664	70
J-84	784.00	1,664	70
J-85	804.00	1,530	61
J-86	826.00	1,676	51
J-87	842.00	1,816	45
J-88	843.00	1,816	44
J-89	844.00	1,847	44
J-90	844.00	1,676	44
J-91	866.00	1,676	34
J-92	756.00	4,940	82
J-93	755.00	4,940	82
J-94	759.00	5,041	80
J-95	758.00	5,041	81
J-96	759.00	5,080	80
J-97	760.00	5,027	80
J-98	778.00	4,633	72
J-99	778.00	4,649	72
J-100	779.00	4,649	72
J-101	773.00	4,878	74
J-102	773.00	4,944	74
J-103	777.00	4,943	73

J-104	761.00	3,648	80
J-105	774.00	5,286	74
J-106	774.00	5,318	74
J-107	773.00	5,304	74
J-108	774.00	5,304	74
J-109	760.00	5,291	80
J-110	759.00	5,291	80
J-111	760.00	5,341	80
J-112	750.00	5,933	84
J-113	740.00	3,500	89
J-114	761.00	5,398	80
J-115	762.00	5,406	79
J-116	760.00	5,406	80
J-117	762.00	5,407	79
J-118	762.00	5,430	79
J-119	773.00	5,318	74
J-120	783.00	5,286	70
J-121	795.00	5,571	65
J-122	780.00	5,218	71
J-123	784.00	4,923	70
J-124	794.00	4,054	65
J-125	795.00	4,054	65
J-126	795.00	3,691	65
J-127	796.00	3,648	64
J-128	796.00	3,659	64

J-129	802.00	6,923	62
J-130	810.00	7,942	58
J-131	797.00	2,675	64
J-132	895.00	10,000	22
J-134	796.00	3,561	64
J-135	802.00	3,534	62
J-136	803.00	3,534	61
J-137	802.00	3,534	62
J-138	813.00	3,524	57
J-139	831.00	3,411	49
J-140	833.00	3,411	48
J-141	832.00	3,406	49
J-142	828.00	3,406	51
J-143	812.00	3,166	57
J-144	830.00	2,647	50
J-145	836.00	2,485	47
J-146	808.00	2,610	59
J-147	813.00	2,306	57
J-148	821.00	2,250	54
J-149	817.00	2,245	55
J-150	820.00	2,147	54
J-151	861.00	3,304	36
J-152	874.00	3,221	31
J-153	876.00	3,141	30
J-154	873.00	3,310	31

J-155	869.00	3,412	33
J-156	868.00	3,418	33
J-157	844.00	3,516	44
J-158	846.00	3,404	43
J-159	803.00	2,437	61
J-160	866.00	3,451	34
J-161	865.00	3,451	35
J-162	838.00	3,440	46
J-163	838.00	3,445	46
J-164	808.00	3,520	59
J-165	797.00	3,552	64
J-166	797.00	3,556	64
J-168	797.00	3,691	64
J-170	800.00	3,691	63
J-171	805.00	3,091	61
J-172	804.00	3,091	61
J-173	807.00	3,003	60
J-174	808.00	2,918	59
J-175	868.00	2,109	33
J-176	867.00	2,109	34
J-177	848.00	1,950	42
J-179	847.00	1,894	42
J-180	811.00	3,175	58
J-181	812.00	3,196	57
J-182	811.00	3,196	58

J-183	810.00	2,887	58
J-184	818.00	2,368	55
J-185	818.00	2,339	55
J-186	820.00	234	54
J-187	820.00	3,302	54
J-188	821.00	3,304	54
J-189	821.00	3,307	54
J-190	854.00	2,674	83
J-191	886.00	2,052	69
J-192	884.00	2,052	70
J-193	907.00	1,760	60
J-194	895.00	1,653	65
J-195	784.00	3,890	70
J-198	770.00	5,770	76
J-200	772.00	5,930	75
J-201	771.00	5,930	75
J-202	772.00	6,215	75
J-203	783.00	2,930	70
J-204	784.00	2,882	70
J-205	777.00	2,114	73
J-206	777.00	2,092	73
J-207	772.00	6,239	75
J-208	766.00	6,378	77
J-209	767.00	6,378	77
J-210	764.00	6,448	78

J-213	762.00	6,698	79
J-214	760.00	6,787	80
J-215	760.00	6,787	80
J-216	757.00	6,948	81
J-217	757.00	6,957	81
J-218	755.00	7,354	82
J-219	758.00	7,354	81
J-220	765.00	5,329	78
J-221	754.00	7,599	83
J-222	747.00	7,950	86
J-223	741.00	8,750	88
J-224	735.00	8,880	91
J-225	734.00	7,936	91
J-226	725.00	9,407	95
J-227	726.00	9,291	95
J-228	727.00	8,457	94
J-229	727.00	7,877	94
J-230	731.00	6,507	93
J-231	729.00	5,005	93
J-232	730.00	4,710	93
J-233	737.00	3,723	90
J-234	732.00	10,000	92
J-235	735.00	6,033	91
J-236	735.00	3,034	91
J-238	732.00	10,000	92

J-239	734.00	7,397	91
J-240	728.00	6,331	94
J-241	726.00	5,844	95
J-242	715.00	5,350	99
J-243	716.00	4,874	99
J-244	721.00	4,513	97
J-245	717.00	4,254	99
J-246	713.00	4,127	100
J-247	715.00	4,009	99
J-248	704.00	3,991	104
J-249	698.00	3,974	107
J-250	697.00	3,779	107
J-251	692.00	3,395	109
J-252	700.00	3,165	106
J-253	701.00	3,083	106
J-256	705.00	3,109	104
J-257	711.00	3,000	101
J-258	722.00	2,308	96
J-259	722.00	2,296	96
J-260	701.00	3,246	106
J-261	703.00	3,395	105
J-262	725.00	3,456	95
J-263	730.00	3,751	93
J-264	730.00	3,792	93
J-265	730.00	3,695	93

J-266	730.00	3,821	93
J-267	724.00	4,412	96
J-268	720.00	5,668	97
J-269	701.00	3,892	106
J-270	720.00	3,173	97
J-271	751.00	7,020	84
J-272	751.00	7,023	84
J-273	750.00	7,023	84
J-274	752.00	7,050	83
J-275	761.00	3,501	80
J-276	770.00	2,561	76
J-277	748.00	5,573	85
J-278	746.00	4,999	86
J-279	745.00	4,902	86
J-280	744.00	4,470	87
J-281	744.00	4,843	87
J-282	743.00	4,431	87
J-283	730.00	3,162	93
J-284	720.00	2,657	97
J-285	743.00	3,790	87
J-286	739.00	3,233	89
J-287	739.00	3,175	89
J-288	738.00	3,090	90
J-289	738.00	3,027	90
J-290	714.00	2,381	100

J-291	735.00	2,743	91
J-292	730.00	2,456	93
J-293	728.00	2,442	94
J-294	715.00	2,395	99
J-295	716.00	2,353	99
J-296	718.00	2,351	98
J-297	719.00	2,349	98
J-298	715.00	2,184	99
J-299	707.00	2,011	103
J-300	707.00	1,998	103
J-301	705.00	1,789	104
J-302	700.00	1,589	106
J-304	746.00	4,657	86
J-305	746.00	4,651	86
J-306	744.00	4,136	87
J-307	758.00	6,543	81
J-309	758.00	6,857	81
J-310	759.00	7,162	80
J-311	756.00	7,102	82
J-312	755.00	7,098	82
J-313	755.00	7,087	82
J-314	754.00	6,896	83
J-315	755.00	7,099	82
J-316	756.00	6,081	82
J-317	763.00	3,362	79

J-318	763.00	3,338	79
J-319	766.00	2,280	77
J-320	756.00	6,490	82
J-321	759.00	1,287	80
J-322	760.00	7,189	80
J-323	760.00	7,035	80
J-324	757.00	6,735	81
J-325	743.00	6,567	87
J-326	740.00	6,343	89
J-327	727.00	6,333	94
J-328	722.00	6,287	96
J-329	720.00	6,234	97
J-330	752.00	5,988	83
J-331	794.00	6,950	65
J-332	752.00	5,933	83
J-341	691.00	2,323	110
J-342	706.00	1,796	103
J-343	705.00	1,469	104
J-344	715.00	1,434	99
J-345	718.00	1,312	98
J-346	720.00	2,686	97
J-347	723.00	2,327	96
J-348	752.59	7,004	83
J-349	765.00	2,803	78
J-350	755.42	6,974	82

J-351	770.00	2,710	76
J-352	757.96	6,897	81
J-353	775.00	2,568	74
J-354	764.40	6,434	78
J-355	765.00	6,434	78
J-356	765.00	2,781	78
J-357	750.00	2,287	84
J-358	760.00	4,386	80
J-359	754.64	5,933	82
J-360	737.00	2,596	90
J-361	850.00	36	41
J-362	880.00	26	28
J-363	930.00	20	6
J-364	749.81	6,065	84
J-365	753.00	3,098	83
J-366	760.00	2,140	80
J-367	770.00	1,844	76
J-368	875.62	2,456	30
J-369	820.00	2,066	54
J-370	815.00	1,785	56
J-372	878.28	2,456	29
J-373	810.00	2,417	58
J-374	806.00	1,970	60
J-375	787.43	7,606	68
J-376	825.00	4,715	52

J-377	828.00	4,418	51
J-378	850.00	4,064	41
J-379	813.00	6,580	57
J-380	833.00	4,636	48
J-381	849.00	3,437	42
J-382	815.00	3,437	56
J-383	855.00	3,186	39
J-384	880.00	2,674	71
J-385	885.00	2,673	69
J-386	873.63	2,239	74
J-387	875.00	1,931	73
J-388	835.36	3,392	47
J-389	893.00	2,980	22
J-390	810.00	3,528	58
J-391	793.00	1,968	66
J-392	890.00	1,632	67
J-393	885.00	1,652	69
J-394	824.45	2,843	95
J-395	835.00	2,843	91
J-397	845.00	2,843	86
J-398	848.00	2,843	85
J-399	846.00	2,843	86
J-400	796.00	8,378	64
J-401	809.00	8,833	59
J-402	812.00	8,186	58

J-403	820.00	7,690	54
J-404	805.00	8,091	61
J-406	785.00	8,785	69
J-407	787.00	9,324	68
J-408	801.00	9,484	62
J-409	827.00	10,000	51
J-410	775.00	10,000	74
J-411	830.00	10,000	50
J-412	715.00	5,980	99
J-413	790.00	4,780	67
J-414	790.00	5,268	67
J-415	803.00	2,364	61
J-416	800.00	2,164	63
J-417	790.00	2,062	67
J-418	789.00	1,955	67
J-419	769.00	1,954	76
J-420	803.00	2,546	61
WTP	757.00	6,572	81

HAZARD MAPS

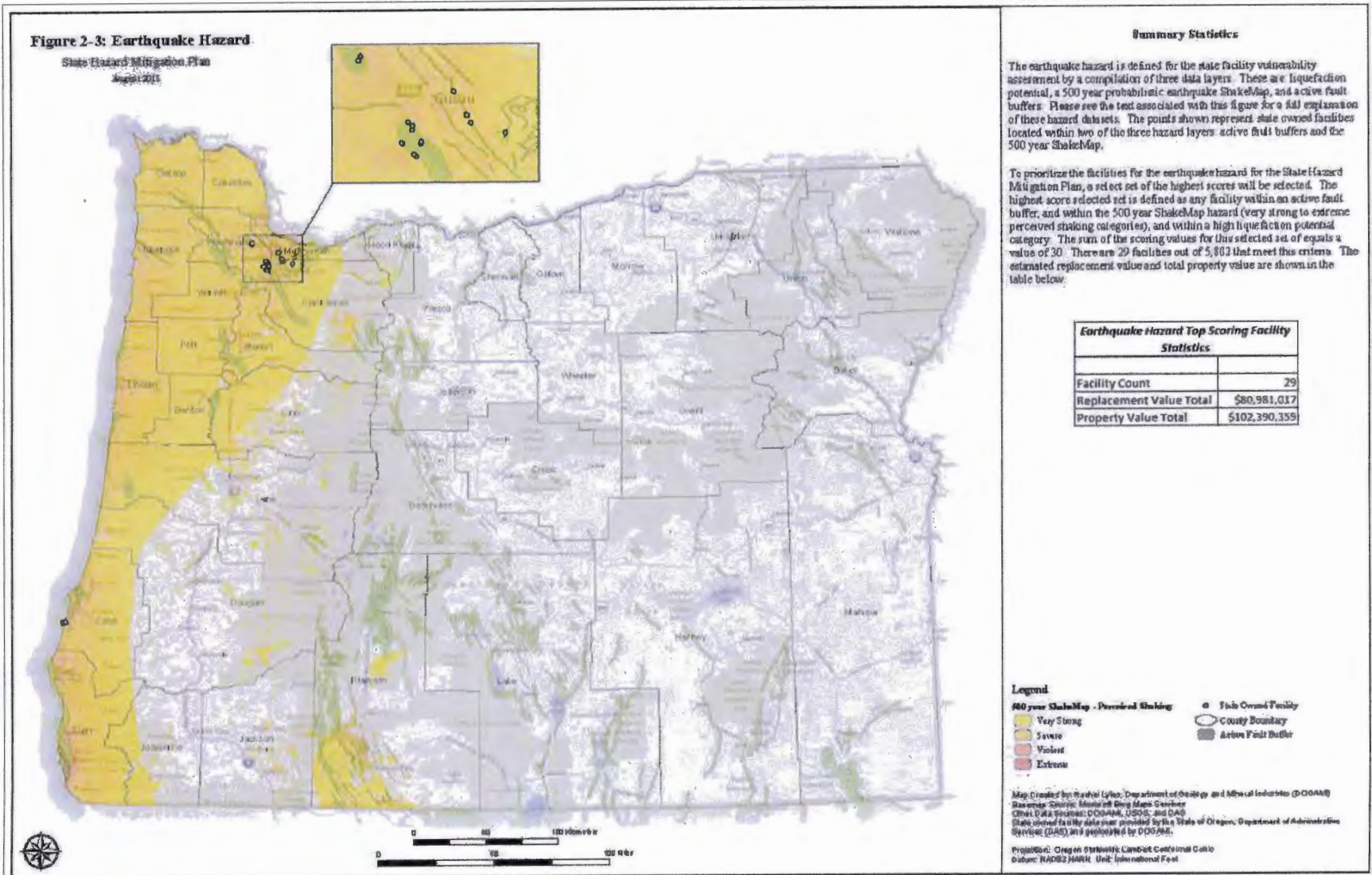
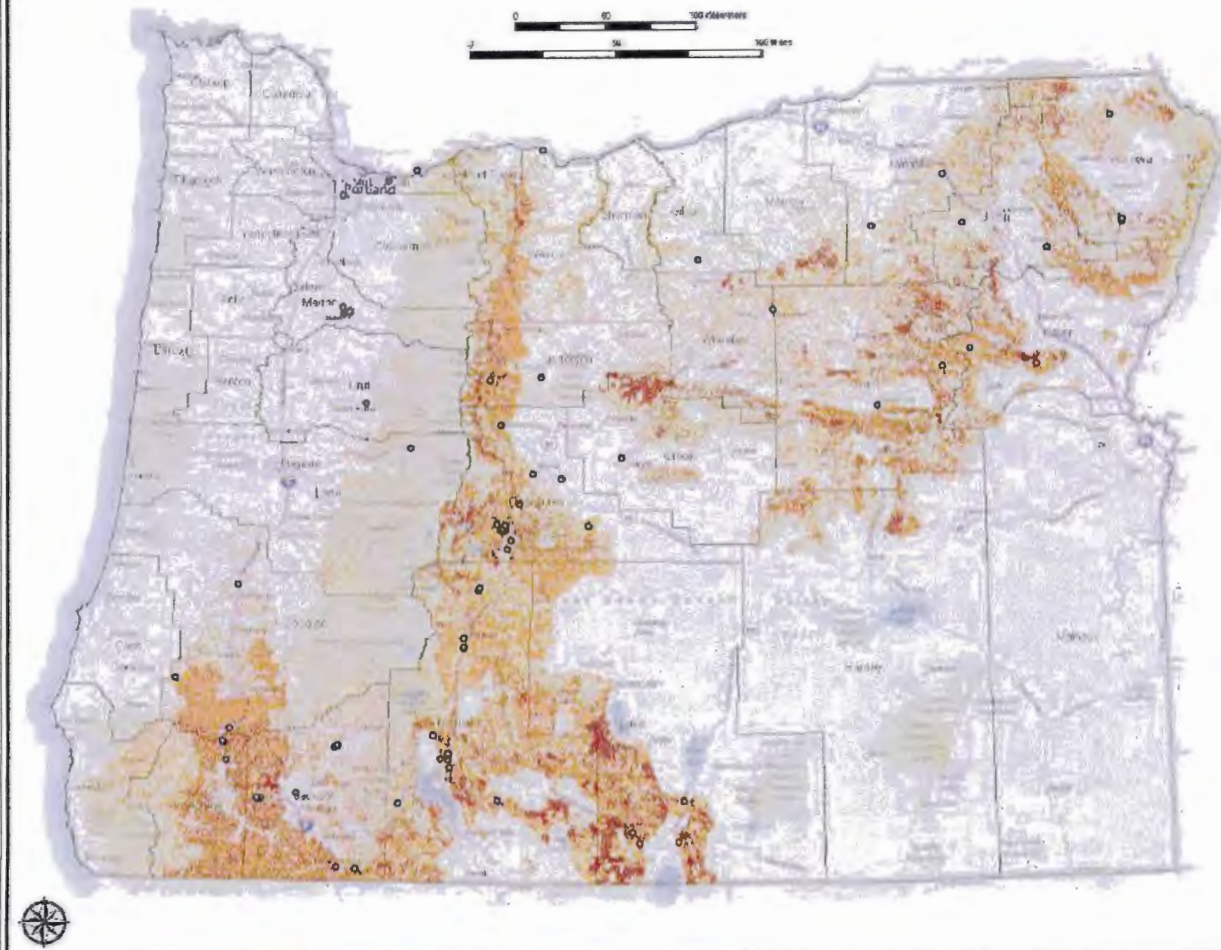


**Figure 2-4: Fire (Wildland-Urban Interface Hazard)
Overall Risk Hazard Rating**
State Hazard Mitigation Plan
August 2011



Summary Statistics

Fire Hazard Statistics (Within High/Very High Overall Risk Hazard Rating)	
Facility Count	203
Replacement Value Total	\$42,748,211
Property Value Total	\$37,067,469

Fire Hazard Within High/Very High Overall Risk Hazard Rating (By County)					
County			County		
County	# of Facilities	Total Property Value	County	# of Facilities	Total Property Value
Baker	3	\$1,167,238	Linn	6	\$222,919
Cook	1	\$96,000	Linn	1	\$67,500
DeSchautes	43	\$16,517,337	Linn	1	\$15,000
Coquille	13	\$1,100,104	Linn	1	\$15,000
Clatsop	2	\$500,000	Linn	1	\$15,000
Grant	3	\$1,100,104	Linn	1	\$15,000
Jackson	17	\$2,599,043	Linn	1	\$15,000
Jefferson	3	\$1,014,884	Linn	1	\$15,000
Josephine	4	\$1,000,171	Linn	1	\$15,000
Marion	42	\$6,146,489	Linn	1	\$15,000

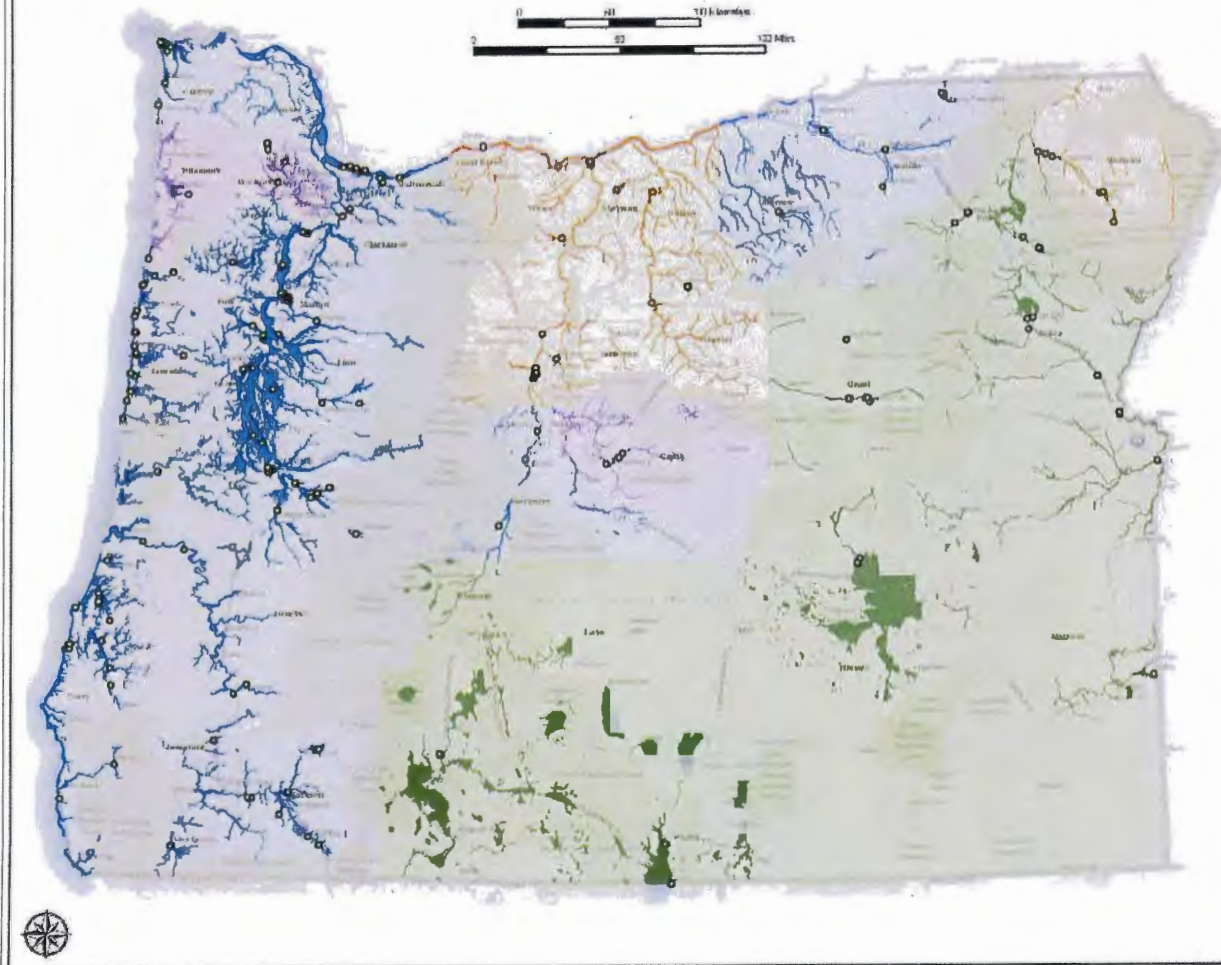
For the purpose of this study, the fire hazard area is defined using two datasets from the Oregon Department of Forestry (ODF): an overall risk hazard rating and a protection capability rating. This map only shows the facilities within the high or very high risk areas of the overall risk hazard rating data layer. This risk hazard rating is an overall assessment based upon a calculated value from the four Communities at Risk ratings: Risk, Hazard, Protection Capability, and Value. Please contact an ODF representative for more information on their datasets and fire related vulnerability studies.

Legend

- State Owned Facility within a Moderate or High Fire Protection Capability Risk
- County Boundary
- Overall Risk Hazard Rating
 - Very High Risk Area
 - High Risk Area

Map Created by Rachel Lyles, Department of Geology and Mineral Industries (DOGAMI)
Base Map Source: Microtop 8 1/2 Map Series
Other Data Sources: Oregon Department of Forestry
High Hazard Facility Data was provided by the Oregon Department of Forestry
Services (ODF) and processed by DOGAMI.
Project Note: Oregon Statewide Fire Protection Council of Oregon
County: ROGERS COUNTY, Oregon
County: ROGERS COUNTY, Oregon

Figure 2-6: Flood Hazard
State Hazard Mitigation Plan
August 2013



Summary Statistics

Flood Hazard Statistics	
Facility Count	623
Registered Value Total	\$379,947,896
Property Value Total	\$907,131,473

Flood Hazard by County					
County	# of facilities	Total Property Value	County	# of facilities	Total Property Value
Baker	0	\$1,075,848	Lane	73	\$190,709,238
Benton	22	\$18,748,810	Linn	0	\$7,316,538
Clatsop	3	\$170,407	Linn	18	\$9,889,656
Clatsop	49	\$4,615,499	Marion	8	\$2,816,656
Columbia	85	\$10,198,163	Marion	128	\$217,022,554
Crook	8	\$215,500	Marion	2	\$137,899
Cuerno	2	\$340,480	Marion	17	\$197,892
Deschutes	5	\$75,411	Marion	0	\$571,544
Deschutes	7	\$1,710,471	Marion	10	\$234,640
Deschutes	1	\$50,000	Marion	2	\$888,987
Grant	10	\$1,479,061	Marion	14	\$2,456,335
Harrison	0	\$4,481,081	Marion	14	\$1,214,021
Harney	1	\$30,000	Marion	7	\$2,714,923
Harney	30	\$2,102,760	Marion	5	\$1,480,012
Jefferson	25	\$2,421,477	Marion	11	\$259,606
Josephine	8	\$4,065,551	Marion	4	\$117,186
Josephine	14	\$23,000	Marion	2	\$22,271
Josephine	0	\$2,282,079	Marion	623	\$107,131,473

The points shown represent state owned facilities within the flood hazard area. This hazard area is characterized by 100 yr floodplain data depicted using multiple qualities (i.e. data accuracy, status, source). This data layer is a compilation of the most accurate flood data available for the State.

The point locations and property values reflect data provided by the Oregon Department of Administrative Services (DAS) in 2010. The points were located based on address data and research performed by the Oregon Department of Geology and Mineral Industries (DOGAMI).

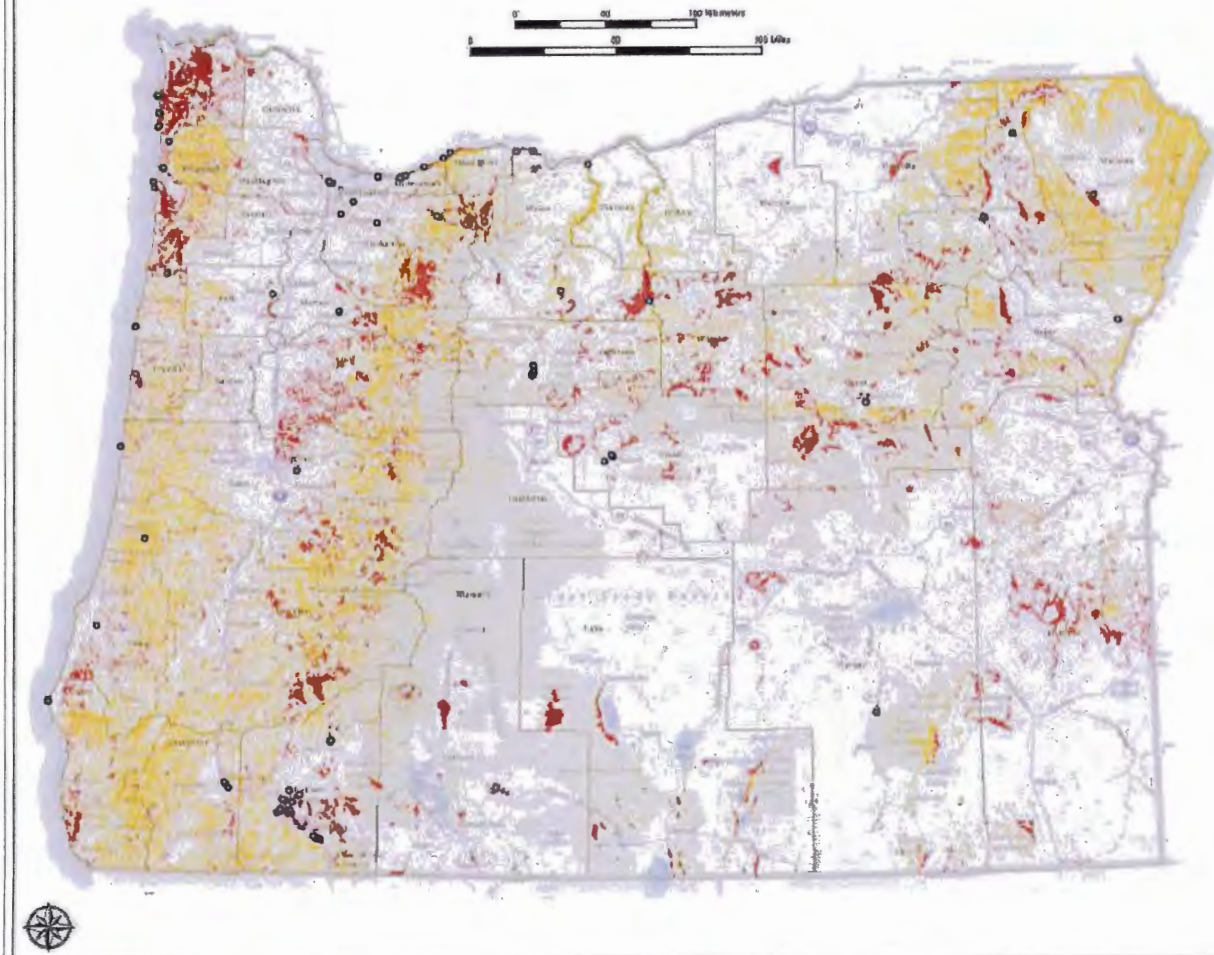
Legend

- State Owned Facility within Flood Hazard Area
- Effective FEMA 100-yr Floodplain
- Preliminary FEMA 100-yr Floodplain
- State Digital Flood Data
- Q7 Flood Zone

Map Created by: Rachel Lutz, Department of Geology and Mineral Industries (DOGAMI)
Historical Source: Malheur River Map Services
Other Data Sources: Oregon State Data Library and Division
State owned facility data was provided by the State of Oregon, Department of Administrative Services (DAS) using information by DOGAMI

Projection: Oregon Statewide Lambert Conformal Conic
Datum: NAD83 HARN Unit: International Foot

Figure 2-7: Landslide Hazard
State Hazard Mitigation Plan
August 2011



Summary Statistics

Landslide Hazard Statistics	
Facility Count	255
Property Value Total	\$200,737,098

Landslide Hazard by County

County	# of Facilities	Total Property Value
Baker	6	\$1,511,340
Clackamas	11	\$1,691,309
Clatsop	6	\$420,000
Coos	1	\$23,592
Crook	20	\$1,372,728
Curry	5	\$1,150,097
Douglas	1	\$30,000
Grant	1	\$17,829
Harnay	2	\$893,002
Hood River	5	\$3,110,399
Jackson	97	\$162,971,529
Jefferson	27	\$3,810,218
Josephine	8	\$2,356,067
Klamath	1	\$15,000
Lane	2	\$28,000
Lincoln	6	\$1,635,543
Marion	5	\$395,972
Multnomah	15	\$6,767,815
Polk	2	\$135,000
Sherman	1	\$15,000
Tillamook	8	\$3,488,423
Union	4	\$6,488,712
Wallowa	3	\$2,019,881
Wasco	7	\$334,000
Wheeler	1	\$30,000
Total	255	\$200,737,098

The points shown represent state-owned facilities within the landslide hazard areas. This hazard area is characterized by historic landslide locations, landslide deposits, and steep slopes.

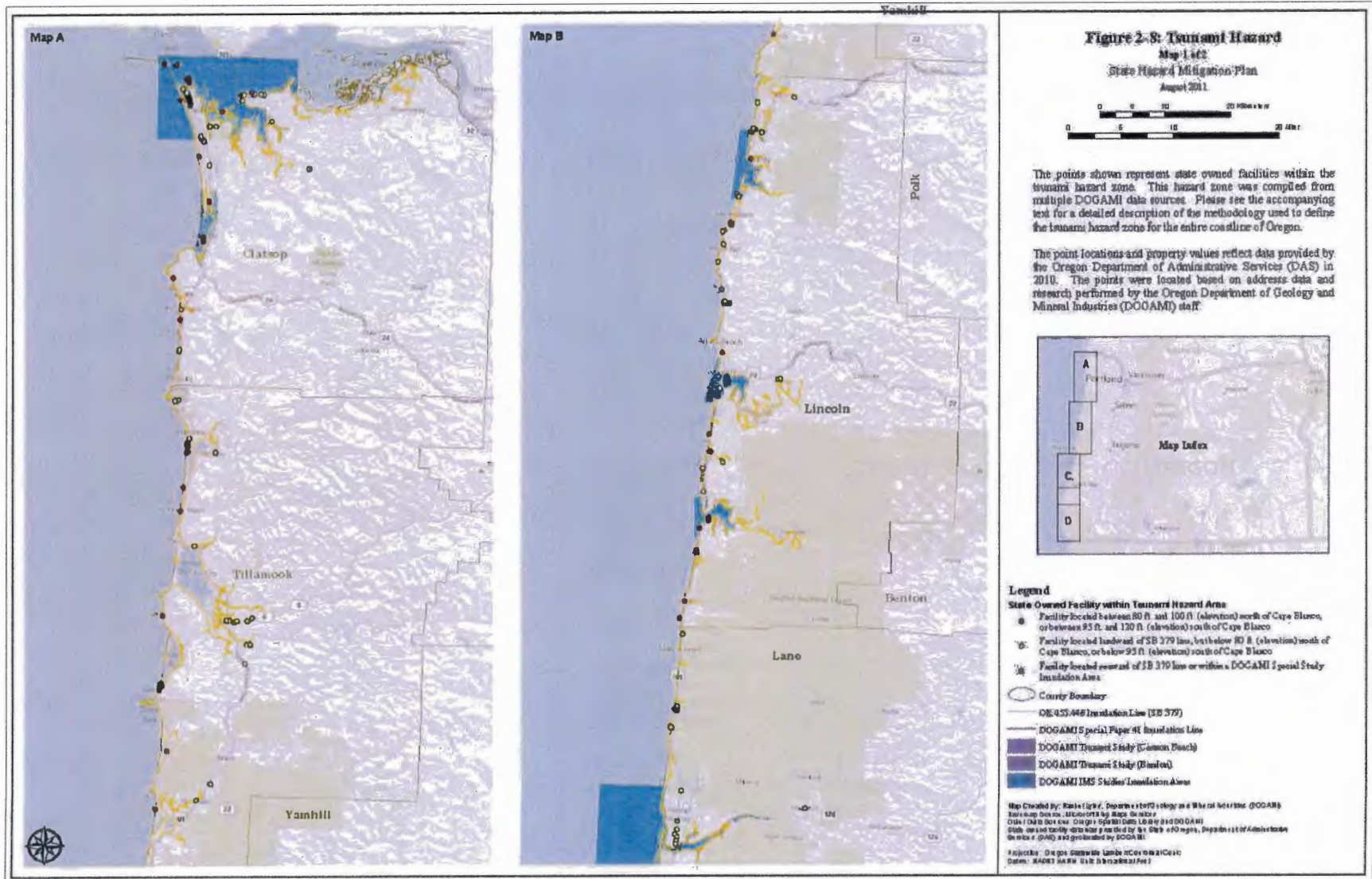
The point locations and property values reflect data provided by the Oregon Department of Administrative Services (DAS) in 2010. The points were located based on address data and research performed by the Oregon Department of Geology and Mineral Industries (DOGAMI).

Legend

- State-Owned Facility within Landslide Hazard Area
- County Boundary
- Yellow: Historical Landslide
- Red: Landslide Deposit
- Orange: Steep Slope

Map Created by: Rachel Lee, Department of Geology and Mineral Industries (DOGAMI)
Reviewed by: Michael Ding, DAS
Other Data Sources: Oregon State Data Library and DOGAMI
State-owned facilities were provided by the State of Oregon, Department of Administrative Services (DAS) and geolocated by DOGAMI.

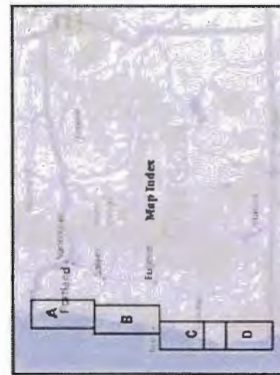
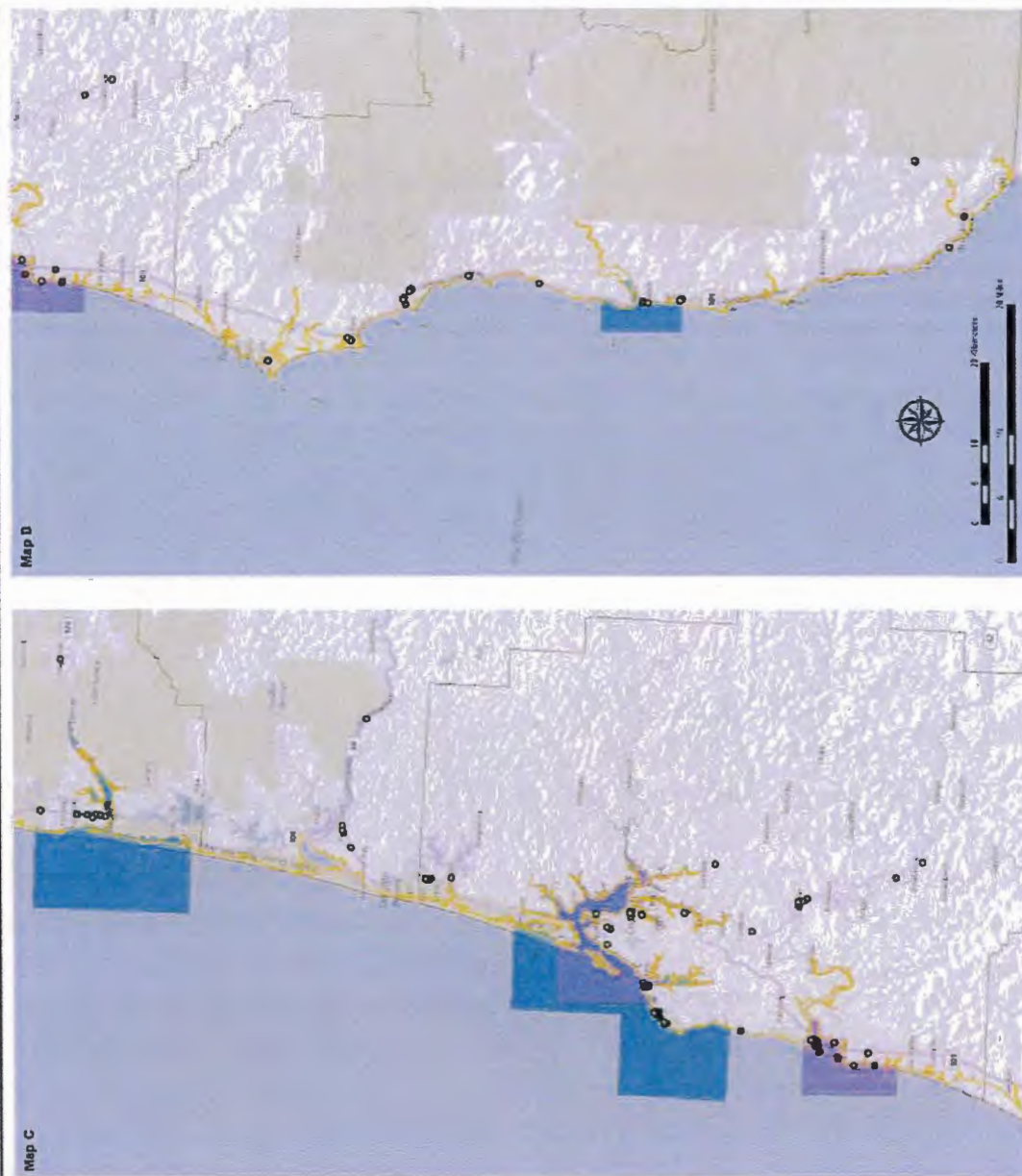
Projection: Oregon Statewide Lambert Conformal Conic
Datum: NAD83 HARN Unit: International Foot



2002

Tuscanum Hazard Statistics	
Facility Count	090
Replacement Value Total	\$187,000,941
Property Value Total	\$234,292,773

Tennant Housed By County		
County	# of Families	Total Property Value
Clatsop	137	\$94,970,857
Tillamook	111	\$40,545,484
Lincoln	162	\$43,045,126
Lane	30	\$5,782,976
Douglas	9	\$3,397,648
Coos	165	\$41,816,868
Curry	56	\$8,031,881
Total	600	\$234,262,773

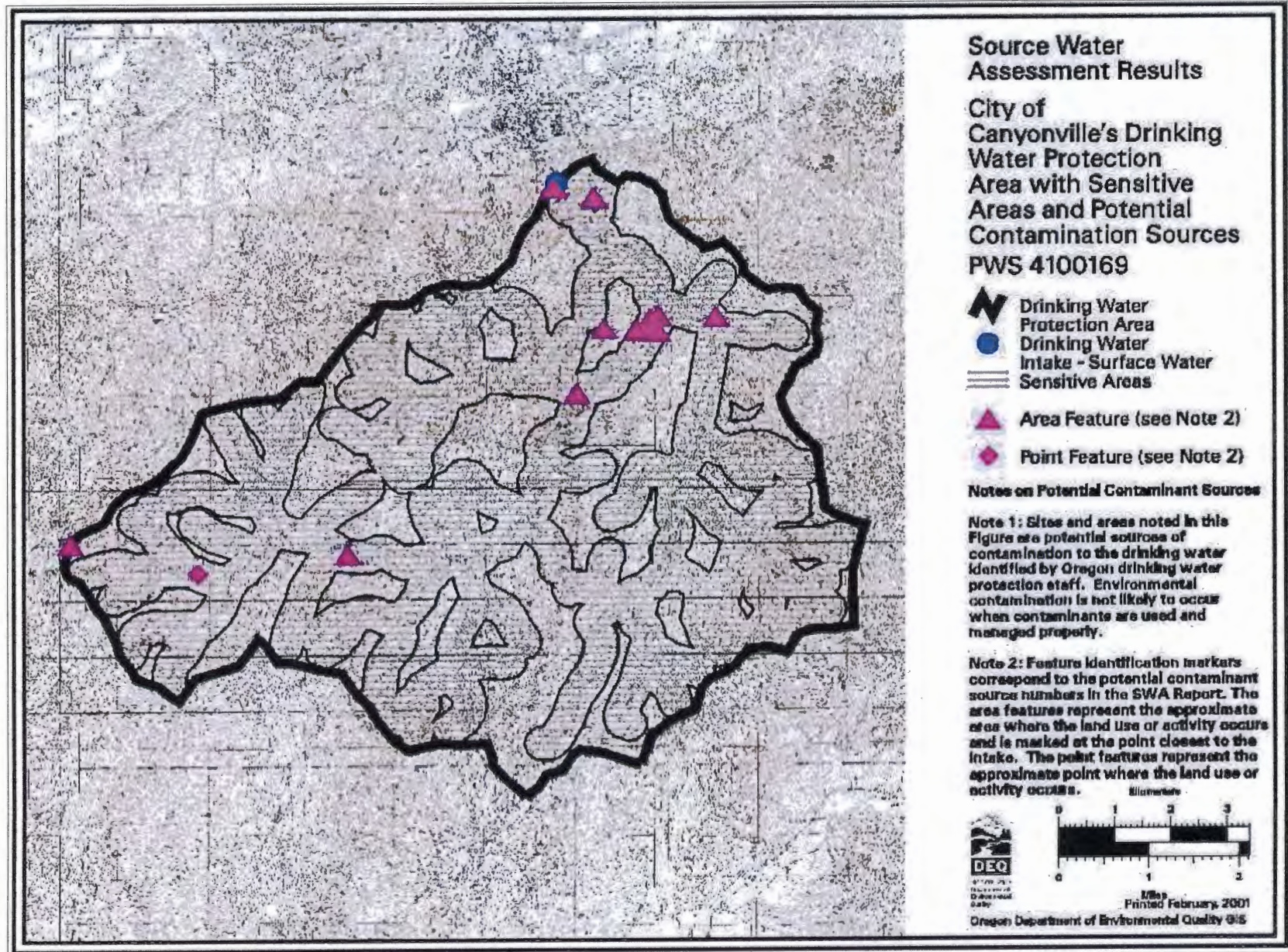
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UMPQUA WATERSHED BOUNDARY

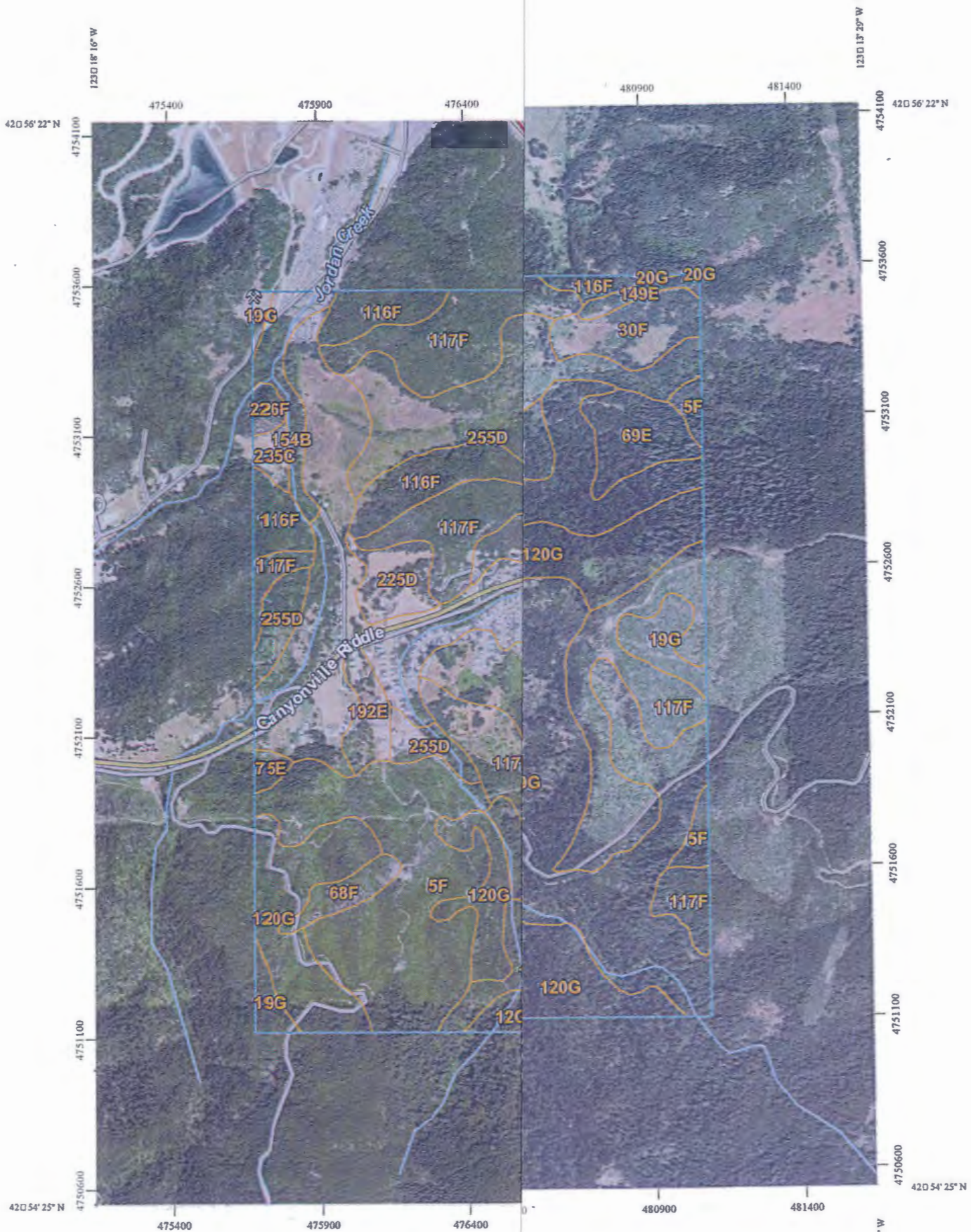
THE DYER PARTNERSHIP
ENGINEERS & PLANNERS, INC.
DATE: JULY, 2014
PROJECT NO.: 180.03

CITY OF CANYONVILLE
WATER MASTER PLAN
Umpqua Watershed Boundary

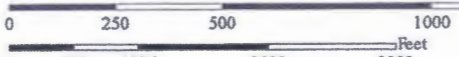
FIGURE NO.
App. A



SOIL MAPS



Map Scale: 1:17,500 if printed on Blandscape (17" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics:



Natural Resources
Conservation Service

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Silp



Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Douglas County Area, Oregon

Survey Area Data: Version 11, Dec 6, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

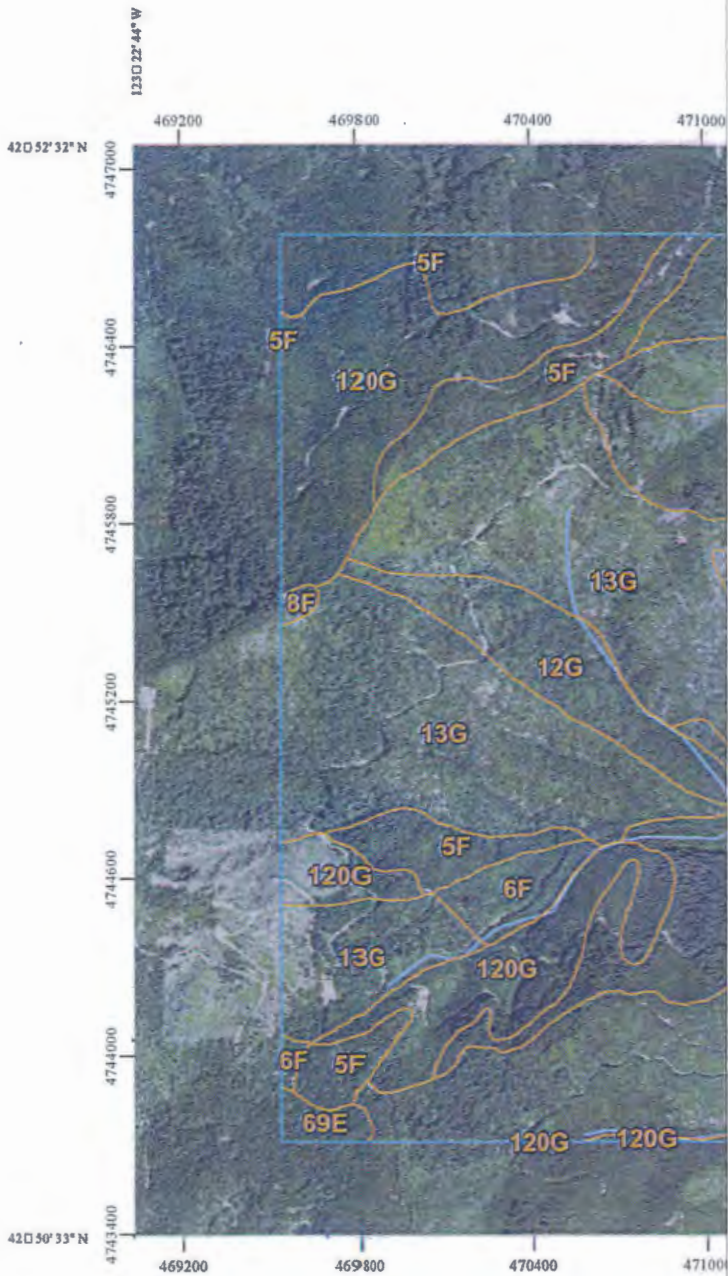
Date(s) aerial images were photographed: Jun 30, 2010—Jul 17, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Douglas County Area, Oregon (OR649)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1C	Abegg very gravelly sandy loam, 2 to 12 percent slopes	1.5	0.0%
5F	Acker-Norling complex, 30 to 60 percent north slopes	401.0	12.1%
12G	Atring-Vermisa complex, 60 to 90 percent north slopes	280.4	8.5%
19G	Beekman-Vermisa complex, 60 to 90 percent south slopes	366.0	11.1%
20G	Beekman-Vermisa complex, 60 to 90 percent north slopes	27.7	0.8%
30F	Buckeye loam, 30 to 60 percent slopes	21.6	0.7%
34A	Camas-Newberg complex, 0 to 3 percent slopes	1.9	0.1%
37A	Chapman-Chehalis complex, 0 to 3 percent slopes	43.7	1.3%
68F	Dubakella-Pearsoll complex, 30 to 70 percent north slopes	9.5	0.3%
69E	Dumont gravelly loam, 12 to 30 percent slopes	65.9	2.0%
75E	Dupee silty clay loam, 12 to 30 percent slopes	3.0	0.1%
81A	Foehlin gravelly loam, 0 to 3 percent slopes	101.4	3.1%
87E	Greengulch-Cedargrove complex, 3 to 30 percent slopes	17.9	0.5%
88F	Greengulch-Cedargrove complex, 30 to 60 percent north slopes	24.6	0.7%
89F	Greengulch-Cedargrove complex, 30 to 60 percent south slopes	29.1	0.9%
115E	Josephine gravelly loam, 12 to 30 percent slopes	1.9	0.1%
116F	Josephine-Speaker complex, 30 to 60 percent north slopes	166.6	5.0%
117F	Josephine-Speaker complex, 30 to 60 percent south slopes	394.4	11.9%
120G	Kanid-Atring complex, 60 to 90 percent north slopes	412.9	12.5%
149E	McMullin-Reston complex, 3 to 30 percent slopes	5.0	0.2%

Douglas County Area, Oregon (OR649)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
154B	Medford clay loam, 0 to 7 percent slopes	37.1	1.1%
184A	Packard gravelly loam, flooded, 0 to 3 percent slopes	40.3	1.2%
192E	Pollard gravelly loam, 3 to 30 percent slopes	43.5	1.3%
211	Rock outcrop	14.9	0.5%
225D	Speaker loam, 2 to 20 percent slopes	14.9	0.5%
225E	Speaker loam, 20 to 30 percent slopes	38.2	1.2%
226F	Speaker loam, 30 to 60 percent north slopes	3.8	0.1%
235C	Sutherlin silt loam, 3 to 12 percent slopes	52.0	1.6%
255C	Veneta loam, 0 to 12 percent slopes	189.3	5.7%
255D	Veneta loam, 12 to 20 percent slopes	275.5	8.3%
256G	Vermisa-Rock outcrop complex, 60 to 100 percent south slopes	221.6	6.7%
Totals for Area of Interest		3,307.1	100.0%



Map Scale: 1:26,000 if printed on A landscape (11" x 8.5") sheet.



0 350 700 1400

0 1000 2000 4000

Map projection: Web Mercator Corner coordinates: WGS84 Edge t



Natural Resources
Conservation Service

MAP LEGEND

Area of Interest (AOI)

-  Area of Interest (AOI)

Soils

-  Soil Map Unit Polygons
-  Soil Map Unit Lines
-  Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Douglas County Area, Oregon
Survey Area Data: Version 11, Dec 6, 2013

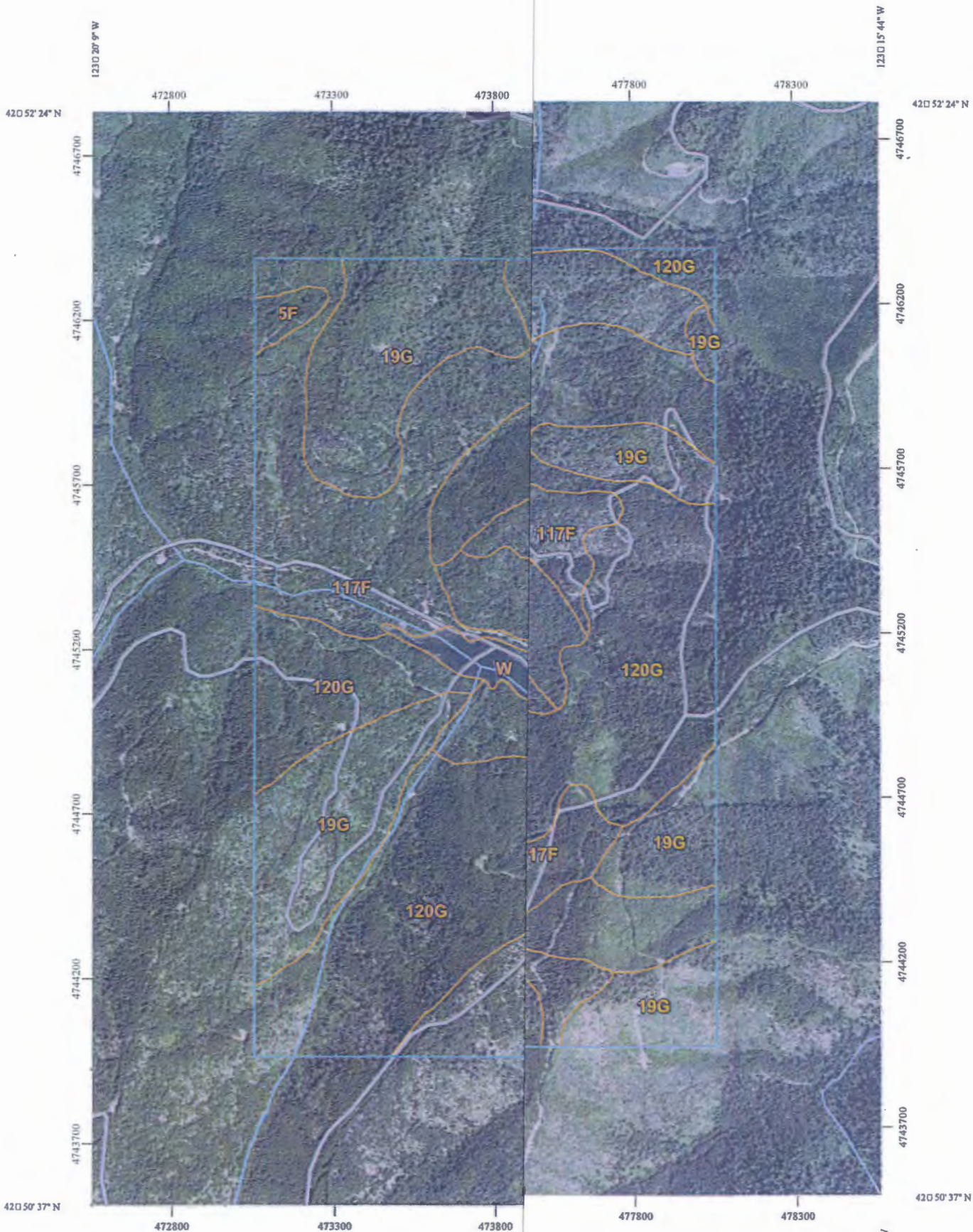
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 30, 2010—Jul 17, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Douglas County Area, Oregon (OR649)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5F	Acker-Norling complex, 30 to 60 percent north slopes	467.2	13.2%
6F	Acker-Norling complex, 30 to 60 percent south slopes	589.5	16.6%
8F	Atring gravelly loam, 30 to 60 percent slopes	3.0	0.1%
12G	Atring-Vermisa complex, 60 to 90 percent north slopes	285.2	8.0%
13G	Atring-Vermisa complex, 60 to 90 percent south slopes	607.0	17.1%
19G	Beekman-Vermisa complex, 60 to 90 percent south slopes	393.5	11.1%
69E	Dumont gravelly loam, 12 to 30 percent slopes	9.5	0.3%
117F	Josephine-Speaker complex, 30 to 60 percent south slopes	314.4	8.9%
120G	Kanid-Atring complex, 60 to 90 percent north slopes	862.7	24.3%
W	Water	15.8	0.4%
Totals for Area of Interest		3,547.9	100.0%



Map Scale: 1:16,200 if printed on B landscape (17" x 11") sheet.

0 200 400 800 Feet

0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics:



Natural Resources
Conservation Service

5/15/2014
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

-  Area of Interest (AOI)

Soils

-  Soil Map Unit Polygons
-  Soil Map Unit Lines
-  Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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Survey Area Data: Version 11, Dec 6, 2013

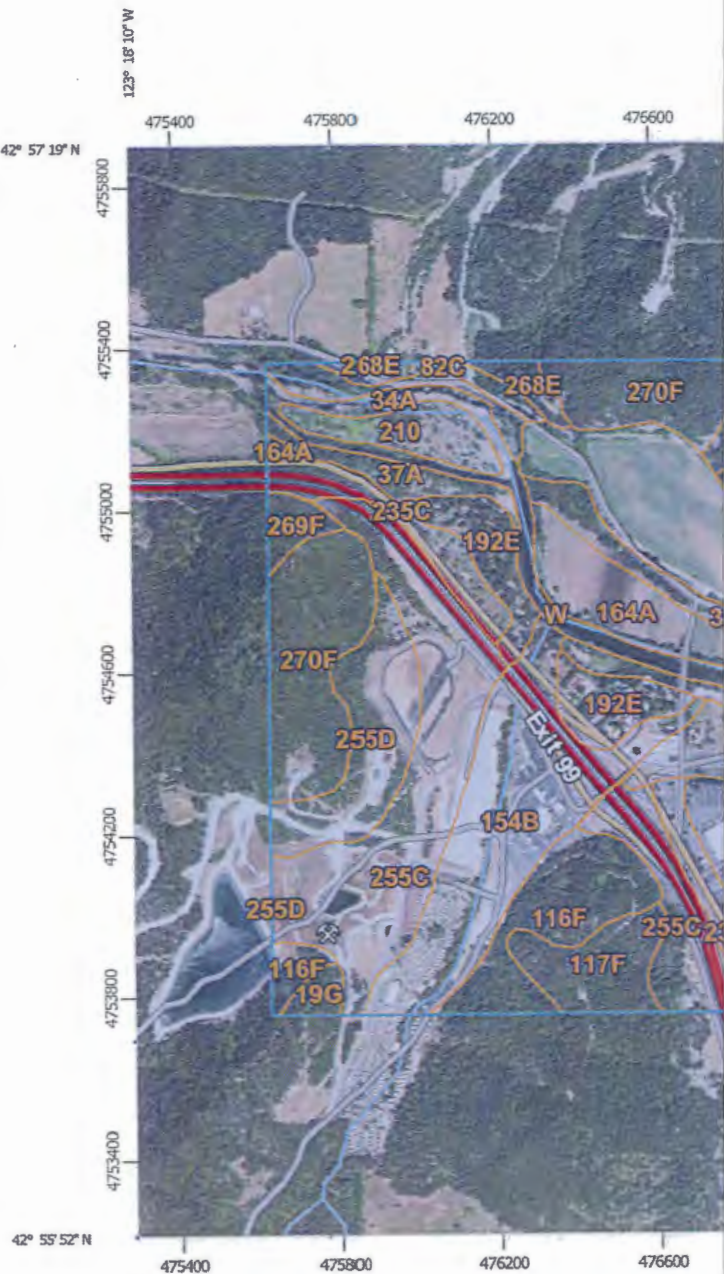
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Map Unit Legend

Douglas County Area, Oregon (OR649)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5F	Acker-Norling complex, 30 to 60 percent north slopes	291.8	9.7%
19G	Beekman-Vermisa complex, 60 to 90 percent south slopes	819.5	27.3%
69E	Dumont gravelly loam, 12 to 30 percent slopes	133.3	4.4%
117F	Josephine-Speaker complex, 30 to 60 percent south slopes	1,019.2	33.9%
120G	Kanid-Atring complex, 60 to 90 percent north slopes	726.1	24.2%
W	Water	15.8	0.5%
Totals for Area of Interest		3,005.7	100.0%



Map Scale: 1:18,900 if printed on A landscape (11" x 8.5") sheet.

0 250 500 1000

0 500 1000 2000 3000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge



Natural Resources
Conservation Service

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
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Survey Area Data: Version 11, Dec 6, 2013

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Map Unit Legend

Douglas County Area, Oregon (OR649)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1C	Abegg very gravelly sandy loam, 2 to 12 percent slopes	27.0	2.0%
19G	Beekman-Vermisa complex, 60 to 90 percent south slopes	3.2	0.2%
34A	Camas-Newberg complex, 0 to 3 percent slopes	89.9	6.5%
37A	Chapman-Chehalis complex, 0 to 3 percent slopes	123.7	9.0%
78A	Evans loam, 0 to 3 percent slopes	8.1	0.6%
81A	Foehlin gravelly loam, 0 to 3 percent slopes	67.5	4.9%
82C	Fordice very cobbly loam, 0 to 12 percent slopes	30.0	2.2%
87E	Greengulch-Cedargrove complex, 3 to 30 percent slopes	32.6	2.4%
88F	Greengulch-Cedargrove complex, 30 to 60 percent north slopes	19.0	1.4%
89F	Greengulch-Cedargrove complex, 30 to 60 percent south slopes	36.2	2.6%
116F	Josephine-Speaker complex, 30 to 60 percent north slopes	29.9	2.2%
117F	Josephine-Speaker complex, 30 to 60 percent south slopes	16.6	1.2%
154B	Medford clay loam, 0 to 7 percent slopes	71.9	5.2%
164A	Newberg fine sandy loam, 0 to 3 percent slopes	70.4	5.1%
188D	Pengra silt loam, 2 to 20 percent slopes	67.7	4.9%
191	Pits	12.9	0.9%
192E	Pollard gravelly loam, 3 to 30 percent slopes	64.0	4.6%
210	Riverwash	13.2	1.0%
224B	Sibold fine sandy loam, 0 to 5 percent slopes	0.2	0.0%
235C	Sutherlin silt loam, 3 to 12 percent slopes	199.1	14.5%
255C	Veneta loam, 0 to 12 percent slopes	84.0	6.1%

Douglas County Area, Oregon (OR649)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
255D	Veneta loam, 12 to 20 percent slopes	27.4	2.0%
268E	Wolfpeak sandy loam, 3 to 30 percent slopes	153.2	11.1%
269F	Wolfpeak sandy loam, 30 to 60 percent north slopes	17.1	1.2%
270F	Wolfpeak sandy loam, 30 to 60 percent south slopes	53.5	3.9%
W	Water	58.7	4.3%
Totals for Area of Interest		1,377.2	100.0%

WIN WALKER DAM INSPECTION



February 10, 2014

Tony Lakey, Public Works Superintendent
City of Canyonville
250 N Main
Canyonville, OR 97417

Re: Canyonville (WinWalker) Dam (C-63) – Inspection Summary

This dam was inspected on October 29, 2013. I performed the inspection with District 15 Watermaster Dave Williams and Assistant Watermaster Laura Duncan. Mark Norris from the City was also there for the inspection. The Water Resources Department conducts these routine inspections to identify safety, maintenance or operational issues that may affect dam integrity. Dams are assigned a hazard rating based on downstream hazard to people and property, not on the condition of the dam. Canyonville is classified as a significant hazard dam. Significant hazard dams are inspected every 2 to 3 years.

The results of this inspection are illustrated and described in the following photos and text. This inspection includes recommendations if actions are needed to keep the dam safe and properly working.

Results of Inspection:



Reservoir and upstream face of dam

The upstream face of the dam shows no signs of distress, and the walkway was secure where evaluated. The reservoir is clean, with no signs of significant erosion in the watershed adjacent to the reservoir and dam. Because the watershed is forested, there are

many sources of large wood (trees) in the watershed for this dam. The spillway seems to be functioning well without a log berm. It is necessary to inspect the spillway more frequently after a major storm.



Right side of spillway and right abutment

The spillway appears to be in its "as-designed" configuration. The spillway is clear of obstructions and debris, and shows no signs of damage that might affect its safely passing flood flows. No significant wear or loss of concrete was observed.



Control for valve and sluice gate

The primary outlet valve was partly open for this inspection, and appears to be cycled on a regular basis. The larger (4' X 4') sluice gate needs cycling after the period of most water need (after summer perhaps during next inspection). We have no record of its ever

being cycled, so it is possible that its function may have diminished and maintenance or repair needs may be noticed upon cycling (or attempting to cycle).



Outlet control valve

The main outlet control valve appears to be in complete working order. The wheel is locked and chained, and both look secure. Exterior rust and corrosion observed are shallow and minor.



Left abutment and discharge from primary conduit

The concrete on the downstream face is in very good condition, with little deterioration observed on the cold joints. The vegetation on the abutments made it difficult to measure seepage from the abutment, but an estimate of flow was made as described later.



Outlet tunnel for sluice gate

The tunnel for the sluice gate shows no signs of distress. All inspected concrete was in adequate to good condition. The water on the floor is not coming through the sluice gate, but has accumulated from rainfall on the slab.



Sluice gate from inside of tunnel

This sluice gate is not leaking. The rust on the sluice gate may be an indicator that the gate has not been used in a long time. We have no record of this sluice gate ever being cycled. It is important to open and close this gate to make sure it functions. Opening and closing this sluice gate may be difficult if it has not been cycled since dam construction. It could malfunction when cycled, so be prepared for possible maintenance or repairs.



Piezometer at toe next to left abutment

The piezometers water levels need to be checked, as I have no record of past measurements. This is important to determine if there is uplift on the dam and if seepage is related to this. Given the low rates of seepage this is unlikely. Seepage is estimated at 2 gallons per minute for the left abutment and 1 gallon per minute for the right abutment. The seepage is at the abutments, and does not appear to be seepage through the dam.

Finally, there is an almost all-weather road to the dam, in the event emergency access is needed in the wet season.

Recommendation(s):

1. Cycle the sluice gate after consulting the manufacturer. I would like to be on site for this activity, and would expedite my next inspection if needed.
2. Measure water levels in the piezometers during my next inspection.

We use a standard inspection form, and a copy of the field inspection sheet for this dam is attached. Thanks again for meeting with Dave and me. The next regular inspection is planned for 2015. Please let me know if you have any questions about this inspection.

Sincerely,

Keith Mills, P.E., Dam Safety Engineer
(503) 986-0840
Cell (541) 706-0849

C: Dave Williams, Watermaster District 15
Dam Safety File C-63



Dam Safety Inspection Form

State of Oregon
Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900

Name of Dam: Winn Walker / Canyonville
File #: C-63
Height: 58 ft. Storage: 300 ac. ft. Permit: R-8323 NID #: OR- 00603
Hazard: ☐ Low ☒ Significant ☐ High ☐ Request Inundation Analysis for change
Inspector(s): Mills, Williams, Duncan Watermaster District: 15
Date: 10-29-13 Weather: Clear and cool
Prior Inspection Date: 7-22-10 Issues from prior inspection: None

Expedited Re-inspection Needed: ☐ Next Inspection Date: 2015

Rating Criteria: 5-Very good; 4-Adequate 3-Maintenance or minor repair needed

2-Serious repair needed; 1- Urgent dam safety issue - action now - Contact dam owner and dam safety engineer directly

I. Dam	☐ Earth ☐ Rock ☐ Concrete ☐ Other	Rating
Up. Slope	Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent	4
Crest	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching	5
Down. Slope	Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression Slide	4
R. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy)	4
L. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy)	4
Toe	<u>Minor - Spray m. flows</u> Vegetation, Erosion, Seepage, Leak (muddy), Boil	4
Seepage/leak flow	Right <u>1</u> gpm Center <u>0</u> gpm Left <u>2</u> gpm Other <u> </u> gpm (use comment)	4
Auxiliary dike (s)	☒ No ☐ Yes ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ over 5	—
Comments:		

II. Reservoir	Pool elevation: <u>322</u>	Point of Reference: <u>Stake</u>	Rating
Minimum freeboard	Vertical distance debris from debris line to crest <u>6.0</u> ft. <u>Full 382</u>		5
Floating Debris/Trash	☒ Clean ☐ Around reservoir ☐ Near spillway		4
Landslides/Erosion	☒ No activity ☐ Gully ☐ Inactive slide ☐ Active movement ☐ Stabilized		
Log Boom	☒ Not needed ☐ Present ☐ Needed ☐ Deterioration ☐ Ineffective		—
Comments:			

III. Toe Drains #	<u>Piezometer</u>						
Flow (gpm)	<u>1</u>	<u>2</u>					
Damage							
Sediment	<u>Not real</u>						
Rating	<u>3</u>	<u>3</u>					

Mark Norris

IIIA. Other Instrumentation	☐ Piezometers	☐ Inclinator(s)	☐ Ground Motion

Reviewed by dam safety engineer: ☐ NA ☐ Yes ☐ No *Need to check*

IV. Conduit	Control:	☐ Trickle tube	☐ Manual Valve	☐ Power Valve	☐ other	Rating
Inlet gate	☒ Submerged					—
Trash Rack	☒ Submerged					—
Control/Stem	☒ Clean	☐ Greased	☐ Irregular			4
Valve(s) cycling	☐ Frozen	☒ unknown	☐ past year	☐ frequent		3
Diameter: 12"	Material <i>Steel</i>	Condition <i>good</i>				
Outlet Structure	☐ Overgrown	☐ Clean	☐ Pressurized	☐ Leaking	_____ gpm	
Secondary outlet	☒ Yes	☐ No	Type _____	Diameter _____	in.	3
Comments:	<i>4x4 Sluice - needs</i>					<i>unknown 3</i>

V. Spillway	☐ Earth	☐ Rock	☒ Concrete	☐ Other	Rating
Modifications	☒ None	☐ Reduction in capacity	☐ Feature not on design		—
Approach Channel	☒ Clear	☐ Trees/brush	☐ debris	☐ sill	
Flashboards/Gate	☐ None	☐ In place	☐ operational	☐ deteriorated	—
Discharge Channel	☒ Clear	☐ Trees/brush	☐ leakage	☐ headcutting	
Stilling basin	☐ N/A	☒ Functional	☐ Minor Erosion	☐ Severe Erosion/Undercutting	
Aux. Spillway	☐ Yes	☐ No	(use comments below)		
Comments:					

VI. Access and Security	Rating
Vehicle access	☐ Public road ☒ all weather road ☐ dirt road ☐ cross country
Fencing, signage	☒ Remote ☐ Clear signage ☐ Secure Fence ☐ Camera ☐ Unsecure
On Site Dam Tender/Contact	☐ Yes ☐ No Name: _____ Phone: _____
Emergency Action Plan	☐ Not required ☐ Completed _____ at dam (dated _____) ☐ None
Comments:	

Comments:

Alert - cycle upper valve

cycle Sluice

5
1112 or 97417

DEPT OF

JUN 15 2015
LAND CONSERVATION
AND DEVELOPMENT

Plan Amendment Specialist

DLCAD

635 Capital St NE Suite 150

Salem or 97301-2540



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