



TOWN OF LYMAN

SKAGIT COUNTY, WASHINGTON

2013 WATER SYSTEM PLAN



G&O #12575
JUNE 2013
REVISED DECEMBER 2013



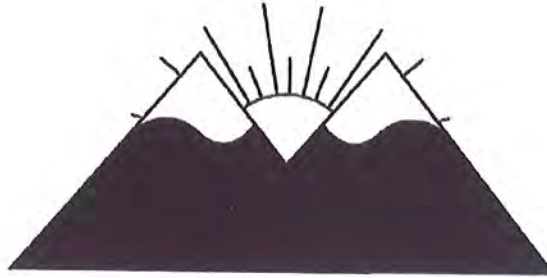
Gray & Osborne, Inc.

CONSULTING ENGINEERS

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Gray & Osborne, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

The Town of Lyman Water System Plan (Plan) provides a long-term planning strategy for the Town's water system over a 20-year planning period. The Plan has been prepared and is consistent with Department of Health Requirements as specified in the Washington Administrative Code (WAC) Chapter 246-290.

PLAN SUMMARY

Chapter 1 of the Plan provides a description of the Town's water system including a description of existing facilities, service area, and service area policies. Chapter 2 presents historical and projected populations and demands. Chapter 3 presents water system design standards and an analysis of the water system's supply, storage, and pumping capacities. Chapter 3 continues on to present a hydraulic analysis of the distribution system that evaluates the system's ability to maintain appropriate levels of service under a variety of conditions. Chapter 4 contains information on water quality. Chapter 5 presents the Town's Water Use Efficiency Program. Chapter 6 describes the measures the Town is taking to protect the wells used for drinking water. Chapter 7 discusses the Town's operation and maintenance procedures. Chapter 8 presents the Town's Capital Improvement Program, which identifies capital projects the Town plans to complete over the next 20 years. Chapter 9 summarizes the financial program of the Town's water system and its ability to fund operations, maintenance, and planned capital projects.

WATER SERVICE AREA

The Town of Lyman water service area is located north and south of State Route 20, adjacent to the Skagit River. The Town's water system serves the entire Urban Growth Area (UGA), which is all incorporated into the Town, as well as outlying rural areas along the Town's existing distribution system.

HISTORICAL AND PROJECTED WATER USAGE

The Town's water system served 473 customers as of 2012. During the period from 2008 to 2012, the Town's water consumption fluctuated between 9.1 to 12.1 million gallons per year as a result of varying weather conditions. The Town's water system produces roughly double the amount of water on a maximum day compared to an average day. Table E-1 shows the historical usage of the Town's water system from 2008 to 2012.

TABLE E-1

Historical Water Production from 2003 to 2009

Year	Number of Service Connections	Total Annual Production⁽²⁾ (MG)	Average Daily Production⁽²⁾ (gpd)	Maximum Day Production⁽²⁾ (gpd)
2008	193	18.83	51,595	95,000
2009	195	19.42	53,197	115,000
2010	205	18.44	50,521	110,000
2011	206	17.68	48,427	87,000
2012	217 ⁽¹⁾	17.49	47,923	94,000

(1) From Table 2-2.

(2) From Table 2-3.

Based on the historical population growth and the latest census data, the population of the Town's Water Service Area is expected to grow at a rate of approximately 0.6 percent over the next 20 years. Projections for the Town's water usage over the next 20 years are shown in Table E-2.

TABLE E-2

Projected Water Production from 2013 to 2033⁽¹⁾

Year	Average Daily Production (gpd)	Maximum Day Production (gpd)
2013	52,100	104,200
2019	55,000	110,000
2033	62,800	125,600

(1) From Table 2-10.

SYSTEM ANALYSIS

The analysis of the Town's water system contained in this Plan evaluates whether the Town's existing water system facilities are adequate to provide the current and anticipated future demands of the Town's customers. The analysis indicates that the Town has adequate source and distribution capacity to serve anticipated growth over the next 20 years. The analysis indicates that the Town has enough storage capacity to meet all requirements for the existing customers and new residential constructions. However, the existing storage reservoir is not sufficient to meet fire flows that would be required for future non-residential development. It is anticipated that the improvements required for new non-commercial development will be provided by the developer.

WATER USE EFFICIENCY

The Plan includes the Town's Water Use Efficiency (WUE) program as required by the Water Use Efficiency Rule (WUE Rule), which became effective in 2007. The WUE Rule requires additional planning, distribution leakage standards, and performance reporting aimed at conserving the State's water resources. The program includes goals to reduce customer consumption and distribution system leakage. The WUE Rule requires that distribution system leakage be less than 10 percent on a 3-year rolling average but systems serving less than 500 connections that meet certain conditions may submit a request to the Department of Health for approval of an average distribution system leakage of 20 percent. The Town does not currently qualify for the 20 percent standard, but may apply for it in the future. As of 2012, the Town's current 3-year average distribution system leakage is 41 percent, so the water system is not currently in compliance with the requirement. The Town must therefore implement a Water Loss Control Action Plan, which is given in Chapter 5. The Town has taken steps to improve the accounting of water usage in the system and reduce leakage, such as the installation of service meters since the last plan. The Town plans to increase its leakage reduction and conservation efforts to meet its WUE goals and comply with the distribution system leakage standard.

CAPITAL IMPROVEMENT PLAN

The Plan contains a list of projects for the Town's capital improvement plan through 2033, with a schedule for all the projects. Major projects include repairing leaks on Pipeline lane and Myer Avenue and several major aging and leaking pipe replacement projects. Table E-3 provides a summary of the projects proposed through 2033.

TABLE E-3

Capital Improvement Projects through 2017⁽¹⁾

Project Description	Year to be Completed	Estimated Cost⁽²⁾
Repair Leak on Myer Avenue ⁽³⁾	2013	\$ 280
Repair Leak on Pipeline Lane ⁽³⁾	2013	\$ 3,500
Improvements to Well 2	2016	\$ 3,500
Record Conveyance of Reservoir Land	2017	\$ 4,000
Repair Leak from Reservoir Sample Tap	2018	\$ 1,500
Purchase Backup Equipment	2019	\$ 3,000
Update Auto-Read Handheld Meter Reader	2019	\$ 9,000
Clean Reservoir	2020	\$ 4,000
Storage Metering Improvements	2021	\$ 21,600
Well 2 Pump Replacement	2022	\$ 18,000
Dyer Avenue Waterline Replacement	2023	\$ 96,000
Pipeline Lane Waterline Replacement	2028	\$114,000
Lyman Hamilton Road Waterline Replacement	2030	\$542,000

- (1) From Table 8-1.
- (2) All costs given in 2013 dollars.
- (3) Completed.

FINANCIAL PROGRAM

The Plan contains information on the water utility’s financial program, which includes revenues the water utility will produce, the cost of operations, maintenance, and the planned capital projects. There is a projected deficit for 2013 due to the payment of the interfund loan but a surplus every year after. Revenues in excess of operating expenses are available for capital projects and utility reserve funds. Table E-4 summarizes the revenues and expenses of the water system from 2013 to 2018.

TABLE E-4

Projected Revenues and Expenses⁽¹⁾ (2013 to 2018)

	2013	2014	2015	2016	2017	2018
Total Revenues	\$119,527	\$113,845	\$113,513	\$115,980	\$118,335	\$120,836
Total Expenses	(\$113,661)	(\$103,754)	(\$106,785)	(\$106,992)	(\$109,246)	(\$111,050)
Net Revenues	(\$ 3,134)	\$ 10,091	\$ 6,728	\$ 8,988	\$ 9,089	\$ 9,786

- (1) From Table 9-5.

CHAPTER 1

WATER SYSTEM DESCRIPTION AND POLICIES

INTRODUCTION

The Town of Lyman (Town) is a rural community located in Skagit County adjacent to Washington State Highway 20 and the Skagit River. Lyman owns and operates its potable water system which serves a population of approximately 473 customers through 217 residential and non-residential connections. Lyman's sole source of supply is an aquifer accessed by two shallow wells. The location of the Town is shown in Figure 1-1. Adjacent water purveyors are shown in Figure 1-2. An aerial view of the Town and water system are shown in Figure 1-3.

The Town of Lyman is located within the Skagit County Critical Water Supply Service Area. As such, Lyman's Water System Plan is required to meet all legislated service area identification requirements of the Skagit County Coordinated Water System Plan under the State of Washington Water System Coordination Act. Lyman representatives, as members of the Skagit County Water Utility Coordinating Committee, participated in revision of the County's Utility Service Review Procedures and identified a water service area boundary as part of the 1999 Skagit County Coordinated Water System Plan. As part of this 2013 Water System Plan update, the Town of Lyman water service area has been revised and filed with Skagit County Department of Health and the County Planning Office.

This 2013 Water System Plan (WSP) update has been prepared according to requirements outlined in the Washington State Department of Health Guidance Manual for Small Water System Plans to fulfill the water system's regulatory obligations under WAC 246-290-100.

WATER SYSTEM OWNER AND MANAGER

The Lyman Water Department (DOH System 49050-0) is owned and operated by the Town. The utility's Water Facilities Inventory documentation is included as Appendix A. The utility point of contact for all inquiries regarding the Lyman Water Department is:

Town of Lyman
Debra Heinzman
Honorable Mayor
P.O. Box 1248
Lyman, Washington 98263
(360) 826-3033 (Phone and Fax)

NEIGHBORING PURVEYORS

The Bacus Hill water system is located approximately 5 miles west of Lyman on the north bank of the Skagit River. The Hamilton water system is located 4 miles to the east. Currently, Lyman does not have an intertie with either of these systems. These water purveyors are shown in Figure 1-2

HISTORY OF WATER SYSTEM DEVELOPMENT

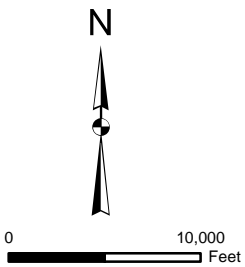
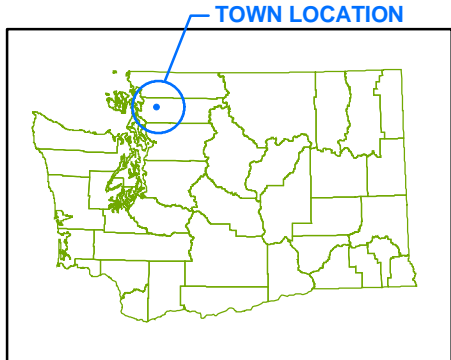
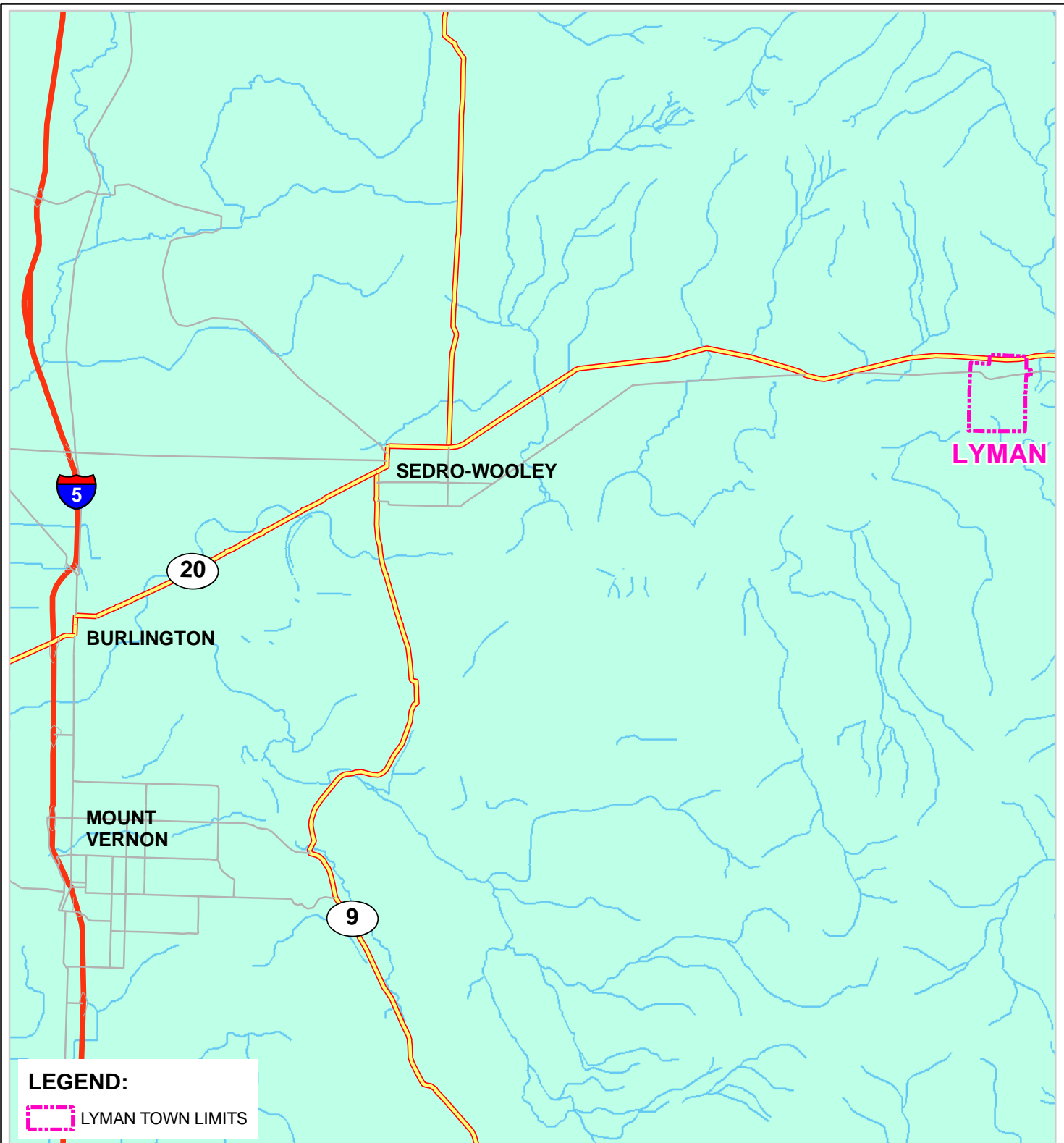
The sole source of supply for the Town of Lyman prior to 1961 was a surface water diversion from Jones Creek, located along the Town's eastern boundary. In July 1961, Lyman was issued the rights for a groundwater withdrawal (Certificate 4041) (Appendix B) and began to supply water to local residents from Well 1 located at the northwest corner of East Main Street and Pipeline Road. In 1978, the Jones Creek surface water supply was discontinued and Well 1 became the sole source of supply. In 1979, Well 2, located near the eastern town limits and approximately 300 feet south of East Main Street, was constructed to provide redundancy of supply. No additional water rights were obtained or required, as Wells 1 and 2 were drilled in the same aquifer. Lyman's water right certificate stipulates a total allowable annual withdrawal (Q_a) and maximum instantaneous pumping rate (Q_i), irrespective of the number of withdrawal points.

Flood events and surface water ponding in November 1993 threatened water quality at Well 1. As a result, the Department of Ecology (Ecology) granted Lyman temporary authorization to use Well 2 as the primary source of supply. In November 1995, DOH approved status for Well 1 was withdrawn because of its proximity to Pipeline Road and susceptibility to flooding. Lyman took action and installed DOH-recommended disinfection and corrosion control treatment in order to regain approved status for Well 1 which is now the primary source of supply for the Town.

In 2004, the Town completed a major water system improvement project. This project included a new storage reservoir, a new Well 1 facility with disinfection and corrosion control equipment, a new transmission main between the wells and the reservoir, and various distribution improvements.

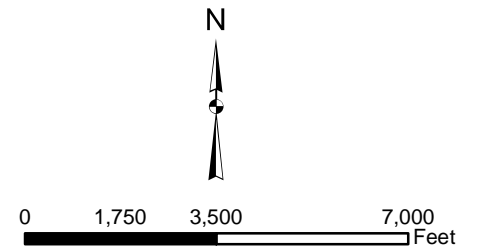
SERVICE AREA CHARACTERISTICS

The Town of Lyman water service area is located north and south of State Route 20, adjacent to the Skagit River. The water service area includes the Town's entire Urban Growth Area, which is all incorporated into the Town, as well as outlying rural areas along the Town's existing distribution system.



TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 1-1
 LOCATION MAP

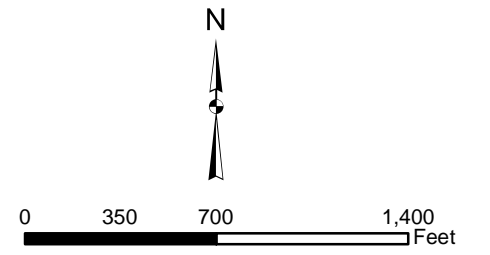
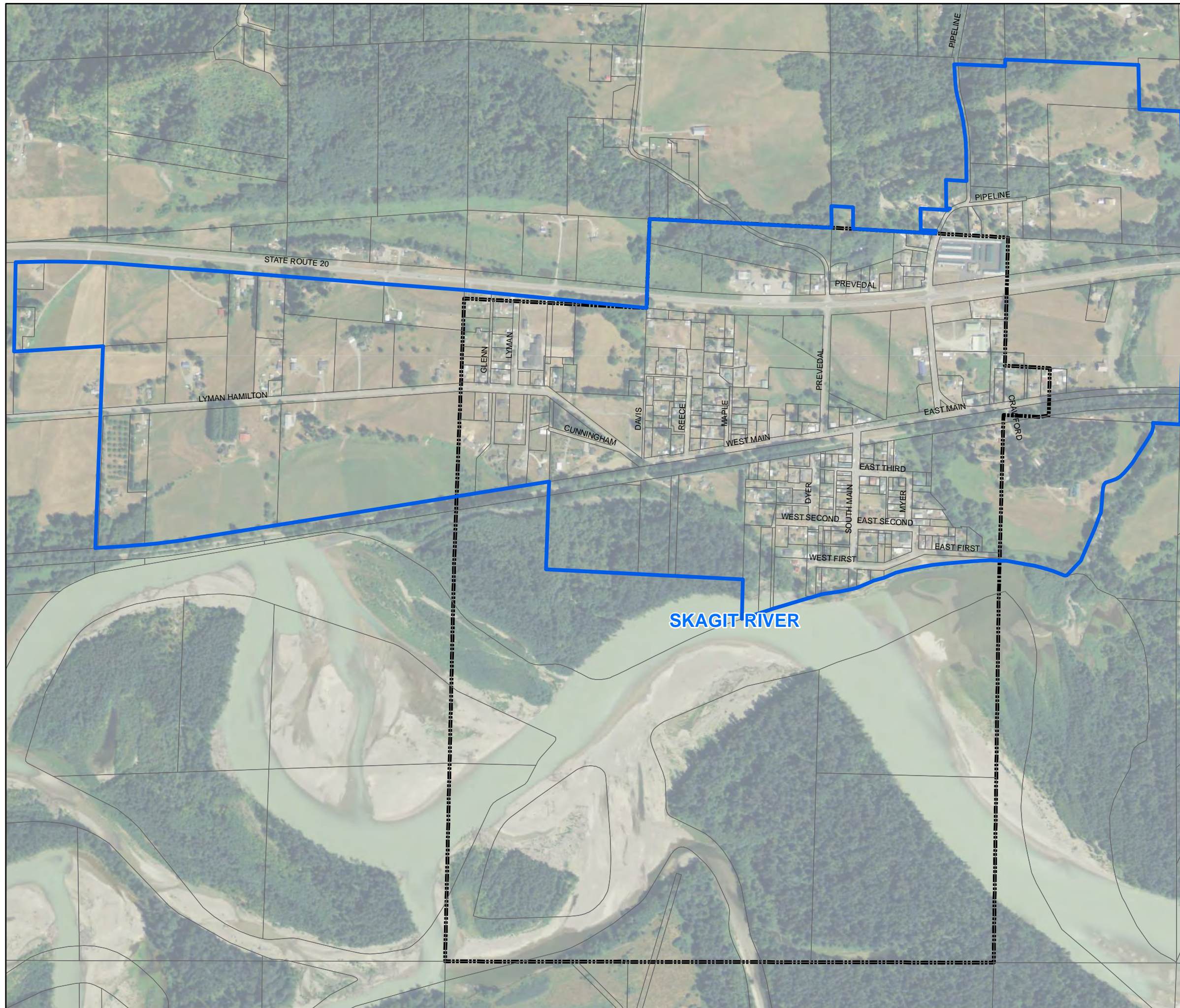
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- LEGEND:**
- LYMAN TOWN LIMITS
 - PARCELS
 - WATER PURVEYORS:**
 - BACUS ROAD
 - DAY CREEK CHAPEL
 - LYMAN WATER
 - SHANGRI LA COMMUNITY CLUB
 - TOWN OF HAMILTON

TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 1-2
 ADJACENT PURVEYORS





LEGEND:

-  RETAIL SERVICE AREA
-  LYMAN TOWN LIMITS
-  PARCELS

TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 1-3
 AERIAL VIEW



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RETAIL SERVICE AREA

The Town's retail water service area, as described in the Municipal Water Law, is shown in Figure 1-4.

The Town acknowledges that it has a duty to serve all new connections within its retail service area if:

1. Service can be provided in a timely and reasonable manner.
2. The Town has sufficient water rights to provide service.
3. The Town has sufficient capacity to serve water in a safe and reliable manner.
4. The service request is consistent with adopted local plans and development regulations.

FUTURE SERVICE AREA

The Town does not anticipate expanding its water service area beyond the water service area boundaries identified above.

ZONING

The service area within the administrative boundaries of the Town is divided into the following four zoning types: (1) Residential District; (2) Business/Commercial District; (3) Industrial/Heavy Commercial District; and (4) Open Space and Parks District. Currently, there are no plans for expansion of the system or expansion outside of the water service area identified in this WSP. A large portion of Lyman's water service area is the zoning responsibility of Skagit County. The service area does not share a common boundary with other water systems. Zoning for the Town's service area is shown in Figure 1-5.

PHYSICAL CHARACTERISTICS OF THE WATER SERVICE AREA

Planning and design of water system facilities can be influenced by physical characteristics such as geography, topography, geology and soils, climate, ground and surface water availability, water quality, and terrestrial/aquatic environmental characteristics. The following sections provide an overview of the physical characteristics of the Town of Lyman water service area.

TOPOGRAPHY

The topography of the central portion of the Town of Lyman is generally flat with a mean elevation of 80 to 100 feet above sea level in the Skagit River valley. The area north of the Town is hilly with steep slopes leading up out of the river valley. Groundwater in the

area is relatively shallow, generally within 15 feet of the ground surface. A topographical map of the Lyman area is shown in Figure 1-6.

FLOOD HAZARD AREAS

The 100-year flood plain is shown in Figure 1-7. These boundaries are in accordance with the Federal Emergency Management Agency (FEMA). Areas within the 100-year flood plain include much of the southern portion of the Town bordering the Skagit River. Although FEMA highly recommends against the placement of any structure in the 100-year floodplain, any structure built within the flood plain's boundaries must provide for adequate protection against the 100-year flood (i.e., structures within the floodplain are constructed at a minimum of 1 foot above the flood plain elevation).

WETLANDS

Wetlands are defined as those areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Figure 1-7 illustrates the wetlands identified in the Water Service Area.

FACILITY INVENTORY

This section outlines the various components of the Lyman water system, including treatment, storage, pumps, distribution system piping, and instrumentation and control systems. The facilities are shown in Figure 1-8.

WELLS

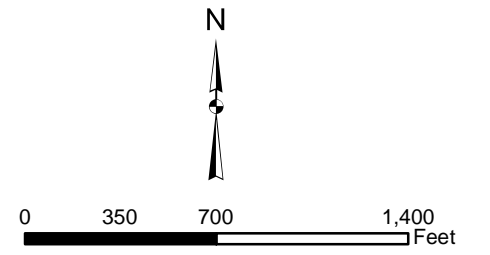
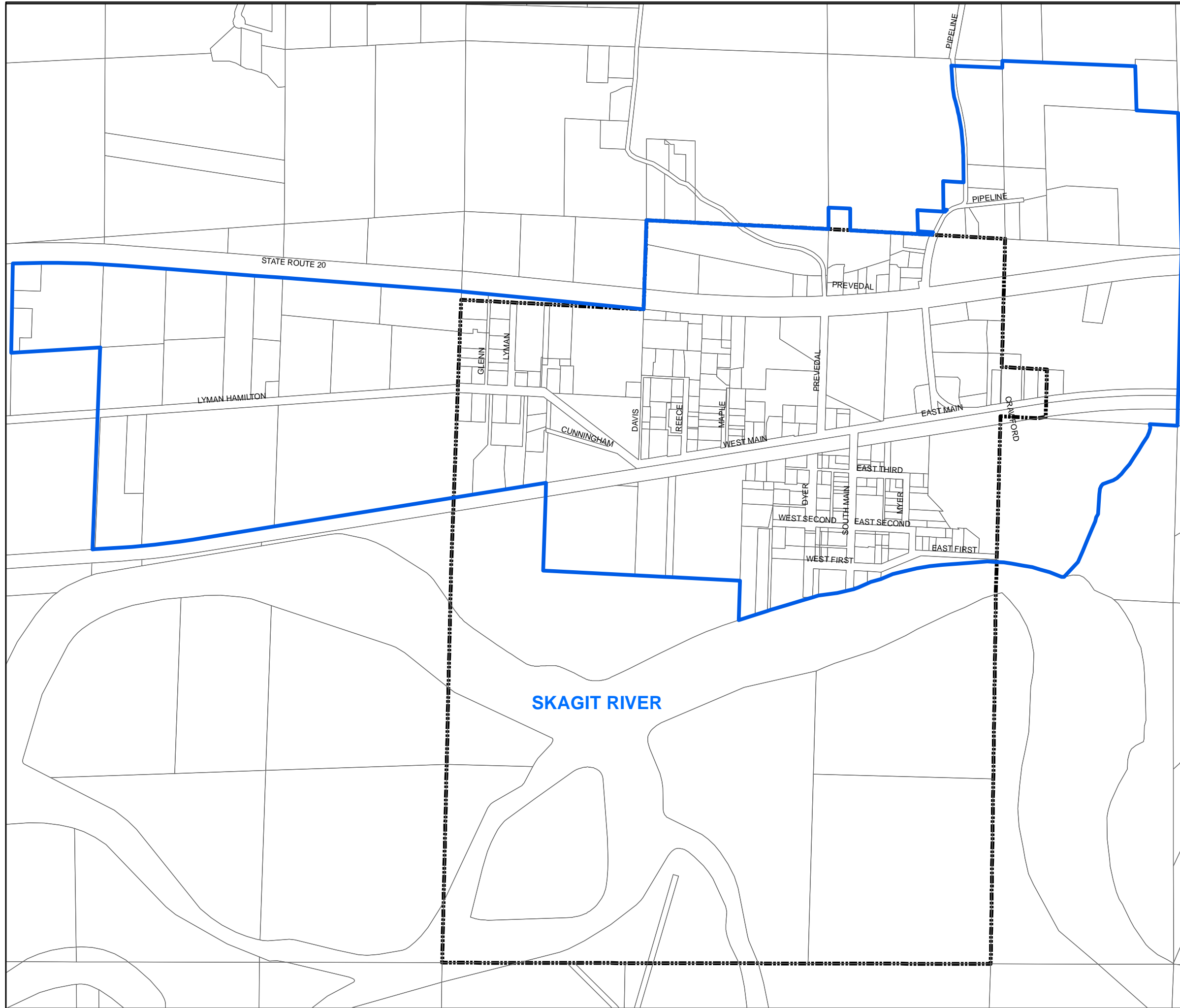
Lyman operates two wells, designated Well No. 1 and Well No. 2. Well No. 1 is the primary source of supply, and Well No. 2 serves as a backup well. The wells feed the Town's storage reservoir through a dedicated transmission main. Flows from Well No. 1 and Well No. 2 flow through the Well No. 1 facility, where sodium hypochlorite is added for disinfection and sodium hydroxide is added to adjust the pH for corrosion control.

STORAGE

Lyman operates a single storage reservoir. The reservoir is a round reinforced concrete above-grade structure. The reservoir measures 30 feet wide by 30 feet tall. The total storage capacity of the reservoir is 158,000 gallons.

BOOSTER PUMPS/PRESSURE STORAGE

The water system does not employ booster pumping. The system is classified as a single pressure zone and is served by gravity flow from the storage reservoir.

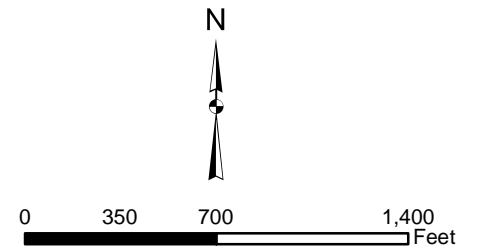
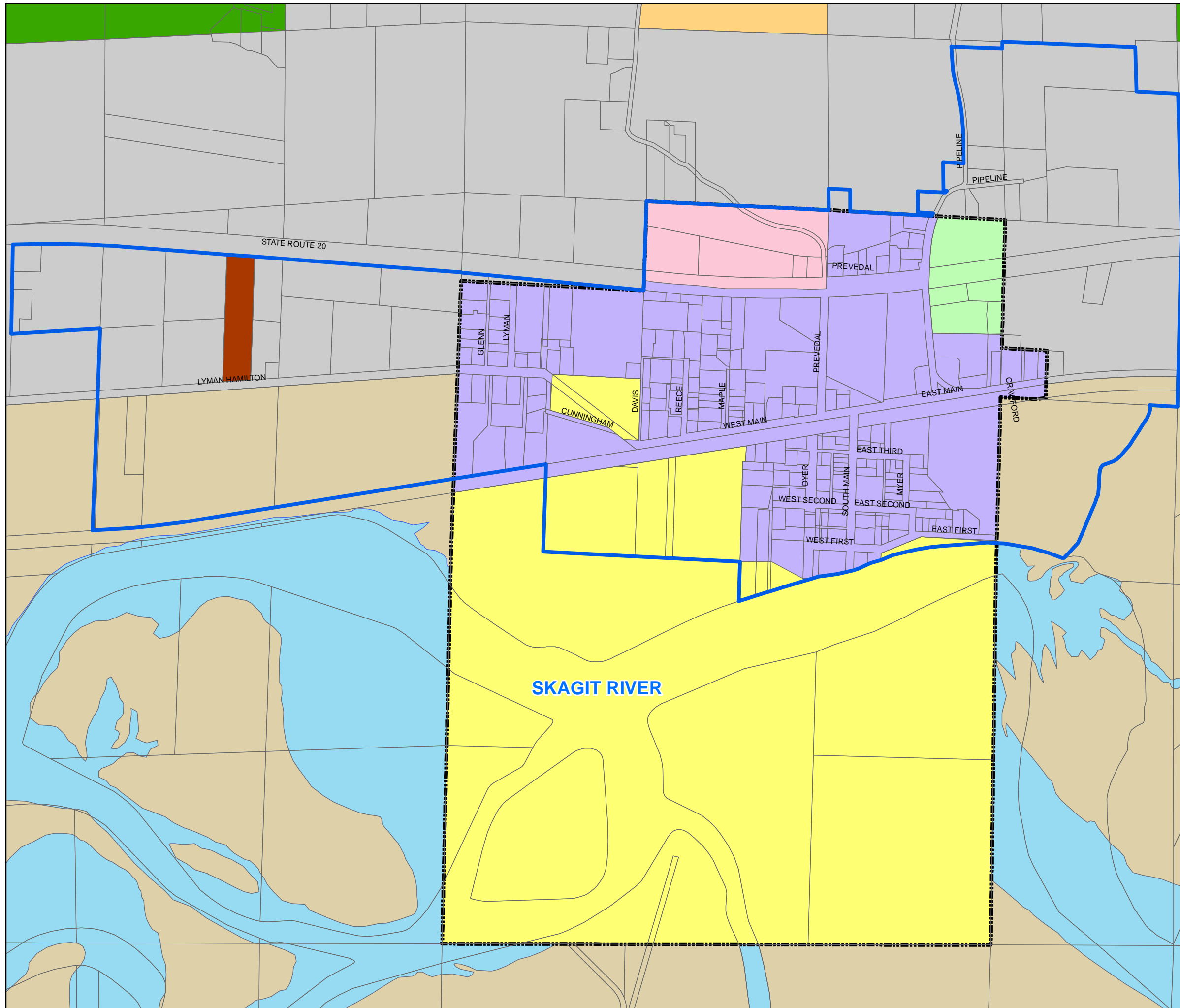


- LEGEND:**
- RETAIL SERVICE AREA
 - LYMAN TOWN LIMITS
 - PARCELS

TOWN OF LYMAN

WATER SYSTEM PLAN
FIGURE 1-4
RETAIL SERVICE AREA BOUNDARY

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CONSULTING ENGINEERS



LEGEND:

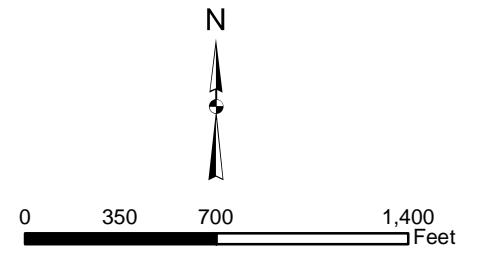
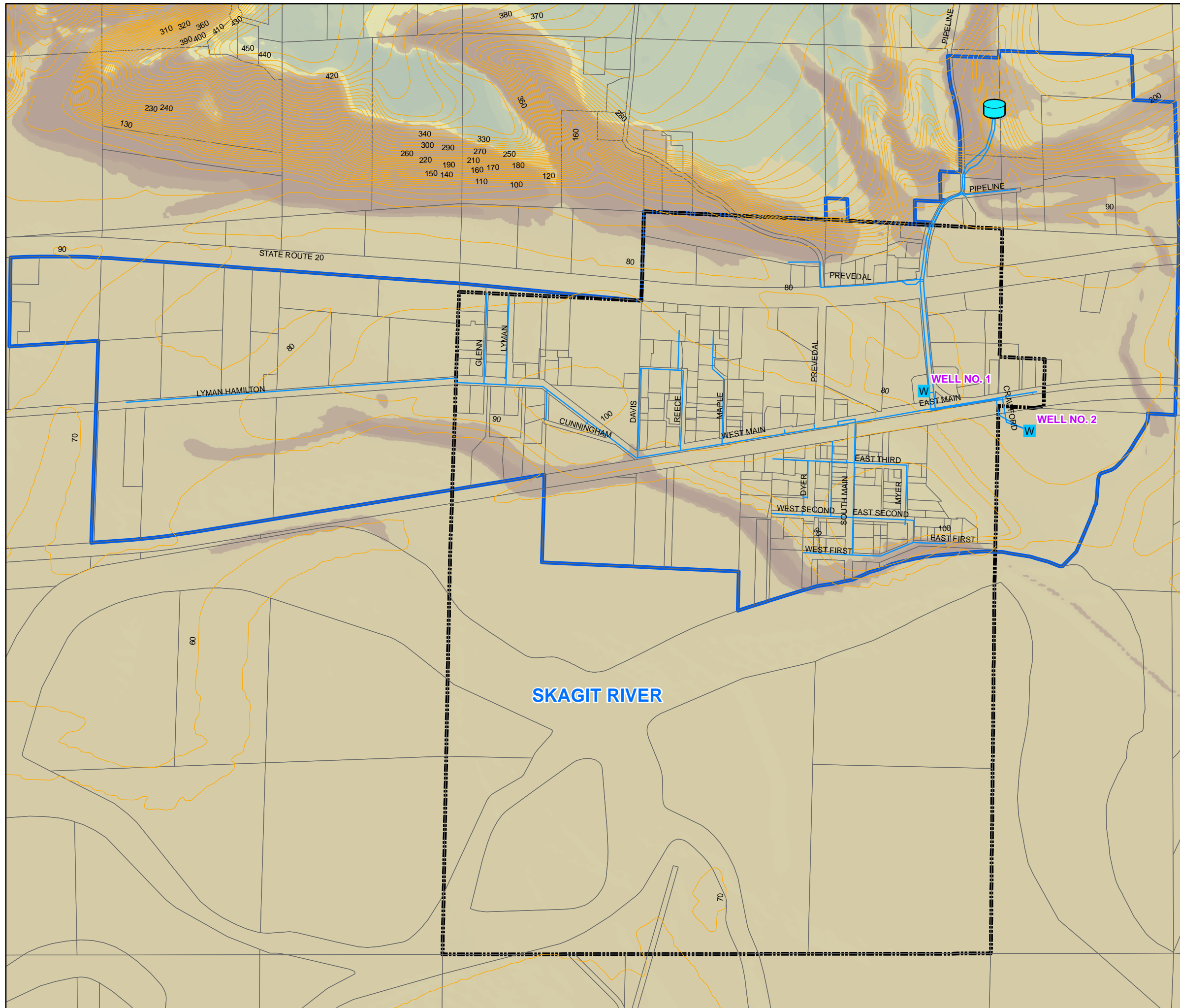
- LYMAN TOWN LIMITS
- RETAIL SERVICE AREA
- CITY ZONING**
- RESIDENTIAL DISTRICT - (R-1)
- BUSINESS / COMMERCIAL DISTRICT - (B-C)
- INDUSTRIAL / HEAVY COMMERCIAL DISTRICT (M-C)
- OPEN SPACE & PARKS DISTRICT - (O-S)
- SKAGIT COUNTY ZONING:**
- AGRICULTURAL - NATURAL RESOURCE LAND (AG-NRL)
- RURAL BUSINESS (RB)
- RURAL RESOURCE - NATURAL RESOURCE LANDS (RRc-NRL)
- RURAL RESERVE (RRv)
- SECONDARY FOREST - NATURAL RESOURCE LANDS (SF-NRL)
- WATER
- PARCELS

TOWN OF LYMAN








WATER SYSTEM PLAN
FIGURE 1-5
ZONING



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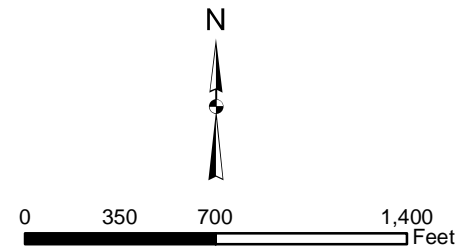
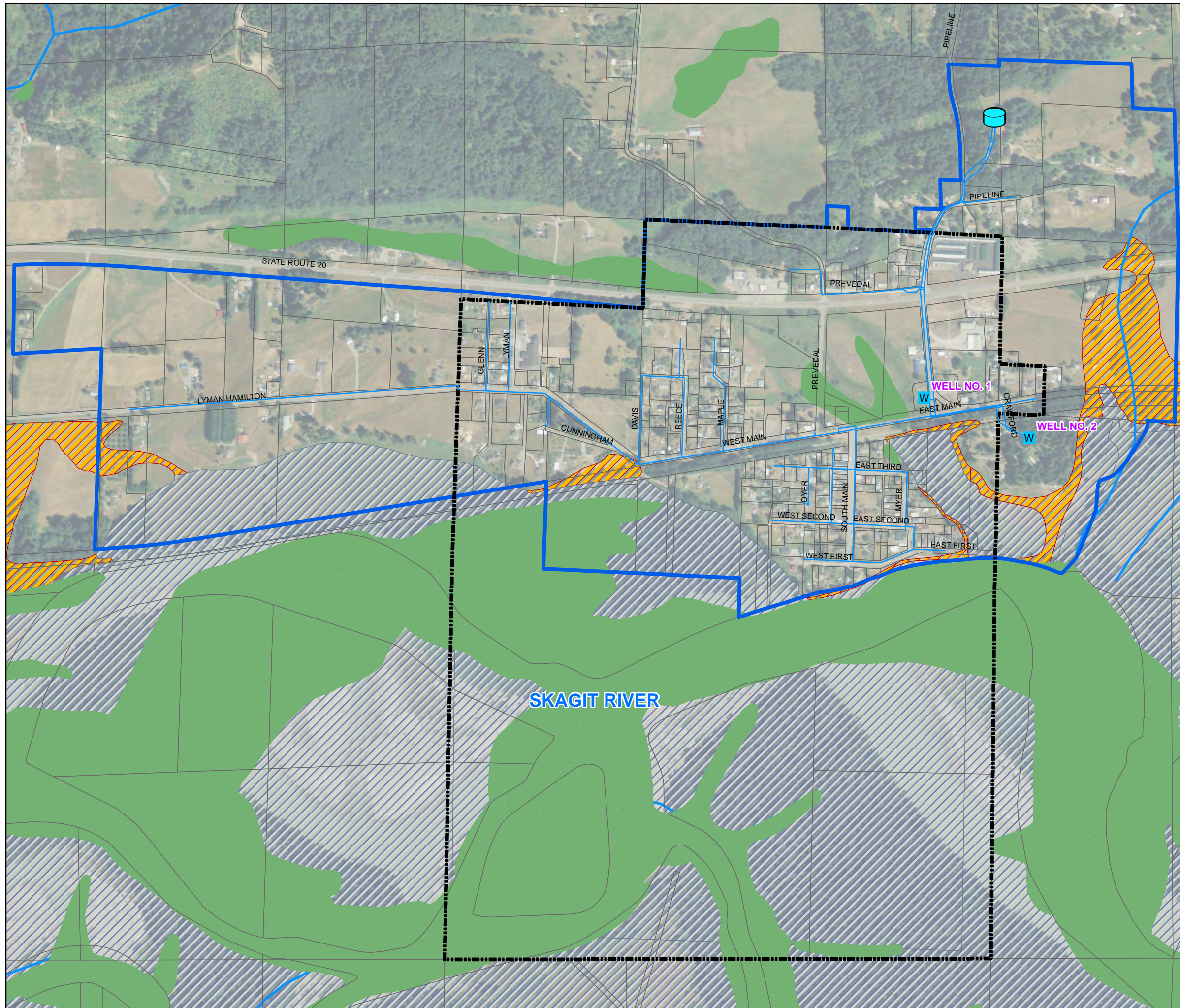
LEGEND:

-  RESERVOIR
-  WELL
-  WATERLINES
-  10 FOOT CONTOURS - USGS INTERPOLATED
-  LYMAN TOWN LIMITS
-  RETAIL SERVICE AREA
-  PARCELS











TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 1-6
 TOPOGRAPHY



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 CONSULTING ENGINEERS

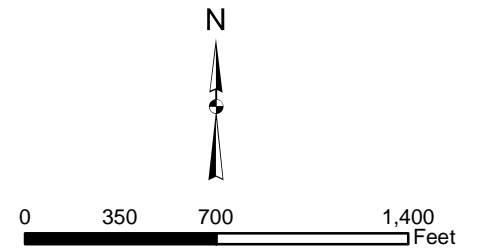
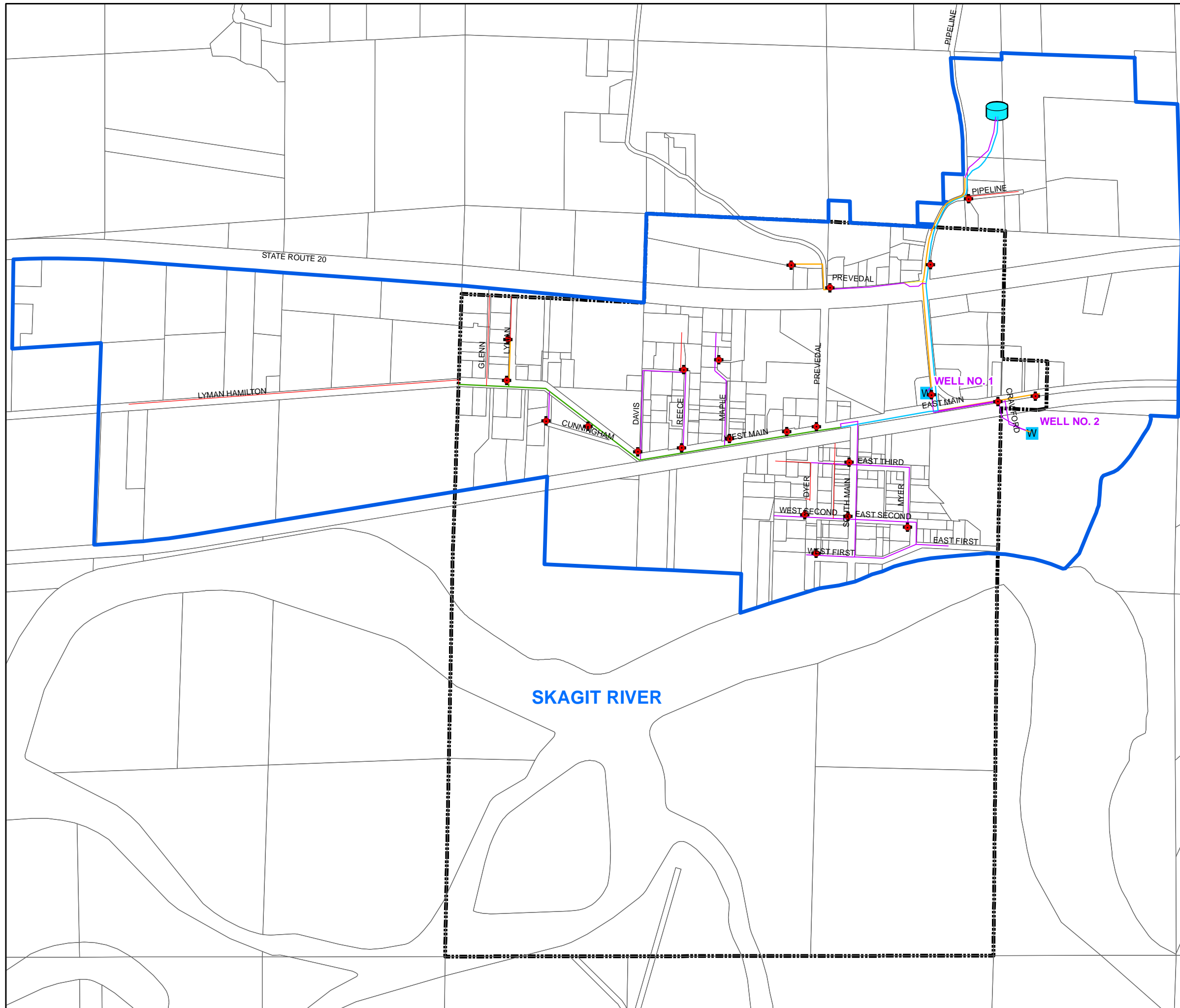


LEGEND:

-  RESERVOIR
 -  WELL
 -  WATERLINES
 -  LYMAN TOWN LIMITS
 -  RETAIL SERVICE AREA
 -  PARCELS
 -  WETLANDS
 -  STREAMS
- FEMA FLOOD ZONES:**
-  A - AN AREA INUNDATED BY 100 YEAR FLOODING, FOR WHICH NO BFE'S HAVE BEEN ESTABLISHED
 -  X500 - AN AREA INUNDATED BY 500 YEAR FLOODING; AN AREA INUNDATED BY 100-YEAR FLOODING WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; OR AN AREA PROTECTED BY LEVEES FROM 100 YEAR FLOODING

TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 1-7
 CRITICAL AREAS





LEGEND:

- HYDRANTS
- WATERLINES:**
- 2"
- 4"
- 6"
- 8"
- 10"
- 12"
- RESERVOIR
- WELL
- RETAIL SERVICE AREA
- PARCELS
- LYMAN TOWN LIMITS

TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 1-8
 WATER SYSTEM

Gray & Osborne, Inc.
 CONSULTING ENGINEERS

INSTRUMENTATION AND CONTROL

Well pumps are currently controlled by a signal from floats in the storage reservoir. The signals are transmitted to the control panel in the Well 1 Pump House via telephone lines. The level control setup employs three floats, a lead well call, a lag well call, and an off call.

SERVICE AREA POLICIES

The following policies directly or indirectly affect the provision of water service for Lyman Water Department customers. These defined policies are designed to guide the growth of the system and establish how the purveyor will respond to requests for water service within the water system service area.

WHOLESALE OF WATER

The Lyman Water Department does not currently, nor does it have plans to, provide water on a wholesale basis to other purveyors or industrial users.

WHEELING OF WATER

The Lyman Water Department is not interconnected in a manner to enable it to wheel water to other entities.

ANNEXATION

The Town of Lyman does not have a formal annexation policy. In practice, if properties are annexed, the annexed property owners pay the costs of expanding water facilities. Connection fees are charged in addition to the cost of system expansion. Annexation of properties is limited to properties within the water service area boundary revised in this WSP and on file with Skagit County Planning Department.

DIRECT CONNECTION AND REMOTE SYSTEM POLICY

Satellite systems are not allowed. New developments must directly connect to the existing water system. The ownership and all necessary easements of all developer constructed water systems must be transferred to the Town to enable the Town to operate and maintain the system.

DESIGN AND PERFORMANCE STANDARDS AND POLICIES

The Town of Lyman has their own design standards attached in Appendix C. If the Town does not have a design standard then refer to the design standards outlined in *Public Utility District No. 1 of Skagit County – Design Standards and Details* (July 2012).

SURCHARGE FOR OUTSIDE CUSTOMERS

Under the revised water service area included in this WSP, the water service area extends beyond the Town's administrative boundaries. The service area was revised to include all existing service connections. No water is served outside of the revised service area. Therefore, no surcharges are in place.

LATECOMER AGREEMENTS

The Town does not have formal latecomer agreements. In practice, the party requesting service is required to pay for expansion of the system (see Annexation).

SYSTEM EXTENSION POLICY

The Town of Lyman serves water to all customers within its identified water service area. Beyond the current boundary, an extension of service must be in accordance with Section 3.4 of the 1999 *Skagit County Coordinated Water System Plan*.

CONDITIONS OF SERVICE

Conditions of service are formalized in town ordinances that address specific requirements which facilitate the implementation of the utility's service area policies. The conditions of service must be met prior to an applicant receiving water service. The ordinances described below are included as Appendix D.

PURVEYOR RESPONSIBILITY AS A WATER SERVICE PROVIDER

The Town of Lyman has resolved to provide water to all customers who have paid their water bills in a responsible and timely manner. Ordinance 208, adopted in March of 2010, outlines the Town's policy with respect to late payments, service charges, and customer notification. The Town delivers water bills every month and defines the bill as due by the 10th of the month and past due on the 25th day of the month. The Town reserves the right to impose a \$5 service charge for payments not made by the 25th day of the month it is due.

The Town provides a shutoff notice on the Monday after the 25th day of the month. As part of the shutoff process, the Town will add \$50 to the outstanding water bill plus any additional expenses associated with the shutoff.

The Town has documented its willingness to work with customers who are unable to pay their water bill by allowing the customer the opportunity to pay a monthly fee for an agreed-upon set length of time.

CUSTOMER RESPONSIBILITY AS A WATER SERVICE CUSTOMER

The primary responsibility of the customer is to pay water bills (and any service charges) in a timely manner. Additionally, it is the customer's responsibility to communicate in advance with the Town if they believe they will be unable to pay their water bill.

CONNECTION FEE

Ordinance 208 specifies that connection fees for customers will be \$3,000 for residential and \$3,500 for commercial, plus the cost of the meter assembly.

RECONNECTION FEE FOLLOWING SHUTOFF

A \$50.00 charge will be added to the water bill. In order to have the water turned back on, the water bill will have to be paid in full, plus a reconnect fee of \$50.00. This applies to all water customers (Water Policy dated June 10, 2008).

METER REQUIREMENTS

Currently, all of Lyman's connections are metered. All new connections will be required to have a meter installed at the time of connection.

CUSTOMER CONSENT AND NOTIFICATION PROCEDURES FOR INSPECTION

The Town of Lyman does not currently have a formal, documented policy or ordinance which addresses notification requirements for inspection. The Town's procedure for such action involves contacting the homeowner, obtaining verbal permission, and coordinating an appropriate inspection time.

CROSS-CONNECTION CONTROL DEVICE REQUIREMENTS

The Town of Lyman adopted Ordinance 183 in 2003. It is a formal, documented ordinance which specifies cross-connection control device requirements.

RATE STRUCTURE

Ordinance 208 (effective March, 2010) outlines rate requirements.

WATER AVAILABILITY

POLICY FOR ISSUANCE OF WATER AVAILABILITY COMMITMENTS

The Town issues a letter of commitment at the time a building permit application is filed. Water service is installed and provided upon payment of the connection fee. A

commitment letter is also issued at the time of plat approval if enough services are available for the plat. Water availability commitments are valid for a period of 1 year.

POLICY ON SUBDIVISION DEVELOPMENT

Developers must submit engineered drawings for approval by the Town Engineer and the Town Council. The developer will construct and pay all costs incurred to service the plat. Upon installation completion, inspection, and acceptance, the Town will assume operation and maintenance responsibilities. Actual connection fees are collected at the time of service installation and meter set for each lot.

CHAPTER 2

BASIC PLANNING DATA

INTRODUCTION

Basic planning data essential for assessment of the Town's water system demands are presented in this chapter. The information includes historical water demands, anticipated growth, water demand projections, and production quantities. This data is used to project future population, customer growth, and associated water demands over the planning period. This information is used in future chapters to evaluate the condition of the existing water system and determine future needs based on anticipated growth.

As a utility within the Skagit County Critical Water Supply Area, water system planning in Lyman must be in accordance with the regional *Skagit County Coordinated Water System Plan* (CWSP) (Skagit County, 1999). The 1999 CWSP update was completed through a Water Utility Coordinating Committee (WUCC) process in which Lyman representatives were participating members. WUCC membership consisted of water purveyors serving more than 15 customers. Through that CWSP WUCC process, utility service review procedures and water service areas were revised and agreed to by all participants. All elements of this WSP are in accordance with the 1999 Skagit County CWSP.

PROJECTED LAND USE

Existing land use patterns are analyzed periodically to provide a basis for projecting future growth. Lyman coordinates land use planning with the Skagit County Planning Department.

Parameters that can impact water service and demands include:

- Type of additional development;
- Amount of development;
- Location of development; and
- Timing of development.

Lyman projects that development for 6- and 20-year planning horizons will be due largely to population growth; no industrial development is planned at this time, but could be considered in the future.

EXISTING POPULATION AND SERVICE CONNECTIONS

The Town of Lyman currently services a population of 473 through 199 residential connections and 18 non-residential connections. The Town’s population contains the majority of the customers in the water service area and provides the best indication of population growth. Table 2-1 presents the Washington State Office of Financial Management’s (OFM) historical population estimates for the Town of Lyman.

TABLE 2-1

Historical Population Estimates for Town of Lyman

Year Range	Population ⁽¹⁾	Annual Growth Rate
2000	409	-
2001	415	1.5%
2002	421	1.4%
2003	424	0.7%
2004	435	2.6%
2005	446	2.5%
2006	444	-0.4%
2007	442	-0.5%
2008	437	-1.1%
2009	440	0.7%
2010	438	-0.5%
2011	440	0.5%
2012	440	0.0%
Average Growth Rate		0.6%

(1) Years 2000 and 2010 are from census data.

Table 2-2 provides customer connection information for 2012. Water system records show no net change in the number of non-residential connections over a 3-year period.

TABLE 2-2

Service Connections

Customer Classification	Number of Service Connections
Residential	199.0
Commercial	16
School	1
2"	1
Total	217.0

WATER USE DATA COLLECTION

PRODUCTION HISTORY

The Town records the volume of water pumped from its wells on a daily basis. A summary of the Town’s annual water production, average day production, and maximum day production is shown in Table 2-3.

As shown in Table 2-3, the Town’s production peaked in 2009, after which it began to decrease.

TABLE 2-3

Metered Water Production

Year	Total Annual Production (Gal)	Average Daily Production (Gal)	Maximum Day Production (Gal)	Ratio
2008	18,832,000	51,595	95,000	1.84
2009	19,417,000	53,197	115,000	2.16
2010	18,440,000	50,521	110,000	2.18
2011	17,676,000	48,427	87,000	1.80
2012	17,492,000	47,923	94,000	1.96
Average	18,371,400	50,333	100,200	1.99

MAXIMUM DAY PRODUCTION

The Town’s maximum day production for the years 2008 through 2012 is shown in Table 2-3. The peaking factor, also known as maximum day to average day ratio, identifies the relation between the maximum day production and average day production. The peaking factor was calculated for years 2008 to 2012. Table 2-3 shows the peaking factor ratio for each year. During the period from 2008 to 2012, the Town’s overall peaking factor has ranged from a low of 1.80 to a high of 2.18, with an average value of 1.99. For the analysis in this Plan, a value of 2.0 will be used.

CONSUMPTION HISTORY

Meter data for the Town is collected monthly for all customers. Historical annual water consumption for the period 2008 to 2012 is shown in Table 2-4. Table 2-5 shows the water consumption by month for 2012.

TABLE 2-4

Historical Metered Water Consumption

Customer Classification	Annual Consumption (gal)				
	2008 ⁽¹⁾	2009 ⁽¹⁾	2010	2011	2012
Residential	8,426,654	10,965,777	9,462,050	9,468,999	8,941,988
Commercial	49,308	1,010,294	982,775	842,173	764,179
School ⁽²⁾	-	126,659	283,888	413,479	203,598
2"	615,073	60,334	10,322	10,465	12,424
Total	9,091,035	12,163,064	10,739,036	10,735,116	9,922,190

(1) Billing information for these years is inconsistent in Town records. Data shown is based on the best available information.

(2) The customer classification for "School" was created in 2009.

As shown in Table 2-4, residential usage accounts for approximately 90 percent of the Town's water use, with commercial, school, and 2-inch usage accounting for the other 10 percent. As shown in Table 2-5, the peak usage was in August. The peak in residential usage may be attributed to irrigation.

DISTRIBUTION SYSTEM LEAKAGE

Distribution system leakage (DSL) is defined as the difference between total water produced or purchased and all authorized water consumption. Authorized consumption (AC) includes both metered customer consumption and unmetered authorized consumption for activities such as construction, firefighting, and flushing.

Distribution system leakage for the Town equals the difference between the water produced by the wells and the volume measured at customers' meters along with all credibly estimated unmetered use. Table 2-6 provides annual data of distribution system leakage from 2010 to 2012. As shown in Table 2-6, based on the best available data for customer consumption, the Town's annual distribution system leakage has ranged from 39 percent to 43 percent, with a 3-year rolling average of 41 percent.

TABLE 2-5

2012 Metered Water Consumption by Month (Gal)

Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Residential	701,811	715,043	606,179	672,848	832,816	696,695	720,870	1,048,973	895,521	707,481	766,737	577,015
Commercial	58,636	63,221	53,609	59,294	76,603	61,643	66,490	104,353	74,299	54,649	51,373	40,011
School	24,340	24,617	20,331	22,029	22,590	17,406	13,262	14,242	19,321	10,868	8,333	6,261
2"	636	1,047	890	868	1,541	838	1,997	830	1,242	1,107	815	613
Total	785,422	803,928	681,009	755,039	933,549	776,581	802,619	1,168,398	990,382	774,105	827,258	623,899

TABLE 2-6

Historical Distribution System Leakage⁽¹⁾

	2010	2011	2012
Total Production	18,440,000	17,676,000	17,492,000
Metered Authorized Consumption	10,739,036	10,735,116	9,922,190
Unmetered Authorized Consumption ⁽²⁾	77,200	35,580	35,580
Total Consumption	10,816,236	10,770,696	9,957,770
Distribution System Leakage (Gal)	7,623,764	6,905,304	7,534,230
Distribution System Leakage (%)	41%	39%	43%
3-year Rolling Average (%)	-	-	41%

(1) DSL for 2008-2009 were not included in the 3 year rolling average with DOH agreement due to billing and metering issues.

(2) Includes discharged sampling water, flushing, and use by the Fire District.

EQUIVALENT RESIDENTIAL UNITS

An Equivalent Residential Unit (ERU) is the amount of water, in gallons per day, equivalent to water usage by one single-family (SF) residential customer. The amount of water attributed to an ERU is calculated by dividing the total volume of water utilized in the residential customer class by the total number of residential connections. This number defines the average residential water use. Residential customer billing data for 2008 through 2012 have been used to determine the ERU value for those years. These ERU values are shown in Table 2-7. The average residential water use per ERU for the Town in 2008 through 2012 was 137 gallons per day.

TABLE 2-7

Equivalent Residential Units (ERUs) 2008-2012

Year	SF Residential Consumption (gpd)	SF Residential Connections	ERU Value (gpd/ERU)
2008	23,087	181.1	127
2009	30,043	181.2	166
2010	25,923	188.5	138
2011	25,942	199.0	130
2012	24,499	199.0	123
Average			137

Table 2-8 presents the numbers of ERUs for each customer class for 2012, based on the ERU value for 2012.

TABLE 2-8

Year 2012 Equivalent Residential Units

Customer	Average Daily Consumption (gpd)	ERUs	ERU/connection
Residential	24,499	199.0	1.0
Commercial Customer	2,094	17.0	1.1
School	558	4.5	4.5
2"	34	0.3	0.3
Total System ERUs	27,184	220.8	1.0

PER CAPITA WATER PRODUCTION

The estimated population of the water service area for 2012 is 473. The residential consumption for 2012 was 24,499 gpd. Therefore, the residential consumption per capita

for 2012 is estimated to be 52 gallons per capita per day (gpcd). The residential production per capita was estimated by assuming the residential production for 2012 was 90 percent of the total production for 2012, which is the same proportion as residential consumption to total consumption. The estimated production per capita for 2012 is 91 gpcd. Table 2-9 presents a summary of water production per capita.

TABLE 2-9

Year 2012 Per Capita Residential Production

Year	Population	Residential Consumption (gpd)	Per Capita Consumption (gpcd)	Residential Production (gpd)	Per Capita Production (gpcd)
2012	473	24,499	52	43,189	91

WATER DEMAND FORECASTING

Water demand forecasting was conducted for 6- and 20-year planning horizons. Non-residential demand was assumed to increase at the same rate as residential demand. The forecasting is based on the metered consumption and production data. The projected ERUs are based on a 1.5 percent growth rate and an initial total system ERUs value of 137 based on higher historical usage in hot and dry years. The 1.5 percent growth rate was used in the 2007 Skagit County Comprehensive Plan to project Lyman’s population growth from 2010-2025. The projected population for the water system assumes a constant growth rate through the 20-year planning period ending in 2033.

PROJECTED AVERAGE DAY CONSUMPTION

Projected average day consumption for the next 20 years is shown in Table 2-10. The initial projections are based on metered consumption over the last 4 years. From there, projected usage is anticipated to grow for the residential and commercial classes proportional to the projected growth in ERUs for these customer classes.

AVERAGE AND MAXIMUM DAY DEMAND

Average day demand (ADD) was determined by adding Average Day Consumption and DSL. The DSL is projected to be a constant volume based on the average DSL from 2008 to 2012. A peak factor of 2 was used when forecasting Maximum Day Demand (MDD).

PEAK HOURLY DEMAND

Peak hourly demand (PHD) was determined according to the following equation:

Equation 5.3

$$\text{Peak Hour Demand (PHD)} = (\text{MDD}/1440)\{(C) * (N) + F\} + 18$$

PHD = Peak Hour Demand (gpm)

MDD = Maximum Day Demand (gpd/ERU) (MDD = 471)

C = Coefficient associated with ranges of ERUs (C = 2)

N = Number of ERUs (N = 214)

F = Factor associated with ranges of ERUs (F = 75)

(The C and F coefficients can be found in the DOH, Water System Design Manual)

The Town's peak hour consumption is calculated to be 183 gallons per minute based on projected 2013 data. Maximum day demand in gallons per minute is 70 gpm. The peak hour to maximum day ratio is then calculated as $183/70 = 2.61$. This peak hour factor is used to calculate the peak hour demand for future years.

PROJECTED AVERAGE DAY, MAXIMUM DAY AND PEAK HOUR DEMANDS

The total average day, maximum day, and peak hour demands for the system are calculated as the consumption plus all distribution system leakage for the system. A summary of projected total system water demands for average day, maximum day, and peak hour is shown in Table 2-10. The distribution system leakage is assumed to be a constant volume and is based on historical rates. The projected demands are consistent with historical production and anticipated future growth.

TABLE 2-10

Projected Water System Demands

Year	Pop.⁽¹⁾	ERUs⁽²⁾	Average Day Consumption⁽³⁾ (gpd)	DSL Volume⁽⁴⁾ (gpd)	DSL %	Average Day Demand⁽⁵⁾ (gpd)	Maximum Day Demand⁽⁶⁾ (gpd)	Peak Hour Demand⁽⁷⁾ (gpm)
2013	480	224	30,700	21,400	41%	52,100	104,200	187
2014	487	227	31,200	21,400	41%	52,600	105,200	188
2015	495	231	31,600	21,400	40%	53,000	106,000	190
2016	502	234	32,100	21,400	40%	53,500	107,000	192
2017	510	238	32,600	21,400	40%	54,000	108,000	194
2018	517	241	33,100	21,400	39%	54,500	109,000	195
2019	525	245	33,600	21,400	39%	55,000	110,000	197
2023	557	260	35,600	21,400	38%	57,000	114,000	204
2033	647	302	41,400	21,400	34%	62,800	125,600	225

- (1) Populations are calculated with a growth rate of 1.5 percent.
- (2) ERUs are calculated with a growth rate of 1.5 percent.
- (3) Average day consumption is calculated using an ERU value of 137 gpd/ERU.
- (4) DSL is assumed to be a constant volume and is estimated based on an average of historical rates.
- (5) Average Day Demands include Average Day Consumption and DSL.
- (6) Maximum Day Demands are calculated by multiplying Average Day Demand by a peaking factor of 2.
- (7) Peak Hour Demands are calculated by multiplying Maximum Day Demand by a peak hour factor of 2.58.

CHAPTER 3

SYSTEM ANALYSIS

INTRODUCTION

Chapter 3 provides an analysis of water system components from source to customer including an evaluation of available water rights. As part of the system analysis, evaluation of fire flow was conducted to identify areas of the distribution system in need of improvement in order to meet flow rates and system pressures. Based on the analysis, a list of prioritized improvements was developed.

SYSTEM DESIGN AND CONSTRUCTION STANDARDS

The Town has adopted system design, water quality, and construction standards. These standards are summarized in the following sections.

DESIGN STANDARDS

Performance and design criteria typically address the sizing and reliability requirements for source, storage, distribution, and fire flow. The Town has established design standards that meet or exceed the minimum standards required by the Washington State Department of Health (DOH). The DOH standards are established in the following:

- **WAC 246-290, Group A Public Water Systems, Washington State Board of Health (September 2010).**
This is the primary drinking water regulation utilized by the Washington State Department of Health to assess capacity, water quality, and overall compliance with drinking water standards.
- **Water System Design Manual (WSDM), Washington State Department of Health (December 2009).**
The WSDM serves as guidance for the preparation of plans and specifications for Group A public water systems in compliance with WAC 246-290.

Table 3-1 lists the suggested DOH Water System Design Manual guidance and the Town policies with regard to each standard for general facility requirements.

TABLE 3-1

General Facility Requirements

Standard	DOH Water System Design Manual	Town of Lyman Standard
Average Day and Maximum Day Demand	Average Day Demand (ADD) should be determined from metered water use data. Maximum Day Demand (MDD) is estimated at approximately 2.0 times the average day demand if metered data is not available.	ADD = metered production data MDD = ADD x 2
Peak Hour Demand	Peak hour demand is determined using the following equation from DOH Water System Design Manual: $PHD = (MDD/1440)[(C)(N) + F] + 18$ C = Coefficient from DOH Table 5-1 N = Number of connections, ERUs F = Factor of range from Table 5-1	Peak hour demand is calculated based on the DOH formula.
Source	Capacity must be sufficient to meet MDD and replenish fire suppression storage in 72 hours.	Same as DOH Water System Design Manual, Chapter 7.
Storage	The sum of: <u>Operational Storage</u> Volume sufficient to prevent pump recycling. <u>Equalizing Storage</u> $V_{ES} = (Q_{PH} - Q_S) * 150$ <u>Standby Storage</u> $V_{SB} = (2 * ADD * N) - t_m * (Q_S - Q_L)$ <u>Fire Suppression Storage</u> $V_{FSS} = NFF * T$ ADD = average day demand, gpd/ERU N = number of ERU's Q _{PH} = peak hour demand, gpm Q _S = capacity of all sources, excluding emergency sources, gpm Q _L = capacity of largest source, gpm t _m = daily pump source run time, min (1440) NFF = needed fire flow, gpm T = fire flow duration, min	Same as DOH Water System Design Manual, using the formulas provided in the manual, Chapter 9.
Minimum System Pressure	The system should be designed to maintain a minimum of 30 psi in the distribution system under peak hour demand and 20 psi under fire flow conditions during MDD.	Same as DOH Water System Design Manual, Chapter 8.
Fire Flow Standard	The minimum fire flow shall be determined by the local fire authority or WAC 246-293 for systems within a critical water supply service area (CWSSA).	Fire Flow as determined by the Skagit County Fire Marshal
Minimum Pipe Sizes	The diameter of a transmission line shall be determined by hydraulic analysis. The minimum distribution system line size shall not be less than 6-inches in diameter.	Same as DOH Water System Design Manual, Chapter 8.

TABLE 3-1 – (continued)

General Facility Requirements

Standard	DOH Water System Design Manual	Town of Lyman Standard
Reliability Recommendations	<ul style="list-style-type: none"> • Sources capable of supplying MDD within an 18-hour period • Sources meet ADD with largest source out of service • Back-up power equipment for pump stations unless there are two independent public power sources • Provision of multiple storage tanks • Standby storage equivalent to ADD x 2, with a minimum of 200 gpd/ERU • Low and high level storage alarms • Looping of distribution mains when feasible • Pipeline velocities not > 8 fps at PHD • Flushing velocities of 2.5 fps for all pipelines 	Same as DOH Water System Design Manual, Chapter 5.
Valve and Hydrant Spacing	Sufficient valving should be placed to keep a minimum of customers out of service when water is turned off for maintenance or repair. Fire hydrants on lateral should be provided with their own auxiliary gate valve.	Same as DOH Water System Design Manual, Chapter 8. Hydrant spacing must meet local fire authority requirements.

WATER QUALITY STANDARDS

A summary of the existing and proposed drinking water quality standards applicable to the Town is presented in Chapter 4. Any water quality deficiencies are summarized at the end of this chapter.

SYSTEM COMPONENT ANALYSIS

WATER RIGHTS EVALUATION

The Town of Lyman obtained a Water Right Certificate (4041) (Appendix B) on July 5, 1961, which established maximum instantaneous (Q_i) and total annual (Q_a) groundwater withdrawal rates:

- $Q_i = 700$ gpm
- $Q_a = 108$ acre-feet

The Water Right Certificate covers both wells since they are located in the same aquifer. Table 3-2 summarizes Lyman’s current water right allocations.

TABLE 3-2

Existing Water Right Status

Parameter		Well 1	Well 2
Permit Claim No.		4041	
Name of Right Holder		Town of Lyman	
Priority Date		July 5, 1961	
DOH Source No.		S01	S02
Primary or Supplemental		Primary	Supplemental
Existing Water Rights	Maximum Instantaneous	700 gpm	
	Maximum Annual Volume	108 acre-feet	

SOURCE OF SUPPLY ANALYSIS

The Town of Lyman draws groundwater from two production wells. Well 1, located at the northwest corner of East Main Street and Pipeline Road, was constructed in 1961 and a new well building and pump were installed in 2004. In 1979, Well 2, located near the eastern town limits and approximately 300 feet south of East Main Street, was constructed as a redundant supply.

Table 3-3 identifies the capacity of each well and compares it to the Town’s maximum instantaneous water rights. The two wells have a combined withdrawal capacity of 558 gpm which is below the Town’s water rights.

TABLE 3-3

Instantaneous Water Production Capacity vs. Maximum Instantaneous Water Rights Analysis

Source	Current Withdrawal Capacity (gpm)	Maximum Instantaneous Withdrawal Authorized Under Existing Water Rights (gpm)	Surplus/(Deficit) (gpm)
Well No. 1	279	-	-
Well No. 2	279	-	-
Total	558	700	142

(1) Withdrawal Capacity does not reflect any system limitations downstream due to hydraulics.

Well 1 is the primary well used for water production and Well 2 is a backup. Table 3-4 shows the annual production of each well in 2012 and compares it to the annual water right. The Town pumped 53.5 acre-feet which is approximately 50 percent of the maximum annual withdrawal water right.

TABLE 3-4

2012 Water Production versus Annual Water Rights

Source	2012 Total Production		Maximum Annual Withdrawal Allowed Under Existing Water Rights (afy)	Surplus/Deficit (afy)
	(gal)	(afy)		
Well No. 1	17,452,000	53.4	-	-
Well No. 2	40,000	0.1	-	-
Total	17,492,000	53.5	108.0	54.5

Table 3-5 displays the instantaneous water right analysis. Table 3-6 displays the annual water right analysis. Both analyses show that the Town has adequate water rights to meet the projected 20-year annual and maximum day demands.

TABLE 3-5

Instantaneous Water Right Analysis

Year	Current Maximum Permitted Instantaneous Withdrawal (gpm)	Projected Maximum Day Production Requirement (gpm)	Water Rights Surplus/(Deficit) (gpm)
2013	700	72	628
2014	700	73	627
2015	700	74	626
2016	700	74	626
2017	700	75	625
2018	700	76	624
2019	700	76	624
2023	700	79	621
2033	700	87	613

TABLE 3-6

Annual Water Right Analysis

Year	Current Maximum Permitted Annual Withdrawal (afy)	Projected Annual Withdrawal Requirement (afy)	Water Rights Surplus/(Deficit) (afy)
2013	108	58.4	49.6
2014	108	58.9	49.1
2015	108	59.4	48.6
2016	108	59.9	48.1
2017	108	60.5	47.5
2018	108	61.0	47.0
2019	108	61.6	46.4
2023	108	63.8	44.2
2033	108	70.3	37.7

DOH recommends that a water system should be capable of supplying the MDD within an 18 hour production period. Table 3-7 shows the source capacity analysis for one pump running for 18 hours. The analysis shows that there is adequate source capacity to meet 20-year projected demands.

TABLE 3-7

Source Production Capacity Analysis

Year	Production Capacity⁽¹⁾ (gal)	Projected Maximum Day Production Requirement (gal)	Production Capacity Surplus/(Deficit)	
			(gal)	(gpm)
2013	301,320	104,200	197,120	137
2014	301,320	105,200	196,120	136
2015	301,320	106,000	195,320	136
2016	301,320	107,000	194,320	135
2017	301,320	108,000	193,320	134
2018	301,320	109,000	192,320	134
2019	301,320	110,000	191,320	133
2023	301,320	114,000	187,320	130
2033	301,320	125,600	175,720	122

(1) Capacity with either well running for 18 hours.

TREATMENT

Currently, groundwater drawn from Wells 1 and 2 is treated. In 2000, Lyman entered into a Bilateral Compliance Agreement (Appendix E) with DOH to mitigate Lead and Copper corrosion and to inactivate bacterial and viral contaminants. The following treatment processes were installed in 2004 and are still operational:

- Sodium Hypochlorite injection
- Sodium Hydroxide solution injection

Disinfection

Disinfection is required for all parts of a public water systems containing potable water before being put into service according to WAC 246-290-451. Contact time (CT_{mg/L-min}) is a measure of how effective a system is at disinfection. Any combination of the free chlorine residual (C_{mg/L}) and contact time (T_{min}) that provide a CT (C · T) of 6 mg-min/L will provide 4-logs (99.99 percent) of viral inactivation.

Monitoring conducted throughout 2000 indicated that groundwater from Well 1 is hydraulically connected to surface water (Skagit River), but is not under the influence of the surface water (GUI). The application of chlorine serves to inactivate bacterial and viral contaminants that may be present in groundwater, as well as provide a barrier against microbiological contamination of the distribution system. Liquid sodium hypochlorite is generated at the Well 1 facility and metered into the reservoir feed line. A contact time study was completed in 2006 and is attached in Appendix F. This study used the following data to find the contact time while in the pipe from the well to the reservoir:

- 1,600 LF of 8-inch pipe and 700 LF of 6-inch pipe
- Flow Rate = 370 gpm
- Assumed plug flow

The goals of the chlorine feed system are to have a minimum residual concentration of 0.6 mg/L at the reservoir entrance and 0.2 mg/L throughout the distribution system. This study found a contact time of 10.7 min from the well to the entrance of the reservoir and with the minimum concentration of 0.6 mg/L this provides a CT above the 6 mg/L-min required by DOH. If the flow rate of one well was used (i.e., 279gpm) there would be a longer contact time which will make the CT larger than 10.7 mg/L-min. Historical records indicate that the system has consistently met these standards.

Corrosion Control

Sodium hydroxide is injected at the Well 1 building to adjust the pH of the water. The target pH of 7.6 is typically met or exceeded. This pH has been successful at controlling lead and copper corrosion in the system and has been confirmed by the testing of tap

samples. The injection equipment is sufficient for treating the current source capacity of 279 gpm and is therefore adequate for reaching the target pH for the 20-year planning period.

STORAGE ANALYSIS

Storage requirements for the Town will be determined by applying the Department of Health Group A Water System Design Manual, December 2009, Chapter 9. The storage recommended according to this guidance document is based on the sum of the following:

- Operational Storage (OS)
- Equalizing Storage (ES)
- Standby Storage (SB)
- Fire Suppression Storage (FSS)
- Dead Storage (DS)

Operational Storage (OS)

Operational storage is the volume of the reservoir devoted to supplying the water system while, under normal operation conditions, the source(s) of supply are in “off” status. This volume is dependent upon the sensitivity of the reservoir water level sensors and the tank configuration necessary to prevent excessive cycling of source pump motors. Operational storage is in addition to other storage components, thus providing a factor of safety for equalizing, standby, and fire suppression components.

In the Lyman water system, three feet of storage in the reservoir is operational.

Equalizing Storage (ES)

Equalizing storage is typically used to meet diurnal demands that exceed the average day and maximum day demands. The volume of equalizing storage required depends on peak system demands, the magnitude of diurnal water system demand variations, the source production rate, and the mode of system operation. Sufficient equalizing storage must be provided in combination with available water sources and pumping facilities such that peak system demands can be satisfied.

Equalizing storage is calculated using the following equation:

$$V_{ES} = (Q_{PH} - Q_S) \times 150 \text{ minutes}$$

$$V_{ES} = \text{Equalizing storage component (gallons)}$$

$$Q_{PH} = \text{Peak hourly demand (gpm)} \quad (\text{values in Table 2-10})$$

$$Q_S = \text{Total source of supply capacity, excluding emergency sources (gpm)}$$

For the 20-year planning period, the result of this equation is zero since the source production capacity (285 gpm) exceeds the peak hourly demand.

Standby Storage (SB)

Standby storage is provided in order to meet demands in the event of a system failure such as a power outage, an interruption of supply, or break in a major transmission line. The amount of emergency storage will be based on the reliability of supply and pumping equipment, standby power sources, and the anticipated length of time the system could be out of service.

Standby storage for a water system with multiple sources is calculated using the following equation:

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

SB_{TSS} = Standby storage component for a single source system (gallons)
 ADD = Average day demand for the system (gpd/ERU)
 N = Number of ERUs
 Q_S = Sum of all installed and continuously available supply source capacities, except emergency sources, in gpm.
 Q_L = The largest capacity source available to the water system, in gpm.
 t_m = Time the remaining sources are pumped on the day when the largest source is not available, in minutes. Unless restricted otherwise, assume 1,440 minutes.

DOH Note: Although standby storage volumes are intended to satisfy the requirements imposed by system customers for unusual situations and are addressed by WAC 246-290-420, it is recommended that a standby storage volume be not less than 200 gallons/ERU.

Because each of the Town's wells is capable of supplying average day demands during an outage of the other well, the standby storage required by the equation is zero. For future projections, the minimum recommended standby storage of 200 gallons/ERU will be used.

Fire Suppression Storage (FSS)

The minimum standby fire suppression storage volume is calculated using the following equation:

$$V_{FSS} = (NFF) \times (T)$$

- V_{FSS} = Fire suppression storage volume, gallons
- NFF = Minimum fire flow requirement
- T = Duration of fire flow needed, minutes

The maximum fire flow requirement in the Lyman water system is governed by the 2012 International Fire Code which is 1,500 gpm for 2 hours for non-residential structures. This fire flow requirement results in a fire suppression storage requirement of 180,000 gallons. This requirement is larger than the volume of the Town's tank. The Town intends to plan for this requirement at some time in the future, but the current system can only provide non-residential fire suppression storage for a duration of 1 hour, which was the previous requirement. The Skagit County Fire Marshal may also, per Skagit County Code 15.04.03(2)f, revise fire flow requirements downward in rural areas where the full fire flow requirement is impractical.

Dead Storage (DS)

Dead storage is the component of capacity, which is below the minimum level to provide adequate pressure to some customers. Water pressure must remain above 20 psi at all times, which means that dead storage is the volume of water below the 20-psi level.

One single-family residence is supplied by a booster pump off the transmission main near the storage tank. This residence is not included in the storage analysis. The majority of the service area operates between 60 and 70 psi.

Table 3-8 shows the dead storage analysis for the Lyman water system. As shown in the table, there is no dead storage in the system because the highest customer is below the elevation needed to ensure 20 psi in the distribution system.

TABLE 3-8

Dead storage

Highest Service ⁽¹⁾ (ft)	HGL Required for 20 psi (ft)	Tank Bottom (ft)	Dead Storage (gal)
120	166.2	235	0

(1) Excludes property adjacent to reservoir site.

OVERALL STORAGE ANALYSIS

Table 3-9 presents the storage analysis for the Lyman water system. As shown in the table, the system has a storage deficiency resulting from the fire suppression storage for commercial structures. However, the available storage is sufficient to provide fire suppression storage for residential areas.

TABLE 3-9

Storage Analysis

Year	Operational Storage (gallons)⁽¹⁾	Equalizing Storage (gallons)	Standby Storage (gallons)⁽²⁾	Fire Suppression Storage⁽³⁾ (gallons)	Total Required Storage (gallons)	Available Storage Volume (gallons)	Storage Surplus/ (Deficit)
2013	15,862	0	44,825	180,000	195,862	148,044	(47,817)
2014	15,862	0	45,498	180,000	195,862	148,044	(47,817)
2015	15,862	0	46,180	180,000	195,862	148,044	(47,817)
2016	15,862	0	46,873	180,000	195,862	148,044	(47,817)
2017	15,862	0	47,576	180,000	195,862	148,044	(47,817)
2018	15,862	0	48,290	180,000	195,862	148,044	(47,817)
2019	15,862	0	49,014	180,000	195,862	148,044	(47,817)
2023	15,862	0	52,022	180,000	195,862	148,044	(47,817)
2033	15,862	0	60,373	180,000	195,862	148,044	(47,817)

- (1) Represents 3 feet of storage.
- (2) Required for non-residential structures. 1,500 gpm x 2 hours.
- (3) The DOH minimum recommended standby storage per ERU (200 gallons) multiplied by the number of ERUs.

HYDRAULIC MODELING AND FIRE FLOW ANALYSIS

The Town's existing water system was analyzed using the InnoVize's InfoWater hydraulic modeling software, which operates in an ArcGIS mapping environment. The Infowater hydraulic model was created from the water system base map developed for this plan.

The InfoWater model is configured with a graphical user interface. Each model element, including pipes, valves, pumps, and reservoirs, is assigned a unique graphical representation within the program. Each element is connected together within the model in a network of nodes, or pipe intersections, and links, the pipes themselves. Each element is also assigned a number of attributes specific to its function and representation. Element attributes include spatial coordinates, elevation, water demand, pipe length, and diameter, as well as pump and reservoir characteristics. Model input is accomplished through the creation and manipulation of these objects and their attributes.

MODEL CALIBRATION

For the purposes of model calibration, hydrant flow tests were conducted in February 2013 at two locations throughout the Town's water system. The field results from these flow tests were used to calibrate the hydraulic model through adjustment of system elevations, friction coefficient factors, and verification of pipe sizes and system connectivity. Table 3-10 describes the locations of the hydrants used for the tests and the model nodes associated with those hydrants. The nodes for these hydrants are shown on Figure 4-1.

TABLE 3-10

Calibration Node Numbers and Locations

Node Numbers	Hydrant Locations
J-213/J-55	South Dyer Avenue and West 2 nd Street
J-135/J-59	Lyman Avenue and West Main Street

The conditions of the hydrant tests were simulated as closely as possible in the model. The calibration was conducted under average daily demand conditions with the level in the tank observed. Table 3-11 presents actual field hydrant flow test data along with the corresponding results from the calibrated model.

TABLE 3-11

Field Hydrant Flow Test Results

Test	Pressure/ Flow Node	Field Observations			Model Calibration Results		
		Static Pressure (psi)	Flow (gpm)	Residual Pressure (psi)	Static Pressure (psi)	Flow (gpm)	Residual Pressure (psi)
1	J-213/J-55	70	593	58	70	593	59
2	J-135/J-59	70	750	64	70	750	63

The results of the calibration of the hydraulic model fell within the allowable limits. The model is an accurate representation of the conditions in the field.

MODEL SIMULATION AND RESULTS

The results of the hydraulic modeling and a node map are included in Appendix G.

PEAK HOUR DEMAND

In order to evaluate the water system’s ability to meet future demands, the existing system has been modeled under the projected peak hour demand conditions for 2013, 2019, and 2033. WAC 246-290-230(5) requires that public water systems be designed to deliver peak hour demand while maintaining minimum system-wide pressures of 30 psi, with equalizing storage depleted from any reservoirs.

Figure 3-1 shows the 2033 peak hour pressures generated by the model. The lowest pressure generated in the model was 64 psi. Therefore, the modeling results indicate the Town’s existing water system can adequately supply peak hour demands throughout the 20-year planning period.

AVAILABLE FIRE FLOWS

For design of water systems, WAC 246-290-230 states, “If fire flow is to be provided, the distribution system shall also provide maximum day demand (MDD) plus the required fire flow at a pressure of at least 20 psi at all points throughout the distribution system, and under the condition where the designed volume of fire suppression and equalizing storage has been depleted.”

The Town’s typical fire flow requirements are summarized in Table 3-12. Minimum fire flows are set by the County and states that the flow required to all buildings shall be determined by the International Fire Code and that no hydrant shall provide less than 1,000 gpm at 20 psi. The maximum fire flow required in the commercial/industrial area is 1,500 gpm for 2 hours.

TABLE 3-12

Typical Fire Flow Requirements

Zoning	Fire Flow Required (gpm)	Duration (hours)
Single-Family Residential	1,000	1
Multi-Family/Institutional/Commercial/Industrial	1,500	2

Figure 3-2 shows the 2033 available fire flows generated by the model. Because the Town has a storage deficiency for non-residential fire suppression storage, the model was run with a fire suppression storage of 90,000 gallons depleted, which would be sufficient for residential areas and for non-residential fire flow for the duration of 1 hour. The lowest available fire flow generated in the model was 1,003 gpm. Therefore, the modeling results indicate the Town's existing distribution system can adequately supply fire flow requirements throughout the 20-year planning period.

LYMAN SYSTEM DEFICIENCIES

Existing and future system deficiencies are summarized below. Chapter 8 presents the capital improvement projects necessary to correct existing deficiencies.

WATER RIGHTS

The Town has adequate instantaneous and annual withdrawal water rights to meet projected demands through 2033 as shown in Tables 3-5 and 3-6.

SOURCE OF SUPPLY

The Town's existing source of supply is capable of supplying maximum day demands through 2033 as shown in Table 3-7.

STORAGE

As shown in Tables 3-9, the Town's system does not have adequate storage capacity to meet non-residential fire flow requirements. The storage capacity meets all other requirements.

WATER QUALITY

The Town's water quality currently meets all requirements. A complete analysis of water quality can be found in Chapter 4 of this plan.

DISTRIBUTION SYSTEM

The Town’s water system meets all peak hour and fire flow pressure requirements through 2033 as shown in Figures 3-1 and 3-2.

DISTRIBUTION SYSTEM LEAKAGE

The Town’s 3-year rolling average distribution system leakage (DSL) is currently 41 percent, which exceeds the 10 percent DSL standard per WAC 246-290-820(1)(b)(i). To comply with the DSL requirements, the Town has developed a Water Loss Control Action Plan, which is presented in Chapter 5.

OPERATION AND MAINTENANCE

The Town’s Operations and Maintenance Program, which is discussed in Chapter 7, currently meets all requirements.

SYSTEM CAPACITY SUMMARY

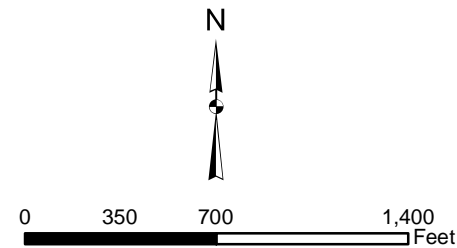
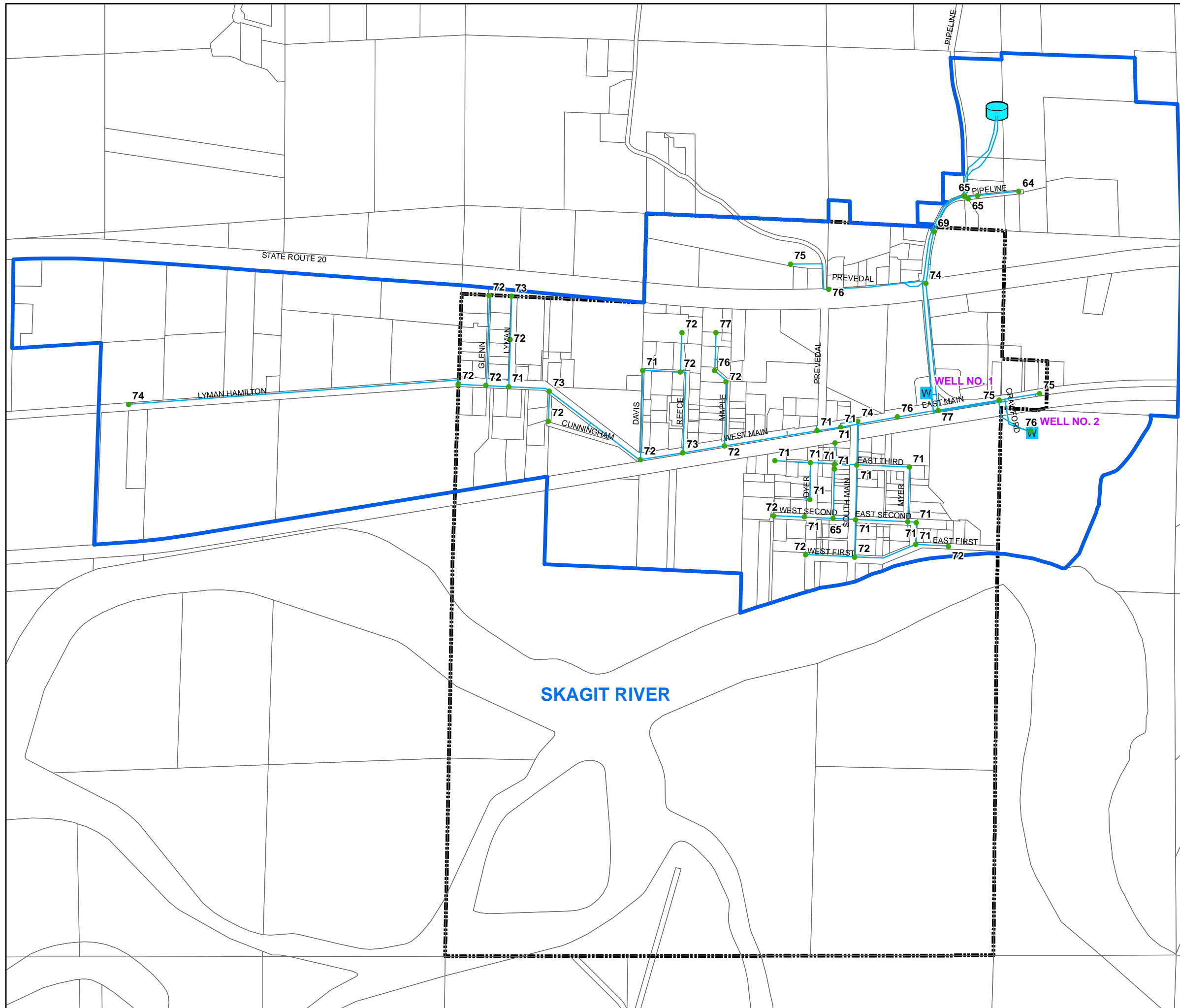
Table 3-13 summarizes the Town’s water system capacity in terms of ERUs and indicates the year in which the capacity is projected to be exceeded. The water system capacity is sufficient to meet demands through the 20-year planning period with the exception of the storage capacity deficiency related to non-residential fire suppression storage.

TABLE 3-13

System Capacity Summary

Capacity Parameter	Capacity (ERUs)	Year Capacity is Exceeded
Distribution System - Peak Hour	>300	>20 years
Distribution System - Fire Flow	>300	>20 years
Storage Capacity ⁽¹⁾	593	>20 years
Source Capacity	943	>20 years
Treatment	943	>20 years
Water Rights - Annual	548	>20 years
Water Rights - Instantaneous	3,523	>20 years

(1) Excluding non-residential fire suppression storage deficiency.

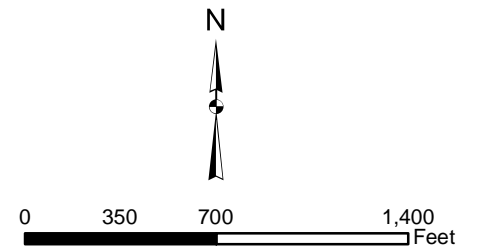
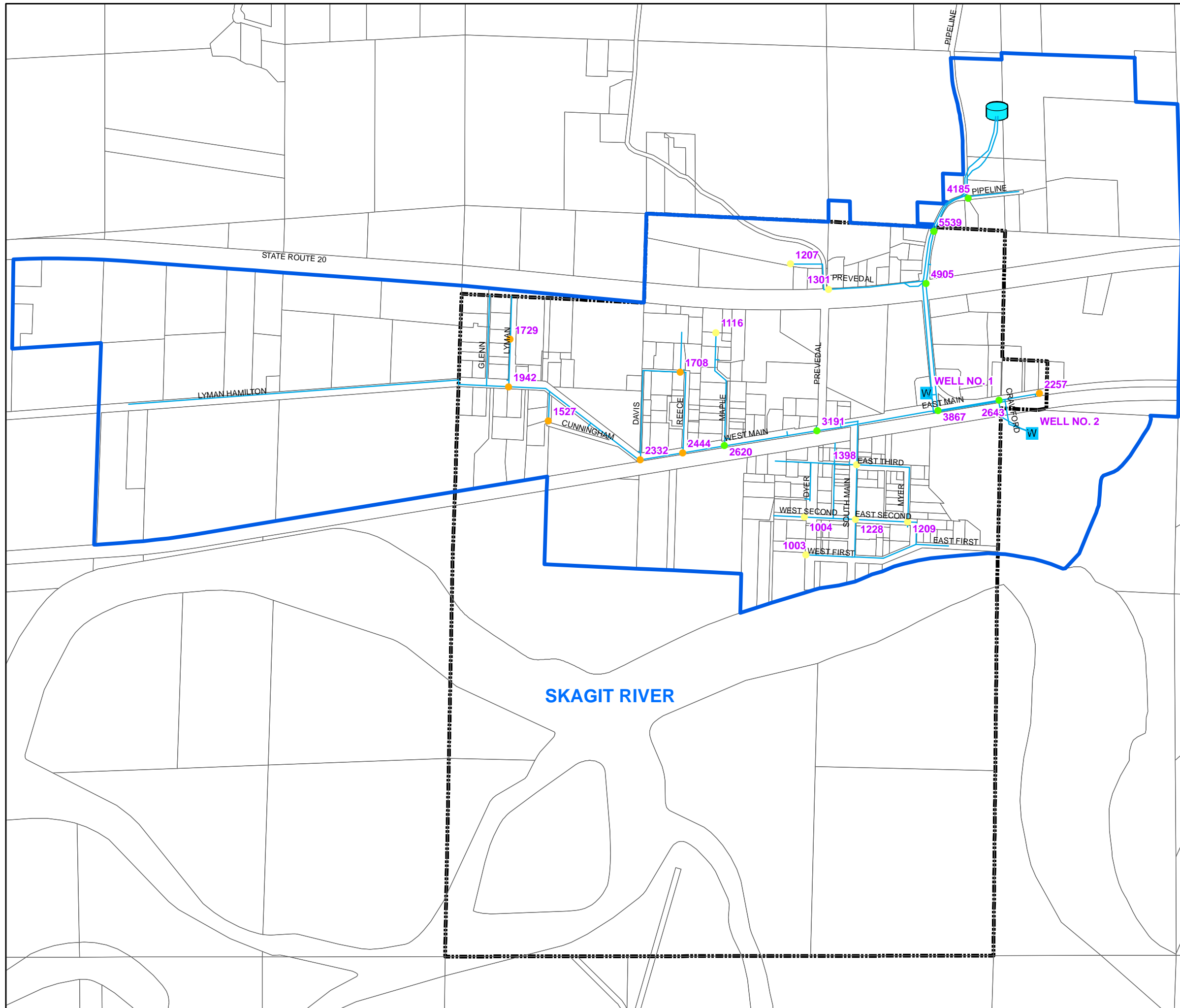


LEGEND:

- PRESSURE:**
- 60 - 80 PSI
- WATERLINES:
- RESERVOIR
- W WELL
- ▭ RETAIL SERVICE AREA
- ▭ PARCELS
- - - LYMAN TOWN LIMITS

TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 3-1
 2033 PEAK HOUR STATIC WATER SYSTEM
 PRESSURE

Gray & Osborne, Inc.
 CONSULTING ENGINEERS



LEGEND:

FIRE FLOW:

- 1,000 - 1,500 GPM
- 1,500 - 2,500 GPM
- > 2,500 GPM

WATERLINES:

- RESERVOIR
- W WELL

- RETAIL SERVICE AREA
- PARCELS
- ⊞ LYMAN TOWN LIMITS

TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 3-2
 2033 AVAILABLE FIRE FLOW

Gray & Osborne, Inc.
 CONSULTING ENGINEERS

CHAPTER 4

WATER QUALITY AND REGULATORY EVALUATION

INTRODUCTION

The objective of this chapter of the Water System Plan is to review current Washington Administrative Code (WAC) 246-290 and federal drinking water regulations pursuant to the Safe Drinking Water Act (SDWA) in order to assess the compliance status of the Town of Lyman. Additionally, anticipated regulations have been reviewed to assess future implications for the Town. This chapter identifies water quality conditions from 2008 to 2012, monitoring and waiver status, and non-compliance issues.

STATE AND FEDERAL REGULATORY FRAMEWORK

Lyman's water system is classified as a Class A, non-transient, community system as defined in WAC 246-290. As such, Lyman is responsible for monitoring and compliance with all SDWA and WAC regulations pertaining to source water and distribution system water quality for groundwater purveyors. A chronological list of applicable federal effective and promulgated regulations is provided in Table 4-1.

TABLE 4-1

Water Quality Regulations

Rule	Parameters Regulated	Regulatory Milestone
Phase I Rule	Volatile Organic Chemicals	Effective January 1989
Total Coliform Rule	Bacteriological, Disinfection	Effective December 1990
Lead and Copper Rule	Lead, Copper, Water Quality Parameters	Effective December 1992
Phase II, Phase V Rules	Inorganic, Volatile Organic, and Synthetic Organic Chemicals	Effective January 1993
Arsenic Rule	Arsenic Contamination	Effective January 2001
Stage 1 D/DBP Rule	Trihalomethanes, Haloacetic Acids, Disinfectant Residuals	Effective January 2004
Public Notification Rule (2 nd Revision)	Stipulates Reporting Protocol For Acute Violations	Effective March 2010
Consumer Confidence Report Rule	Requires Annual Report Addressing Drinking Water Quality	Effective September 1998
Stage 2 D/DBP Rule	Trihalomethanes, Haloacetic Acids, Disinfectant Residuals	Effective January 2006
Groundwater Rule	Disinfection	Effective November 2006

APPLICABLE EFFECTIVE WATER QUALITY REGULATIONS

Water quality monitoring requirements and maximum contaminant levels (MCLs) are addressed in Sections 246-290-300 and 246-290-310 of the WAC, respectively. Monitoring requirements detailed therein are minimum requirements and DOH maintains the authority to require additional monitoring as warranted under the following conditions:

- System contamination is present or suspected;
- Groundwater is determined to be or has the potential to be a GUI source;
- Unsatisfactory source protection;
- Determination of vulnerability;
- Evaluation of continuing effectiveness of a treatment process where problems with the process may exist; and
- Other circumstances as identified by DOH departmental order.

The following regulations are currently in effect for the Town of Lyman.

TOTAL COLIFORM RULE

Under the Total Coliform Rule (TCR) and WAC 246-290-300, the Town of Lyman, as required, collects one monthly sample from the distribution system. As shown in the revised Coliform Monitoring Plan (Appendix H), the water system monitors four sites on a rotating basis. Since 2009, no samples have tested positive for the presence of coliform.

LEAD AND COPPER RULE

The Lead and Copper Rule (LCR) addresses lead and copper levels in the source water or resulting from corrosion of distribution piping and household plumbing. The LCR requires that public water systems conduct lead and copper monitoring at customer taps to determine if the 90th percentile of homes tested exceeds lead and copper action levels of 0.015 mg/L and 1.3 mg/L, respectively. The LCR also sets out required actions of corrosion control treatment, source water treatment, lead service line replacement, and public education for systems exceeding the 90th percentile levels.

Lead and copper monitoring was conducted at ten representative customer taps in 2008 and ten customer taps in 2011. The 90th percentile results are summarized in Table 4-2.

TABLE 4-2**Lead and Copper Monitoring Results**

Period	Lead		Copper	
	90 th Percentile	Action Level	90 th Percentile	Action Level
Oct-08	0.002 mg/L	0.015 mg/L	0.174 mg/L	1.3 mg/L
Aug-11	0.0002 mg/L		0.095	

Lyman has not exceeded the copper action level since installing the corrosion control equipment. The facility injection is for the adjustment of pH for corrosion control. The location of the treatment facility is immediately prior to the system storage reservoir. The treatment process targets a pH increase to 7.6. The current pH levels for Wells 1 and 2 are 6.3 to 6.4 and 6.6 to 7.0, respectively.

INORGANIC CHEMICALS

Water samples for the analysis of regulated inorganic chemicals are to be collected from Wells 1 and 2 every 36 months per WAC 246-290-300. The most recent round of inorganic contaminant sampling was conducted in August 2007. Inorganic levels from both wells were non-detectable and below allowable MCLs.

In 2010, Lyman applied for and received a State Waiver for collection of complete IOC samples.

Lyman is required to collect nitrate samples annually except for the years that IOC samples are due. Table 4-3 summarizes the monitoring results for 2009 through 2012.

TABLE 4-3**Nitrate/Nitrite Monitoring Results**

Sample Date	Nitrate (mg/L as N)		Regulatory MCL
	Well 1	Well 2	
August 2009	1.09	<0.5	10.0
July 2010	0.74	0.50	10.0
July 2011	0.97	0.67	10.0
July 2012	0.73	0.69	10.0

VOLATILE ORGANIC CHEMICALS

In July 2010 and 2012, the Town conducted VOC monitoring at each well. During that monitoring round, all U.S. EPA-regulated and unregulated VOC levels were below analytical detection limits and MCLs.

SYNTHETIC ORGANIC CHEMICALS

In 2009, 2010 and 2012, the Town conducted SOC monitoring at each well. During that monitoring round, all SOC levels were below analytical detection limits and MCLs.

ASBESTOS

All public water systems with more than 10 percent of their distribution system constructed with asbestos-cement (AC) pipe must collect one sample for asbestos analysis from a tap served by AC pipe every 9 years. All asbestos cement pipe was replaced in 2004-2005, therefore the Town no longer needs to test for asbestos.

GROUNDWATER RULE

The Groundwater Rule (GWR) became effective November 1, 2010. The goal of the GWR is to set disinfection requirements for groundwater not under the influence of surface water. Under the 1986 SDWA, the U.S. EPA was required to set disinfection requirements for all public water systems. The SWTR did this for surface water and GUI. The GWR contains four regulatory elements:

- Sanitary Surveys
- Hydrologic Sensitivity Assessments
- Source Water Monitoring
- Corrective Action or Disinfection

Each groundwater source will be evaluated by DOH to determine if it should be disinfected. If disinfection is required, the system must provide either: (1) a continuous free chlorine residual of 0.2 mg/L at the entry to the distribution system and detectable free chlorine residual throughout the distribution system; or (2) an alternate treatment strategy that ensures at least 4-logs (99.99 percent) of viral inactivation as determined by DOH.

Lyman is currently incorporating chlorination into its water system and targeting a chlorine residual of 0.6 mg/L at the entrance to the distribution system. Therefore, the impact of this rule would be limited to targeting a CT of 6 mg-min/L for inactivation of viruses. The chlorine dose of 1.0 mg/L provides 20 mg-min/L when travel time to the reservoir and 10 percent of the storage detention time are considered. A minimum residual of 0.20 mg/L is maintained throughout the system.

STAGE 1 DISINFECTANT/DISINFECTION BYPRODUCTS RULE

The Stage 1 Disinfectant/Disinfection Byproducts (D/DBP) Rule supplanted the Total THM Rule in January 2004 for groundwater systems serving fewer than 10,000 customers. The Stage 1 D/DBP Rule applies to all community water systems and

non-transient-non-community water systems using a chemical disinfectant for either primary or secondary disinfection. The Stage 1 D/DBP Rule sets MCLs for several disinfection byproducts (trihalomethanes, haloacetic acids, chlorite, and bromate) as well as maximum residual disinfectant levels (MRDLs) for disinfectants (chlorine, chloramine, and chlorine dioxide). Table 4-4 summarizes the requirements of the rule as they pertain to Lyman.

TABLE 4-4

Stage 1 D/DBP Rule Monitoring Requirements

Parameter	MCL or MRDL	Sample Frequency	Sample Locations
Chlorine	MRDL 4.0 mg/L	Same as total coliform	Same as total coliform
Trihalomethanes	MCL 80 µg/L	1 per year	Maximum residence time ⁽¹⁾
Haloacetic Acids	MCL 60 µg/L	1 per year	Maximum residence time ⁽¹⁾

(1) During month of warmest temperature.

DBP samples must be taken during the month of warmest water temperature at a point of maximum residence time in the distribution system. Compliance with the MCLs is based on the running annual average (RAA) of samples taken throughout the system. The Town may reduce the monitoring frequency to one sample per source per 3-year monitoring cycle, taken at the extreme end of the distribution system during the month of warmest water temperature, if either of the following criteria is met:

1. The average of two consecutive annual samples for total trihalomethanes (TTHM) is no more than 40 µg/L, the average of two consecutive annual samples for haloacetic acids (HAA5) is no more than 30 µg/L, and at least 2 years of routine monitoring have been completed; or
2. The annual sample for TTHM is no more than 20 µg/L, the annual sample for HAA5 is no more than 15 µg/L, and at least 1 year of routine monitoring has been completed.

If the TTHM sample exceeds 60 µg/L or the HAA5 sample exceeds 45 µg/L under reduced monitoring, then routine monitoring must be re-implemented. If the TTHM sample falls between 80 and 100 µg/L, health effects language is required in the annual Consumer Confidence Report as described in Paragraph 73, Appendix I, Subpart O of the Consumer Confidence Report Rule. Table 4-5 summarizes the Town’s Stage 1 DBP Monitoring Results.

TABLE 4-5

Stage 1 DBP Monitoring Results Summary

Sample Date	Total Trihalomethanes Results (µg/L)	Regulatory MCL (µg/L)	Halo-Acetic Acids 5 Results (µg/L)	Regulatory MCL (µg/L)
July 2005	6.7	80.0	3.4	60.00
August 2007	8.0	80.0	1.2	60.0
August 2010	6.5	80.0	1.3	60.0

STAGE 2 DISINFECTANT/DISINFECTION BYPRODUCTS RULE

The Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 D/DBP Rule) sets new monitoring requirements for total trihalomethanes (TTHM) and haloacetic acids (HAA5). The U.S. Environmental Protection Agency (EPA) published the Stage 2 D/DBP Rule in January 2006, and Washington State assumed responsibility for the Stage 2 D/DBP Rule on January 4, 2010. The Stage 2 D/DBP Rule applies to all community and nontransient noncommunity (NTNC) Group A water systems that deliver water continuously treated with a primary or residual disinfectant other than ultraviolet light. The Stage 2 D/DBP Rule does not apply to water systems that only use these disinfectant chemicals temporarily, such as after facility cleaning or repair. Table 4-6 summarizes the schedule for Stage 2 D/DBP Rule implementation.

TABLE 4-6

Schedule for Stage 2 D/DBP Rule Implementation Dates

Schedule Number	Public water system population⁽¹⁾	Submit IDSE document or receive a 40/30 Certification or Very Small System Waiver⁽²⁾	Complete IDSE monitoring or study	Submit IDSE Report	Begin routine monitoring according to Stage 2 Rule
1	≥ 10,000	10/1/2006	9/30/2008	1/1/2009	4/1/2012
2	50K –99,999	4/1/2007	3/31/2009	7/1/2009	10/1/2012
3	10K –49,999	10/1/2007	9/30/2009	1/1/2010	10/1/2013
4	< 10,000	4/1/2008	3/31/2010	7/1/2010	10/1/2014

- (1) Public water systems that have non-emergency interties with other water systems must comply with the deadlines for the largest water system in their combined distribution system.
- (2) An Initial Distribution System Evaluation (IDSE) document is a standard monitoring plan or system-specific study plan. Systems serving less than 500 people may obtain a very small system waiver.

The Stage 2 D/DBP Rule has three major changes to the Stage 1 D/DBP Rule:

1. Water systems choose Stage 2 monitoring locations based on monitoring data (either historical Stage 1 data or data collected through the IDSE);
2. Stage 2 bases compliance on locational running annual average (LRAA) calculations at each individual monitoring location; and
3. The Stage 2 Rule now includes Consecutive Systems that do not provide their own treatment, but receive treated water from a supplying water system

Because the Town's water system serves less than 500 people, the Town is eligible for a very small system waiver from conducting an Initial Distribution System Evaluation (IDSE). The Town has chosen its Stage 2 D/DBP Rule sampling points based on historical Stage 1 D/DBP Rule data.

DISINFECTANT RESIDUALS

Chlorine residual measurements must be conducted at the same time and location as total coliform sample collection. Compliance with the MRDL is based on the running annual arithmetic average of monthly averages of all samples collected. Notification of a violation of the MRDL is required only for an annual average exceedance.

ARSENIC RULE

The U.S. EPA published the Arsenic Rule in the *Federal Register* in January 2001. For small water systems (serving fewer than 10,000 customers), the effective date for compliance with this rule was January 14, 2004.

The Arsenic Rule, which applies to all community and non-transient-non-community water systems, establishes a revised arsenic MCL of 10 µg/L.

Arsenic must be monitored at each entry point to the distribution system as part of the IOC monitoring framework. If any sampling point is in violation of an MCL, the system is in violation. All historical IOC data collected for this system indicates that arsenic is below 10 µg/L in both source wells.

RADIONUCLIDE RULE

The revised Radionuclide Rule was promulgated in December 2000 and became effective in December 2003. This rule establishes reduced MCLs for radioactive elements, as summarized in Table 4-7. The monitoring locations and frequency remained identical to those required under the previous Radionuclide Rule.

TABLE 4-7

Radionuclide Rule MCLs

Contaminant	MCL
Radium-226/228	5 pCi/L
Gross Alpha Particle Activity	15 pCi/L
Gross Beta and Photon Emitters	4 mrem/yr ⁽¹⁾
Uranium	30 µg/L
Tritium	20,000 pCi/L ⁽²⁾
Strontium	8 pCi/L ⁽²⁾

(1) Millirem effective dose to the body.

(2) As an annual average.

The most recent round of radionuclide testing was performed in July 2012, for each source well. At that time, the system was in compliance with this rule.

OPERATOR CERTIFICATION

The 1996 SDWA amendments put in place the requirement for states to develop and implement an operator certification program. The regulation sets out minimum guidelines for such a certification program including operator classification and qualifications. These sections of the regulation require that:

- Each treatment facility and/or distribution system be placed under the direct supervision of a certified operator;
- Operator certification must be equal to or greater than the system classification being operated;
- All process control personnel be certified;
- At least one certified operator be available on every shift;
- Operators must sit for and pass a validated exam demonstrating skills, knowledge, ability, and judgment necessary for the system classification; and
- Each operator has a high school diploma, GED, or state-approved experience and training.

The Town is in compliance with all Operator Certification regulations.

SUMMARY

The Town of Lyman’s past available water quality data indicates that regulatory MCLs are not being exceeded and full regulatory compliance has been met on all rules.

CHAPTER 5

WATER USE EFFICIENCY PROGRAM

A viable water use efficiency plan is a requirement of water system planning. Public awareness and participation are necessary for the Town to develop an active and beneficial water use efficiency plan. The following chapter presents the Town's Water Use Efficiency Program.

WATER USE EFFICIENCY PLANNING REQUIREMENTS

The Washington Legislature passed the Water Use Efficiency Act of 1989 (43.20.230 RCW) which directs the Department of Health (DOH) to develop procedures and guidelines relating to water use efficiency. In response to this mandate, the Department of Ecology (Ecology), the Washington Water Utilities Council, and DOH jointly published a document titled Conservation Planning Requirements (1994). In 2003, the Municipal Water Supply - Efficiency Requirements Act (Municipal Water Law) was passed and amended RCW 90.46 to require additional conservation measures. The Municipal Water Law, among other things, directed DOH to develop the Water Use Efficiency Rule (WUE Rule), which is outlined in the Water Use Efficiency Guidebook and became effective January 22, 2007. These documents provide guidelines and requirements regarding the development and implementation of conservation and efficiency programs for public water systems. Conservation and efficiency programs developed in compliance with these documents are required by DOH as part of water system planning documents and by Ecology as part of a public water system water right application. Conservation must be evaluated and implemented as an alternate source of supply before State agencies approve applications for new or expanded water rights.

Conservation can be used effectively to help meet the increased demand for water, to protect the environment, to delay the development of costly infrastructure and to ensure that water is available to meet economic and population growth consistent with the Growth Management Act by using existing supplies more efficiently. Public awareness and participation are necessary for the Town to develop an active and beneficial conservation plan.

As an extension to the *Conservation Planning Requirements*, the WUE Rule sets more stringent requirements for public water purveyors. The WUE Rule is comprised of three fundamental elements:

1. Planning requirements;
2. Distribution leakage standards; and
3. Goal setting and performance reporting.

This Chapter provides a discussion of the requirements, and the impact the WUE Rule has on the Town.

PAST CONSERVATION PROGRAMS

The Town adopted a conservation program in 2002 as part of its last Water System Plan. Table 5-1 shows the proposed action items from the previous conservation program and the current status of each item.

TABLE 5-1

Summary of Previous Conservation Program

Action Item	Status
Program Promotion	Brochures Provided in Customer Mailings
Reservoir Lining	Reservoir Replaced in 2004
Reservoir Outlet Master Meter	Not installed – Scheduled in Capital Improvement Plan (Chapter 8)
Service Meter Installation	Meters Installed on All Services
Leak Detection Program	Leak Survey Completed in 2011

Many of these measures will continue to be implemented as part of the Town’s new WUE program, and are described in more detail further on in this Chapter.

EFFECTS OF PAST PROGRAMS

The installation of service meters now allows the Town to calculate leakage, which was not previously possible. The number of connections and total production have remained relatively constant since the 2002 Water System Plan. The Town found and repaired most of the leaks identified in the recent leak survey. The remaining leaks are scheduled to be repaired as part of the Town’s Capital Improvement Plan. See Chapter 8 for more information.

PLANNING REQUIREMENTS

Under the WUE Rule, water systems are required to implement planning methods to forecast future demands and determine necessary measures to reduce usage and demand. Elements of the planning requirements include:

- Data collection
- Demand forecasts
- Selection and evaluation of WUE measures

DATA COLLECTION AND REPORTING

The WUE Rule requires regular collection of production and consumption data. Data must be reported in the Town’s planning documents and annual performance report to DOH. Water use data will be used by the Town for the following:

- Calculating leakage
- Forecasting demand for future water needs
- Identifying areas for more efficient water use
- Evaluating the success of the Town’s WUE program
- Describing water supply characteristics
- Aiding in decision-making about water management

Table 5-2 summarizes the water use data collection requirements.

A summary of the water use data collection requirements for the Town of Lyman is presented in Table 5-2. These specific requirements that apply to the Town are based on the total number of direct residential service connections being less than 1,000.

TABLE 5-2

Summary of Water Use Data Collection

Data Type	Includes
Source of Supply Meter Readings	Monthly and annual totals of water produced, purchased from another water system, and/or supplied to other water systems through interties
Service Meter Readings	Total annual water consumed, annual water consumed by each customer class.

This data is needed to meet the planning and performance reporting requirement and to check compliance with the distribution system leakage standard of the WUE Rule.

DEMAND FORECAST

Demand forecasting is an essential element of planning. It provides a basis for comparison for growth and usage, and also helps in scheduling system improvements. For the purposes of the WUE Rule, forecasting is used in goal setting and measuring the success of the WUE program.

Complete demand forecasts are provided in Chapter 2 of this plan.

Source Evaluation

As discussed in Chapters 1 and 3 of this Plan, the Town's sources are capable of supplying maximum day demands through the 20-year planning period. Reduction in production with efficient water use will prolong the ability of the existing wells to meet future demands.

WUE MEASURES

The WUE Rule requires the evaluation or implementation of water use efficiency measure to help meet the WUE goals. The WUE Guidebook states several measures that must be implemented or evaluated and provides a list of measures that can be counted as additional measures in the WUE Program. WAC 246-290-810 identifies the minimum number of water use efficiency measures that must be evaluated based on system size. The Town serves less than 500 service connections and therefore must evaluate or implement one water use efficiency measure.

Additional discussion of the Town's measures is included later in this chapter.

DISTRIBUTION SYSTEM LEAKAGE

The *Conservation Planning Requirements* set the maximum allowable amount of lost and unaccounted for water at 20 percent of total source production. The WUE Rule now requires that water distribution systems have a distribution system leakage (DSL) rate less than 10 percent of finished water production based on a three-year rolling average. The Town was required to meet the 3-year rolling average requirement by July 1, 2010.

Systems serving less than 500 connections may submit a request to the Department of Health for approval of an average DSL of 20 percent per WAC 246-290-820(1)(b)(iii). The request must include the following information:

- Production volume
- Distribution system leakage volume
- Evidence documenting that:
 - A leak detection survey using best available technologies has been completed on the system within the past 6 years.
 - All leaks found have been repaired.
 - The system is unable to locate additional leaks.
 - Ongoing efforts to minimize leakage are included as part of the system's water use efficiency program.
- Any technical concerns or economic concerns, or other system characteristics justifying the higher distribution system leakage.

The Town intends to submit a request for approval of an average DSL rate of 20 percent once all requirements for the approval have been met. See Chapter 8 for information on the schedule for the Town's Capital Improvement Plan.

Distribution system leakage for the Town equals the difference between the volume pumped from the Town's wells and the volume measured at the customers' meters plus any other credibly estimated usage. Table 2-6 provides annual data of distribution system leakage from 2008 to 2012. As shown in Table 2-6, based on the best available data for customer consumption, the Town's annual distribution system leakage has ranged from 39 percent to 43 percent, with a 3-year rolling average of 41 percent. The current 3-year rolling average of 41 percent exceeds the DOH requirement. As a result, the Town will implement a Water Loss Control Action Plan, which is described later in this Chapter.

The Town intends to install a new meter at the end of the well transmission main at the tank site. This meter will measure all of the water that enters the Town's distribution system. Per WAC 246-290-820(2)(b), this meter, once installed, can be used to exclude transmission main losses between the well and tank sites from the Town's DSL.

GOAL SETTING AND WUE MEASURES

Under the WUE Rule, the Town must set water use efficiency goals and measure progress each year toward meeting these goals. Goals must include a measurable outcome, address water supply or demand characteristics, and include an implementation schedule. The Town must also evaluate or implement efficiency measures to help meet these goals.

GOALS

The Town plans to reduce its total water use in several ways. First, the Town will reduce DSL to 10 percent or less by 2019. Second, the Town will promote efficient water use to reduce overall demands.

Goal No. 1 of the water use efficiency program is to significantly reduce distribution system leakage. The Town would like to have a DSL rate of 10 percent or less by 2019. The Town's current 3-year rolling average for DSL is 41 percent, with a rate of 43 percent in 2012. Table 5-3 summarizes the annual reductions in DSL needed to meet this goal.

TABLE 5-3

Supply Side Goal Summary

Year	DSL %
2013	38
2014	34
2015	29
2016	24
2017	19
2018	15
2019	10

Goal No. 2 of the WUE program is to reduce residential consumption by 1 percent per year through 2019 Chapter 3. To compensate for growth, this goal will be measured by reduction in the ERU value. The initial benchmark for this goal is an ERU value of 137 gpd/ERU, which is the average of the ERU values for the last 5 years. Table 5-4 gives a summary of the reductions in the ERU value needed to meet Goal No. 2.

TABLE 5-4

Demand Side Goal Summary

Year	ERU Value (gpd/ERU)
2013	136
2014	134
2015	133
2016	132
2017	130
2018	129
2019	128

EVALUATION OR IMPLEMENTATION OF WUE MEASURES

The Town has less than 500 connections and, therefore, must evaluate or implement one supplementary water use efficiency measure. The following sections describe both the mandatory and supplementary water use efficiency measures evaluated and indicate which have been or will be implemented by the Town.

Mandatory Measures

Implement Source and Service Metering and Meter Calibration

The installation of flow meters on each source of supply is required to measure the amount of water entering the distribution system. A source meter installed at the Town's wells measures all source water produced.

The Town has service meters installed on all service connections.

Implement Water Loss Control Action Plan

The Town's current 3-year rolling average DSL rate is approximately 41 percent, well exceeding the requirement 10 percent or less. As a result, the Town must implement a Water Loss Control Action Plan (WLCAP). The Water Loss Control Action Plan is described later in this Chapter.

Implement Customer Education

Water conservation materials published by DOH and Ecology are made available to the public at Town Hall. These materials include water conservation tips and information on water saving devices for the home. Conservation tips and promoting efficient water use are also included in the Town's annual consumer confidence report.

Evaluate Conservation Rate Structure

The Town currently has a uniform rate structure. The rates include a monthly base rate and a usage rate. Both the base rates and usage rates are fixed rates based on customer class. The Town's current rates are further described in Chapter 9.

Supplementary Measures

Customer Leak Detection

The Town monitors customers' water bills for abnormally high water reads. When a read occurs that is outside the range of normal use, the customer is notified of a potential leak on their side of the water meter.

Water Bill Showing Consumption History

The Town's water bills show consumption history for all customer classes.

Summary of Supplemental Measures

Based on their number of connections, the Town must implement or evaluate one measure. The Town has chosen to implement all measures listed above. Table 5-5 provides a summary of measures.

TABLE 5-5

Water Use Efficiency Measures

Measure for Implementation	Customer Classes Affected
Customer Leak Detection	3
Bills Showing Consumption History	3
Total Measures Counted	6

Evaluation of Measures

All of the measures selected for implementation require little funding aside from any time required by staff to develop and execute each measure. Nonetheless, the Town will track any costs associated with the supplemental measures and compare it to water saved to evaluate effectiveness of each measure.

TARGET WATER SAVINGS PROJECTIONS

Table 5-6 presents the projected system demands with water use efficiency savings. The water use efficiency savings projections include the Town's WUE Goals No. 1 and 2 to reduce leakage and consumption as discussed previously. At the end of the 6-year planning period (2019), these water use efficiency measures will account for a total WUE savings of 29 MG.

The primary savings projected for the Town's system are attributable to reductions in DSL.

TABLE 5-6

Projected Water System Demands with WUE Savings

Year	Population	ERUs	Average Day Consumption⁽¹⁾	DSL Volume⁽²⁾	DSL %⁽³⁾	Average Day Demand (gal)	Maximum Day Demand (gal)	Peak Hour Demand (gpm)	Annual WUE Savings (MG)
2013	480	224	28,800	17,900	38%	46,700	93,400	167	2.0
2014	487	227	29,000	14,700	34%	43,700	87,400	157	3.2
2015	495	231	29,100	11,800	29%	40,900	81,800	147	4.4
2016	502	234	29,300	9,300	24%	38,600	77,200	138	5.4
2017	510	238	29,400	7,100	19%	36,500	73,000	131	6.4
2018	517	241	29,600	5,100	15%	34,700	69,400	124	7.2
2019	525	245	29,700	3,300	10%	33,000	66,000	118	8.0
2023	557	260	31,500	3,500	10%	35,000	70,000	125	8.0
2033	647	302	36,600	4,100	10%	40,700	81,400	146	8.1

- (1) Projected Average Day Consumption using ERU values per the Town’s WUE Goal No. 2.
- (2) DSL Volume to meet the Town’s WUE Goal No. 1.
- (3) DSL percentage to meet the Town’s WUE Goal No. 1.

PERFORMANCE REPORTING

The Town must report water use efficiency goals progress annually. The annual report must include:

- Total source production
- Distribution system leakage in percentage and volume
- Goal description, schedule, and progress toward meeting goals

The latest annual report is included in Appendix J.

WATER LOSS CONTROL ACTION PLAN

The following elements are included in the Town's Water Loss Control Action Plan (WLCAP):

- An International Water Association Water Audit
- Assessing data accuracy, collection methods and errors
- Field activities to reduce leakage
- Additional water loss control methods to reduce leakage
- Schedule for completion of elements

INTERNATIONAL WATER ASSOCIATION WATER AUDIT

The Town has completed an International Water Association (IWA) Water Audit form, which is provided in Appendix K. This water audit further refines the types of water loss and provides priority areas for improving the Town's water use efficiency practices.

For 2012, the IWA water audit indicated Current Annual Real Losses (CARL) of 43.35 MG. The Town's system is too small to fit within the IWA methodology for calculating Unavoidable Real Losses (UARL); however, using the IWA formula the Town's UARL would be approximately 4,800 gpd, or 1.75 MG. Using these CARL and UARL values, the Town's Infrastructure Leakage Index (ILI) would be approximately 12.0, which is still well outside the range of acceptable limits.

The first priority area suggested by the IWA audit is improving the accuracy of "Volume from own sources." This priority area is consistent with the Town's plans for addressing DSL, as discussed in the following sections.

ASSESSING DATA ACCURACY AND COLLECTION METHODS

The Town has taken several steps to ensure the accuracy of its water production and consumption data. The Town uses radio read meters, which minimize error by automatically uploading data and alerting operators when a meter has a reading error.

The Town's water operator has been working with the manufacturer of the well meter to ensure accurate source readings. The manufacturer has indicated that the installation conditions may be contributing to meter inaccuracies. The Town plans to install an additional supply meter at the storage tank to verify well production and measure losses in the transmission main from the well to the storage reservoir.

FIELD ACTIVITIES TO REDUCE LEAKAGE

The Town will repair leaks as identified in the recent leak detection survey and prioritize the replacement of mains with frequent leaks or breaks. See Chapter 8 for the Town's Capital Improvement Plan.

WATER LOSS CONTROL METHODS

The Town plans to implement several water loss control methods to reduce leakage and eliminate water accounting inaccuracies, including leak detection, large meter calibration, meter replacements, and pipe replacements.

The Town's Capital Improvement Plan projects ST-3, D-1, D-2, D-3, D-4, and D-5 involve replacements of leaking infrastructure that are anticipated to reduce DSL. See Chapter 8 for a description of the Town's Capital Improvement Plan.

CHAPTER 6

WELLHEAD PROTECTION PROGRAM

INTRODUCTION

The goal of the Wellhead Protection Program (WPP) is to protect Lyman's water supply by identifying and managing potential sources of groundwater contamination that could impact the Town's wells. Lyman currently has two water supply wells constructed in alluvial sand and gravel deposits associated with the Skagit River. The depths to the tops of the screened intervals for Well 1 and Well 2 are 35 feet and 51 feet, respectively.

The objectives of the WPP are to delineate a wellhead protection area around the Town's wells, establish and maintain an inventory of potential sources of groundwater contamination, and outline the emergency spill response and contingency plans. The WPP also includes a formalized process to notify business owners/operators and educate the general public about wellhead protection.

DELINEATION OF THE WELLHEAD PROTECTION AREA

The following five zones of the wellhead protection area were delineated:

1. Sanitary Control Zone
2. 6-Month Time of Travel Zone
3. 1-Year Time of Travel Zone
4. 5-Year Time of Travel Zone
5. 10-Year Time of Travel Zone

The 6-month through 9-year time of travel zone boundaries are displayed on the Susceptibility Assessment Survey forms completed for each well. Copies of the Susceptibility Assessment Surveys for Well 1 and Well 2 are provided in Appendix L.

Well 1 and Well 2 both have a sanitary control area with a radius of at least 100 feet, as required by WAC 246-290-135(2). Pipeline Road and a residential property boundary are located approximately 25 feet and 100 feet from Well 1, respectively. The residential property has a small pasture and likely has a septic tank and/or drain field. A residential septic system and small residential pasture are located approximately 200 and 250 feet, respectively, from Well 2. Small quantities of fuel and municipal solid waste were formerly stored in a residential shed located within 100 feet of Well 2. The sanitary control area around Well 2 is protected by a restrictive covenant, which is included in Appendix E. Both Well 1 and Well 2 are located on relatively flat land in the floodplain of the Skagit River and are enclosed in a locked, concrete well house.

The calculated fixed radius method was used to determine the 6-month, 1-year, 5-year, and 9-year time of travel zone boundaries as described in the DOH WPP Guidance Document. The annual pumping rate was determined by averaging source meter readings compiled from 1996 to 2000. The pumping rate of each well was assumed to equal the combined total of both wells since Lyman rotates pumping between the two wells. The screened intervals of Well 1 and Well 2 are 10 feet and 9 feet, respectively. A generalized porosity value of 0.22 was used in the calculations. Table 6-1 displays the radius of each zone of the wellhead protection area.

TABLE 6-1

Wellhead Protection Area Radii

Time of Travel	Radius to Edge of Boundary from Well 1	Radius to Edge of Boundary from Well 2
Sanitary Setback	100 feet	100 feet
6 months	530 feet	560 feet
1 year	740 feet	780 feet
5 years	1,700 feet	1,800 feet
10 years	2,400 feet	2,600 feet

CONTAMINANT INVENTORY IN THE WELLHEAD PROTECTION AREA

A walking/driving survey was conducted on January 22, 2001, to inventory potential sources of groundwater contamination. Areas within a 1/2-mile radius of Well 1 or Well 2 were investigated during the survey. Residents and Town staff with local knowledge about past, current, and future land uses were interviewed. Water Well Reports from the Washington State Department of Ecology (Ecology) were used to infer information about abandoned water wells. The following U.S. Environmental Protection Agency (U.S. EPA) and Ecology databases were searched for sites with a Lyman address and for sites with a Lyman zip code:

- Comprehensive Environmental Response, Compensation, and Liability Information System
- Resource Conservation and Recovery Information System
- Toxic Release Information System
- Permit Compliance System
- Solid Waste Facility List
- Underground Storage Tank List
- Leaking Underground Storage Tank List
- Confirmed and Suspected Contaminated Sites List

Businesses within the wellhead protection area with potential contaminant sources include a small cabinet making shop, current underground storage tank (UST) site, and the Town Cemetery. The former LUST/current UST site was the only site identified by the U.S. EPA and Ecology database searches described above. The cabinet making shop is located within the 6-month time of travel boundary around Well 1 and 1-year time of travel boundary around Well 2. Current UST site is located within the 5-year time of travel boundary around Well 1 and 10-year time of travel boundary around Well 2. The Town Cemetery is located within the 10-year time of travel boundary around Well 1. Locations of these businesses are displayed on the Susceptibility Assessment Surveys in Appendix L.

Notification letters were sent to owners/operators of the cabinet making shop, current UST site, and Town Cemetery informing them of their locations within the wellhead protection area. Copies of both owner/operator notification letters are included in Appendix M. A notification letter was sent to Ecology's Toxics Cleanup Program regarding the location of the current UST site in the wellhead protection area. A copy of the notification letter to Ecology is included in Appendix M.

Few additional sources of groundwater contamination are located in the vicinity of Well 1 and Well 2 based on current land use. The predominant land use within the wellhead protection area is residential/rural. Potential residential sources of contamination include septic systems, pesticide application, household hazardous waste storage and disposal, and heating tanks. Septic tanks and/or drain fields are assumed to be associated with each residence since the Town does not have a sanitary sewer system. Agricultural land use in the wellhead protection area consists exclusively of small pastures and residential gardens. Land used for transportation does have the potential to impact the Town's wells in the event of an accidental spill. State Route 20 is located within the 1-year time of travel boundary around Well 1 and 5-year time of travel boundary around Well 2. The removal of a railroad line between Well 1 and Well 2 approximately 10 years ago has greatly reduced the potential for an accidental spill in the 6-month time of travel zone of both wells.

Proposed land use changes within the incorporated town boundary must be approved by the Town Council. The Town is notified of proposed land use changes outside its incorporated boundary by the Skagit County Planning and Permit Center.

MANAGEMENT PROGRAM FOR THE WELLHEAD PROTECTION AREA

Although Well 1 and Well 2 are shallow, the risk of either being impacted appears to be small due to the nature of current land use and limited extent of contaminant sources in the wellhead protection area. Nonetheless, the Town has adopted an Emergency Response Plan (ERP) which includes contingency planning, spill response planning, and education in order to protect its wells. The ERP is included in Appendix N.

In the event that one of Lyman's two wells is unfit for consumption, the Town could switch production to the other well. As mentioned previously, the Town normally rotates pumping between the two wells and does not pump both wells concurrently. In the event that both wells are unfit for consumption, several contingency options are available. In the event that both wells are taken offline due to bacteriological contamination, response measures are described in the Town of Lyman ERP. Procedures outlined in the (ERP) include shutting down the wells, notifying residents and the DOH Regional Engineer, and collecting water quality samples. Residents are advised to conserve water, boil water, or use bottled water during the emergency. In the event of long-term disability of Well 1 and Well 2 due to groundwater contamination other than bacteriological, the Town could transport water from another municipality by tanker truck. If water were transported from another municipality, the tanker truck would need to be disinfected and equipped with a supply fitting prior to use. Lyman's best opportunity for an emergency intertie may be with the Town of Hamilton, located approximately 2 miles to the east. However, at present, no intertie or infrastructure is in place.

In the event of an accidental spill, residents and business owners would call the Town offices. A member of the Town staff would, in turn, notify Skagit County Fire District 8 as a first responder. The fire district is responsible for contacting the Skagit County Department of Emergency Management if additional spill response measures are needed. Notification letters are on file with Skagit County Fire District 8 and Skagit County Department of Emergency Management informing them of the location of State Route 20 in the wellhead protection areas. Copies of these notification letters are included in Appendix O.

Educational material is periodically presented at the elementary school in Lyman. Presentation subjects include water conservation and water quality. The Town provides access to public records at Town Hall, posts public notices related to the water system, and has notified owners/operators of businesses with potential contaminant sources.

SUMMARY OF WELLHEAD PROTECTION PROGRAM NEEDS

The potential for contaminants to impact Lyman's wells appears to be low based on the current contaminant inventory within the wellhead protection area. The Emergency Response Plan adopted by the Town appear to be adequate to provide protection of the Town's water supply. Table 6-2 presents areas of additional work for the Town's Wellhead Protection Program.

TABLE 6-2

Wellhead Protection Program Needs

Description	Purpose
Additional public education	Inform community about wellhead protection
Public education flyers	Inform residents about septic systems and pesticide use
Update contaminant inventory	Should reflect land use changes

CHAPTER 7

OPERATION AND MAINTENANCE PROGRAM

INTRODUCTION

Chapter 7 provides a review of the Lyman Water System Operation and Maintenance (O&M) Program. Included is a review of preventive maintenance activities and frequencies as well as water quality monitoring requirements. Elements of critical importance are the identification of vulnerable facilities and the details of Lyman's emergency response activities.

WATER SYSTEM MANAGEMENT

Lyman's water system operations are under the management of the Town. Daily operations of the water system are under the direction of the water system operator, or in his absence, the contract backup water system operator. The point of contact for all water system-related inquiries is the Town Mayor.

CERTIFICATION REQUIREMENTS

Waterworks Operator Certification, specified in WAC 246-292 requires public water systems in Washington State to retain in their employ individuals who are certified, by examinations, as competent in water supply operations and/or management. The Washington State Department of Health (DOH) determines the required level and number of certified positions based on the population and complexity of the water system.

Under the current certification requirements of the DOH, the Town must have at least one operator certified as a Water Distribution Manager Level 1 (WDM 1) in charge of the daily operations of the water system. The current level of operator certification for each certified Town employee is presented below.

TABLE 7-1

Town Staff Certification Levels

Name	Position	WDM	CCS	BTO
Mark Kitchen	Water System Operator	1	—	—
Kathleen (Cas) Hancock	Contract Operator	2	X	X

ROUTINE OPERATION AND PREVENTIVE MAINTENANCE PROCEDURES

This section outlines routine O&M activities conducted by Town operators, including customer response activities and water quality monitoring requirements.

REGULAR MAINTENANCE

The water system operators are responsible for conducting regularly scheduled system distribution and storage maintenance activities. Table 7-2 summarizes these activities and their associated frequencies.

TABLE 7-2

Routine Preventive Maintenance Schedule

Daily	<ul style="list-style-type: none"> • Check and record chlorine residual level readings in distribution. • Check and record chlorine analyzer chlorine level at injection point. • Check chlorine injection meters and pumps for leaks. • Check chlorine solution tank level. • Check pH analyzer and record pH level at injection point. • Check and record water production reading. • Check system pressure.
Weekly	<ul style="list-style-type: none"> • Check both chlorine and sodium hydroxide tanks for leaks and general corrosion. • Inspect reservoir exterior. • Check chlorine generator process injector and generator. • Check water softener salt level; refill. • Check and record alkalinity of raw water and finished water.
Monthly	<ul style="list-style-type: none"> • Check pulsation dampers precharge pressure. • Flush hydrants and mains per schedule. • Calibrate Lamotte chlorine test kit. • Calibrate chlorine residual analyzer; replace grit and electrolyte.
Quarterly	<ul style="list-style-type: none"> • Check chlorine blower fan for buildup of material dirt. • Check chlorine generator process water heater, softener, and cartridge filter (clean or replace). • Check sodium hydroxide injection meter, tubing, and pump. • Flush eyewash and shower; repair as necessary. • Inspect reservoir interior, top and vent, and clean as necessary.
Annually	<ul style="list-style-type: none"> • Check pressure relief valves. • Check and lubricate Encore metering pumps; replace parts with kit when needed. • Acid wash chlorine generator electrolytic cell – TMG Services. • Replace diaphragms in all back pressure, pressure relief valves, and metering pumps. • Test backflow preventers – professional service. • Check fire extinguishers – professional service. • Exercise valves and repair as necessary.

CUSTOMER INQUIRIES

Lyman has a formally documented customer inquiry response procedure. When a customer inquiry is received, water system operators conduct the following sequence of activities:

- Complete Customer Complaint Form;
- Inspect the service line in question;
- Collect water samples for analyses if necessary;
- Report the findings to the customer; and
- Take appropriate action to resolve the water quality issue.

WATER QUALITY MONITORING

System operators conduct water quality monitoring as required under WAC 246-290 requirements. Table 7-3 summarizes the sampling conducted by the water system operators.

TABLE 7-3

Water Quality Monitoring Parameters and Frequencies

Parameter	Sample Location	Sampling Frequency	Next Sample Period
Coliform	Representative points in the distribution system	1 per month	ongoing
IOC	From each source after treatment	every 3 years	2013
SOC	From each source after treatment	every 3 years	2014
VOC	From each source after treatment	every 3 years	2014
Nitrite/Nitrate	From each source after treatment	1 per source per year	2013
Lead and Copper	Representative customer taps	every 3 years	2014
Trihalomethanes	Maximum residence time in distribution system	1 per longest residence time in distribution every 3 years ⁽¹⁾	2013
Haloacetic Acids	Maximum residence time in distribution system	1 per longest residence time in distribution every 3 years ⁽¹⁾	2013
Radionuclides	From each source after treatment	every 4 years	2016
Arsenic	From each source after treatment	same as IOC	same as IOC

(1) During the month of warmest water temperature.

Lyman currently possesses a monitoring waiver for IOC. However, unless another waiver is offered, Lyman will need to sample for IOC in 2013.

VULNERABLE FACILITIES

As a requirement of the water system planning process, Lyman is required to identify the three most critical elements to the supply of water. In the Lyman system, those elements are:

1. Contamination of Groundwater Wells
2. Failure of Well Pumps
3. Electrical Power Outage

Table 7-4 identifies the system elements, the typical failure mode for each element, and the expected repair or replacement time. The repair/replacement time for failure of the well pump or contamination of the well are estimated because these incidences have not occurred.

TABLE 7-4

Vulnerable Facilities

Facility	Failure Mode	Repair/Replacement Time
Well	Collapse/Contamination	2 days or longer
Well Pump	Seals/Motor/Impeller	2 to 3 days
Electrical Power	Outage	Typically 2 to 8 hours
Transmission Mains	Leaks/Failure	Less than 24 hours (typically 4 to 8 hours)
Distribution Mains	Leaks/Failure	Less than 24 hours (typically 2 to 4 hours)
Chemical Feed Pumps	Seals/Motor	1 to 2 days

EMERGENCY RESPONSE PROGRAM

In the case of an emergency that may cause or threaten the ability to provide continuous water service, the Town has a written Emergency Response Plan (ERP) to follow. Copies of the ERP are located in the Maintenance office, Treatment plant, Town Hall and with the Mayor. See Appendix N.

CROSS-CONNECTION CONTROL PROGRAM

The Town also has a formal Cross-Connection Control Program (CCCP). The Town's CCCP is fully implemented. There are three backflow prevention assemblies at the Lyman School and two assemblies in the water treatment plant. These assemblies are all tested annually. Test results are filed in the Water Department office. All water customers are required to complete a Water Use Questionnaire every three years. A new questionnaire is now due and will be mailed with the billing for December usage on

January 2, 2014. New customers are required to complete a Questionnaire before water service is provided. Physical inspection was completed for all commercial connections when the Town's Cross Connection Control Specialist was hired. Subsequent inspections of commercial connections are made whenever new equipment is added or when changes are made to any plumbing. See Appendix D.

DISINFECTION BYPRODUCTS MONITORING PROGRAM

The Town has a formal Disinfection By-Products Monitoring Program that is found in Appendix P.

RECORDKEEPING AND REPORTING

The following items are documented on a regular basis by the Town and archived in the Town Maintenance Office:

- Piping As-Built Drawings
- Water System As-Built Drawings
- Water Rights Information
- Easements

The following items are documented on a regular basis by the Town and archived in the Maintenance office:

- Water Quality Monitoring Results
- Well Pump Flow Totalizer Readings (daily)
- Injection and Distribution System Chlorine Residual Readings (daily)
- Pre and Post-Treatment pH Readings (daily)
- Hydrant Records
- Valve Records
- All Equipment Maintenance Records

CHAPTER 8

CAPITAL IMPROVEMENT PLAN

This chapter presents a Capital Improvement Plan in accordance with the requirements of WAC 246-290. Recommended water system improvements and associated cost and scheduling information are presented in the following sections according to the analyses, deficiencies, and recommendations identified in earlier chapters of the plan. Figure 8-1 provides a map of the proposed project locations. Scheduling and financing of these improvements is included in Chapter 9. Costs shown in this chapter are either planning level costs and are based upon similar projects constructed in Western Washington under public works bidding or based on quotes received from the Town for minor repairs or purchases. Larger project costs assume engineering and administration cost of 25 percent of construction cost, 20 percent construction cost contingency, and sales tax. Detailed cost estimates for the capital improvement projects are included in Appendix Q.

Since the adoption of the Town's 2001 Water System Plan, the following projects identified in that plan have been completed:

- Transmission Main from Storage
- Distribution Improvements
- New Well 1 Facility
- Acquire Land Around Well 1
- Well 1 and 2 Intertie
- Disinfection Facility
- Corrosion Control Facility
- Construction of Reservoir (158,000 gallons)

The remaining projects from the previous capital improvement program that are still considered necessary have been added to the current capital improvement program.

In the future other projects may arise that are not identified as part of the Town's CIP. Such projects may be deemed necessary for ensuring water quality, preserving emergency water supply, accommodating transportation improvements proposed by other agencies, or addressing unforeseen problems with the Town's water system. Any improvements driven by growth will be paid for by the developer requiring water service. Due to budgetary constraints, the completion of these projects may require that the proposed completion date for the projects in the CIP be rescheduled. The Town is committed to doing the most cost effective improvements first, then re-evaluating and prioritizing larger projects based on available financing. The Town retains the flexibility to reschedule proposed projects and to expand or reduce the scope of the proposed projects as best determined by the Town when new information becomes available for evaluation.

The following sections present the recommended general system, source, storage, and distribution improvements.

GENERAL SYSTEM IMPROVEMENTS

G-1 – PURCHASE BACKUP EQUIPMENT

The Town plans to purchase backup equipment, such as chemical pumps and valves, to replace like equipment that is reaching the end of its useful life or malfunctioning.

Year to be Completed: 2019

Estimated Project Cost: \$3,000

G-2 – UPDATE AUTO-READ HANDHELD METER READER

The Town plans to purchase a new auto-read handheld meter reader to replace the current malfunctioning meter reader and improve data logging and usability.

Year to be Completed: 2019

Estimated Project Cost: \$9,000

PROPOSED SOURCE IMPROVEMENTS

SO-1 – WELL 2 IMPROVEMENTS

The Town plans on making improvements to Well 2 to bring the electrical panel up to code, add new lighting for visibility, and to replace the roof.

Year to be Completed: 2016

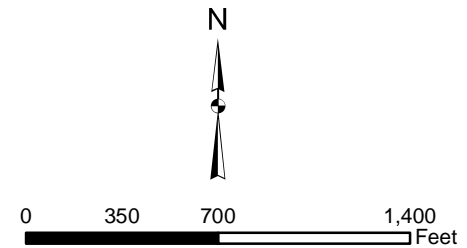
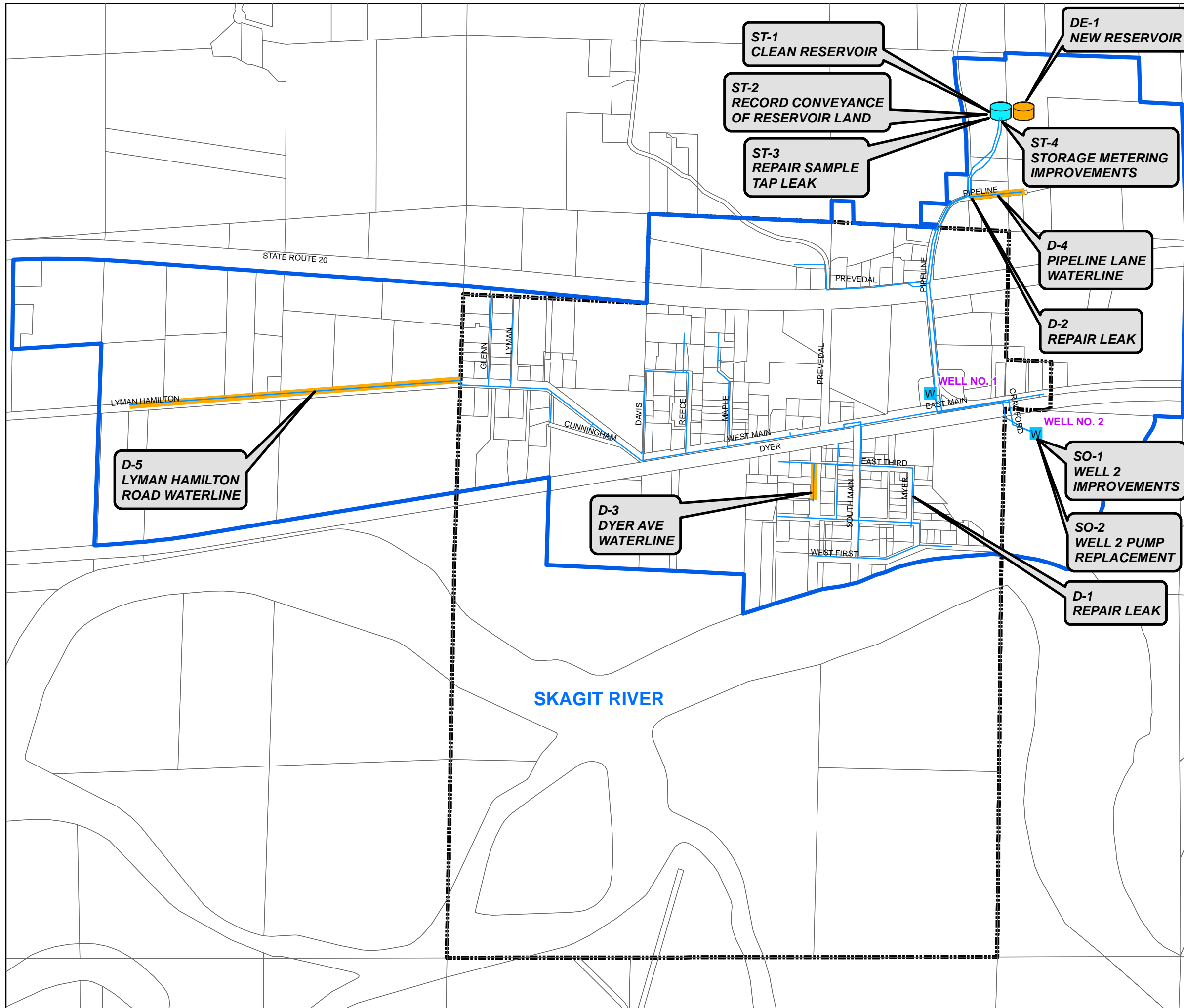
Estimated Project Cost: \$3,500

SO-2 – WELL 2 PUMP REPLACEMENT

The Town plans to replace the submersible pump for Well 2 since it is reaching the end of its useful life.

Year to be Completed: 2022

Estimated Project Cost: \$18,000



TOWN OF LYMAN
 WATER SYSTEM PLAN
 FIGURE 8-1
 CAPITAL IMPROVEMENT PLAN

Gray & Osborne, Inc.

PROPOSED STORAGE IMPROVEMENTS

ST-1 – CLEAN RESERVOIR

The Town's existing reservoir will be cleaned as a part of routine maintenance.

Year to be Completed: 2020

Estimated Project Cost: \$4,000

ST-2 – RECORD CONVEYANCE OF RESERVOIR LAND

The Town owns 0.5 acre around the existing reservoir, but needs to complete the recording of the conveyance documents.

Year to be Completed: 2017

Estimated Project Cost: \$4,000

ST-3 – REPAIR LEAK FROM THE SAMPLE TAP

The Town's sample tap near the reservoir currently leaks when in use and needs to be repaired. The sample tap is currently typically turned off when not in use to prevent leakage.

Year to be Completed: 2018

Estimated Project Cost: \$1,500

ST-4 – STORAGE METERING IMPROVEMENTS

A new meter will be installed at the reservoir site to meter water entering the Town's distribution system. This meter will allow the Town to measure losses in the transmission main from the wells and will also provide the Town with information on peak demands in the distribution system.

Year to be Completed: 2021

Estimated Project Cost: \$21,600

PROPOSED DISTRIBUTION SYSTEM IMPROVEMENTS

The distribution projects will provide the system with increased reliability, system pressures, and fire flows.

D-1 – REPAIR LEAK ON MYER AVENUE

A leak identified during the recent leak detection survey on Myer Avenue has been repaired to reduce DSL. This project was funded by the Town's operating funds.

Year Completed: 2013

Project Cost: \$280

D-2 – REPAIR LEAK ON PIPELINE LANE

A leak identified during the recent leak detection survey on Pipeline Lane has been repaired to reduce DSL. This project was funded by the Town's operating funds.

Year Completed: 2013

Project Cost: \$3,500

D-3 – DYER AVENUE WATERLINE REPLACEMENT

The Town plans to replace approximately 360 LF of 2-inch pipe on Dyer Avenue with new 8-inch PVC pipe. The replacement will include new valves and hydrants for fire flow. These waterlines are nearing the end of their useful life. This project is anticipated to reduce leakage and will provide fire flow to the adjacent area.

Year to be Completed: 2023

Estimated Project Cost: \$96,000

D-4 – PIPELINE LANE WATERLINE REPLACEMENT

The Town plans to replace approximately 420 LF of 2-inch pipe on Pipeline Lane with new 8-inch PVC pipe. The replacement will include new valves and hydrants for fire flow. These waterlines are nearing the end of their useful life. This project is anticipated to reduce leakage and will provide fire flow to the adjacent area.

Year to be Completed: 2028

Estimated Project Cost: \$114,000

D-5 – LYMAN HAMILTON ROAD WATERLINE REPLACEMENT

The Town plans to replace approximately 2,310 LF of 2-inch pipe on Lyman Hamilton Road with new 8-inch PVC pipe. The replacement will include new valves and hydrants for fire flow. These waterlines are nearing the end of their useful life. This project is anticipated to reduce leakage, accommodate infill, and will provide fire flow to the adjacent area.

Year to be Completed: 2030

Estimated Project Cost: \$542,000

DEVELOPER EXTENSIONS AND LOCAL IMPROVEMENT DISTRICTS

Some of the Town's proposed capital improvement projects involve areas that may be further developed within the next 20 years. Where possible, the Town will coordinate with developers to meet the goals of the capital improvement plan, for example, by paying for line upsizing.

DE-1 – NEW RESERVOIR

The Town's existing storage capacity is no longer sufficient to meet the fire flow requirement of 1,500 gpm for 2 hours for new non-residential developments per the 2012 International Fire Code. In order to provide the required storage to any new businesses, an additional reservoir will need to be constructed and will match the capacity of the Town's existing reservoir. This will also provide the Town with redundancy in its storage capacity if a reservoir needs to be taken offline for maintenance. This could be funded by a grant and/or the developer. The developer may also choose to build an on-site reservoir to only account for its individual water and fire flow needs if permitted by the County.

CAPITAL IMPROVEMENT PLAN SCHEDULE

Table 8-1 provides a summary of the capital improvements and a timetable for their completion. Figure 8-1 shows the locations of the capital improvement projects.

TABLE 8-1

Capital Improvement Project Costs and Schedule

No.	Project	Estimated Construction Date	Anticipated Funding Source	Estimated Cost⁽¹⁾
G-1	Purchase Backup Equipment	2019	Grant/Town Funds	\$3,000
G-2	Update Auto-Read Handheld Meter Reader	2019	Grant/Town Funds	\$9,000
SO-1	Improvements to Well 2	2016	Grant/Town Funds	\$3,500
SO-2	Well 2 Pump Replacement	2022	Grant/Town Funds	\$18,000
ST-1	Clean Reservoir	2020	Grant/Town Funds	\$4,000
ST-2	Record Conveyance of Reservoir Land	2017	Grant/Town Funds	\$4,000
ST-3	Repair Leak from Reservoir Sample Tap	2018	Grant/Town Funds	\$1,500
ST-4	Storage Metering Improvements	2021	Grant	\$21,600
D-1	Repair Leak on Myer Avenue ⁽²⁾	2013	Town Funds	\$280
D-2	Repair Leak on Pipeline Lane ⁽²⁾	2013	Town Funds	\$3,500
D-3	Dyer Avenue Waterline Replacement	2023	Grant	\$96,000
D-4	Pipeline Lane Waterline Replacement	2028	Grant	\$114,000
D-5	Lyman Hamilton Road Waterline Replacement	2030	Grant	\$542,000
Total 6-Year CIP (2013-2018)				\$12,780
Total 7 to 20-Year CIP (2019-2033)				\$807,600
Total 20-Year CIP				\$820,380

- (1) All costs in 2013 dollars.
- (2) Completed.

CHAPTER 9

FINANCIAL ANALYSIS

This chapter describes how the Town of Lyman can operate the existing system and finance the water improvements outlined in the previous chapters. Included in this chapter is a review of historical revenues and expenses, a 6-year budget forecast, and a review of rates over the next 6 years to finance operation of the existing system and for constructing recommended capital improvements. Also included is a summary of potential funding sources available for providing grant and loans for funding planning documents and the design and construction of capital projects.

FINANCIAL STATUS OF EXISTING WATER UTILITY

CURRENT WATER RATES

The Town's monthly water rates were last approved by the Town Council in Ordinance No. 208 on March 9, 2010, which is included in Appendix D. Table 9-1 shows base water rates specified under Ordinance No. 208.

TABLE 9-1

Monthly Base Rates

Customer Class	2013 Monthly Base Rate
Low Income	\$11.25
Residential	\$21.70
Business	\$29.75
School 2"	\$70.00

Each customer is also billed by volume for water usage. Table 9-2 details the monthly volume rates specified in Ordinance No. 208.

TABLE 9-2

Monthly Volume Rates

Customer Class	2013 Monthly Volume Rate ⁽¹⁾
Low Income	\$0.0339 per cubic foot
Residential	\$0.0339 per cubic foot
Business	\$0.0364 per cubic foot
School 2"	\$0.0364 per cubic foot

(1) The monthly volume rate was increased by 2 percent in 2012 and 2013 as provided for in Ordinance No. 208.

CURRENT CONNECTION FEES

All new connections pay a water hookup fee based on customer class, plus the cost of the meter assembly. Connections outside the town limits pay the base fee plus all extra costs of installing water meters and materials. Connection charges are summarized in Table 9-3.

TABLE 9-3

Current Connection Charges

Customer Class	2013 Connection Charge ⁽¹⁾
Low Income	\$3,000
Residential	\$3,000
Business	\$3,500
School 2"	\$3,500

(1) New customers also pay the cost of the meter assembly. Connections outside the town limits pay the base fee plus all extra costs of installing water meters and materials.

HISTORICAL REVENUES AND EXPENSES

The Town's historical revenues and expenses for 2008 through 2012 are summarized in Table 9-4.

BUDGET PROJECTION

A budget forecast has been prepared to assess the Town's ability to fund continued operation of the existing system without funding any new capital projects. Table 9-5 shows a budget forecast for the Town's water system. The Town plans to continue to increase base and volume rates annually by 2 percent as provided for in Ordinance No. 208 to compensate for inflation.

TABLE 9-4
Historical Revenues and Expenses

Description	2008	2009	2010	2011	2012
Start of Year Balance	(\$75,465)	(\$14,281)	\$243	\$4,343	\$5,986
Water Sales ⁽¹⁾	\$95,598	\$98,843	\$100,273	\$99,805	\$100,111
Water Excise Tax ⁽²⁾	\$5,872	\$5,768	\$6,203	\$6,321	\$6,382
Other Revenue Sources	\$3,333	\$7,251	\$6,557	\$3,416	\$3,290
Total Revenue	\$104,803	\$111,862	\$113,033	\$109,542	\$109,783
General O&M ⁽³⁾	(\$43,619)	(\$47,397)	(\$52,310)	(\$48,002)	(\$54,532)
Interfund Loan	\$-	(\$2,401)	(\$7,202)	(\$12,813)	(\$12,813)
DWSRF Debt Service ⁽⁴⁾	(\$47,761)	(\$47,540)	(\$47,319)	(\$47,098)	(\$46,876)
Total Expenses	(\$91,380)	(\$97,338)	(\$106,831)	(\$107,913)	(\$114,221)
Net Revenues	\$13,423	\$14,524	\$6,202	\$1,629	(\$4,438)
Non-Revenues	\$47,761	\$-	\$-	\$-	\$-
Non-Expenditures to Water Capital Fund⁽⁵⁾	\$-	\$-	(\$2,104)	(\$972)	\$-
End of Year Balance	(\$14,281)	\$243	\$4,343	\$5,000	\$1,548

- (1) Water sales based on rates effective in January 2013 and 2 percent annual base and volume rate increase thereafter.
- (2) Excise taxes based on projected water sales.
- (3) General expenses projected with inflation.
- (4) Debt service based on existing loans.
- (5) Transfers to Capital Fund based on 6-year Capital Improvement Plan.

TABLE 9-5
Budget Forecast

Description	2013	2014	2015	2016	2017	2018
Start of Year Balance	\$1,548	\$7,414	\$14,357	\$14,357	\$16,357	\$17,357
Water Sales ⁽¹⁾	\$101,111	\$101,802	\$103,838	\$105,915	\$108,035	\$110,196
Water Excise Tax ⁽²⁾	\$6,341	\$6,400	\$6,425	\$6,565	\$6,700	\$6,840
Other Revenue Sources	\$12,075 ⁽⁶⁾	\$5,643	\$3,250	\$3,500	\$3,600	\$3,800
Total Revenue	\$119,527	\$113,845	\$113,513	\$115,980	\$118,335	\$120,836
General O&M ⁽³⁾	(\$54,193)	(\$57,320)	(\$60,572)	(\$61,000)	(\$63,475)	(\$65,500)
Interfund Loan	(\$12,813)	\$-	\$-	\$-	\$-	\$-
DWSRF Debt Service ⁽⁴⁾	(\$46,655)	(\$46,434)	(\$46,213)	(\$45,992)	(\$45,771)	(\$45,550)
Total Expenses	(\$113,661)	(\$103,754)	(\$106,785)	(\$106,992)	(\$109,246)	(\$111,050)
Net Revenues	\$5,866	\$10,091	\$6,728	\$8,988	\$9,089	\$9,786
Non-Revenues	\$-	\$-	\$-	\$-	\$-	\$-
Non-Expenditures to Reserve Fund	\$-	(\$600)	(\$2,000)	(\$2,000)	(\$4,000)	(\$4,000)
Non-Expenditures to Capital Fund⁽⁵⁾	\$-	(\$2,548)	(\$4,728)	(\$4,988)	(\$4,089)	(\$5,786)
End of Year Balance	\$7,414	\$14,357	\$14,357	\$16,357	\$17,357	\$17,357

- (1) Water sales based on rates effective in January 2013 and 2 percent annual base and volume rate increase thereafter.
- (2) Excise taxes based on projected water sales.
- (3) General expenses projected with inflation.
- (4) Debt service based on existing loans. DWSRF loan expires in 2023.
- (5) Transfers to Capital Fund based on 6-year Capital Improvement Plan.
- (6) Includes new connection fees that the Town has received applications for and anticipates payment by the end of the year.

TABLE 9-6

Capital Fund Forecast

Description	2013	2014	2015	2016	2017	2018
Start of Year Balance	\$-	\$0	\$2,548	\$7,276	\$8,764	\$8,853
Transfer from Operating Fund	\$-	\$2,548	\$4,728	\$4,988	\$4,089	\$5,786
Project D-1: Repair Leak on Myer Avenue ⁽²⁾	\$-	\$-	\$-	\$-	\$-	\$-
Project D-2: Repair Leak on Pipeline Lane ⁽²⁾	\$-	\$-	\$-	\$-	\$-	\$-
Project SO-1: Well 2 Improvements	\$-	\$-	\$-	(\$3,500)	\$-	\$0
Project ST-2: Record Conveyance of Reservoir Land	\$-	\$-	\$-	\$-	(\$4,000)	\$-
Project ST-3: Repair Leak at Reservoir Sample Tap	\$-	\$-	\$-	\$-	\$-	(\$1,500)
End of Year Balance	\$-	\$2,548	\$7,276	\$8,764	\$8,853	\$13,139

(1) The capital fund forecast does not include existing funds, which may be used during the current year.

(2) The Town’s operating budget funds were used to fund the repair of the leak on Myer Avenue and Pipeline Lane.

CAPITAL IMPROVEMENT EXPENSES

The Town plans to pursue low interest public loans and grants for the proposed capital improvement projects. Public loans and grants are increasingly competitive and therefore cannot be relied upon for consistent funding. If loan or grant funding is not received, these projects may be deferred until a later date when a loan is received or when sufficient funds have been raised to pay for the projects. See Table 8-1 for anticipated funding sources for other projects.

EXTERNAL SOURCES OF FUNDING

In order to pursue funding to complete capital improvement projects, the Town will closely monitor future opportunities to obtain grant funds. The following are funding sources that may be available to the Town for funding water system capital improvement projects.

Skagit County Economic Development Public Facility Program

The Skagit County Economic Development Public Facility Program is funded by keeping 0.8 percent of the sales tax collected in Skagit County. This program is available to local governments with projects that will encourage new employment opportunities in the county.

Washington State Department of Health

In Washington State, the Drinking Water State Revolving Fund (DWSRF) is managed by the Department of Health (DOH) Division of Drinking Water.

DWSRF loans are available to assist community public water systems and non-profit non-community public water systems, except federally owned and state-owned systems. The loans may be used to address State Drinking Water Act (SDWA) health standard violations, replace infrastructure for SDWA compliance, or consolidate supplies and acquire property if needed for SDWA compliance.

Public Works Trust Fund

The Public Works Trust Fund (PWTF) loan program is a loan program set up by the Legislature to assist cities, towns, counties, or special districts with funding for different types of public works projects. The emphasis of allocating funds for water and sewer systems is based on replacement and/or repair of existing systems. No funds will be allocated to install a new system. Rather, funds will be granted to rehabilitate or replace existing infrastructure serving an existing population.

U.S. Department of Agriculture, Rural Development

Loan monies are available through USDA Rural Development (RD) for the preliminary engineering, design, construction, and startup of new water system facility projects. The application process allows for a thorough review of the engineering, environmental, and financial impacts of proposed projects before extending a loan offer. The RD loan program offers interest rates lower than municipal bonds and up to a 40-year term. The RD loan program requires some form of interim financing, as loan monies are made available after completion of the construction activity.

Community Development Block Grant

The state Community Development Block Grant (CDBG) program provides funds to local governments on a competitive basis for public facilities, community facilities, economic development, affordable housing, public services and planning projects that principally benefit low- and moderate-income persons. The CDBG Program improves the economic, social and physical environment of eligible, rural cities and counties to enhance the quality of life for low- and moderate-income residents, and as a result, assists the entire community. Activities must principally benefit low- and moderate-income persons. Applicants may submit one request per fund each program year.

While the above list of possible grant and loan opportunities for the Town is not exhaustive, it does however, highlight the most probable outside funding sources, excluding revenue bonds, available to the Town for its Capital Improvement Plan.

APPENDIX A

DOH WATER FACILITIES INVENTORY AND FORMS



WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 2
Updated: 02/05/2013
Printed: 4/15/2013

WFI Printed For: On-Demand
Submission Reason: Annual Update

RETURN TO: Northwest Regional Office, 20425 72nd Ave S STE 310, Kent, WA, 98032

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
49050 0	LYMAN WATER DEPARTMENT	SKAGIT	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 003500
MARK H. KITCHEN [OPERATOR] PO BOX 1248 LYMAN, WA 98263	LYMAN, TOWN OF DEBRA HEINZMAN PO BOX 1248 LYMAN, WA 98263	TITLE: MAYOR
STREET ADDRESS IF DIFFERENT FROM ABOVE		STREET ADDRESS IF DIFFERENT FROM
ATTN ADDRESS CITY STATE ZIP		ATTN ADDRESS 8405 S MAIN CITY LYMAN STATE WA ZIP 98263

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 661-6417	Owner Daytime Phone: (360) 826-3033
Primary Contact Mobile/Cell Phone: (360) 661-6417	Owner Mobile/Cell Phone: (360) 333-7631
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax: (360) 826-6473 E-mail: XXXXXX	Owner Fax Phone: E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

Not applicable (Skip to #12)

Owned and Managed SMA NAME: _____ SMA Number: _____

Managed Only

Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

<input type="checkbox"/> Agricultural	<input type="checkbox"/> Hospital/Clinic	<input checked="" type="checkbox"/> Residential
<input checked="" type="checkbox"/> Commercial / Business	<input type="checkbox"/> Industrial	<input checked="" type="checkbox"/> School
<input checked="" type="checkbox"/> Day Care	<input type="checkbox"/> Licensed Residential Facility	<input type="checkbox"/> Temporary Farm Worker
<input checked="" type="checkbox"/> Food Service/Food Permit	<input type="checkbox"/> Lodging	<input checked="" type="checkbox"/> Other (church, fire station, etc.): _____
<input type="checkbox"/> 1,000 or more person event for 2 or more days per year	<input type="checkbox"/> Recreational / RV Park	

13. WATER SYSTEM OWNERSHIP (mark only one)	14. STORAGE CAPACITY (gallons)
<input type="checkbox"/> Association <input type="checkbox"/> County <input type="checkbox"/> Investor <input type="checkbox"/> Special District <input checked="" type="checkbox"/> City / Town <input type="checkbox"/> Federal <input type="checkbox"/> Private <input type="checkbox"/> State	158,000

15 Source Number	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY											19 USE	20	21 TREATMENT					22 DEPTH	23	24 SOURCE LOCATION			
			WELL	WELL FIELD	WELL IN A WELL	SPRING	SPRING IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL			EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION			FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET
S01	WELL # 1 AKF855		X											X	Y	X				X	35	210	SE NE	17	35N	06E
S02	WELL # 2 ABR314		X												X	Y	X			X	41	190	NW NE	17	35N	06E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID 49050 0	2. SYSTEM NAME LYMAN WATER DEPARTMENT	3. COUNTY SKAGIT	4. GROUP A	5. TYPE Comm
--------------------------------	---	----------------------------	----------------------	------------------------

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)	0	202	257
A. Full Time Single Family Residences (Occupied 180 days or more per year)	202		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	0		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	15	15	15
28. TOTAL SERVICE CONNECTIONS		217	272

29. FULL-TIME RESIDENTIAL POPULATION	
A. How many residents are served by this system 180 or more days per	473

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?												
B. How many days per month is water accessible to the public?												

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?	200	200	200	200	200	20	20	20	200	200	200	200
B. How many days per month are they present?	18	18	20	18	20	30	31	31	20	20	18	20

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	1	1	1	1	1	1	1	1	1	1	1	1

35. Reason for Submitting WFI:

Update - Change
 Update - No Change
 Inactivate
 Re-Activate
 Name Change
 New System
 Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WS ID **WS Name**

49050 LYMAN WATER DEPARTMENT

Total WFI Printed: 1

Water System Plan (WSP) Pre-Plan Agenda

Chapter	√Required	Content Description	WSP Page #
Chapter 1		Description of Water System	
	(√)	Ownership and management	1-1
	(√)	System history and background	1-2
	(√)	Inventory of existing facilities	Appendix A, Figures: 1-8, 1-4
	(√)	Related plans: Coordinated Water System Plan (CWSP), Comp./Community	1-1
	(√)	Information & Maps: Service area, identify retail service area ★, designated land use and zoning, future comprehensive plan request for changes to land use, & agreements	Figures: 1-4, 1-5 Appendix E
	(√)	Policies: Service area, SMA, conditions of service, annexation	p 1-5, 1-6 Appendix E
	(√)	Duty to serve ★ requirement: identify process, timeframes, conditions, appeals	1-3
	(√)	Consistency from local planning ★ agency	Appendix R
	(?)	Consistency for local watershed★ (Ecology comments)	_____
Chapter 2		Basic Planning Data	_____
	(√)	Current water use: Population, service connections, & ERUs and data reporting	2-2, 2-3, 2-6
	(√)	Consecutive 6 & 20th year projections: Population, service connections, & ERUs	2-9
	(√)	Consecutive 6 & 20th year projections: Demand forecasts w/ & w/o expected efficiency savings ★	5-6
	(√)	Monthly and annual production. Totals per source. Water Supply Characteristics ★	2-5
	(?)	Annual usage for water supplied to other systems	NA
	(√)	Annual usage by customer class. Demand Characteristics (see Ch.4) ★	2-4
	(√)	Historical total water loss (DSL) – percent and volumes★	2-5
	(√)	>1000, seasonal variations in consumption by customer class ★	2-5*
Chapter 3		System Analysis	
	(√)	Capacity analysis with water right self assessment (3 forms DOH/ECY per MOU: Existing, 6, and 20-year projections)	Appendix B
	(√)	System design standards	Appendix C
	(√)	Water quality analysis	Chapter 4
	(√)	System inventory, description and analysis	3-3
	(√)	Source	3-4
	(√)	Treatment	3-7
	(√)	Storage	3-8
	(√)	Distribution system/hydraulics	3-11
	(√)	Summary of system deficiencies	3-14
	(√)	Analysis of possible improvement projects	Chapter 8
Chapter 4		Water Use Efficiency Program and Water Resource Analysis	_____
	(√)	Water Use Efficiency Program per WAC 246-290-810 ★ Budget line item for	Chapter 5

<i>√Required</i>	Content Description	WSP Page #
(√)	measures.★ >1,000 Estimate water savings from measures past six years.★ Source & Service Meters/Or schedule w/activities to minimize leakage★	5-1
(√)	Water supply and demand characteristics – Subtitles with description & discussion on effect of water use★	1-4, 3-3, 3-4
(?)	Source of supply analysis and evaluation of supply alternatives	3-4
(?)	Interties	N/A
()	≥1,000 connections explore reclaimed water opportunities★	N/A
Chapter 5	Source Water Protection (Check One or Both)	
(√)	Wellhead protection program	Chapter 6
()	Watershed control program	N/A
Chapter 6	Operation and Maintenance Program	
(√)	Water system management and personnel	7-1
(√)	Operator certification	7-1
(√)	Routine operating procedures and preventive maintenance	7-2
(√)	Water quality sampling procedures & program – Identify WQ PN Requirements	7-2
(√)	Coliform monitoring plan/map. Add Ground Water Rule (GWR) narrative, actions	Appendix H
(√)	Emergency program, water shortage plan, service reliability per WAC 246-290-420	7-4
(√)	Address sanitary survey findings	
(√)	Cross-connection control program – Summarize next actions to address	Appendix D
(√)	Recordkeeping, reporting, and customer complaint program	7-4
(√)	Summary of O&M deficiencies	3-15
Chapter 7	Distribution Facilities Design and Construction Standards	
(?)	Standard construction specification for distribution mains	Appendix C
Chapter 8	Improvement Program	
(√)	Capital improvement schedule for 6 and 20 years	8-6
Chapter 9	Financial Program	
()	≥1000 connections – Balanced 1-year budget – recommend 6 years	N/A
(√)	<1000 connections – Balanced 6-year budget, w/ Financial Viability	9-4
(√)	Revenue and cash flow stability to fund capital and emergency improvements	9-5
(√)	Evaluation of affordable rate structure that encourages water demand efficiency★ Budget line item if Water Loss Control Action Plan is required★	5-7
Chapter 10	Miscellaneous Documents	
(√)	Meeting of the consumers (documentation). Approval by EGB prior to DOH approval (per WAC Change in 2007)★	Appendix R
(√)	County/Adjacent Utility Correspondence	Appendix R
()	≥1000 connections - State Environmental Policy Act (SEPA) Determination	N/A
(?)	Agreements (intertie, service area, franchise, etc.)	Appendix E

<i>√Required</i>	<i>Content Description</i>	<i>WSP Page #</i>
(?)	Satellite Management Program	<u>N/A</u>



Water System Plan Submittal Form

This form must be completed and submitted along with the Water System Plan (WSP). It will expedite review and approval of your WSP. **All water systems should contact their regional planner before developing any planning document for submittal.**

<u>LYMAN WATER DEPARTMENT</u>	<u>003500</u>	<u>TOWN OF LYMAN</u>	
1. Water System Name	PWS ID# or Owner ID#	System Owner Name	
<u>DEBRA HEINZMAN</u>	<u>(360) 826- 3033</u>	<u>MAYOR</u>	
Contact Name for Utility	Phone Number	Title	
<u>PO BOX 1248</u>	<u>LYMAN</u>	<u>WASHINGTON</u>	<u>98263</u>
Contact Address	City	State	Zip
<u>JOSEF DALAELI</u>	<u>(206) 284- 0860</u>	<u>PROFESSIONAL ENGINEER</u>	
2. Project Engineer	Phone Number	Title	
<u>701 DEXTER AVE N. SUITE 200</u>	<u>SEATTLE</u>	<u>WASHINGTON</u>	<u>98109</u>
Project Engineer Address	City	State	Zip
<u>3. Billing Contact Name (required if not the same as #4)</u>	<u>Billing Phone Number</u>	<u>Billing Fax Number</u>	
<u>Billing Address</u>	<u>City</u>	<u>State</u>	<u>Zip</u>

4. How many services are presently connected to the system? 217
5. Is the system expanding? (seeking to extend service area or increase number of approved connections) Yes No
6. If number of services is expected to increase, how many new connections are proposed in the next six years? 21
7. If the system is private-for-profit, is it regulated by the State Utilities and Transportation Commission? Yes No
8. Is the system located in a Critical Water Supply Service Area (i.e., have a Coordinated Water System Plan)? Yes No
9. Is the system a customer of a wholesale water purveyor? Yes No
10. Will the system be pursuing additional water rights from the State Department of Ecology in the next twenty years? Yes No
11. Is the system proposing a new intertie? Yes No
12. Do you have projects currently under review by the Department of Health? Yes No
13. Are you requesting distribution main project report and construction document submittal exception, and if so, does the WSP contain standard construction specifications for distribution mains? Yes No
14. Are you requesting distribution related project report and construction document submittal exception, and if so, does the WSP contain distribution facilities design and construction standards, including internal engineering review procedures? Yes No
15. The purveyor is responsible for sending a copy of the WSP to adjacent utilities for review or a letter notifying them that a copy of the WSP is available for their review and where the review copy is located. Has this been completed? Yes No
16. The purveyor is responsible for sending a copy of the WSP to all local governments within the service area. (County and City Planning Departments, etc). Has this been completed? Yes No
17. Are you proposing a change in the place of use of your water right? Yes No

If answer to questions 7,8, 11, 15and/or 16 is "yes," list who you sent the WSP to: SKAGIT COUNTY,

Is this plan: an Initial Submittal a Revised Submittal

Please enclose the following number of copies of the WSP:
3 copies for Northwest and Southwest Regional Offices **OR** 2 copies for Eastern Regional Office (We will send one copy to Ecology)
1 additional copy if you answered "yes" to question 7. Total copies attached

Please return completed form to the Office of Drinking Water regional office checked below.

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> Northwest Drinking Water Operations
Department of Health
20425 72 nd Avenue South, Suite 310
Kent, WA 98032-2358
(253) 395-6750 | <input type="checkbox"/> Southwest Drinking Water Operations
Department of Health
PO Box 47823
Olympia, WA 98504-7823
(360) 236-3030 | <input type="checkbox"/> Eastern Drinking Water Operations
Department of Health
16201 East Indiana Avenue Suite 1500
Spokane Valley, WA 99216
(509) 329-2100 |
|--|--|--|

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD, call (800) 833-6388.

APPENDIX B

WATER RIGHT CERTIFICATES

Table 1
WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – EXISTING STATUS

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		EXISTING CONSUMPTION		CURRENT WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1. GWC 4041	Town of Lyman	1961	Well #1/ Well #2		700 gpm	108 acre-ft	558 gpm	53.5 acre-ft	142 gpm	54.5 acre-ft
TOTAL	*****	*****	*****	*****	700 gpm	108 acre-ft	558 gpm	53.5 acre-ft	142 gpm	54.5 acre-ft
INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		EXISTING CONSUMPTION THROUGH INTERTIE		CURRENT INTERTIE SUPPLY STATUS (Excess/Deficiency)				
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)			
1.										
2.										
3.										
4.										
TOTAL	*****									
PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS						
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested					
1.										
2.										
3.										
4.										

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DOH Form 331-371 (Updated 08/10)

To return form, please see reverse side.



Table 2

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 6 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (6-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1. GWC 4041	Town of Lyman	1961	Well #1/ Well #2		700 gpm	108 acre-ft	558 gpm	61.5 acre-ft	142 gpm	46.5 acre-ft
TOTAL	*****	*****	*****	*****	700 gpm	108 acre-ft	558 gpm	61.5 acre-ft	142 gpm	46.5 acre-ft
INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)				
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)			
1.										
2.										
3.										
4.										
TOTAL	*****									
PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS						
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested					
1.										
2.										
3.										
4.										

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DOH Form 331-372 (Updated 08/10)

To return form, please see reverse side.



Table 3

WATER SYSTEM PLAN

WATER RIGHTS SELF ASSESSMENT – 20 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (20-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1. GWC 4041	Town of Lyman	1961	Well #1/ Well #2		700 gpm	108 acre-ft	558 gpm	70.2 acre-ft	142 gpm	37.8 acre-ft
TOTAL	*****	*****	*****	*****	700 gpm	108 acre-ft	558 gpm	70.2 acre-ft	142 gpm	37.8 acre-ft
INTERTIE NAME/ IDENTIFIER		NAME OF PURVEYOR PROVIDING WATER			EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.										
2.										
3.										
4.										
TOTAL		*****								
PENDING WATER RIGHT APPLICATION (New/Change)		NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS					
					Maximum Instantaneous Flow Rate (Qi) Requested		Maximum Annual Volume (Qa) Requested			
1.										
2.										
3.										
4.										

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

DOH Form 331-373 (Updated 08/10)

To return form, please see reverse side.

Report of Examination on Ground Water

Received date 7-5-61 Date of exam 7-11-61 Appl. No. 5989
 Name Town of Lyman Address Lyman, Wash.
 Type of works well Dimensions 12"x34"
 Progress of works started - in that pump has been installed, but mains not connected.
 Quantity applied for 1500 g.p.m. _____ acre-feet per year
 Legal sub. NW 1/4 NE 1 Sec. 17 Twp. 35 N. Rge. 6 E. County Skagit
 Use municipal supply
 Irrigation-acreage: Present _____ Planned _____ Feasible _____
 Municipal: Population 435 as of the present
 Industrial _____
 Time pump will be operated continuously
 Other water rights appurtenant to this land see below
 Proximity to existing works, springs, wells, or streams Wallace Crawford SE 800'
 Area _____ Sub-area _____ Zone _____

RECOMMENDATIONS

Approved for 1500 g.p.m. 108 acre-feet per year, subject to existing well all water rights (1 acre-foot 325,850 gallons).
 The installation of an access port to Town of Lyman is derived from a surface water source, Jones Creek. This source has reportedly been in use for about 40 years, however, this office has no record of this diversion. If beneficial use had been made of the waters of Jones Creek prior to June, 1917, the town would probably enjoy a vested right for the use of these waters, but if use was initiated after that date, rights should be established by filing with this office.
 The water requirement for the Town of Lyman is based upon a per capita demand of 200 gallons per day, a present population of 435 plus 10% increase making a total of about 480 persons, or a total annual withdrawal of 108 acre-feet.


 WILLIAM R. SMITH, Geologist

Signed this 22nd day of August, 1961.
 Division of Water Resources

Permit to appropriate Public Ground Waters of the State of Washington

Book No. 12 of Ground Water Permits, on page 5641 under Application No. 5949

TOWN OF LYMAN, WASHINGTON

is hereby granted a permit to appropriate the following described public ground waters of the State of Washington, subject to existing rights, and to the limitations and provisions set out herein.

Priority date of this permit is July 5, 1961

Source of the proposed ground water appropriation is a well

within _____ area, _____ sub-area

zone. Name or number of works is _____

Quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 1500 gallons per minute; 106 acre-feet per year, to be used for the following purposes: municipal supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is 1050 feet south and 550 feet east of the north quarter corner of sec. 17

being within NW 1/4, sec. 17, T. 35 N., R. 6 E., W. 2

county of Snohomish

Use, or uses to which water is to be applied:

For municipal supply: 1500 gallons per minute; 106 acre-feet per year, to supply the town of Lyman.

For irrigation: _____ gallons per minute; _____ acre-feet per year, for the irrigation of _____ acres.

For miscellaneous uses: _____ gallons per minute; _____ acre-feet per year, for _____

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Town of Lyman, Snohomish County, Washington.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
FOR APPLICATION FOR CHANGE OF WATER RIGHT

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

Ground Water (based in accordance with the provisions of Chapter 120, Laws of Washington for 1948, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PROPERTY DATE July 5, 1961	APPLICATION NUMBER 5989	PERMIT NUMBER 5641	CERTIFICATE NUMBER 4041
-------------------------------	----------------------------	-----------------------	----------------------------

NAME
Town of Lyman

ADDRESS (CITY/ST)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 1248	Lyman	Washington	98263

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
2 Wells

TRIBUTARY OF (IF SURFACE WATER)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	700	108

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
Well #1 - 1050 feet south and 950 feet east of the N $\frac{1}{4}$ corner of Section 17 (NW $\frac{1}{4}$ NE $\frac{1}{4}$).
This change adds:
Well #2 - 1600 feet south and 1600 feet east of the N $\frac{1}{4}$ corner of Section 17 (SE $\frac{1}{4}$ NE $\frac{1}{4}$).

LOCAL TIES WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W. & S.	WRLA	COUNTY
	17	35	6E	4/3	Skagit

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Lyman Water Department as described in the most recent DOH approved Water System Plan.

DESCRIPTION OF PROPOSED WORKS

Well #1 - 12" x 37'

Well #2 - 10" x 56'

DEVELOPMENT SCHEDULE

BEGUN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Begun	Complete	In Use

REPORT

BACKGROUND:

Ground water application for change to:	GWC 4041
Name:	Town of Lyman, Washington
Priority date:	July 5, 1961
Application for change received:	February 9, 1993
Use:	Municipal supply - continuously
Purpose of Change:	To add an additional point of withdrawal
Legal notice published in:	<u>The Skagit Valley Herald</u>
Date:	March 16 and 23, 1993
Protests:	None

Evaluation criteria for water right applications are: (chapter 90.03 RCW)

- Availability of water
- Proposed use must be beneficial
- Existing water rights are not impaired
- Proposed use must be in the public interest

Applications for change to an existing water right are evaluated according to RCW 90.03.380 which states that "the point of diversion of water for beneficial use... may be changed, if such change can be made without detriment or injury to existing rights."

INVESTIGATIONS:

Date of Field Examination: February 7, 1996

This application was submitted to add a point of withdrawal under Ground Water Certificate (GWC) 4041. GWC 4041 was issued in 1961 for 700 gallons per minute and 108 acre-feet per year for municipal supply from a well (Well #1). Prior to that time, the main supply of water for the Town of Lyman was a surface water diversion from Jones Creek. No water right was applied for or issued for the diversion from Jones Creek. In 1978, the Jones Creek surface water system was discontinued, and groundwater became the sole water supply.

WELL #1

Well Characteristics

Date completed:	1961
Dimensions:	12" x 37'
Static Water Level (SWL):	7.7'
Slotted casing from:	24.7' to 34.7'
Screened from:	34.7' to 37'
Intake:	33'

Pump: 25 HP submersible

Well #1 became the primary source for the Town of Lyman in 1978. Major improvements were made to the system at that time. Well #2 was drilled in 1979 as a backup supply.

At this time, well #1 is not an approved source by the State Department of Health (DOH) because it is within the Skagit River flood plain. Flood water was higher than the well casing during the November 1995 flood. This creates a serious concern for contamination with pathogenic bacteria. In addition, well #1 does not have a 100' setback from a roadway. The Town of Lyman is currently in the process of negotiating an approval from the Department of Health.

WELL #2

Well Characteristics

Date completed:	1979
Dimensions:	10' x 56'
Static Water Level (SWL):	14.25'
Screened from:	41' to 50'
Intake:	45'

Pump: 25 HP submersible

The Town of Lyman has submitted this application for change so that well #2 can be used as the primary source. Temporary Authorization was granted by Ecology to the town of Lyman to use well #2 as the primary source on November 10, 1993. Before that time, well #2 was used principally during periods of high water from flooding of the Skagit River.

Lyman has submitted an application to DOH, requesting that well #1 become an approved source so that it can be used as a backup for well #2. Aquifer testing on well #1 has been completed.

There have been no other water rights issued in Section 17. There is a well log for one exempt well (Trueman) in Section 17, located approximately ¼ mile away. The Trueman well is no longer in use. There are no ground water claims in Section 17. Mr. Ralph Clemons reported an old well located approximately 300 feet away from well #2. Mr. Clemons is currently served water by the Town of Lyman, but maintains the old well as a back-up supply.

Investigation showed no evidence of wetlands in the area.

Changing the existing certificate of water right to add a new well is in keeping with the intent of the Growth Management Act. No additional quantity is requested by the Town of Lyman.

CONCLUSIONS:

The conclusions made regarding the areas of investigation are:

- Water is available, as determined by pump testing
- Municipal supply is defined as a beneficial use
- Existing water rights will not be impaired
- It is in the public interest

In accordance with chapter 90.03 RCW, specifically RCW 90.03.380, and chapter 90.44 RCW, it is concluded that existing water rights will not be impaired. Water is available for the beneficial use proposed, and the appropriation will not be detrimental to the public welfare.

RECOMMENDATIONS:

It is recommended that this application for change be approved and a superseding certificate issued for 700 gpm and 108 acre-feet per year for municipal supply - continuously, subject to the following conditions and provisions:

The water source and/or water transmission facilities are not wholly located upon the land owned by the applicant. Issuance of a certificate of change by this department for appropriation of the waters in question does not convey a right of access to, or other right to use land which the applicant does not legally possess. Obtainment of such right is a private matter between applicant and owner of that land.

This certificate of change is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements: Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, March 1994, which are attached.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An airline and gauge may be installed in addition to the access port.

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

In order to protect the resource, static water level (SWL) shall be measured at least once each month. Measurements shall be taken after the pump has been shut off a reasonable time to allow water level to return to normal. Ecology's Water Resources section (NWRO) shall be notified if a below normal seasonal drop is measured in SWL, otherwise this data shall be maintained and be made available to Ecology upon request. See attached form.

REPORT BY: Buck Smith DATE: 2/22/96

APPENDIX C
DESIGN STANDARDS AND DETAILS

TOWN OF LYMAN WATER SYSTEM STANDARDS

GENERAL

- A. The standards established by this chapter are intended to represent the minimum standards for the design and construction of water system facilities. Greater or lesser requirements may be mandated by the Town due to localized conditions. Extensions, connections or modifications to the existing system shall be in compliance with the requirements of the State Department of Health and the Department of Ecology as applicable.
- B. Off-site improvements to the existing system may be warranted based on (1) the condition and capacity of the existing water system and (2) impacts caused by the proposed development. These off-site improvements (in addition to “on-site improvements) shall be completed as determined by the Town staff to mitigate impacts caused by the development.
- C. All water mains shall have a capacity at least 150% of the expected maximum size required for the development.
- D. All water systems shall have telemetry satisfactory to the Town staff on all associated lines, tanks, reservoirs, pumps, valves, and associated vaults and buildings for sampling and monitoring those items such as chlorination, turbidity, pressure, levels, flow, and status, which may be required by the Town staff.
- E. All water booster pump stations shall be equipped with on-site auxiliary power capability sufficient to ensure the station is operable during a power outage.

DESIGN STANDARDS

- A. The design of water system improvements shall depend on their type and local site conditions. The design elements of water system improvements shall conform to the standards as set forth in these standards.
- B. Detailed plans which provide the locations, size, and type of the proposed water system and points of connection shall be submitted for the Town’s review.
- C. Project plans shall have a horizontal scale of not more than 50 feet to the inch. Plans shall show:

1. Locations of streets, right-of-ways, existing utilities, and water system facilities;
 2. Ground surface, pipe type and size, water valves, and hydrants stationing;
 3. All known existing structures, both above and below ground, which might interfere with the proposed construction, particularly gas mains, storm drains, telephone lines, television cables, and overhead and underground power lines;
 4. All utility easements, and applicable County recording number(s); and
 5. Computations and other data used for design of the water system shall be submitted to the Town for approval.
- D. The water system facilities shall be constructed in conformance with the current version of the Standard Specifications for Road, Bridge, & Municipal Construction and current amendments thereto, State of Washington, revised as to form to make reference to Local Governments and as modified by the Town's requirements and standards.
- E. Material and installation specifications shall contain appropriate requirements that have been established by the industry in its technical publications, such as ASTM, AWWA, WPCF, and APWA standards. Requirements shall be set forth in the specifications for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints.
- F. Except as otherwise noted herein, all work shall be accomplished as recommended in applicable American Water Works Association (AWWA) Standards, and according to the recommendations of the manufacturer of the material or equipment concerned.
- G. The location of the water mains, valves, hydrants, and principal fittings including modifications shall be staked by the Developer. No deviation shall be made from the required line or grade. The Contractor shall verify and protect all underground and surface utilities encountered during the progress of this work.
- H. Prior to final inspection, all pipelines shall be tested and disinfected.
- I. Before acceptance of the water system by the Town, all pipes, assemblies, and other appurtenances shall be cleaned of all debris and foreign material.

After all other work is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections for a new roadway consistent with the original section.

- J. The Developer shall be required, upon completion of the work and prior to acceptance by the Town, to furnish the Town with a written guarantee covering all material and workmanship for a period of three years after the date of final acceptance and he shall make all necessary repairs during that period at his own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship. The Developer shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required and shall deliver copies to the Town upon completion of the work.

GENERAL REQUIREMENTS

- A. Prior to construction, the Contractor shall schedule a pre-construction meeting with the Town staff, stakeholders, and all other interested parties.
- B. Work shall be performed only by contractors experienced in laying public water mains.
- C. Prior to any work being performed, the Contractor shall contact the Town staff to set forth his proposed work schedule.
- D. Contractor shall obtain approval of materials to be used from the Town staff prior to ordering of materials.
- E. Water mains shall be laid only in dedicated street, rights-of-ways or easements shown on preliminary plats or which have been granted to the Town. A street is normally not considered dedicated until the plat which created it has been officially filed with the County Auditor.
- F. All water main distribution pipeline construction shall have a minimum 36" cover from finished grade (Standard Detail WA-MAIN or WA-MAIN2). Mains shall generally be located parallel to and 10 feet northerly or easterly of street centerline. Water mains shall be extended to the far property line(s) of the property being served. Off-site extensions may be required to hydraulically loop existing and new systems. Oversizing of water mains may be required to be installed per Town's current Water System Plan.

- G. Water main pipe and service connections shall be a minimum of 10 feet away from building foundations and/or roof lines.
- H. Air relief valves are required at high points in water lines. Air relief valves shall be installed in accordance with Standard Detail AIR-RLS.
- I. Fire hydrants are generally required approximately every 600 feet in residential areas, and every 300 feet in commercial areas. However, fire hydrants shall be furnished and installed at all locations as specifically mandated by the local fire marshal and/or per Town Building Code. Refer to Standard Detail FIRE-HYD, FIRE-HYD2, FIRE-HYD3, FIRE-HYD4, and FIRE-HYD5 for information regarding fire hydrant installation.
- J. Fire hydrants on dead end streets and roads shall be located within approximately 300 feet from the frontage center of the farthest lot. Distances required herein shall be measured linearly along street or road.
- K. Pipes connecting hydrants to mains shall be at least 6 inch in diameter and be less than 17 feet in length.
- L. Dead end lines are not permitted except where the Developer can demonstrate to the Town's satisfaction that it would be impractical to extend the line at a future date. Water mains on platted cul-de-sacs shall extend to the plat line beyond the cul-de-sac to neighboring property for a convenient future connection, and extended off-site to create a hydraulic loop, or, as minimum, have a four (4") inch blow off assembly installed at the termination point (Standard Detail BLOW-OFF).
- M. All materials shall be new and undamaged.
- N. Unless otherwise approved or required by the Town, the water main shall be ductile iron. HDPE or C-900 PVC pipe may be appropriate in special circumstances and must receive specific approval from the Town staff. The minimum nominal size for water mains shall be 8 inches, unless otherwise approved/required by Town.
- O. Fittings shall be compatible with HDPE, C-900 PVC, and ductile iron as appropriate. Ductile iron fittings shall be cement-lined.
- P. Provide bends in field to suit construction and in accordance with pipe manufacturer's recommendations so as not to exceed allowable deflection at pipe joints.
- Q. Provide thrust blocking and/or restrained joints at all fittings and bends in accordance with the Town standards and conditions (Standard Detail

THUR-BLO and Standard Detail DUCT-PIP). Blocking is to be designed by Developer's Engineer.

- R. Provide anchor blocking at all up-thrust vertical bends in accordance with Town standards (Standard Detail ANCH-BLO). Blocking is to be designed by Developer's Engineer.
- S. Water valves shall be located in clusters when possible and shall be located so that each leg of the main line system can be isolated separately.
- T. All water valve marker posts shall be painted yellow and marked with the distance to valve being referenced (Standard Detail AIR-RLS).
- U. Residential water service pipe shall be PE or PVC pipe (no joints beneath pavement areas), meeting or exceed ASTM D2239, SDR-7 as manufactured by Driscopipe (CL 200), or Town approved equal (Standard Detail WAT-SERV).
- V. Minimum size service lines between the water main and the water meter shall be 1 inch unless otherwise specified (Standard Detail WAT-SERV). All service lines shall be the minimum size otherwise specified by the Uniform Plumbing Code in accordance with fixture units, unless otherwise specified.
- W. Meter services and meter boxes shall be set to final grade and all adjustments shall be made prior to final pressure testing of the system, centerline of service inlets shall be located to match bottom elevation of meter box in such a manner that meter inlet and outlet will be the same elevation as bottom of meter box. Refer to Standard Detail WAT-SERV or WAT-SERV2 for required materials and installation information for water services 2" and smaller. Refer to Standard Detail WAT-SERV3 for required materials and installation information for water services 3" and larger.
- X. All water services shall end within road right-of-way or easements.
- Y. All meters shall be installed by the Town, and the Developer shall pay the current meter installation charge.
- Z. All meters shall be compatible with the radio-read meter system used by the Town.

- AA. All new construction shall comply with the "Accepted Procedure and Practice in Cross Connection Control Manual" as published by the Pacific Northwest Section of the American Water Works Committee, November 1995, Sixth Edition, and current amendments thereto. A copy of such is available for review at the Town office. Where required, backflow and cross-control devices will be installed.
- BB. Cut in connections shall not be made on Fridays, holidays or weekends. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains.
- CC. Contractor shall notify the Town staff and obtain approval from the Town prior to any water shut-off or turn-on, affecting the water system, a minimum of 48 hours in advance.
- DD. Biological test samples will be taken by the Town and paid for by the contractor.
- EE. All water mains and appurtenances shall be hydrostatically tested at 200 psi in accordance with Town Standards.
- FF. Resilient seated wedge gate valves shall be used for 10-inch mains and smaller. Butterfly valves shall be used for mains greater than 10 inches.
- GG. Road restoration shall be in accordance with Town, County and State design and construction standards, as may be applicable. Developer and Contractor shall become familiar with all Town, County and State conditions of required permits, and shall adhere to all conditions and requirements.

MATERIALS

- A. Water Mains & Fittings
 - 1. Water mains to be installed shall be ductile iron or if approved by the Town, C-900 PVC or HDPE.
- B. Ductile Iron Pipe and Fittings:
 - 1. Ductile iron pipe shall conform to ANSI/AWWA C151/A21.51-91 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 52 for 4" through 14" diameter pipe (except for 6-inch hydrant spools which shall be Cl. 53) and Class 50 for 16" and larger. Grade of iron shall be a minimum of 60-42-

10. The pipe shall be cement lined to a minimum thickness of 1/16", and the exterior shall be coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight.
2. Ductile iron joints shall be mechanical joint or push-on type, employing a single gasket, such as "Tyton", except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.
3. Restrained ductile iron joint pipe, where shown on the plans shall be push-on joint pipe with "Fast Tight" gaskets as furnished by U.S. Pipe or equal for 12" diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for 16" and 24" diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.
4. All ductile iron fittings shall be short-bodied and comply with applicable ANSI/AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be lined and either mechanical joint or flanged, as indicated on the plans.

C. HDPE Pipe and Fittings

1. If approved, HDPE pipe for water mains shall be manufactured from PE 3408.3608 resin conforming to ASTM D3350. 4" and greater pipe shall be IPS/DIPS, DR9 conforming to ASTM F714, AWWA C906, NSF. 1/2" through 3" pipe shall be IPS, DR9, conforming to D3035, AWWA C901, NFS.
2. All HDPE molded fittings and fabricated fittings shall be fully pressure rated to match the pipe DR pressure rating to which they are made. All fittings shall be molded or fabricated by the manufacturer. No Contractor fabricated fittings shall be used unless approved by the Town.
3. The manufacture of the HDPE pipe shall supply all HDPE fittings and accessories as well as any adapters and/or specials required to perform the work.

4. All fittings shall be installed using butt-fused fittings, thermo-fused fittings/couplings, or flanged adapters and must be approved by the Town.
5. All transition from HDPE pipe to ductile iron or PVC shall be made per the approval of the Town and per the HDPE pipe manufacturer's recommendations and specifications. A molded flange connector adapter within a carbon steel back-up ring assembly shall be used for pipe type transitions. Ductile iron back-up rings shall mate with cast iron flanges per ANSI B16.1. A 316 stainless steel back-up ring shall mate with a 316 stainless steel flange per ANSI B16.1.

D. PVC Pipe and Fittings

6. If approved, PVC pipe for water mains shall C-900 be made from material conforming to ASTM C1784. The pipe shall be DR 18 and conform to ANSI/AWWA C900 specification, with gaskets meeting ASTM F477 and joints in compliance with ASTM D3139. Pipe joints shall be gasketed. Solvent-cement joints are not acceptable.
7. PVC Schedule 80 fittings shall conform to ASTM D 2467. PVC Schedule 80 threaded fittings shall conform to ASTM D 2464. Pipe and fittings shall be manufactured as a system and be the product of one manufacturer. Pipe and fittings shall conform to National Sanitation Foundation (NSF) Standard 61 or the health effects portion of NSF Standard 14.

- E. All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, and be carefully installed in complete compliance with the manufacturer's recommendations.
- F. Joints shall be "made up" in accordance with the manufacturer's recommendations. Standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.
- G. Fittings in areas shown on the plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be Town approved.

- H. The pipe and fittings shall be inspected for defects and prepped prior to installation. HDPE and PVC piping shall be wiped clean. If ductile iron has been approved, all lumps, blisters and excess coal tar coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, and free from oil and grease before the pipe is laid.
- I. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and pipe forced home and brought to correct line and grade. The pipe shall be secured in place with select backfill tamped under it. Precaution shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry. No pipe shall be laid in water or when trench conditions are unsuitable.
- J. The cutting of pipe for inserting fittings or closure pieces shall be done in a neat and workmanlike manner, without damage to the pipe or lining, and so as to leave a smooth end at right angles to the axis of the pipe. Pipe shall be laid with bell ends facing in the direction of the laying, unless directed otherwise by the Town. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations.
- K. For connection of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing, and shall be jointed according to manufacturer's directions. Bolts shall be tightened alternately at top, bottom and sides, so pressure on gasket is even.
- L. For connection of "Tyton" joints, the jointing shall be done according to manufacturer's recommendations, with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be non-toxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.
- M. Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner as required. All dead ends on new mains shall be closed with dead end M.J. caps and thrust blocks.
- N. Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall per Standard Detail

THRU-BLO, or Standard Detail ANCH-BLO. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test.

O. All of the new piping, valves and blocking shall have been installed, disinfected and tested up to the point of cutting into existing lines before the crossover is made. The crossover to the existing system shall be in full readiness, including the cut and sized specials. Forty-eight (48) hour notice shall be given the Town in advance of the planned "cut-ins".

P. Valves

1. All valves larger than 10" shall generally be furnished and installed as butterfly valves. All valves 10" and smaller shall generally be furnished and installed as resilient seat gate valves.

Q. Resilient-Seated Gate Valves.

1. All gate valves shall conform to ANSI/AWWA C509-87 Standards for resilient-seated, high strength, bronze stemmed gate valves. The valves shall be iron-bodied, iron disk completely encapsulated with polyurethane rubber and bronze, non-rising stem with "O" ring seals. The polyurethane sealing rubber shall be fusion bonded to the wedge to meet ASTM tests for rubber to metal bond ASTM D429. The valves shall open counter-clockwise and be furnished with 2-inch square operating nuts except valves in vaults shall be furnished with handwheels. All surfaces, interior and exterior shall be fusion bonded epoxy coated, acceptable for potable water.
2. For applications with working pressure above 175 psi, a ductile iron valve rated as 250 psi or higher shall be used.
3. The valves shall be set with stems vertical. The axis of the valve box shall be common with the axis projected off the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.
4. Valves shall be Dresser, M&H, Waterous, or Mueller.

R. Butterfly Valves.

1. Butterfly valves shall be ductile iron body of the tight closing rubber seat type with rubber seat either bonded to the body or mechanically retained in the body with no fasteners or retaining hardware in the flowstream. The valves shall meet the full requirements of AWWA C504, Class 150B except the valves shall be able to withstand 200 psi differential pressure without leakage. The valves may have rubber seats mechanically affixed to the valve vane. Where threaded fasteners are used, the fasteners shall be retained with a locking wire or equivalent provision to prevent loosening. Rubber seats attached to the valve vane shall be equipped with stainless steel seat ring integral with the body, and the body internal surfaces shall be epoxy coated to prevent tuberculations buildup, which might damage the disc-mounted rubber seat.
2. No metal-to-metal sealing surfaces shall be permitted. The valves shall be bubble-tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving valve operations after long periods of inactivity. Valve discs shall rotate ninety (90) degrees from the full open position to the tight shut position. The valve shall be Henry Pratt Company "*Groundhog*", or owner approved equal.

S. Tapping Sleeves & Tapping Valves

1. Connections to existing water mains typically shall be wet taps through a tapping tee and tapping valve and at the time of this report, Skagit County PUD is the Town approved contractor. The tapping sleeves shall be rated for a working pressure of 250 psi minimum and furnished complete with joint accessories. Refer to Standard Detail TAP-CONN for detailed information regarding tapping sleeves.
2. Size-on-size tapping sleeves shall be stainless steel. Stainless steel sleeves only shall be used on AC pipe. Ductile iron tapping tees shall be allowed if tap is at least 2" smaller in diameter than the existing water main.
3. Cut in connections shall not be made on Fridays, holidays or weekends.
4. All tapping sleeves and tapping valves shall be pressure tested to a minimum of 200 psi prior to making connection to existing mains.

T. Pressure Reducing and Relief Valves.

1. Pressure reducing valves in the water service pipe are required when street main pressure exceeds 80 psi, as follows:
2. When street main pressure exceeds 80 psi, an approved pressure reducing valve with an approved pressure relief device shall be installed in the water service pipe near its entrance to the building to reduce the pressure to 80 psi or lower. Pressure at any fixture shall be limited to no more than 80 psi under no-flow conditions.

U. All Valves

1. All valves with operating nuts located more than 42" below finished grade shall be equipped with extension stems to bring the operating nut to within 18" of the finished grade. Cast iron or PVC adjustable valve boxes shall be provided for all valves.
2. At the top of the extension stem, there shall be a two-inch (2") standard operating nut, complete with a centering flange that closely fits the five-inch (5") pipe encasement of the extension stem. The valve box shall be set in a telescoping fashion around the five-inch (5") pipe cut to the correct length to allow future adjustment up or down.

V. Fire Hydrants

1. All fire hydrants shall be Clow Medallion conformance with AWWA Standard Specification C-502. Each hydrant shall be equipped with one (1) 4-1/2" and two (2) 2-1/2" hose ports with permanent Storz hydrant adaptor and Storz blind cap. Refer to Standard Detail FIRE-HYD, FIRE-HYD2, FIRE-HYD3, FIRE-HYD4, OR FIRE-HYD5 for fire hydrant details.
2. The hydrant shall be prime coated with Rustoleum safety yellow base No. 288-14. Top coat shall be two coats of color code AX-6732, T-4432.
3. A blue reflective pavement marker shall be furnished and installed 6 to 12 inches off center on the hydrant side of the road adjacent to the hydrant.

4. The holding spools between the gate valve and fire hydrant shall be made from six-inch (6") Class 52 ductile iron pipe, 3 foot minimum length and 17 foot maximum length without restrained joints.

W. Blow-offs & Air Relief Assemblies

1. Two (2") blowoff assemblies shall be installed at the terminus of all dead end water mains (Standard Detail BLOW-OFF). Blowoffs utilized by the Contractor for flushing the water main shall be sufficient size to obtain 2.5 feet per second velocity in the main. Temporary blow-offs shall be removed and replaced with a suitably sized watertight brass plug.
2. Two (2") inch air and vacuum release valves shall be installed at principal high points in the system (Standard Detail AIR-RLS).
3. The installation of these items shall include connection piping, gate valve, valve box, and all accessories. Valve markers shall be installed.

WATER PIPE TESTING & DISINFECTING

- A. A water hydrant meter shall be required and procured from the Town for all water utilized for flushing pipelines. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Contractor.
- B. Feed for the pump shall be from a barrel or other container within the actual amount of "makeup" water, so that it can be measured periodically during the test period.
- C. The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking.
- D. As soon as pipe is secured against movement under pressure, it may be filled with water. Satisfactory performance of all valves shall be checked while the line is filling.
- E. Contractor shall preflush all water mains after water has remained in the main for 24 hours and before pressure testing the main.

- F. After the pipe is filled and all air expelled, it shall be pumped to a test pressure of 250 psi, and this pressure shall be maintained for a period of not less than thirty (30) minutes to insure the integrity of the thrust and anchor blocks. **The contractor/developer is cautioned regarding pressure limitations on butterfly valves.** All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrostatic tests shall be performed on every complete section of water main between two valves, and each valve shall withstand the same test pressure as the pipe with no pressure active in the section of pipe beyond the closed valve.
- G. In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at 150 psi for a period of not less than one (1) hour. The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{ND(P)^{0.5}}{7,400}$$

in which

L = Allowable leakage, gallons/hour
N = Number of joints in the length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, psi

- H. Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Contractor at the Contractor's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be re-run at the Contractor's expense until a satisfactory test is obtained.
- I. As sections of pipe are constructed and before pipelines are placed in service, they shall be sterilized in conformance with the requirements of the State of Washington Department of Health Services.
- J. The Contractor shall be responsible for flushing all water mains prior to water samples being acquired. The water mains shall be flushed at a rate to provide a minimum 2.5 feet per second velocity in the main.
- K. In all disinfection processes, the Contractor shall take particular care in flushing and wasting the chlorinated water from the mains to assure that

the flushed and chlorinated water does no physical or environmental damage to property, streams, storm sewers or any waterways. The Contractor shall chemically or otherwise treat the chlorinated water to prevent damage to the affected environment, particularly aquatic and fish life of receiving streams.

- L. Chlorine shall be applied in one of the following manners, listed in order of preference, to secure a concentration in the pipe of at least 50 ppm.
 - 1. Injection of chlorine-water mixture from chlorinating apparatus through corporation cock at beginning of section after pipe has been filled, and with water exhausting at end of section at a rate controlled to produce the desired chlorine concentration;
 - 2. Injection similarly of a hypochlorite solution;
 - 3. Other Town pre-approved method(s) selected by the Developer and/or Contractor.
 - 4. After the desired chlorine concentration has been obtained throughout the section of line, the water in the line shall be left standing for a period of twenty-four (24) hours. Following this, the line shall be thoroughly flushed and a water sample collected. The line shall not be placed in service until a satisfactory bacteriological report has been received.

- M. Only Town employees only will be allowed to operate existing and new tie-in valves. The Contractor, his subcontractors, and their respective employees are expressly forbidden to operate any valve on any section of line which has been accepted by the Town.

BACKFLOW PREVENTION AND SPRINKLER SYSTEMS

- A. All water systems connected to the public water system shall have backflow prevention as required by WAC 248-54-285. Refer to Standard Detail RPBA regarding Reduced Pressure Backflow Assembly ¾" to 2".
- B. Fire sprinkler systems as mandated, proposed, or required by the local Fire Marshal and/or Town Ordinance that have a fire department connection shall have backflow prevention as required by WAC 248-54-285.
- C. Building sprinkler systems may be required based on Building Codes and Fire Marshall requirements.

STAKING

- A. All surveying and staking shall be performed by an engineering or surveying firm employed by the Developer and capable of performing such work. The engineer or surveyor directing and/or performing such work shall be currently licensed by the State of Washington to perform said tasks.
- B. A preconstruction meeting shall be held with Town staff prior to commencing staking. All construction staking shall be inspected by the Town prior to construction.
- C. The minimum staking of water systems shall be as follows:
 - 1. Provide staking sufficient to satisfy Town staff. In new plat development roadway centerline staking must be readily identifiable; and
 - 2. Stake locations of all proposed fire hydrant, blow-off, air-vac, valves, meters, etc.

TRENCH EXCAVATION

- A. Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the Town and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits.
- B. Trenches shall be excavated to the line and depth designated by the Town to provide a minimum of 36 inches of cover over the pipe. Except for unusual circumstances where approved by the Town, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency and in compliance with all safety requirements of the prevailing agencies. See Standard Detail WA-MAIN or WA-MAIN2. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The owner shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.
- C. The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below the pipeline grade. Where materials are

removed from below the pipeline grade, the trench shall be backfilled to grade with material satisfactory to the Town and thoroughly compacted.

- D. Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the Town, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.
- E. The bedding course shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

BACKFILLING

- a. Backfilling and surface restoration shall closely follow installation of pipe. The Town, based on the location of construction, shall designate the amount of trenching which may be left exposed. In no case shall more than 100 feet be left exposed during construction hours without approval of Town staff.
- b. Selected material shall be placed and compacted around and under the storm drain by hand tools. Special precautions should be provided to protect the pipe to a point 12 inches above the crown of the pipe. The remaining backfill shall be compacted to 95 percent of the maximum density in traveled areas and road prisms, 90 percent outside driveway, roadways, road prism, shoulders, parking or other traveled areas. Where governmental agencies other than the Town have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. Typically, all trenches located in roadway sections, roadway "prisms", and in traffic bearing areas shall be required to be backfilled and compacted with 5/8-inch minus crushed rock.
- c. Due to local conditions, as may be specifically approved by the Town staff, suitable excavated backfill material or sand, as determined by the Town staff, may be utilized as backfill, or if such material is not available from trenching operations, the Town staff may order the placing of CDF or gravel base conforming with Section 9-03.10 of the Standard Specifications (WSDOT) as appropriate for backfilling the trench. All excess material shall be promptly loaded and hauled to waste.

STREET PATCHING AND RESTORATION

- A. Street patching and trench restoration shall meet applicable town or county requirements.

EROSION CONTROL

- A. The detrimental effects of erosion and sedimentation shall be minimized by conforming to the following general principles:
 - 1. Soil shall be exposed for the shortest possible time;
 - 2. Reducing the velocity and controlling the flow of runoff;
 - 3. Detaining runoff on the site to trap sediment; and
 - 4. Releasing runoff safely to downstream areas.
- B. In applying these principles, the Developer and/or Contractor shall provide for erosion control by conducting work in workable units; minimizing the disturbance to cover crop materials; providing mulch and/or temporary cover crops, sedimentation basins, and/or diversions in critical areas during construction; controlling and conveying runoff; and establishing permanent vegetation and installing erosion control structures as soon as possible.
- C. Trench mulching will be required where there is danger of backfill material being washed away due to steepness of the slope along the direction of the trench, backfill material shall be compacted and held in place by covering the disturbed area with straw and held with a covering of jute matting or wire mesh anchored in place.
- D. Cover Crop Seeding.
 - 1. A cover crop shall be sown in all areas excavated or disturbed during construction that were not paved, landscaped and/or seeded prior to construction. Areas landscaped and/or seeded prior to construction shall be restored to their original or superior condition.
 - 2. Contact the Town Clerk for water charges if use of Town water is contemplated and the Water Operator for use of a hydrant for water in furtherance of seeding.
 - 3. Hydrants shall only be opened and closed by members of the Town crew.

4. Cover-crop seeding shall follow backfilling operations. The Developer and/or Contractor shall be responsible for protecting all areas from erosion until the cover crop affords such protection.
5. The cover crop shall be re-seeded if required and additional measures taken to provide protection from erosion until the cover crop is capable of providing protection.
6. During winter months, the Contractor may postpone seeding, if conditions are such that the seed will not germinate and grow. The Developer and/or Contractor will not, however, be relieved of the responsibility of protecting all areas until the cover crop has been sown and affords protection from erosion.
7. The cover crop shall be sown at a rate of 10 to 15 pounds of seed per acre using a hand or power operated mechanical seeder capable of providing a uniform distribution of seed.

FINISHING AND CLEANUP

- A. After all other work on this project is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections of a new roadway consistent with the original section, and as hereinafter specified.
- B. On water system construction where all or portions of the construction is in undeveloped areas, the entire area which has been disturbed by the construction shall be shaped so that upon completion the area will present a uniform appearance, blending into the contour of the adjacent properties. All other requirements outlined previously shall be met. All pipes, valves, tanks, reservoirs, boost pumps, boost pump stations and building associated therewith shall be cleaned of all debris and foreign material.
- C. Slopes, sidewalk areas, planting areas and roadway shall be smoothed and finished to the required cross section and grade by means of a grading machine insofar as it is possible to do so without damaging existing improvements, trees and shrubs. Machine dressing shall be supplemented by hand work to meet requirements outlined herein, to the satisfaction of Town staff.
- D. Upon completion of the cleaning and dressing, the project shall appear uniform in all respects. All graded areas shall be true to line and grade. Where the existing surface is below sidewalk and curb, the area shall be

filled and dressed out to the walk. Wherever fill material is required in the planting area, the finished grade shall be elevated to allow for final settlement, but nevertheless, the raised surface shall present a uniform appearance.

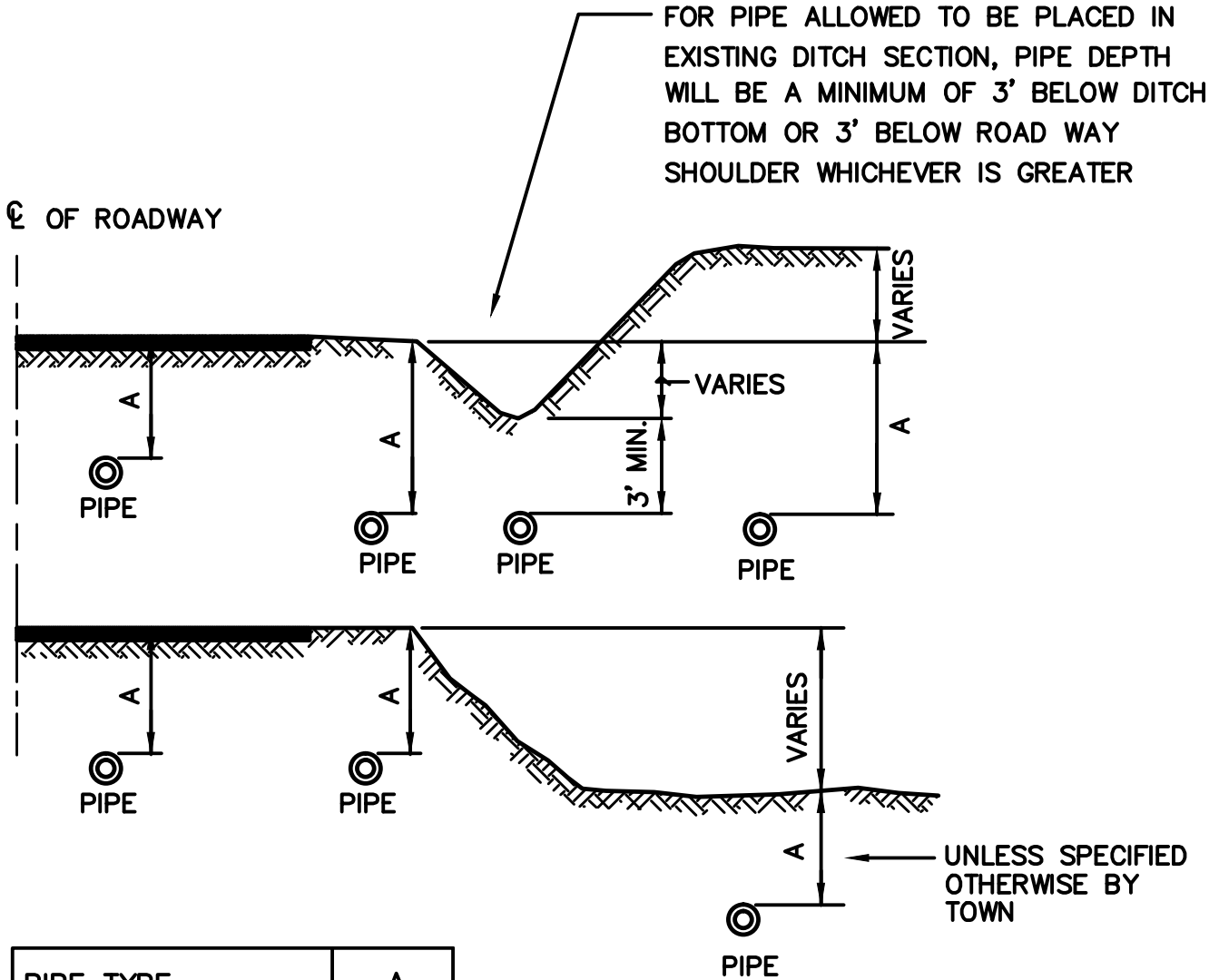
- E. All rocks in excess of one (1) inch diameter shall be removed from the entire construction area and shall be disposed of the same as required for other waste material. In no instance shall the rock be thrown onto private property. Overhang on slopes shall be removed and slopes dressed neatly so as to present a uniform, natural, well-sloped surface.
- F. All excavated material at the outer lateral limits of the project shall be removed entirely. Trash of all kinds resulting from clearing and grubbing or grading operations shall be removed and not placed in areas adjacent to the project. Where machine operations have broken down brush and trees beyond the lateral limits of the project, the Developer and/or Contractor shall remove and dispose of same and restore said disturbed areas at his own expense.
- G. Drainage facilities such as inlets, catch basins, culverts, and open ditches shall be cleaned of all debris, which is the result of the Developer and/or Contractor's operations.
- H. All pavements and oil mat surfaces, whether new or old, shall be thoroughly cleaned. Existing improvements such as Portland cement concrete curbs, curb and gutters, walls, sidewalks, and other facilities, which have been sprayed by the asphalt cement, shall be cleaned and re-painted where needed, all to the satisfaction of the Town staff.
- I. Castings for monuments, water valves, vaults and other similar installations which have been covered with the asphalt material shall be cleaned to the satisfaction of the Town staff.

GENERAL GUARANTEE AND WARRANTY

- A. The Developer shall be required, upon completion of the work and prior to acceptance by the Town, to furnish the Town a written guarantee covering all material and workmanship for a period of two years after the date of final acceptance and he shall make all necessary repairs during that period at his own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship.
- B. The Developer shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required, and shall deliver copies to the Town upon completion of the work.

Delivery of such warranties to the Town shall not relieve the Developer of liability under his guarantee.

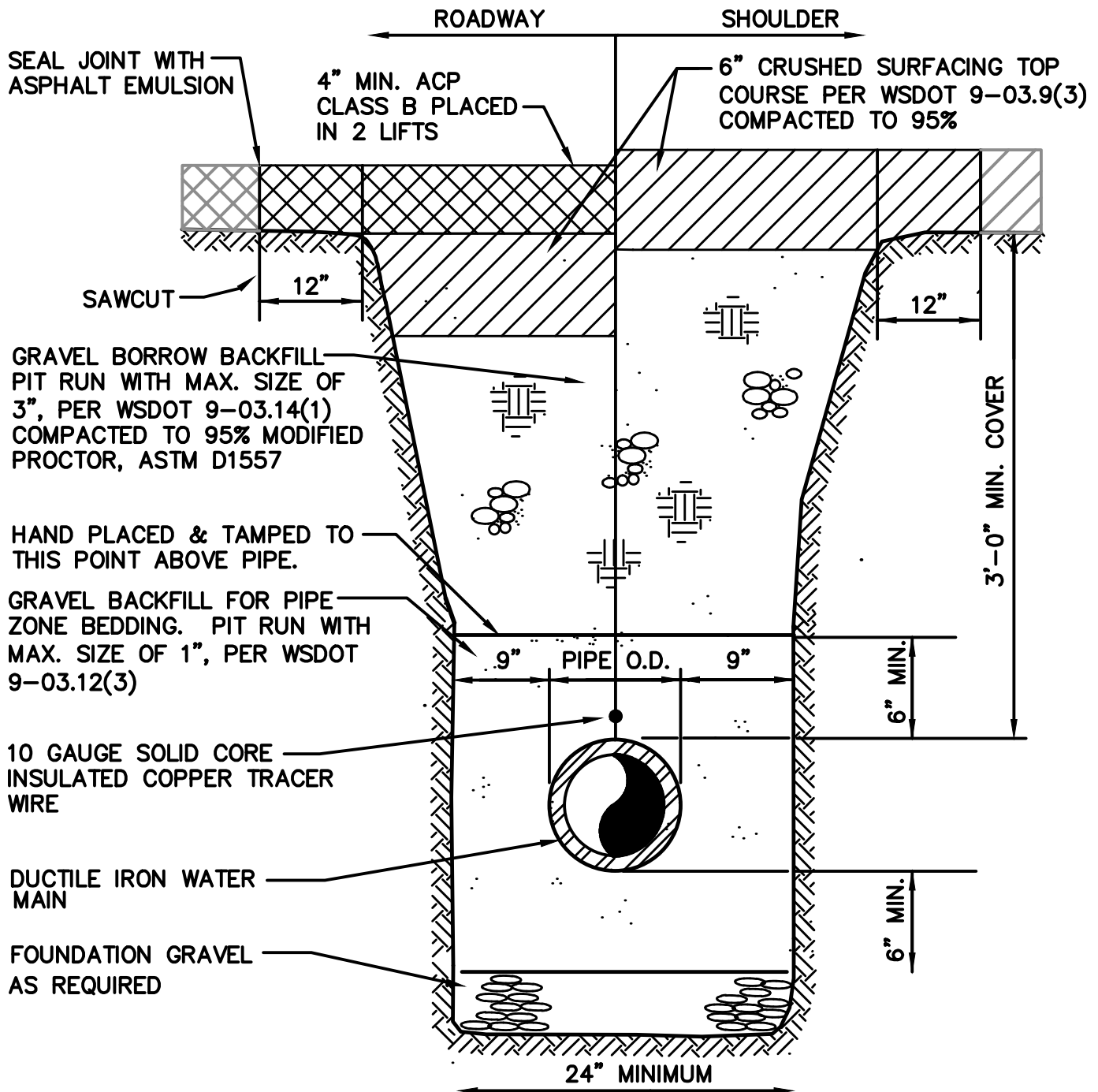
- C. Easement documents, if applicable, shall be filed and recorded with the County Auditor's office and the documents reviewed by the Town prior to project acceptance.



PIPE TYPE	A
TRANSMISSION	42"
DISTRIBUTION	36"

* MINIMUM DEPTH

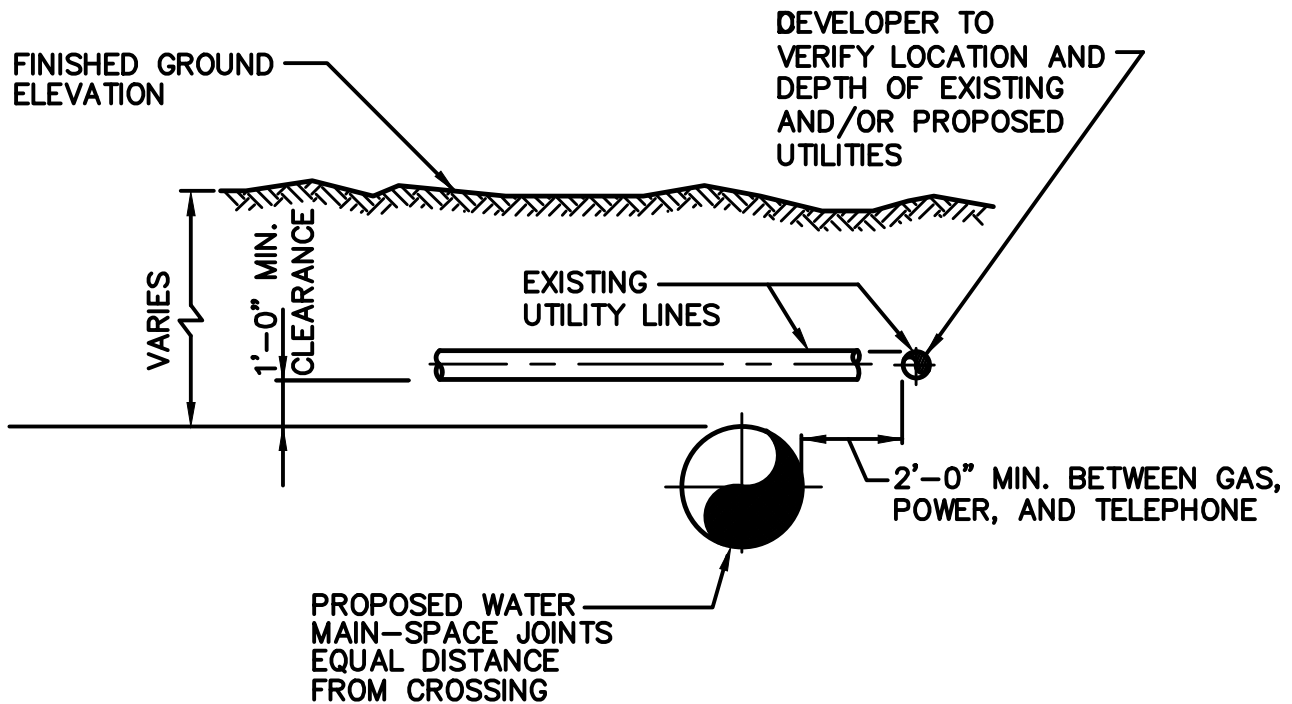
TOWN OF LYMAN			
WATER MAIN DEPTH REQUIREMENTS			
APPROVED:			DWG. NO.
BY TOWN _____			WA-MAIN
DATE:			SCALE:
01/2013	DRWN: M.A.N.	CHKD: J.N.D.	NONE



NOTE:

BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH THE TOWN'S STANDARDS AND/OR STATE OR COUNTY PERMIT REQUIREMENTS.

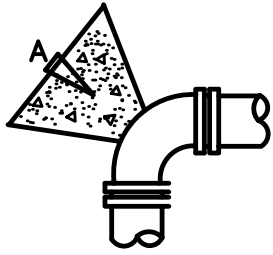
TOWN OF LYMAN			
WATER MAIN TRENCH SECTION			
APPROVED:			DWG. NO.
BY TOWN		DATE	WA-MAIN2
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



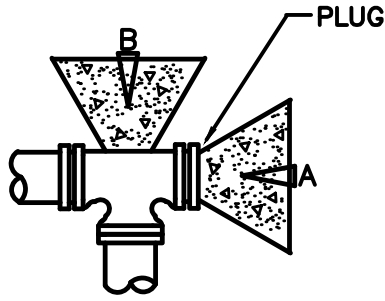
NOTES:

1. REGULATORY AGENCY REQUIREMENTS SHALL SUPERSEDE TOWN STANDARDS IF MORE STRINGENT.
2. CONCRETE ENCASEMENT (BEDDING) SHALL BE UTILIZED, IF APPROVED BY THE TOWN, AT LOCALIZED UTILITY CROSSING IF MINIMUM PIPE SEPARATION (ELEVATION) CANNOT BE MAINTAINED OR ACHIEVED.

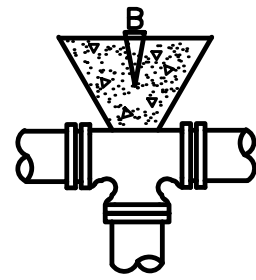
TOWN OF LYMAN			
TYPICAL UTILITY CROSSING			
APPROVED:			DWG. NO.
BY TOWN		DATE	TYP-UTIL
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



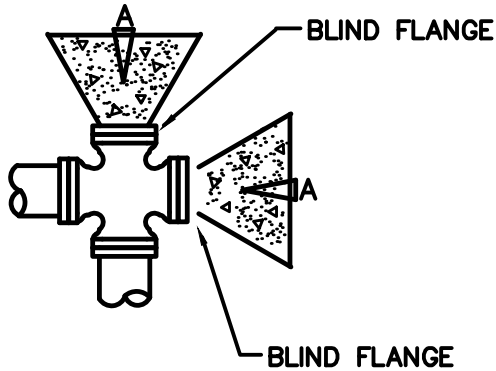
90° BEND



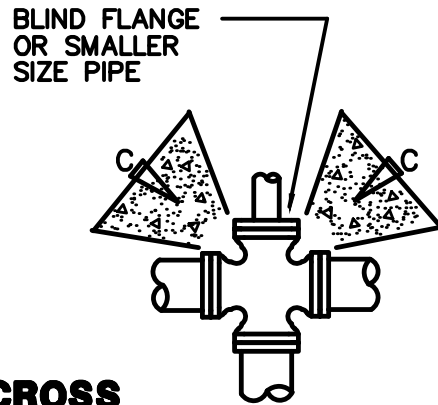
TEE



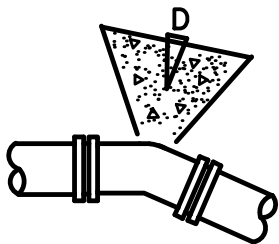
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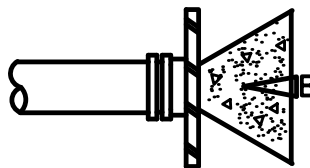
CAPPED CROSS



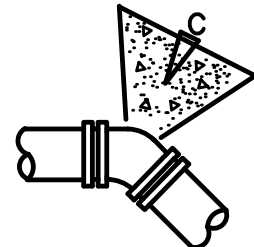
CROSS



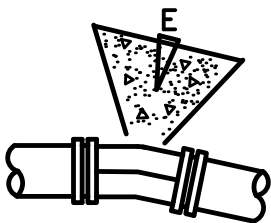
22 1/2 ° BEND



CAP



45° BEND



11 1/4 ° BEND

TOWN OF LYMAN			
THRUST BLOCK DETAIL (1 of 2)			
APPROVED:			DWG. NO.
BY TOWN		DATE	THRU-BLO
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE

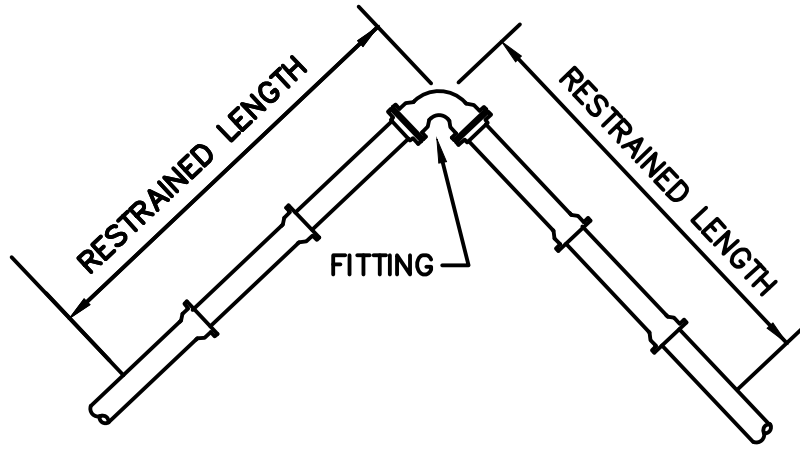
THRUST BLOCK – TABLE
MIN. BEARING AREA AGAINST UNDISTURBED SOIL
SQUARE FEET

PIPE SIZE	A(FT ²)	B(FT ²)	C(FT ²)	D(FT ²)	E(FT ²)	X
4"	3	1	1	1	1	NONE
6"	4	4	2	1	1	NONE
8"	7	6	4	2	1	4
10"	11	10	6	3	2	6
12"	16	14	9	5	3	9

NOTES:

1. BEARING AREA OF CONCRETE THRUST-BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2,000 POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING. WRAP ALL FITTINGS IN 6 MIL PLASTIC PRIOR TO POURING BLOCK. NO CONCRETE SHALL BE PLACED NEAR BOLTS.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

TOWN OF LYMAN			
THRUST BLOCK DETAIL (2 of 2)			
APPROVED:			DWG. NO.
_____ BY TOWN		_____ DATE	THRU-BLO
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



PIPE SIZE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	TEE OR DEAD END CAP
	RESTRAINED LENGTH IN FEET				
4"	40	17	8	4	30
6"	55	23	11	6	39
8"	73	31	15	8	53
10"	88	37	18	9	67
12"	103	43	21	10	82

NOTES:

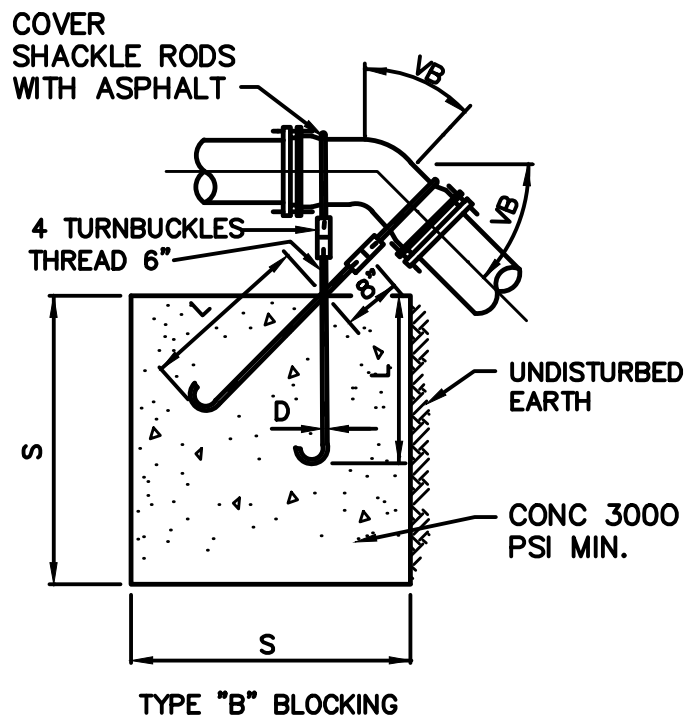
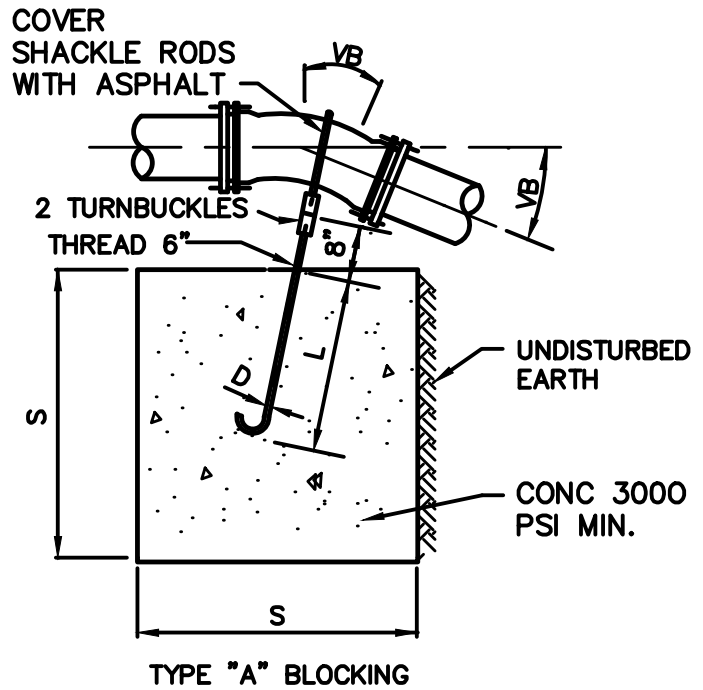
- ① RESTRAINED LENGTHS SHOWN ARE MINIMUM AND FOR LINEAL FEET REQUIRED ON EACH SIDE OF FITTING INDICATED.
- ② FOOTAGES ARE BASED ON 250 PSI PRESSURE AND 42 INCHES COVER. IF PRESSURE IS GREATER OR COVER IS LESS, THE RESTRAINED LENGTH SHALL BE INCREASED ACCORDINGLY

TOWN OF LYMAN			
THRUST RESTRAINT FOR DUCTILE IRON PIPE			
APPROVED:			DWG. NO.
BY TOWN _____		DATE _____	DUCT-PIP
DATE: 01/2013	DRWN: M.A.N.	CHKD: J.N.D.	SCALE: NONE

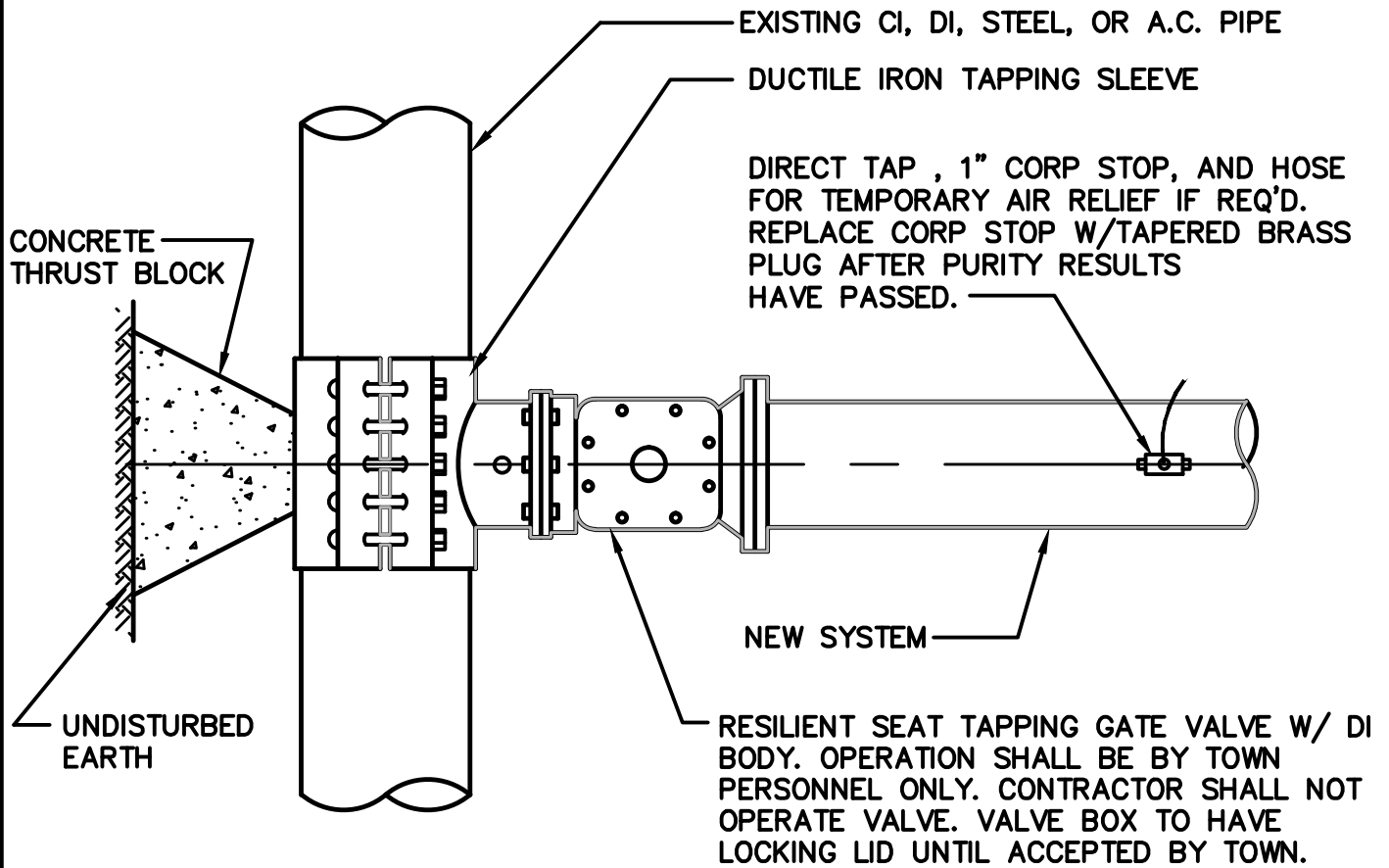
TYPE "A" BLOCKING								
FOR 11 1/4°-22 1/2°-30° VERTICAL BENDS								
PIPE SIZE NOMINAL DIAMETER-- INCHES	TEST PRESSURE PSI	VB	No. OF CU. FT. OF CONC. BLOCKING	S	D	L		
		VERTICAL BEND DEGREES		SIDE OF CUBE LIN. FT.	DIAM. OF SHACKLE RODS (2) INCHES	DEPTH OF RODS IN CONCRETE LIN. FT.		
4"	300	11 1/4	8	2	5/8"	1.5		
		22 1/2	11	2.2		2.0		
		30	17	2.6				
6"	300	11 1/4	11	2.2	5/8"	2.0		
		22 1/2	25	2.9				
		30	41	3.5				
8"	300	11 1/4	16	2.5	5/8"	2.0		
		22 1/2	47	3.6				
		30	70	4.1			3/4"	2.5
12"	250	11 1/4	32	3.2	5/8"	2.0		
		22 1/2	88	4.5			7/8"	3.0
		30	132	5.1				

TYPE "B" BLOCKING						
FOR - 45° VERTICAL BENDS						
		VB		S	D	L
4"	300	45	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1		

THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARD. APPROPRIATELY SIZED ANCHOR BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS ARE REQUIRED



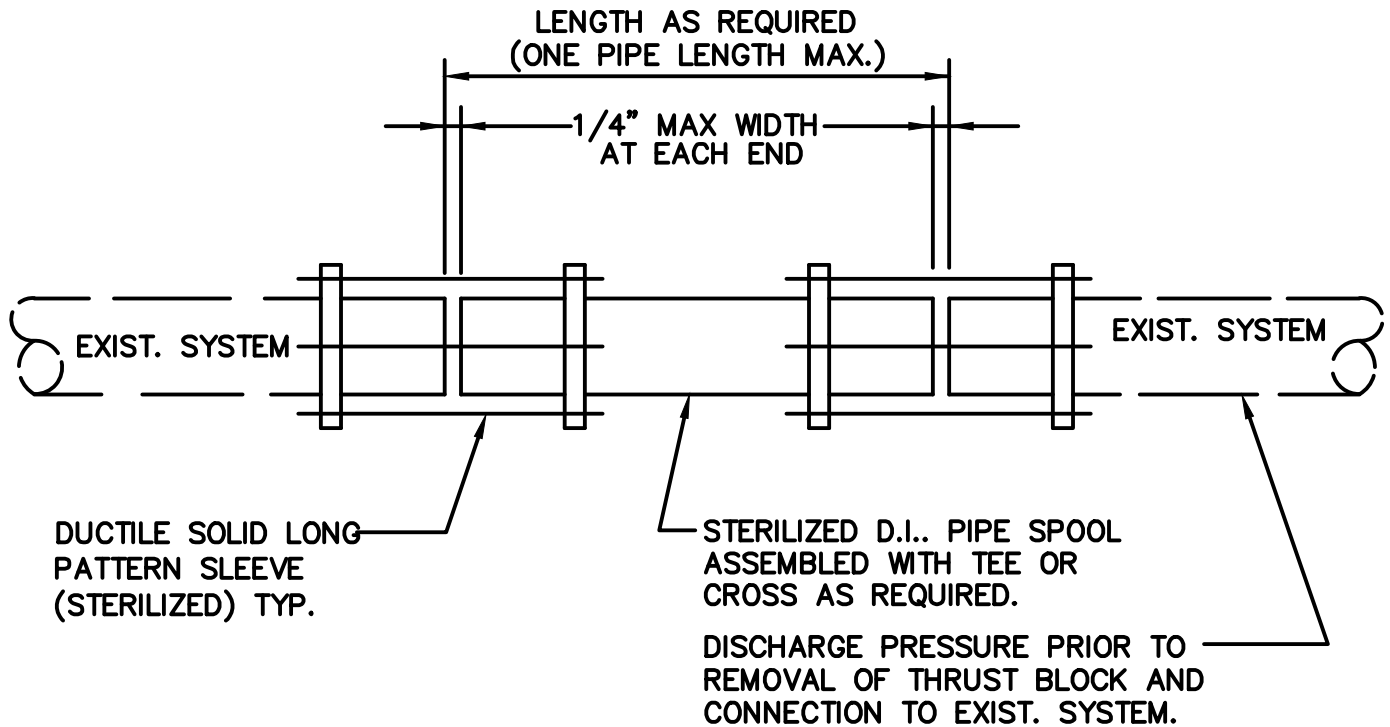
TOWN OF LYMAN			
VERTICAL ANCHOR BLOCK			
APPROVED:			DWG. NO.
BY TOWN _____			ANCH-BLO
DATE: _____			SCALE:
01/2013	DRWN: M.A.N.	CHKD: J.N.D.	NONE



NOTES:

1. TAP TO BE INSTALLED AT DEVELOPER'S EXPENSE UNDER TOWN OBSERVATION.
2. TAPPING TEES SHALL BE AIR PRESSURE TESTED TO 100 PSI PRIOR TO TAPPING MAIN.
3. CONNECTIONS NOT ALLOWED ON FRIDAYS, HOLIDAYS, DAY BEFORE HOLIDAYS, OR WEEKENDS.

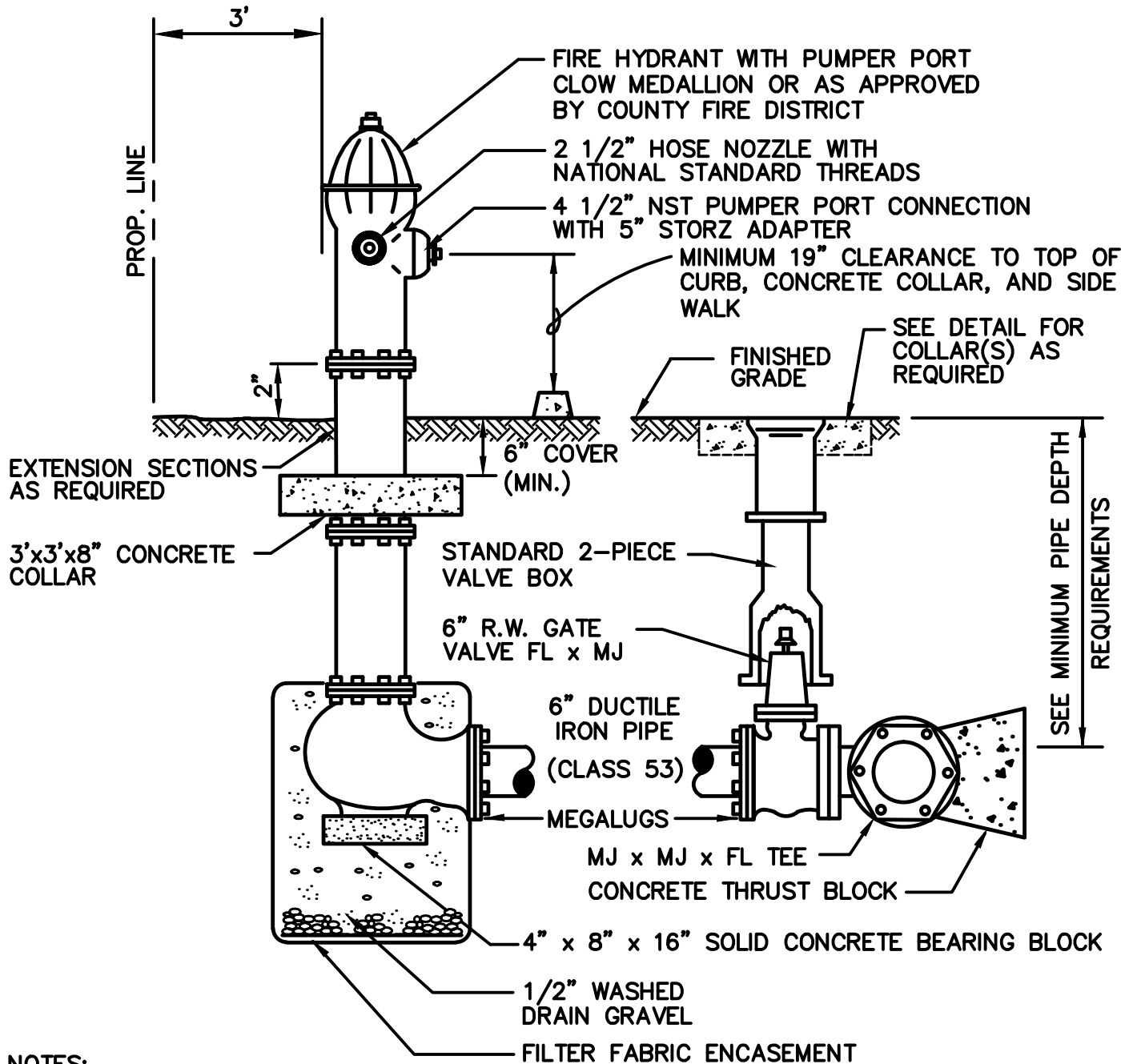
TOWN OF LYMAN			
WET OR HOT TAP CONNECTION			
APPROVED:			DWG. NO.
BY TOWN		DATE	TAP-CONN
DATE: 01/2013	DRWN: M.A.N.	CHKD: J.N.D.	SCALE: NONE



NOTE:

1. NO DEFLECTION SHALL BE ALLOWED AT EITHER COUPLING.
2. CUT-IN CONNECTIONS ON NON-D.I. PIPE SHALL USE EXTENDED RANGE COUPLING (ROMAC XR501 COUPLING OR EQUAL)
3. IN-LINE VALVE(S) IN EXISTING SYSTEM MAY BE REQUIRED AT THE SOLE DISCRETION OF THE TOWN AT ALL NEW INTERTIE LOCATIONS. (NOTE: VALVE(S) ARE NOT SHOWN ABOVE FOR CLARITY)

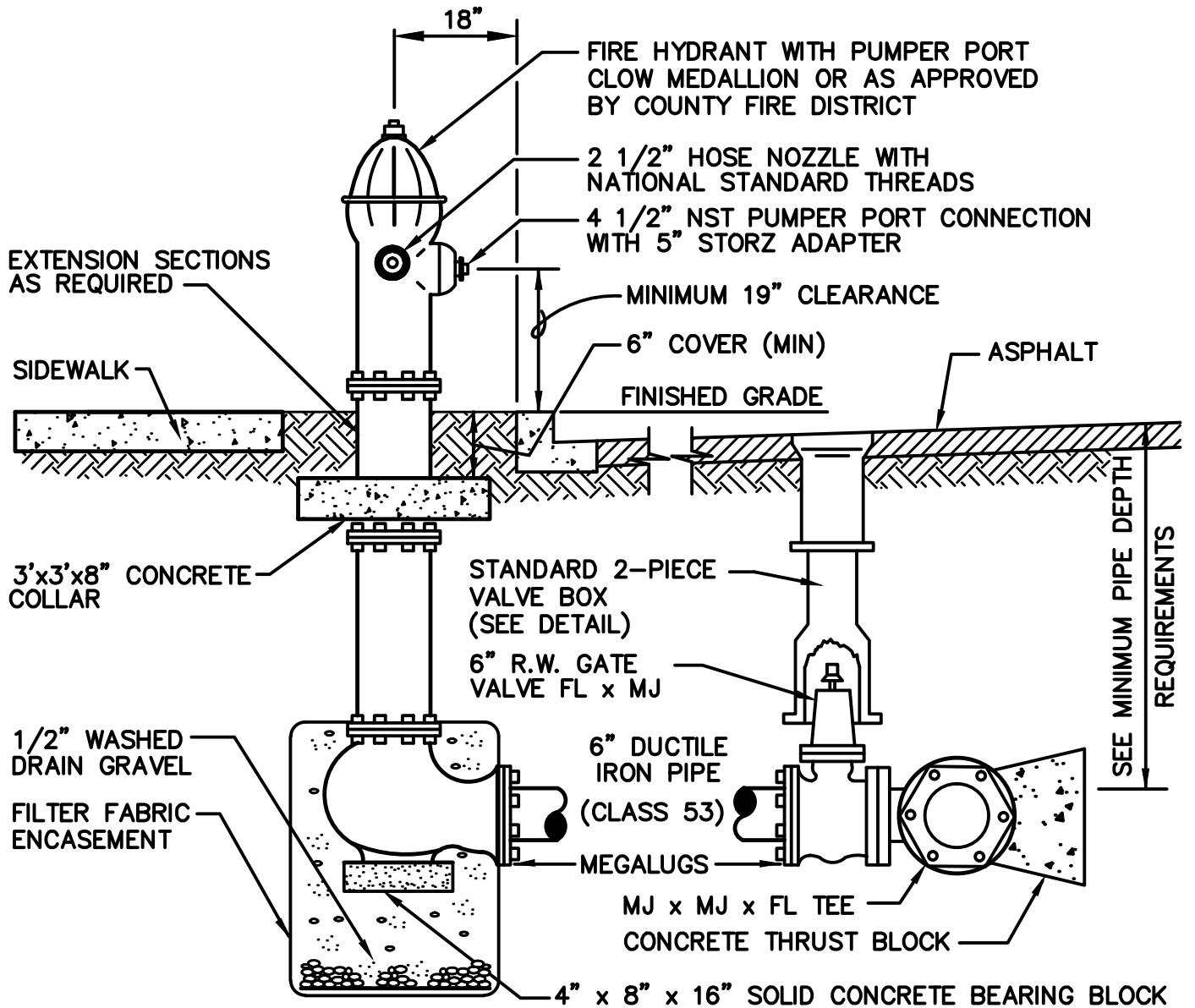
TOWN OF LYMAN			
CUT IN CONNECTION			
APPROVED:			DWG. NO.
BY TOWN		DATE	CUT-CONN
DATE: 01/2013	DRWN: M.A.N.	CHKD: J.N.D.	SCALE: NONE



NOTES:

1. FIRE HYDRANTS TO BE PAINTED AS FOLLOWS:
 IF IN TOWN: RUSTOLEUM SAFETY YELLOW BASE No. 288-14, COLOR CODE AX-6732, T-4432, OR PER LOCAL FIRE MARSHALL, CONTRACTOR TO VERIFY.
2. INSTALL BLUE LANE REFLECTOR IN PAVEMENT.
3. STANDARD 4 1/2" NST PUMPER PORT CAP SUPPLIED WITH HYDRANT SHALL BE SALVAGED FOR TOWN USE.

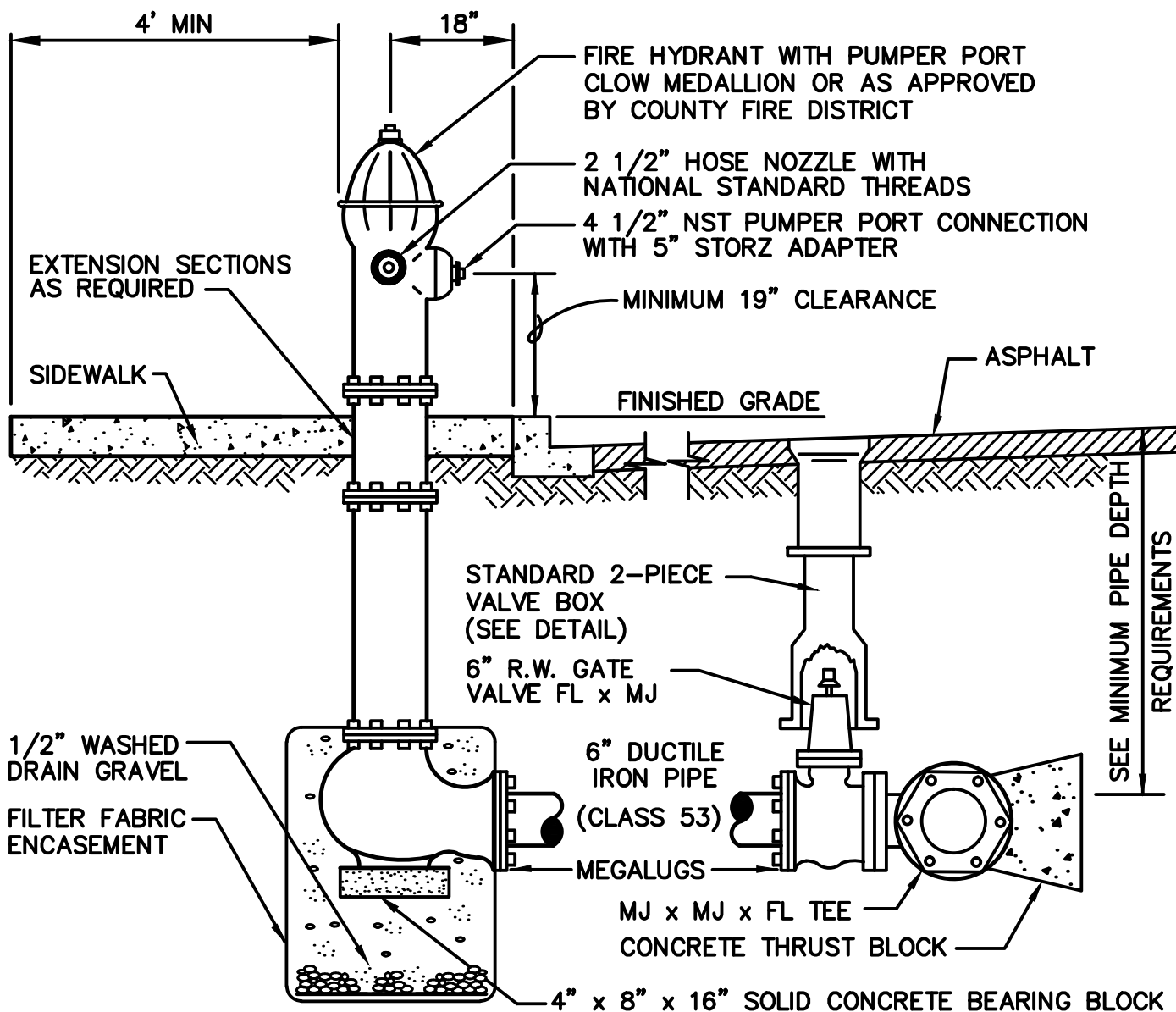
TOWN OF LYMAN			
FIRE HYDRANT INSTALLATION (EXTRUDED CURB)			
APPROVED:		DWG. NO.	
BY TOWN _____		DATE _____	
DATE: 01/2013		DRWN: M.A.N.	CHKD: J.N.D.
SCALE:			NONE



NOTES:

1. FIRE HYDRANTS TO BE PAINTED AS FOLLOWS:
 IF IN TOWN: RUSTOLEUM SAFETY YELLOW BASE No. 288-14, COLOR CODE AX-6732, T-4432, OR PER LOCAL FIRE MARSHALL, CONTRACTOR TO VERIFY.
2. INSTALL BLUE LANE REFLECTOR IN PAVEMENT.
3. STANDARD 4 1/2" NST PUMPER PORT CAP SUPPLIED WITH HYDRANT SHALL BE SALVAGED FOR TOWN USE.

TOWN OF LYMAN			
FIRE HYDRANT INSTALLATION (CURB, GUTTER, SIDEWALK)			
APPROVED:		DWG. NO.	
BY TOWN _____		DATE _____	
DATE: 01/2013		DRWN: M.A.N.	CHKD: J.N.D.
		SCALE: NONE	



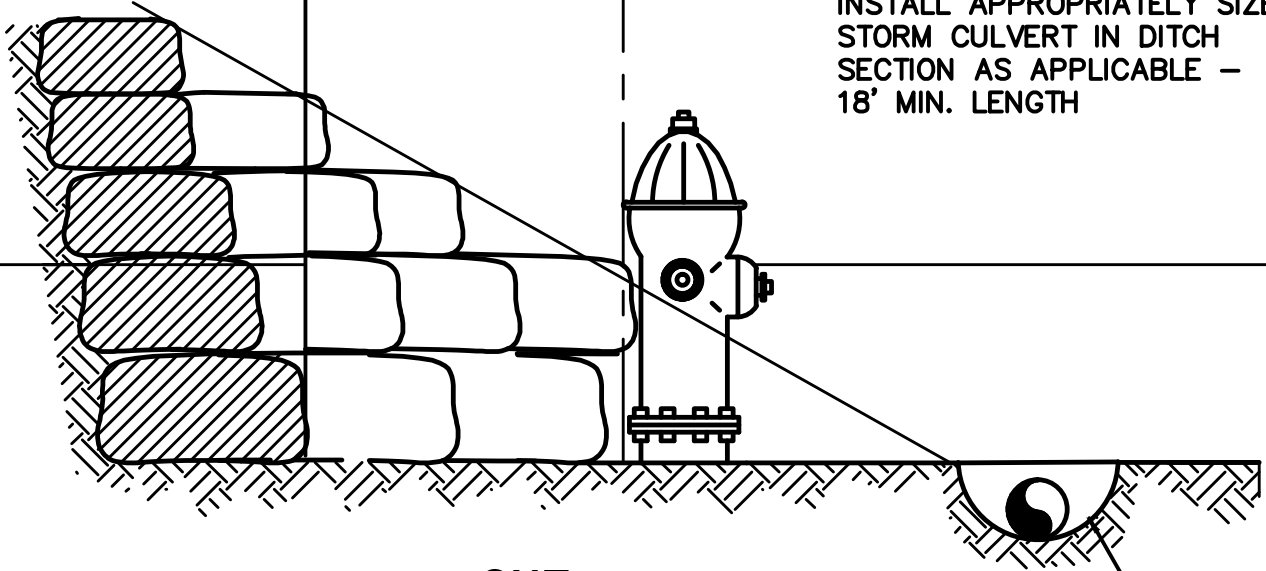
NOTES:

1. FIRE HYDRANTS TO BE PAINTED AS FOLLOWS:
 IF IN TOWN: RUSTOLEUM SAFETY YELLOW BASE No. 288-14, COLOR CODE AX-6732, T-4432, OR PER LOCAL FIRE MARSHALL, CONTRACTOR TO VERIFY.
2. INSTALL BLUE LANE REFLECTOR IN PAVEMENT.
3. STANDARD 4 1/2" NST PUMPER PORT CAP SUPPLIED WITH HYDRANT SHALL BE SALVAGED FOR TOWN USE.

TOWN OF LYMAN			
FIRE HYDRANT INSTALLATION (CURB, GUTTER, SIDEWALK)			
APPROVED:		DWG. NO.	
BY TOWN _____		DATE _____	
DATE: 01/2013		DRWN: M.A.N.	CHKD: J.N.D.
		SCALE: NONE	FIRE-HYD3

LEVEL ALL AROUND
MIN. 3' RADIUS

INSTALL APPROPRIATELY SIZED
STORM CULVERT IN DITCH
SECTION AS APPLICABLE -
18' MIN. LENGTH

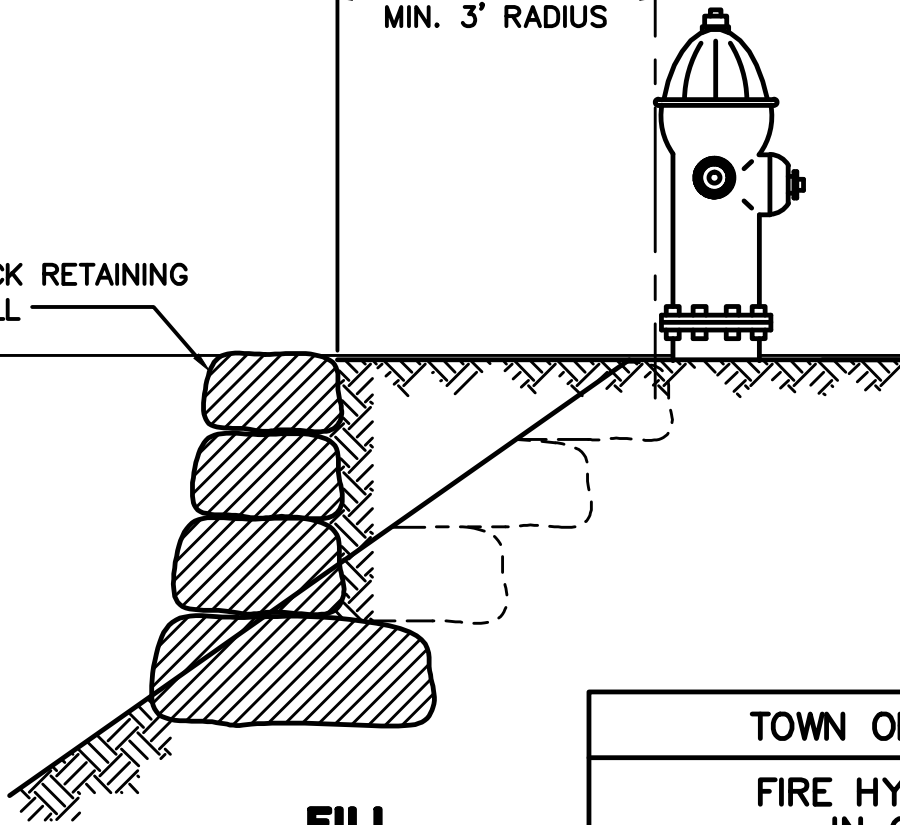


CUT

REFER TO TOWN/COUNTY
STANDARDS FOR STORM
DRAIN INSTALLATION.

LEVEL ALL AROUND
MIN. 3' RADIUS

ROCK RETAINING
WALL



FILL

TOWN OF LYMAN

FIRE HYDRANT LOCATION
IN CUT OR FILL

APPROVED:

DWG. NO.

BY TOWN

DATE

FIRE-HYD4

DATE:

01/2013

DRWN:

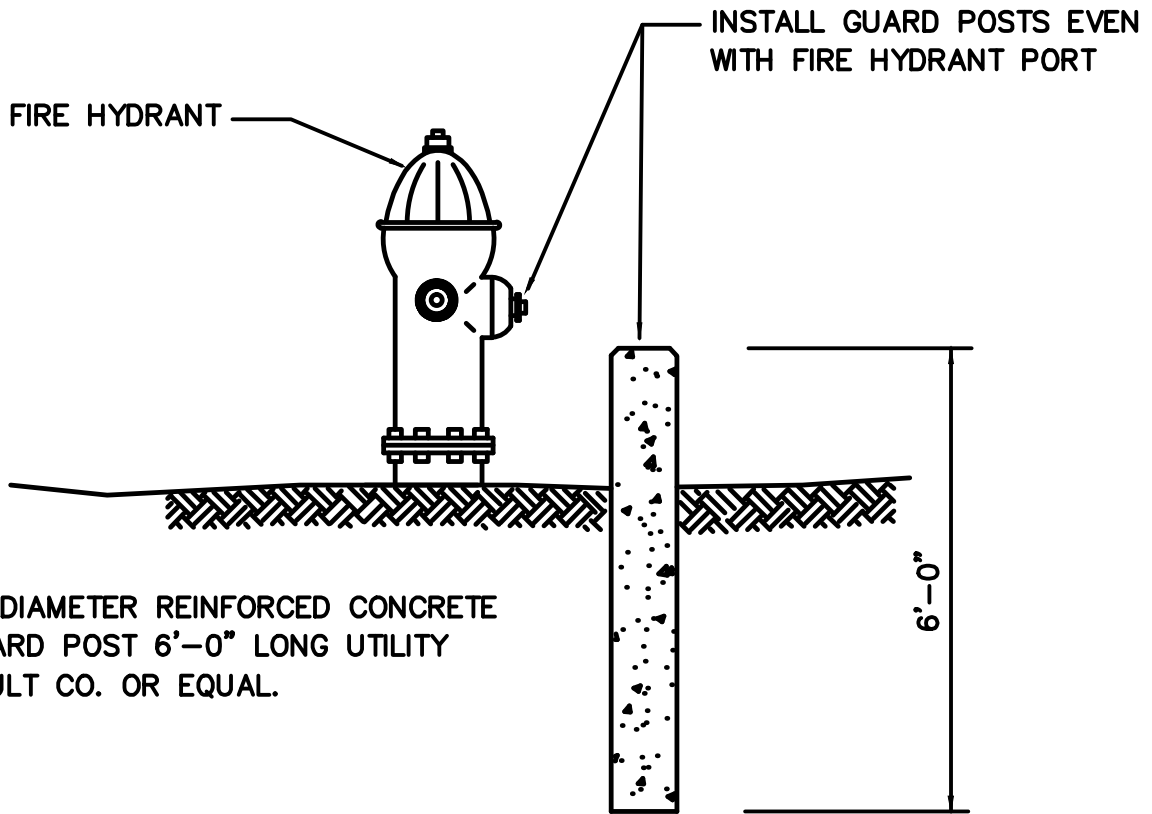
M.A.N.

CHKD:

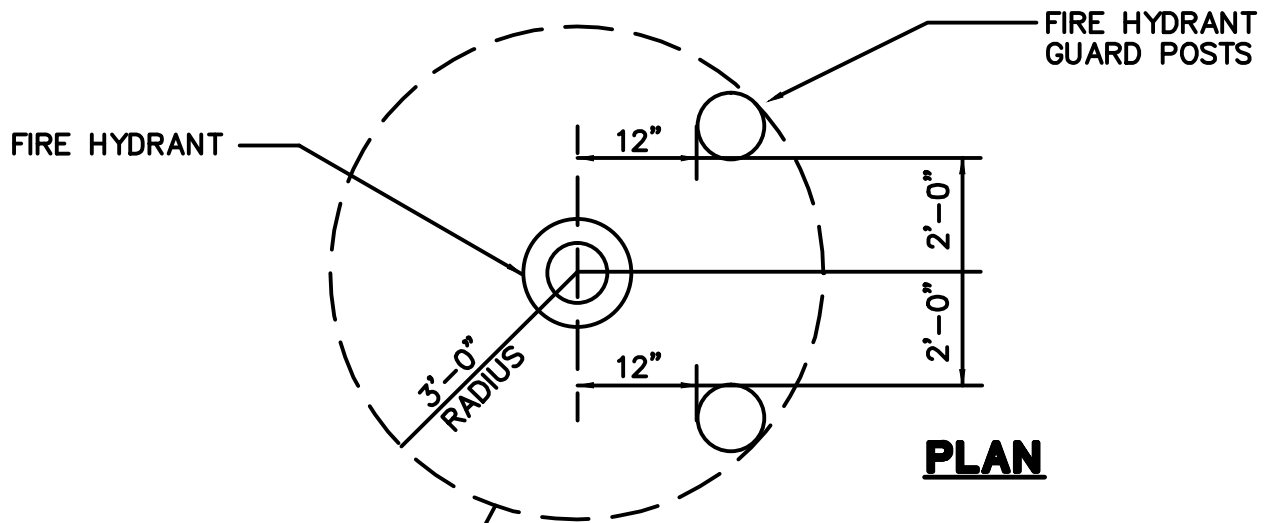
J.N.D.

SCALE:

NONE

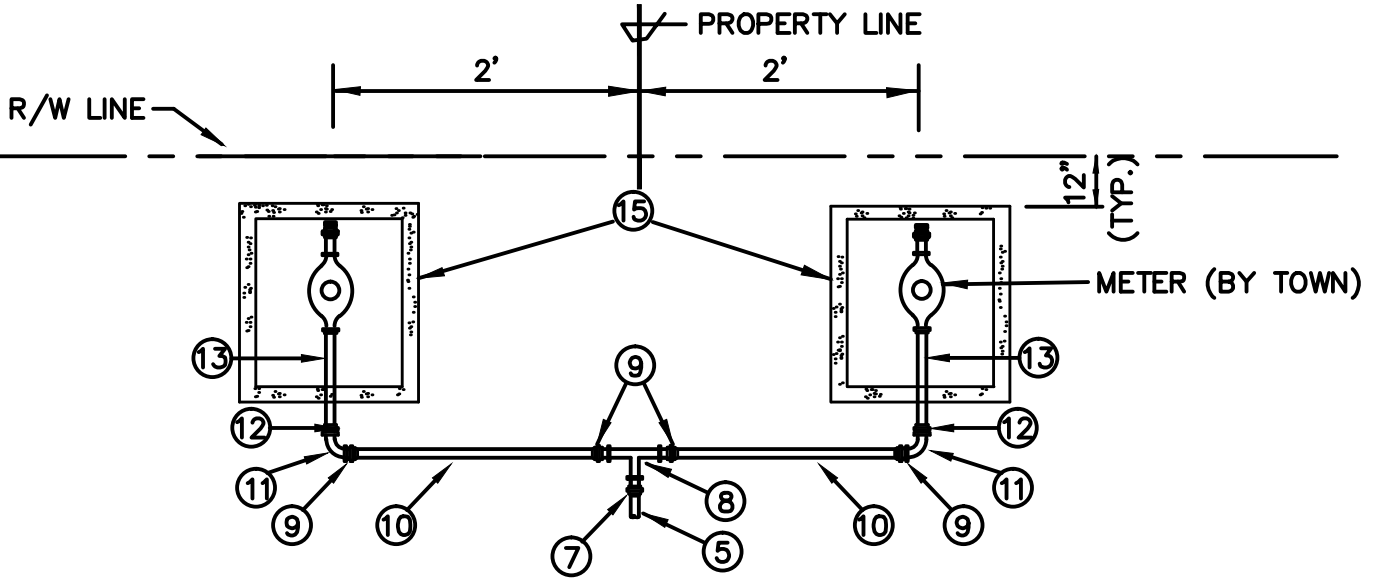


ELEVATION



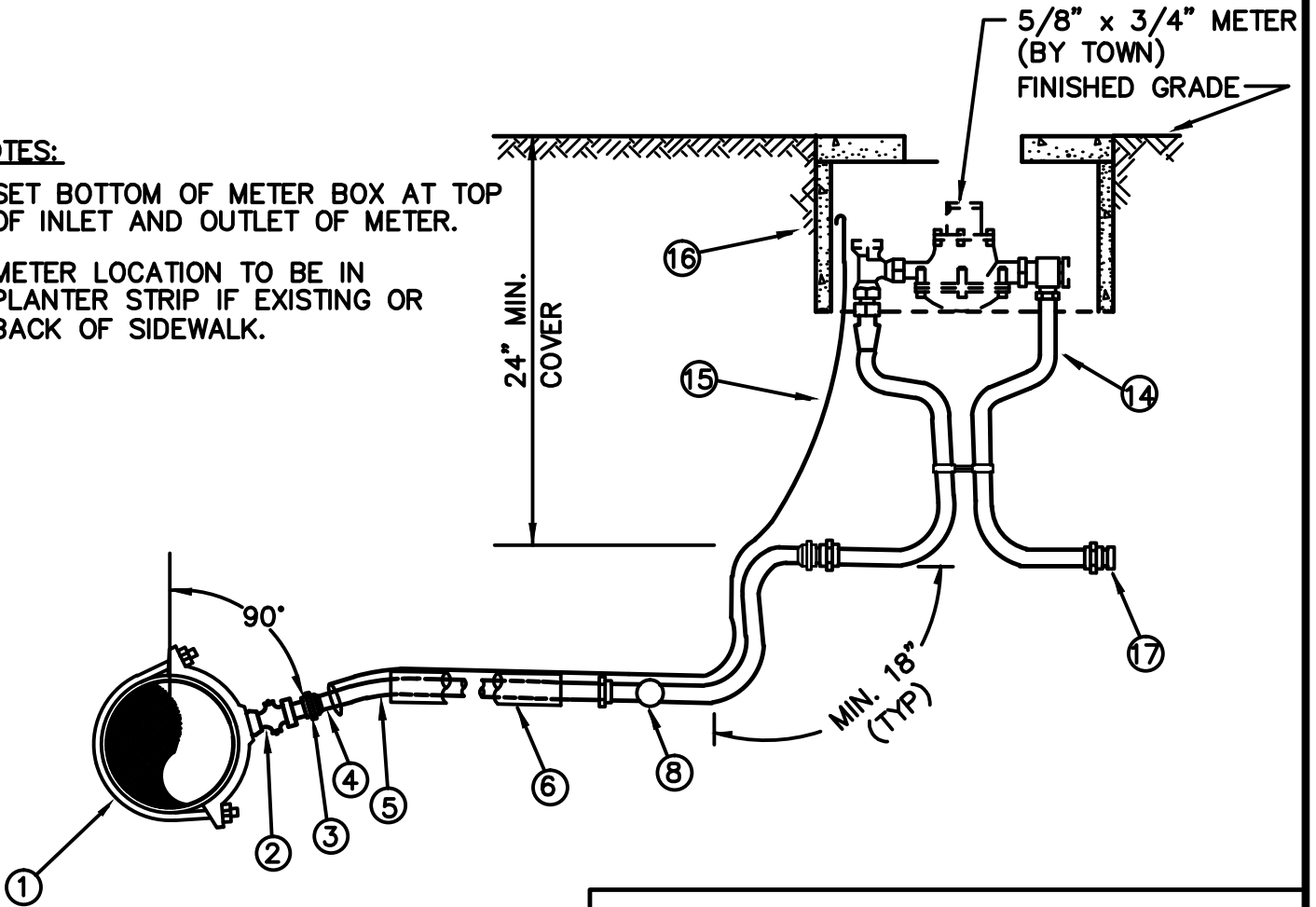
MINIMUM AREA OF LEVEL GROUND SURFACE

TOWN OF LYMAN			
FIRE HYDRANT GUARD POST INSTALLATION			
APPROVED:			DWG. NO.
BY TOWN		DATE	FIRE-HYD5
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



NOTES:

1. SET BOTTOM OF METER BOX AT TOP OF INLET AND OUTLET OF METER.
2. METER LOCATION TO BE IN PLANTER STRIP IF EXISTING OR BACK OF SIDEWALK.

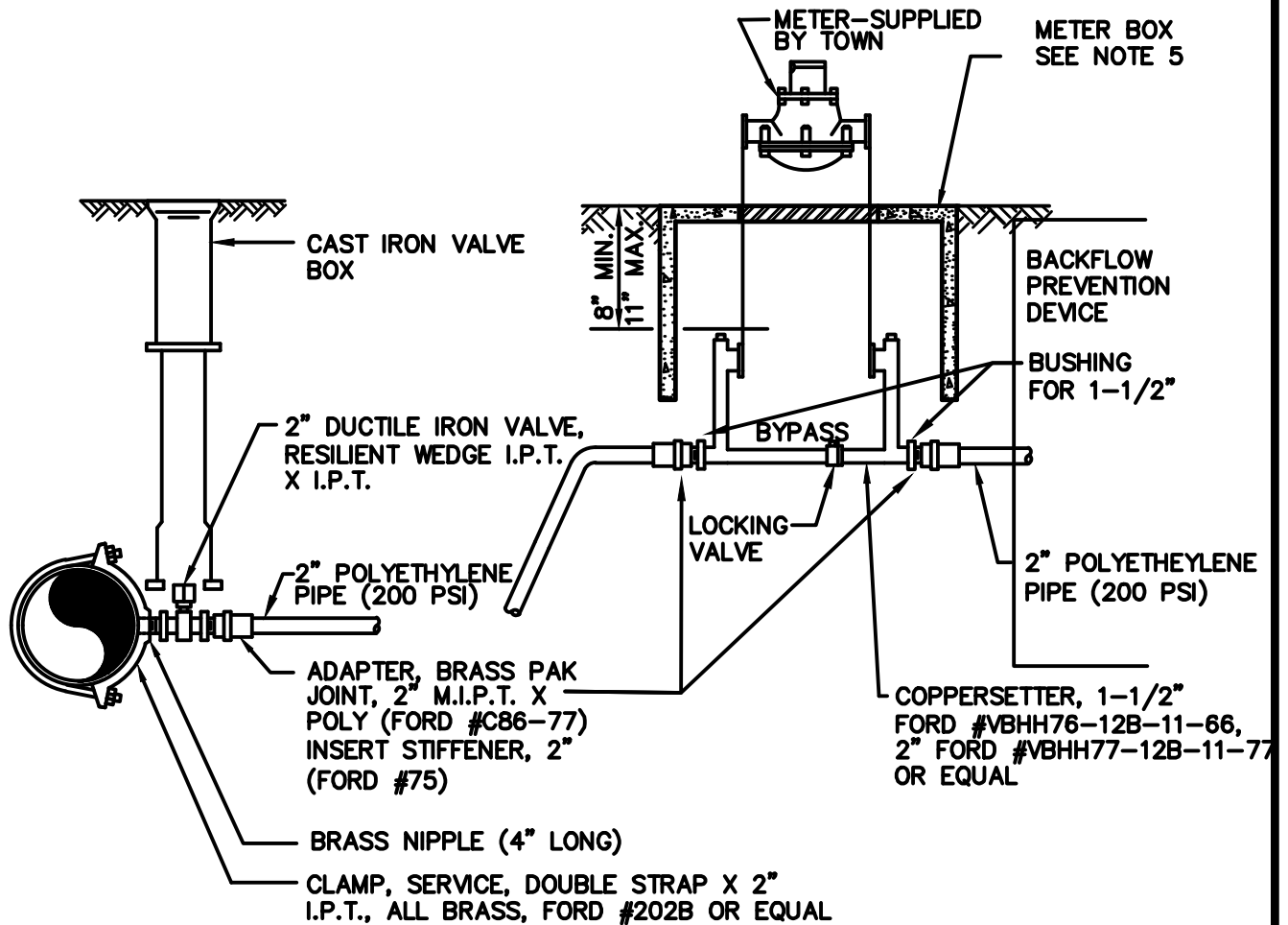


TOWN OF LYMAN			
DUAL 5/8" X 3/4" WATER SERVICE			
APPROVED:			DWG. NO.
BY TOWN		DATE	WAT-SERV
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE

LEGEND

- ① SERVICE SADDLE – DOUBLE STRAP X 1” I.P.T, ALL BRASS (FORD #202B OR EQUAL)
- ② 1” BALL STYLE CORP STOP (FORD FB-500 OR EQUAL)
- ③ BRASS PAK JOINT ADAPTER, 1” F.I.P.T. X 1-1/4” POLY (FORD C16-44 OR EQUAL)
- ④ 1” INSERT STIFFENER (FORD INSERT-72 OR EQUAL)
- ⑤ 1-1/4” POLYETHYLENE PIPE (PE3408, 200 PSI, SDR 7) (LENGTH AS REQUIRED)
- ⑥ INSTALL SERVICE LINE IN 2” PVC GUARD PIPE (SCH-80) WHEN BORING UNDER ROADWAY (3’ MINIMUM BEYOND AND BENEATH PAVEMENT SECTION) OR AT UTILITY CROSSINGS AS DIRECTED BY TOWN.
- ⑦ BRASS PAK JOINT ADAPTER, 1” M.I.P.T. X 1-1/4” POLY
a. (FORD C86-44 OR EQUAL)
- ⑧ 1” X 3/4” X 3/4” BRASS TEE
- ⑨ BRASS PAK JOINT ADAPTER, 1” M.I.P.T. X 1” PVC (FORD C87-44 OR EQUAL)
- ⑩ 1” PVC PIPE, SCHEDULE 80
- ⑪ 1” BRASS ELBOW
- ⑫ BRASS ADAPTER, 1” M.I.P.T X 1” F.I.P.T
- ⑬ 1” BRASS NIPPLE, LENGTH 4”
- ⑭ 3/4” COPPER SETTER, ANGLE BALL VALVE BY ANGLE CARTRIDGE DUAL CHECK VALVE (FORD VBHC72-9W-11-33 OR EQUAL)
- ⑮ #10 GAUGE COPPER WIRE w/ THHN BLUE PLASTIC INSULATION FROM MAINLINE TAP TO METER BOX AND EXPOSE 6” MINIMUM IN BOX (RUN INSIDE 2” PVC GUARD CONDUIT WHERE APPLICABLE). MINIMUM OF 1 WRAP AROUND SERVICE LINE EVERY 5’ FEET.
- ⑯ METER BOX (CARSON INDUSTRIES LLC L SERIES 1419-12 W/COVER 1419-3 OR EQUAL) (SET FLUSH WITH FINISHED GRADE)
- ⑰ PROVIDE APPROVED WATERTIGHT PLUG UNTIL CONNECTION TO PRIVATE SYSTEM IS MADE.

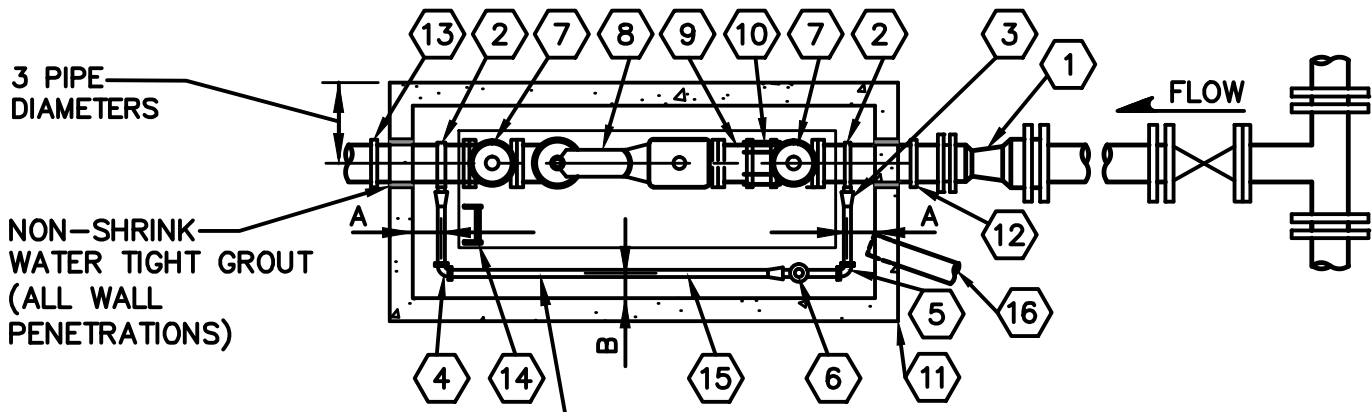
TOWN OF LYMAN			
DUAL 5/8”X3/4” WATER SERVICE			
APPROVED:			DWG. NO.
BY TOWN _____		DATE _____	WAT-SERV
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



NOTES:

1. POLYETHYLENE PIPE SHALL HAVE #10 GAUGE COPPER WIRE w/ THHN BLUE PLASTIC INSULATION FROM MAINLINE TAP TO METER BOX AND EXPOSE 6" MINIMUM IN BOX (RUN INSIDE 2" PVC GUARD CONDUIT WHERE APPLICABLE). MINIMUM OF 1 WRAP AROUND SERVICE LINE EVERY 5'.
2. SERVICE FROM METER BOX TO STRUCTURE BY PROPERTY OWNER.
3. INDIVIDUAL SERVICES REQUIRED FOR EACH STRUCTURE.
4. COPPERSETTER, 1-1/2" FORD #VBHH76-12B-11-66 OR EQUAL
5. METER BOX - UTILITY VAULT 3642-LA W/3642-2436P COVER, BOX SHALL BE H-20 LOAD RATED WHERE REQUIRED.
6. EASEMENT PROVIDED TO TOWN TO AND AROUND METERS LOCATED OUTSIDE R/W.
7. ALL SERVICES SHALL HAVE WASHINGTON STATE APPROVED RPBA FOR BACKFLOW PREVENTION. CONFIRM LOCATION OF ASSEMBLY WITH TOWN. INITIAL AND ANNUAL TESTING REQUIRED. MULTIFAMILY ALLOWED TO USE DCVA IN LIEU OF RPBA.

TOWN OF LYMAN			
1 1/2" & 2" WATER SERVICE			
APPROVED:			DWG. NO.
BY TOWN		DATE	WAT-SERV2
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



ALL METER ASSEMBLIES 3" OR LARGER SHALL BE REVIEWED AND APPROVED BY TOWN.

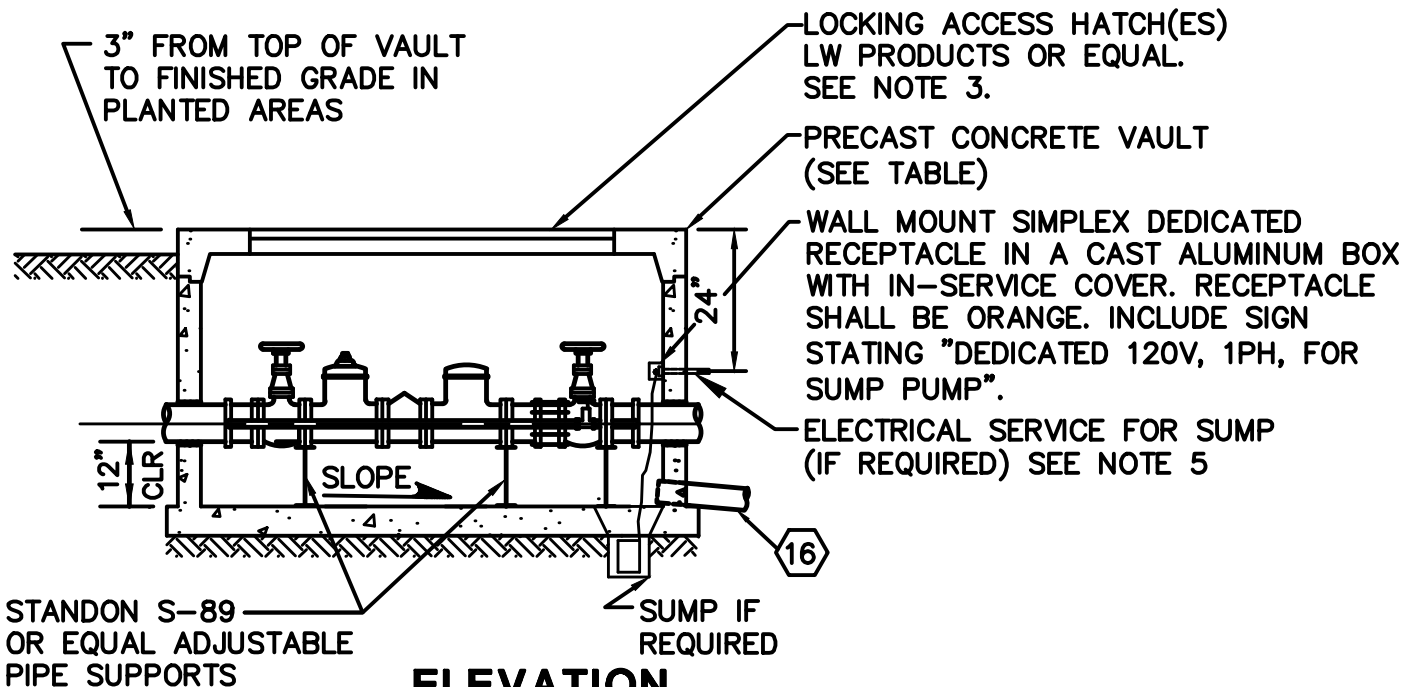
PLAN

- ① REDUCER, M.J.
- ② DOUBLE STRAP SERVICE CLAMP, FORD FC202-425-IP7, OR EQUAL (1 1/2" OR 2" BYPASS, 4-INCH AND LARGER BYPASS REQUIRES D.I. TEE).
- ③ FITTINGS AS REQUIRED.
- ④ BEND CPLG COPPER TO COPPER FORD L22, OR EQUAL.
- ⑤ BEND CPLG, COPPER TO OUTSIDE I.P. THREAD FORD L28, OR EQUAL.
- ⑥ BALL VALVE WITH PADLOCK WING OR LOCK CAP, FORD B21-444W OR B21-666 WITH LOCK CAP OR B21-777 WITH LOCK CAP. SIZED TO LINE.
- ⑦ RESILIENT SEAT GATE VALVE, FL X FL SIZED TO METER.
- ⑧ 3" TO 10" SENSUS METER FOR IRRIGATION SERVICES AND 3" TO 10" COMPOUND METER IF FOR DOMESTIC SERVICE. READ IN CUBIC FEET WITH MXU RADIO UNIT AS SPECIFIED BY TOWN SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
- ⑨ D.I. PIPE SPOOL FL X PE LENGTH TO FIT.
- ⑩ FL CPLG. ADAPT.
- ⑪ PRECAST CONCRETE VAULT, UTILITY VAULT OR EQUAL, SEE PAGE 2 FOR SIZING AND REQUIREMENTS.
- ⑫ MEGA-LUG FOLLOWER INSTALLED ON INFLOW SIDE OF VAULT WITH CONCRETE THRUST BLOCK OR SHACKLE TO THRUST BLOCK TO PREVENT MOVEMENT IF METER IS REMOVED. (BLOCK NOT SHOWN)
- ⑬ DIELECTRIC CPLG. TO BUILDING SERVICE. SIZE AS REQUIRED.
- ⑭ GALV. STEEL OR ALUMINUM LADDER. SECURE TO VAULT LID AND FLOOR. COORDINATE LOCATION FOR ACCESS.
- ⑮ BY-PASS (SIZE BY TABLE BELOW).
- ⑯ 4" PVC TO CATCH BASIN OR DAYLIGHT. WHERE GRAVITY DRAIN IS NOT FEASIBLE, PROVIDE SUMP, ELECTRICAL SERVICE AND PUMP WITH DISCHARGE TO SURFACE DRAIN. PUMP SHALL BE 1/2 HP ZOELLER M-53, WITH CHECK VALVE ON DISCHARGE LINE.
- ⑰ ALL PIPES AND FITTINGS 4-INCH OR LARGER SHALL BE DI., CL 52.

METER SIZE	MAIN-LINE	BYPASS	A	B
3"	4" DI.	2" COPPER	9"	4"
3"	4" DI.	2" COPPER	9"	4"
4"	6" DI.	4" DI.	9"	4"
6"	8" DI.	4" DI.	14"	6"
8"	10" DI.	8" DI.	16"	6"

NOTES:
SEE PAGE 2 FOR ELEVATION AND NOTES.
PAGE 1 OF 2

TOWN OF LYMAN			
METER AND METER VAULT ASSEMBLY 3" THROUGH 10"			
APPROVED:			DWG. NO.
BY TOWN _____			DATE _____
DATE: 01/2013			SCALE: NONE
DRWN: M.A.N.		CHKD: J.N.D.	
WAT-SERV3			



ELEVATION

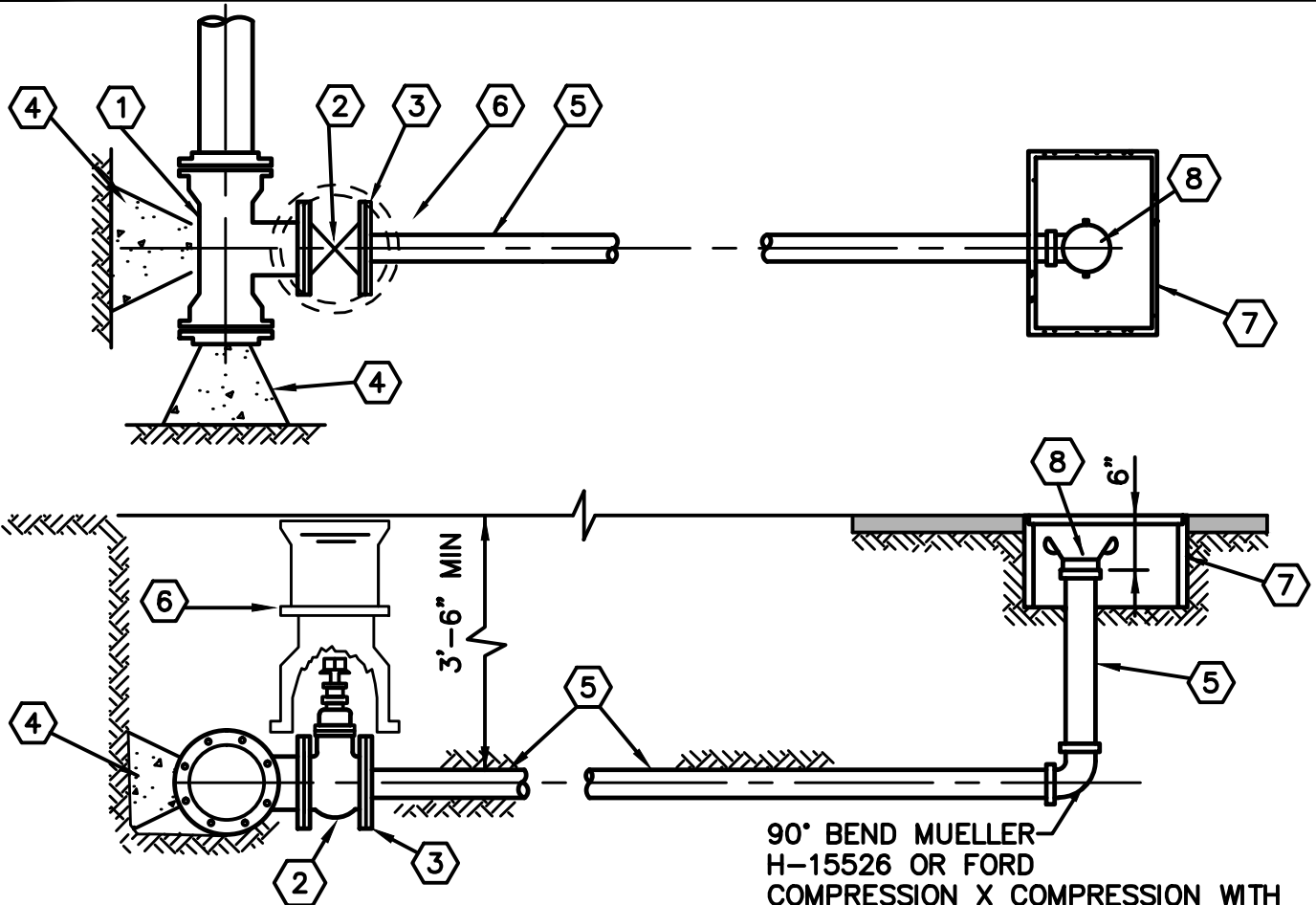
SEE DETAIL V-W16A FOR CALLOUTS

METER SIZE	MAIN-LINE	MINIMUM 1/S VAULT DIM. L x W x H			UTILITY VAULT CO APPROVED MODEL	MIN. HATCH OPENING
3"	4" DI.	8'-4"	4'-4"	6'-2"	4484-LA	3' x 6'
4"	4" DI.	8'-4"	4'-4"	6'-2"	4484-LA	3' x 6'
6"	6" DI.	10'-6"	5'-0"	6'-2"	5106-LA	3' x 6'
8"	8" DI.	12'-0"	6'-0"	6'-6"	612-LA	3' x 6'
10"	10" DI.	14'-0"	8'-0"	6'-6"	814-LA	3' x 6'

NOTES:

- WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW PREVENTOR REQUIRED. SEE RPBA-2. CONFIRM INSTALLATION WITH TOWN. INITIAL AND ANNUAL TEST REQUIRED.
- METER SHALL BE INSTALLED SUCH THAT IT CAN BE READ WITHOUT ENTERING VAULT WITH ACCESS HATCH OPEN.
- COORDINATE ORIENTATION OF HATCH(ES) TO PROVIDE CLEAR VERTICAL ACCESS TO METER ASSEMBLY, AND WITH LADDER LOCATION. VERIFY WITH TOWN.
- DRAIN DRAIN HATCH(ES) TO VAULT FLOOR WITH PVC PIPE AND FITTINGS.
- 3/4" (MINIMUM) PVC SCH-40 CONDUIT. WIRING SHALL BE COMPLETELY SEALED 120V, UNDER GROUND. CONTRACTOR TO SEAL CONDUIT PENETRATION WITH NON-SHRINK GROUT. (NOT REQUIRED IF GRAVITY VAULT DRAIN PROVIDED).
- ESMT TO BE PROVIDED TO TOWN AROUND METERS LOCATED OUTSIDE RIGHT-OF-WAY.
- SEE PAGE 1 FOR PLAN AND NOTES.

TOWN OF LYMAN			
METER AND METER VAULT ASSEMBLY 3" THROUGH 10"			
APPROVED:		DWG. NO.	
BY TOWN		DATE	
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



- ① MJ X MJ X 4" FL D.I. TEE.
- ② 4" AWWA RESILIENT SEAT GATE VALVE, FL X FL, WITH OPERATING NUT.
- ③ 4" BLIND FLANGE, TAPPED FOR 2". MAINS LARGER THAN 8" REQUIRE 4-INCH BLOW-OFF OR HYDRANT.
- ④ CONCRETE THRUST BLOCK.
- ⑤ 2" TYPE K COPPER PIPE.
- ⑥ CAST IRON VALVE BOX PER VALV-BOX
- ⑦ METER BOX - FOGTITE NO. 2. BOX SHALL BE H-20 LOAD RATED.
- ⑧ ALUMINUM CAM-LOCK AND CAP. DRILL 1/8" HOLE IN CAP. (PLASTIC CAM LOCK FITTING NOT ALLOWED)

TOWN OF LYMAN

2" BLOW-OFF ASSEMBLY

NOTES

1. INSTALL DIELECTRIC COMPOUNDS FOR SEPARATION AT DISSIMILAR METALS.

TOWN OF LYMAN			
2" BLOW-OFF ASSEMBLY			
APPROVED:			DWG. NO.
BY TOWN		DATE	BLOW-OFF
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE

4"x4" CONC. MARKER POST PAINTED YELLOW WITH BLACK STENCILED DISTANCE & DIRECTION TO VALVE

PAINT YELLOW THAT PORTION ABOVE GROUND

17" x 28" CONC. METER BOX WITH 3/8" STEEL DIAMOND PLATE COVER, FOG-TITE METER SEAL CO. NO.2

2" BEEHIVE STRAINER

CONCRETE COLLAR, SEE VALVE BOX ADJUSTMENT DETAIL

2" OPEN PATTERN RETURN BEND

FINISHED GRADE

2'-0"

CAST IRON VALVE BOX

2"x90° ELL UNION

2" GALV. IRON PIPE SLOPE

FILTER FABRIC

2" GATE VALVE

BACKFILL W/ SAWDUST

18" MAX

2, 2" x 90° EL GALV. WITH WEEP HOLE IN ONE, 2" SWING JOINT

1/4 CU. WASHED ROCK

2" MIPxCTS ADAPTOR (TYP)

2" PIPE TYPE K COPPER

2" NIPPLE & UNIONS

FOUNDATION ROCK

2" AIR & VACUUM RELEASE VALVE, "APCO" OR OWNER APPROVED EQUAL

DOUBLE STRAP SERVICE CLAMP

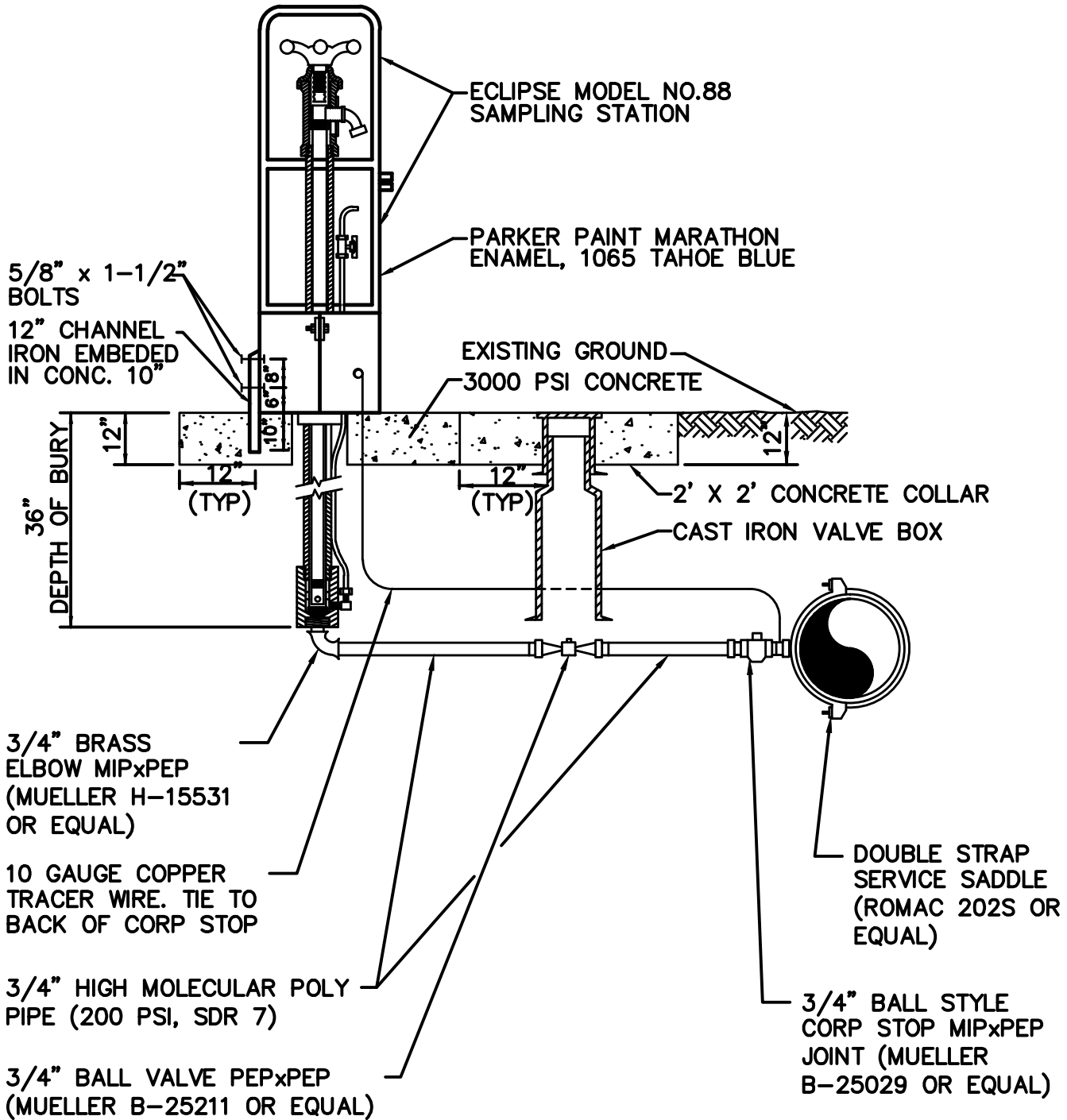
DUCTILE IRON WATER MAIN

UNDISTURBED EARTH

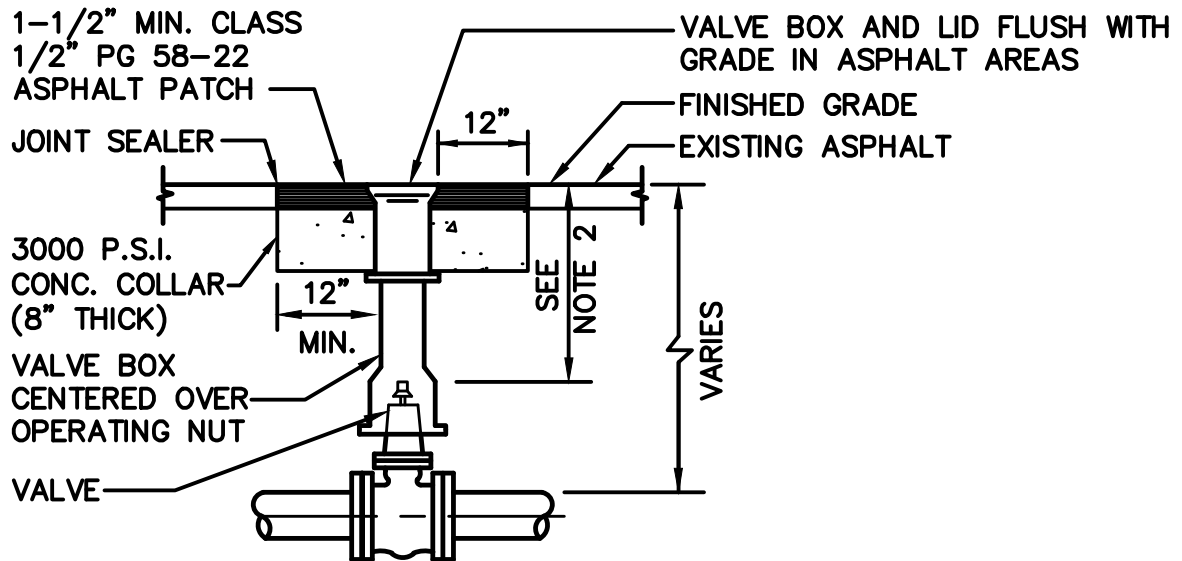
NOTES:

1. GATE VALVE: AWWA RESILIENT SEAL, THRD x THRD WITH OPERATING NUT
2. ALL PIPING BETWEEN DOUBLE STRAP SADDLE AND INLET SIDE OF COMBINATION AIR & VAC ASSEMBLY SHALL BE TYPE K COPPER
3. TAP MAIN AT SYSTEM HIGH POINT. LOCATION TO BE APPROVED BY THE TOWN
4. PAINT PORTION ABOVE GROUND WITH TWO COATS PRESERVATIVE BRAND No. 43-616 YELLOW

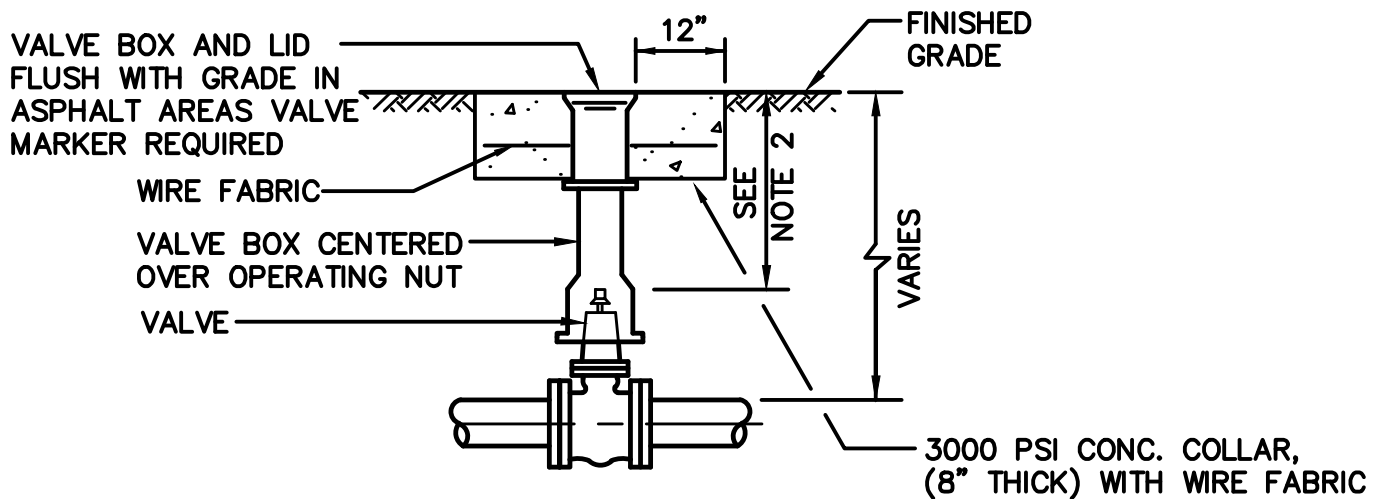
TOWN OF LYMAN			
AIR & VACUUM RELEASE ASSEMBLY			
APPROVED:			DWG. NO.
BY TOWN		DATE	AIR-RLS
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



TOWN OF LYMAN			
WATER SAMPLING STATION			
APPROVED:			DWG. NO.
BY TOWN		DATE	WAT-SAMP
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



VALVE BOX IN ASPHALT AREA

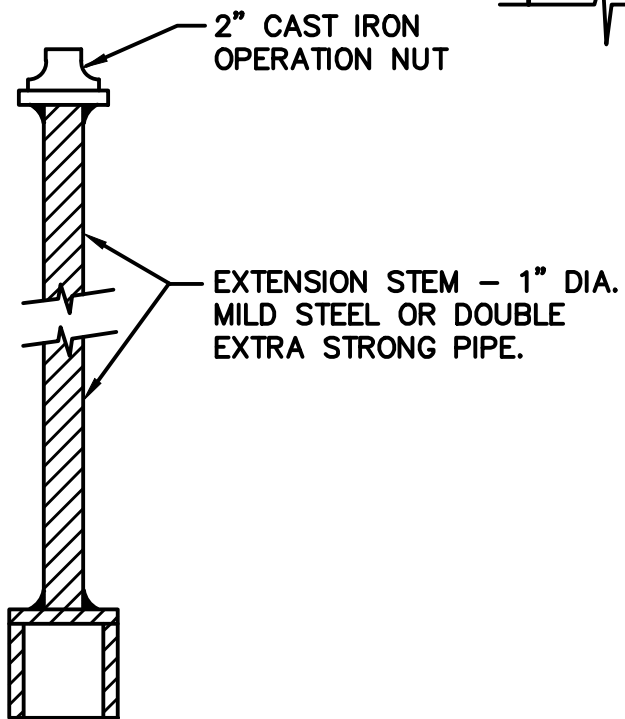
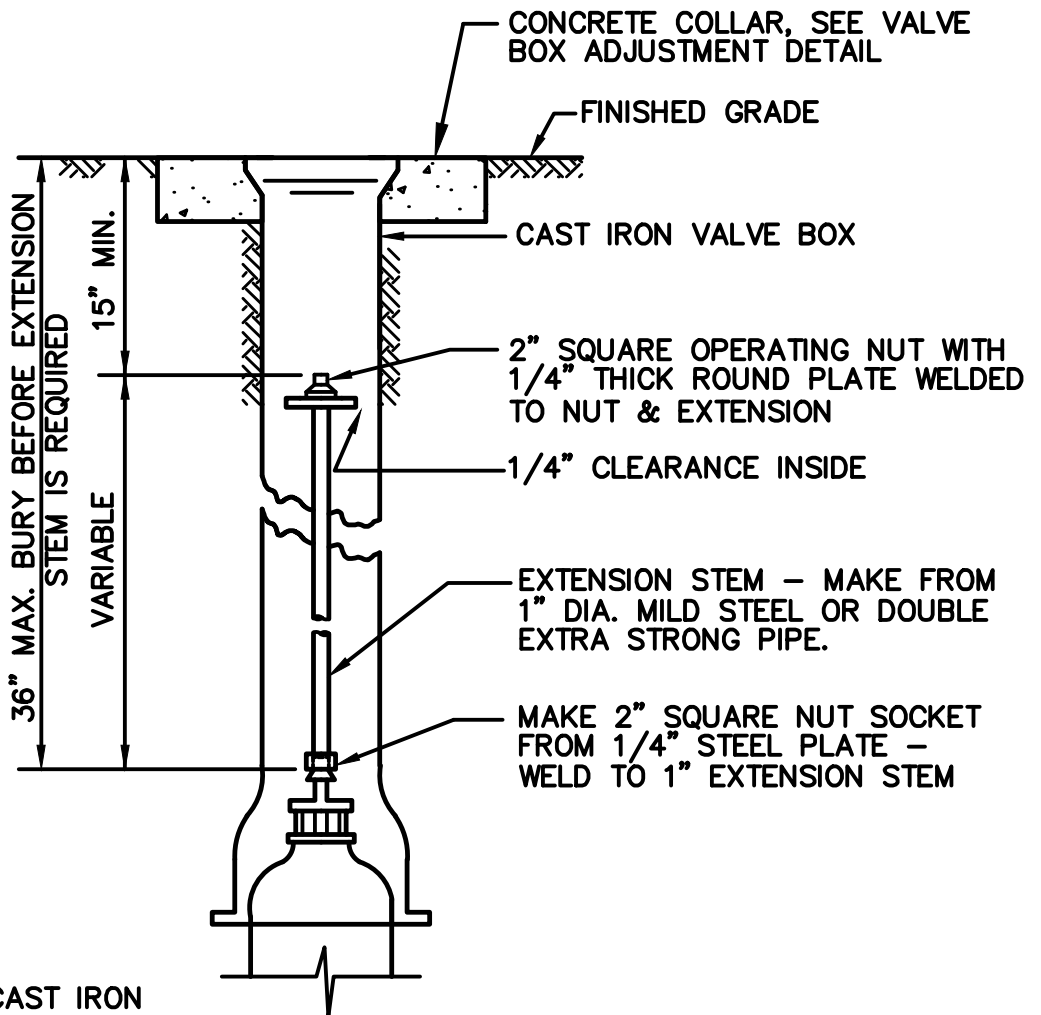


VALVE BOX IN UNIMPROVED AREA

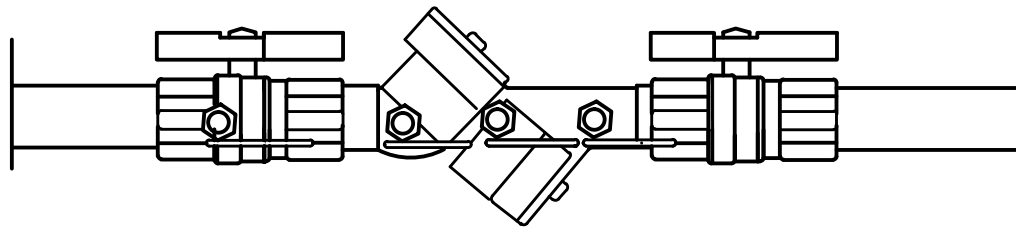
NOTES:

1. EACH VALVE SHALL BE PROVIDED WITH AND ADJUSTABLE CAST IRON VALVE BOX OF 5 INCHES (5") INSIDE DIAMETER. VALVE BOXES SHALL HAVE A TOP SECTION WITH AN EIGHTEEN INCH (18") MIN. LENGTH. THE VALVE BOX SHALL BE OLYMPIC FOUNDRY VB-007-SKAGIT, EAST JORDAN IRON WORKS OR APPROVED EQUAL. VALVE BOX EARS SHALL BE PLACED IN LINE WITH PIPE IT SERVES.
2. 15" MINIMUM, 36" MAXIMUM FOR OPERATOR NUT. EXTENSION MAY BE REQUIRED.

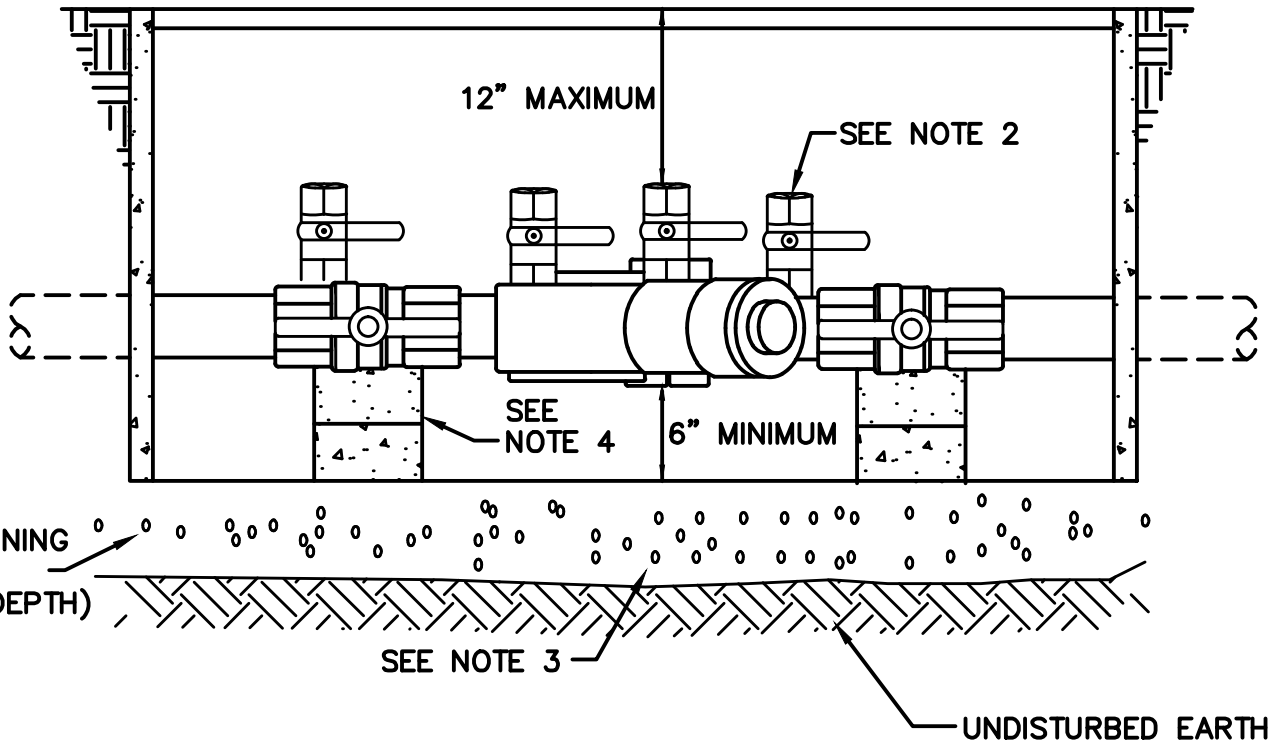
TOWN OF LYMAN			
VALVE BOX ADJUSTMENT			
APPROVED:			DWG. NO.
BY TOWN		DATE	VALV-BOX
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



TOWN OF LYMAN			
WATER VALVE STEM EXTENSION			
APPROVED:			DWG. NO.
BY TOWN		DATE	WAT-VALV
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE



PLAN VIEW



NOTES:

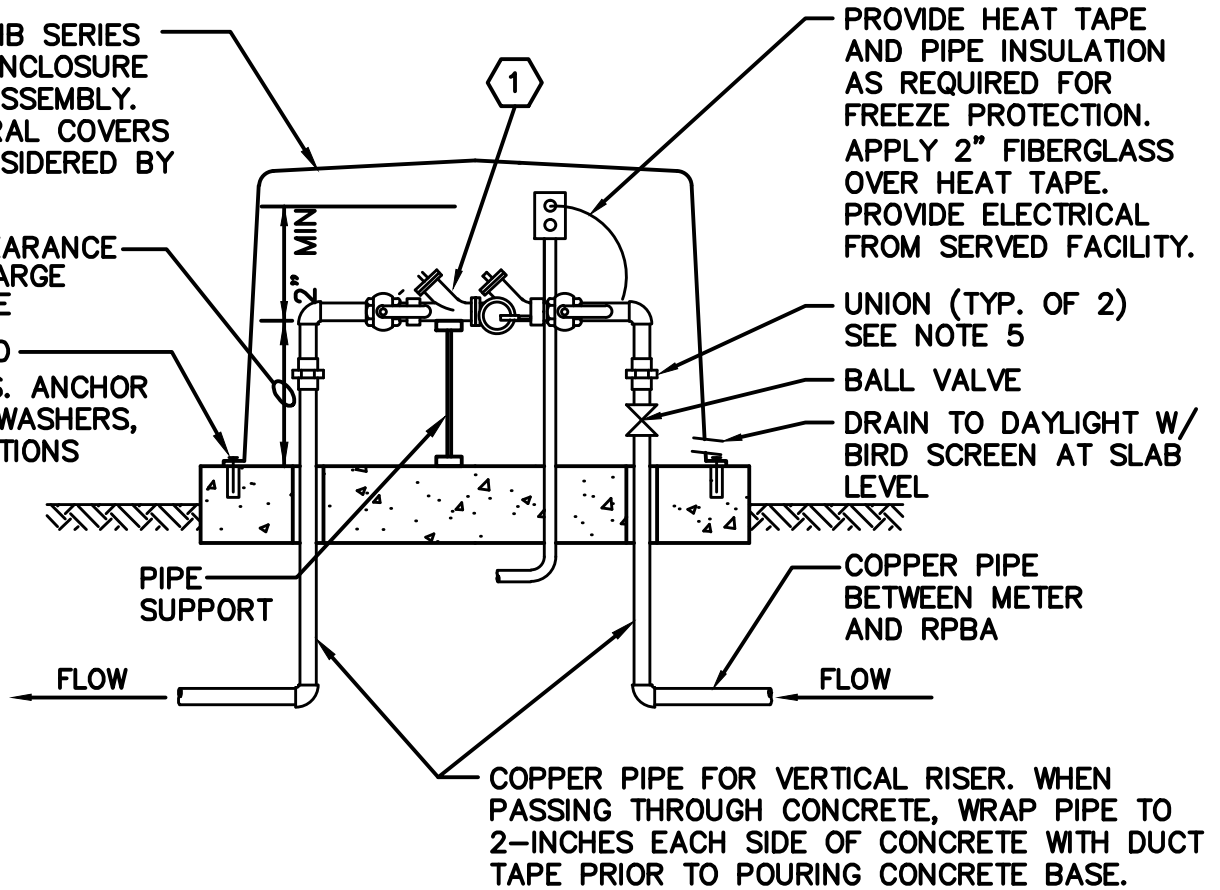
1. MINIMUM BOX SIZE 3/4" - 1" ASSEMBLIES, 10"x13"
1 1/4" - 2" ASSEMBLIES, 14"x20"
2. ASSEMBLY MUST BE INSTALLED WITH TEST COCKS FACING UP OR TO ONE SIDE. INSTALL WATERTIGHT PLUGS IN ALL TEST COCKS.
3. SUFFICIENT DRAINAGE MUST BE PROVIDED TO PREVENT ASSEMBLY FROM BEING SUBMERGED.
4. PROVIDE SUPPORT BLOCKS AS MAY BE REQUIRED.
5. PROVIDE A STRAINER WITH BLOW OUT VALVE AHEAD OF DEVICE IF REQUIRED BY TOWN.
6. THOROUGHLY FLUSH THE LINE, PRIOR TO THE INSTALLATION OF THE DCVA.
7. PROTECT DEVICE FROM FREEZING BY INSTALLING IN STRUCTURE OR PER "HOT BOX" HB SERIES INSULATED ENCLOSURE SIZED FOR ASSEMBLY.

TOWN OF LYMAN			
"INDIVIDUAL" DOUBLE CHECK DETECTOR ASSEMBLY			
APPROVED:			DWG. NO.
BY TOWN		DATE	DBL-CHCK
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE

"HOT BOX" HB SERIES INSULATED ENCLOSURE SIZED FOR ASSEMBLY. ARCHITECTURAL COVERS WILL BE CONSIDERED BY TOWN.

12" MIN. CLEARANCE FROM DISCHARGE TO CONCRETE

BOLT TO PAD W/ 3/8" S.S. ANCHOR BOLTS AND WASHERS, MIN. 4 LOCATIONS



PROVIDE HEAT TAPE AND PIPE INSULATION AS REQUIRED FOR FREEZE PROTECTION. APPLY 2" FIBERGLASS OVER HEAT TAPE. PROVIDE ELECTRICAL FROM SERVED FACILITY.

UNION (TYP. OF 2) SEE NOTE 5

BALL VALVE

DRAIN TO DAYLIGHT W/ BIRD SCREEN AT SLAB LEVEL

COPPER PIPE BETWEEN METER AND RPBA

COPPER PIPE FOR VERTICAL RISER. WHEN PASSING THROUGH CONCRETE, WRAP PIPE TO 2-INCHES EACH SIDE OF CONCRETE WITH DUCT TAPE PRIOR TO POURING CONCRETE BASE.

REDUCED PRESSURE BACKFLOW DEVICE

NOT TO SCALE

1 WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) WITH TEST COCK PROTECTION AND BRONZE BODY BALL VALVE AT EACH END.

NOTES:

1. CONCRETE TO BE 2500 PSI (MINIMUM) MIX WITH AIR ENTRAINMENT.
2. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, DISTRICT AND MANUFACTURER STANDARDS.
3. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE TOWN AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
4. RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
5. DIELECTRIC UNIONS SHALL BE USED TO SEPARATE DISSIMILAR MATERIALS.
6. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND RPBA.

TOWN OF LYMAN			
REDUCED PRESSURE BACKFLOW ASSEMBLY 3/4" TO 2"			
APPROVED:			DWG. NO.
BY TOWN		DATE	RPBA
DATE:	DRWN:	CHKD:	SCALE:
01/2013	M.A.N.	J.N.D.	NONE

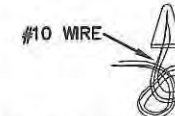
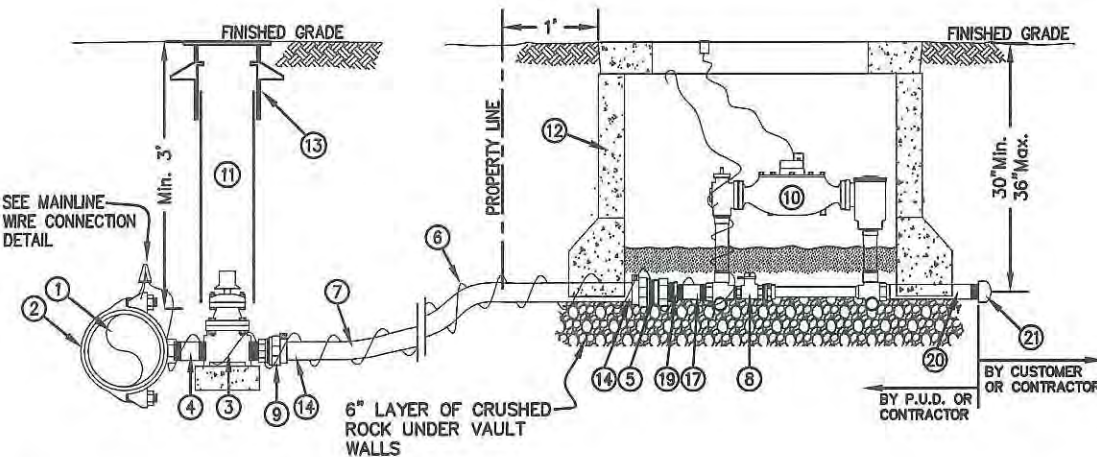
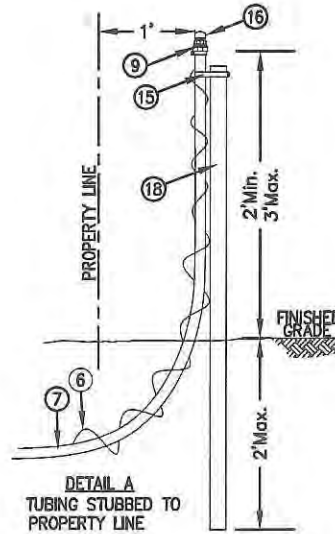
BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE, I.P.T.x I.P.T.	1
4	NIPPLE, BRASS 2X4	1
5	ADAPTER, BRASS PAK JOINT, 2" F.I.P.T. X 2" POLY (FORD #C16-77) ^{a b}	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID	
7	PIPE, 2" PE 3408, SIDR 7, 200 P.S.I.	
8	COPPERSETTER, 1-1/2", (FORD #VBHH76-12B-11-66) ^a	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X POLY (FORD #C86-77) ^a	2
10	METER, BADGER, 1-1/2" MODEL 120	1
11	CASING, 6" PVC SEWER PIPE	1
12	UTILITY VAULT 3642-LA W/3642-2436P COVER ^a	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	INSERT, STIFFENER, 2" (FORD #75) ^a	2
15	HOSE CLAMP, 3/4" STAINLESS STEEL	1
16	CAP, 2" (GALVANIZED)	1
17	NIPPLE, BRASS 1-1/2"x4"	1
18	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
19	BUSHING, BRASS 2" M.I.P.T.x 1-1/2" F.I.P.T.	1
20	NIPPLE, BRASS 1-1/2"x12"	1
21	CAP, 1-1/2" (GALVANIZED)	1

^a OR EQUIVALENT APPROVED BY THE DISTRICT

^b ELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.



MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

NOTES

- CORP TO BE IN FULL OPEN POSITION BEFORE BACKFILL.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
- WATER SERVICE TUBING INSTALLATION IN PLATTED AREAS WILL BE COMPLETED BY THE CONTRACTOR/DEVELOPER FROM THE PIPELINE TO BEYOND THE PROPERTY LINE. IF METER BOX AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE PIPE INSTALLATION, THEN TUBING IS TO BE STUBBED UP AND COMPLETED AS PER DETAIL A. THE DISTRICT WILL COMPLETE THE ACTUAL METER AND BOX INSTALLATION WHEN NEEDED.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN BOX.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- FILL BOX WITH FINE DIRT TO TOP OF METER.
- IF THE METER BOX IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18)^a WILL BE REQUIRED. NOT FOR THROUGH-WAY TRAFFIC APPLICATIONS.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct 24, 2012



STANDARD INSTALLATION OF
1-1/2" METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE
SERVICE LINE

SCALE: 1" = 2'
DATE: 3-01-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD
WS1.5-1

BILL OF MATERIALS

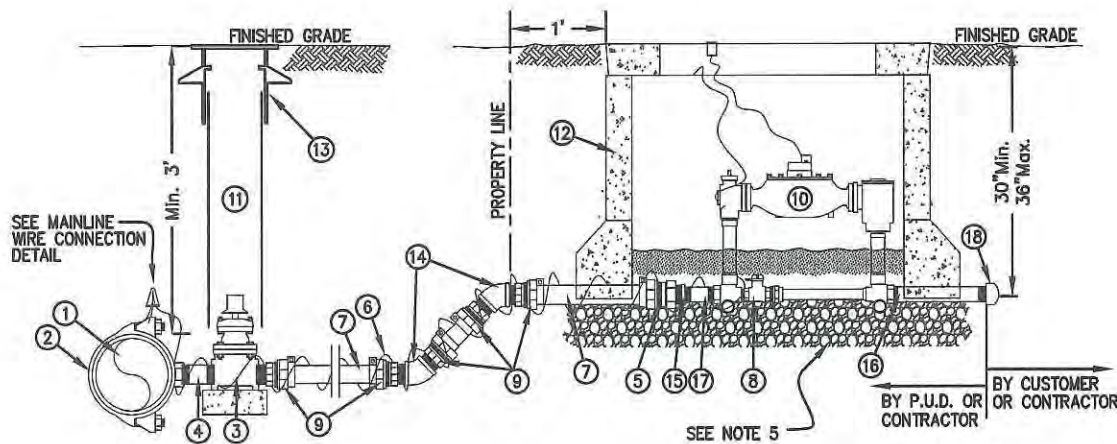
NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	VALVE, 2" CAST IRON, RESILIENT WEDGE	1
4	NIPPLE, BRASS 2X4	1
5	ADAPTER, BRASS PAK JOINT, 2" F.I.P.T. X PVC (FORD #C17-77) ^{a b}	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID	
7	PIPE, 2" P.V.C., 200 PSI, SCHEDULE 80	
8	COPPERSETTER, 1-1/2", FORD #VBHH76-12B-11-66 ^a	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X PVC (FORD #C87-77) ^a	5
10	METER, BADGER, 1-1/2" MODEL 120	1
11	CASING, 6" PVC SEWER PIPE	1
12	UTILITY VAULT 3642-LA W/3642-2436P COVER ^a	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	ELL, BRASS 2", 45' OR 90'	2
15	BUSHING, BRASS 2" M.I.P.T.x 1-1/2" F.I.P.T.	1
16	NIPPLE, BRASS 1-1/2"x12"	1
17	NIPPLE, BRASS 1-1/2"x4"	1
18	CAP, 1-1/2" (GALVANIZED)	1

^aOR EQUIVALENT APPROVED BY THE DISTRICT
^bELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES

1. INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
2. IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE.
3. SUPPORT COPPERSETTER WITH 1'6" TO 2' OF ROD OR PIPE THROUGH EACH EYELET. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN VAULT/BOX. LOCK BYPASS WITH P.U.D.-ISSUED PADLOCK.
4. FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. **DO NOT** ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
5. SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. **DO NOT** REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
6. IF METER IS LOCATED IN ASPHALT OR CONCRETE AREA, A CONCRETE UTILITY VAULT WILL BE REQUIRED. IF IN LAWN OR LANDSCAPED AREA, A CARSON INDUSTRIES LLC L SERIES 1730-15 BOX W/COVER 1730-3L CAN BE INSTALLED WITH APPROVAL BY DISTRICT ENGINEER.
7. IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
8. METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN SIX INCHES OF HINGE NEAR STREET END. IN A CARSON INDUSTRIES BOX, PAD IS TO BE LOCATED AT STREET END OF BOX.
9. SEAL VAULT LIDS AND SEGMENTS WITH 1-1/2"x1" JOINT MASTIC.
10. DRAIN VAULT TO DAYLIGHT WHERE POSSIBLE WITH MINIMUM 3" DRAIN PIPE. (TO BE DETERMINED IN FIELD BY P.U.D. REPRESENTATIVE.)
11. A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



MAINLINE WIRE CONNECTION DETAIL
 NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

[Handwritten Signature]

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct-24, 2012



**STANDARD INSTALLATION OF
 1-1/2" METERED SERVICE
 WITH P.V.C.
 SERVICE LINE**

SCALE: 1" = 1'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

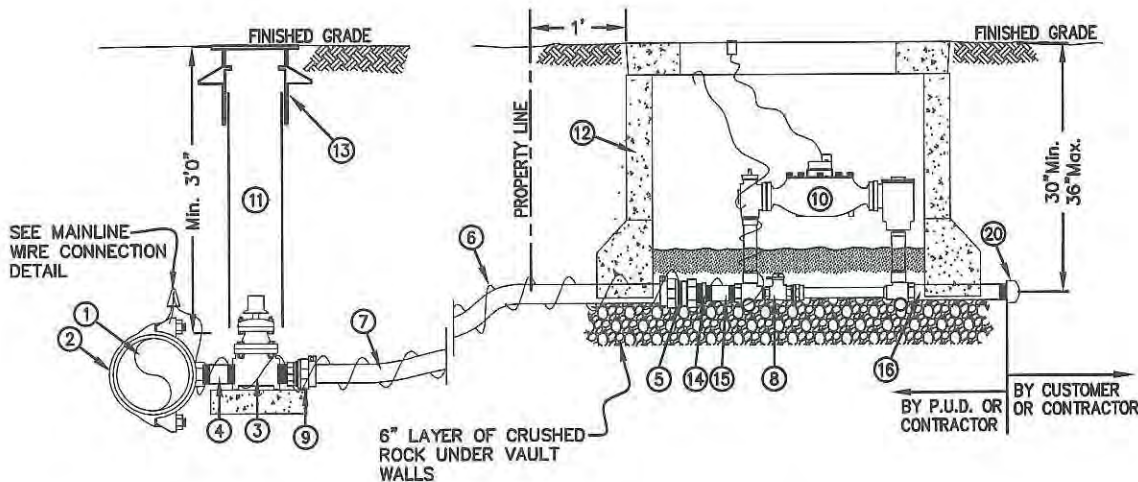
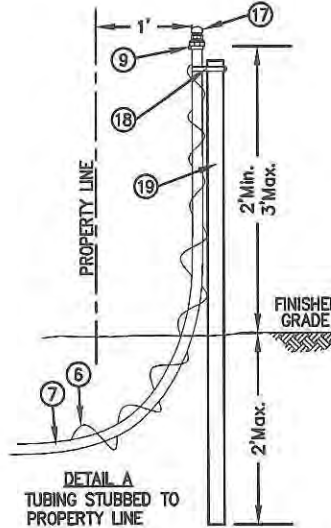
WS1.5-4

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^d	1
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1
4	NIPPLE, BRASS 2X4	1
5	ADAPTER, BRASS PAK JOINT, 2" F.I.P.T. X 2" COPPER (FORD #C14-77) ^{a b}	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID	
7	TUBING, 2" COPPER, TYPE K	
8	COPPERSETTER, 1-1/2", (FORD #VBHH76-12B-11-66) ^d	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X COPPER (FORD #C84-77) ^d	2
10	METER, BADGER, 1-1/2" MODEL M120	1
11	CASING, 6" PVC SEWER PIPE	1
12	UTILITY VAULT 3642-LA W/3642-2436P COVER ^d	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	BUSHING, BRASS 2"x1-1/2" M.I.P.T. X F.I.P.T.	1
15	NIPPLE, BRASS 1-1/2"x4"	1
16	NIPPLE, BRASS 1-1/2"x12"	1
17	CAP, 2" (GALVANIZED)	1
18	HOSE CLAMP, 3/4" STAINLESS STEEL	1
19	POST, 4"-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
20	CAP, 1-1/2" (GALVANIZED)	1

^d OR EQUIVALENT APPROVED BY THE DISTRICT
^b ELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.



MAINLINE WIRE CONNECTION DETAIL
 NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^d

[Handwritten Signature]

NOTES

- CORP TO BE IN FULL OPEN POSITION BEFORE BACKFILL.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
- WATER SERVICE TUBING INSTALLATION IN PLATTED AREAS WILL BE COMPLETED BY THE CONTRACTOR/DEVELOPER FROM THE PIPELINE TO BEYOND THE PROPERTY LINE. IF METER BOX AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE PIPE INSTALLATION, THEN TUBING IS TO BE STUBBED UP AND COMPLETED AS PER DETAIL A. THE DISTRICT WILL COMPLETE THE ACTUAL METER AND BOX INSTALLATION WHEN NEEDED.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN BOX.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- FILL BOX WITH FINE DIRT TO TOP OF METER.
- IF THE METER BOX IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18) WILL BE REQUIRED. NOT FOR THROUGH-WAY TRAFFIC APPLICATIONS.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
 1-1/2" METERED SERVICE
 WITH COPPER TYPE K
 SERVICE LINE**

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS1.5-3

BILL OF MATERIALS

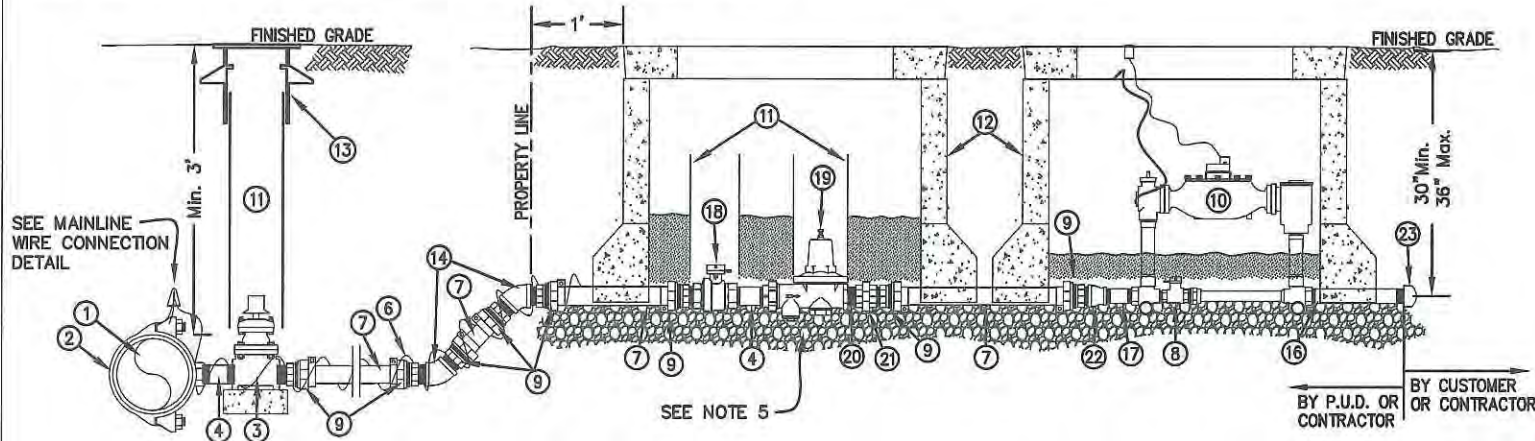
NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1
4	NIPPLE, BRASS 2X4	1
5	ADAPTER, BRASS PAK JOINT, 2" F.I.P.T. X PVC (FORD #C17-77) ^a ^b	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LD	
7	PIPE, 2" P.V.C., 200 PSI, SCHEDULE 80	
8	COPPERSETTER, 1-1/2", FORD #VBHH76-12B-11-66 ^a	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X PVC (FORD #C87-77) ^a	5
10	METER, BADGER, 1-1/2" MODEL 120	1
11	CASING, 6" PVC SEWER PIPE	1
12	UTILITY VAULT 3642-LA W/3642-2438P COVER ^a	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	ELL, BRASS 2", 45° OR 90°	2
15	BUSHING, BRASS 2" M.I.P.T. X 1-1/2" F.I.P.T.	1
16	NIPPLE, BRASS 1-1/2"x12"	1
17	NIPPLE, BRASS 1-1/2"x4"	1
18	CURBSTOP, BRASS 2" (FORD #B11-777-W) ^a	1
19	PRV, WILKINS 2" 600 HLR SC (OUTLET SET @ 120 PSI "HIGH RANGE PRV")	1
20	NIPPLE, BRASS CLOSE 2"	1
21	UNION, BRASS 2"	1
22	REDUCER, BRASS 2"x1-1/2"	1
23	CAP, 1-1/2" (GALVANIZED)	1

^aOR EQUIVALENT APPROVED BY THE DISTRICT
^bELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES

1. INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
2. IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE.
3. SUPPORT COPPERSETTER WITH 1'6" TO 2' OF ROD OR PIPE THROUGH EACH EYELET. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN VAULT/BOX. LOCK BYPASS WITH P.U.D.-ISSUED PADLOCK.
4. FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
5. SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. DO NOT REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
6. IF METER IS LOCATED IN ASPHALT OR CONCRETE AREA, A CONCRETE UTILITY VAULT WILL BE REQUIRED. IF IN LAWN OR LANDSCAPED AREA, A CARSON INDUSTRIES LLC L SERIES 1730-15 BOX W/COVER 1730-3L CAN BE INSTALLED WITH APPROVAL BY DISTRICT ENGINEER.
7. IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
8. METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN SIX INCHES OF HINGE NEAR STREET END. IN A CARSON INDUSTRIES BOX, PAD IS TO BE LOCATED AT STREET END OF BOX.
9. SEAL VAULT LIDS AND SEGMENTS WITH 1-1/2"x1" JOINT MASTIC.
10. DRAIN VAULT TO DAYLIGHT WHERE POSSIBLE WITH MINIMUM 3" DRAIN PIPE. (TO BE DETERMINED IN FIELD BY P.U.D. REPRESENTATIVE.)
11. A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.
12. NOTIFY CUSTOMER TO RECOMMEND THAT THEY INSTALL A LOW RANGE PRV BEYOND THE METER TO REDUCE THE PRESSURE FROM 120 PSI TO BELOW 80 PSI TO PROTECT THEIR INTERIOR PLUMBING.



MAINLINE WIRE CONNECTION DETAIL
 NTS
 NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

[Signature]
 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
 1-1/2" METERED SERVICE WITH P.V.C.
 SERVICE LINE OFF HIGH PRESSURE
 MAIN LINE GREATER THAN 150 P.S.I.**

SCALE: 1" = 1'
DATE: 3-25-05
REVISED: 10/23/12
DRAWN BY: CAS
APPROVED BY: GJS

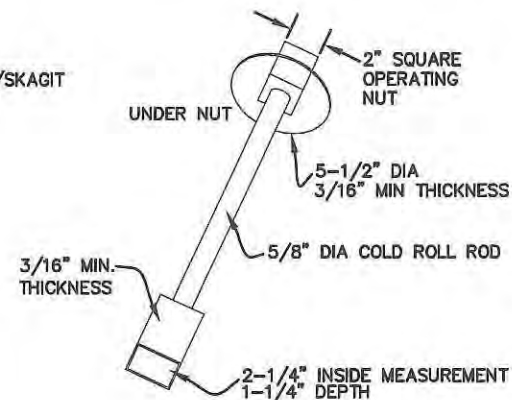
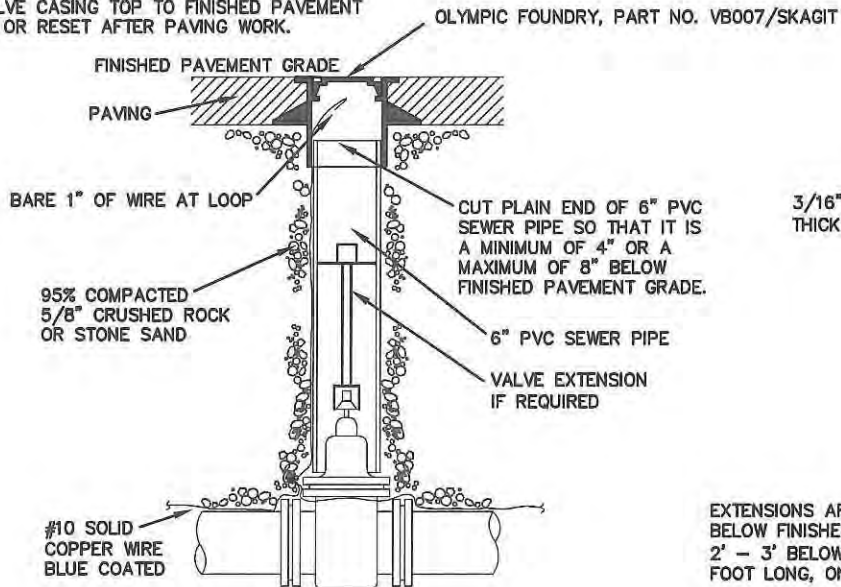
STANDARD
WS1.5-5



MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: BARE 5/8" OF WIRES. CONNECT WITH #62225 KING WATERPROOF WIRE CONNECTOR.^a

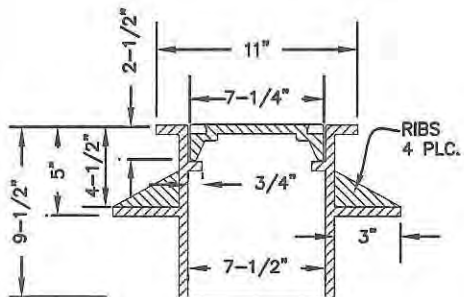
SET VALVE CASING TOP TO FINISHED PAVEMENT GRADE, OR RESET AFTER PAVING WORK.



VALVE OPERATING NUT EXTENSION

EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. THE FINISH ELEVATION OF THE OPERATING NUT IS TO BE 2' - 3' BELOW FINISH GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG, ONLY ONE EXTENSION TO BE USED PER VALVE.

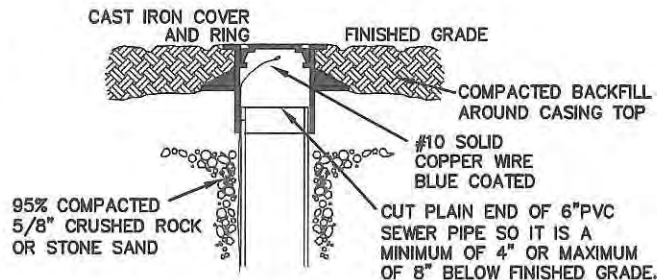
- NOTE:
- 1) ALL EXTENSIONS ARE TO BE MADE OF STEEL SIZED AS NOTED, AND PAINTED WITH TWO COATS OF METAL PAINT. WELD ALL PARTS.
 - 2) A CARSONITE CWV-116 BLUE MARKER POST WILL BE INSTALLED AT ALL VALVE(S) LOCATIONS UNLESS DIRECTED OTHERWISE BY DISTRICT REPRESENTATIVE.



SECTION A-A
OLYMPIC FOUNDRY, PART NO. VB007/SKAGIT
CAST IRON VALVE BOX

VALVE CASING IN PAVED AREAS,
STREETS AND SIDEWALKS

REFER TO "RECOMMENDED PROCEDURE FOR
SETTING VALVE BOXES IN ASPHALT PAVING"
(SHEET 2)



VALVE CASING IN UNPAVED AREAS

VALVE CASING EXTENSION

IF THE 6" PVC VALVE CASING PIPE DOES NOT EXTEND HIGH ENOUGH TO SUPPORT THE CAST IRON VALVE BOX, AN EXTENSION CAN BE ADDED FOLLOWING THE PROCEDURE BELOW:

1. CUT A 6" PVC SEWER PIPE 6" - 8" LONGER THAN THE RISE NECESSARY.
2. SPLIT THE 6" PVC SEWER PIPE THE FULL LENGTH.
3. CURL CASING EXTENSION INTO ITSELF AND PLACE INSIDE EXISTING PVC VALVE CASING THE 6"-8" ALLOWED FOR IN STEP 1. INSTALL VALVE BOX.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012

RECOMMENDED PROCEDURE FOR RAISING AND SETTING CAST IRON VALVE BOX
IN ASPHALT PAVING

1. LOCATE BURIED VALVE BOX USING REFERENCE MEASUREMENTS AND/OR ELECTRONIC OR MAGNETIC LOCATOR. MARK LOCATION WITH WHITE PAINT.
2. BREAK OUT SMALL HOLE IN PAVEMENT AND LOCATE THE VALVE BOX COVER.
3. CAREFULLY BREAK OUT AN 18-INCH DIAMETER HOLE WITH 9-INCH RADIUS FROM THE CENTER OF THE VALVE BOX. A CIRCLE TEMPLATE 18 INCHES IN DIAMETER IS HANDY TO MARK OUT THE PERIMETER OF THIS HOLE. USE A CURVED SPADE WITH A JACKHAMMER TO CUT A NEAT VERTICAL FACE HOLE IN THE ASPHALTIC CONCRETE PAVEMENT. DO NOT CRACK OR DAMAGE THE PAVEMENT BEYOND THIS HOLE. IF IT IS SUSPECTED THE VALVE CASING IS NOT VERTICAL OR CENTERED OVER THE VALVE OPERATING NUT, REMOVE JUST ENOUGH PAVEMENT TO ALLOW REMOVAL OF THE VALVE BOX LID SO IT CAN BE DETERMINED IF CASING ADJUSTMENT IS NEEDED. IT IS VERY IMPORTANT TO NOT REMOVE ANY MORE FINISHED PAVEMENT THAN ABSOLUTELY NECESSARY.
4. COMPLETELY REMOVE THE WHOLE VALVE BOX. DO NOT DISTURB THE SURROUNDING EARTH ANY MORE THAN NECESSARY. EXAMINE THE CASING PIPE. MAKE SURE IT IS VERTICAL, SYMMETRICAL AROUND THE VALVE NUT AND CLEAN OF ALL ROCKS, DEBRIS AND DIRT. CLEAN AND CORRECT AS NECESSARY. CHECK WITH A VALVE WRENCH TO VERIFY OPERATION IS SMOOTH.
5. TRIM OR ADD TO THE CASING PIPE (6-INCH PVC PLASTIC OR CONCRETE) AS NEEDED SO THE TOP OF THE CASING PIPE IS A MINIMUM OF 4 INCHES TO MAXIMUM OF 8 INCHES BELOW THE FINISHED PAVEMENT GRADE. THE LID WILL NOT FIT TIGHT IF THE CASING IS HIGHER. VALVE BOX WILL HAVE POOR SUPPORT IF THE CASING PIPE IS LOWER. TO ADD CASING PIPE, USE A PIECE OF 6-INCH PVC PLASTIC SEWER PIPE CUT 12 INCHES LONGER THAN NEEDED. SAW-CUT THIS PIECE ALONG ONE SIDE IN A STRAIGHT LINE THE FULL LENGTH. FOLD THE PIPE OVER THE SAW-CUT AND INSERT IT INSIDE THE CASING PIPE IN THE GROUND. SLIDE UP OR DOWN TO ACHIEVE DESIRED LEVEL.
6. IF THE VALVE OPERATING NUT IS OVER 3 FEET BELOW FINISH PAVEMENT GRADE, INSTALL A STANDARD VALVE OPERATING EXTENSION, PER STANDARD SPECIFICATIONS.
7. USING A 1-INCH ROD OR CAPPED 3/4-INCH PIPE, THOROUGHLY POUND THE EARTH ALL AROUND THE CASING PIPE TO OBTAIN MAXIMUM EARTH COMPACTION.
8. FILL THE VOID BETWEEN THE CASING PIPE AND EARTH WALL UP TO EXACTLY 12 INCHES (1 FOOT) BELOW FINISH PAVEMENT GRADE WITH 5/8-INCH MINUS CRUSHED ROCK AND THOROUGHLY COMPACT USING ROD OR PIPE AS IN STEP 7. KEEP ADDING AND COMPACTING CRUSHED ROCK UNTIL HARD, TIGHT LEVEL SURFACE IS EXACTLY 12 INCHES BELOW PAVEMENT GRADE.
9. INSERT THE VALVE BOX. USING A STRAIGHT BOARD OR ROD, CHECK THAT THE TOP RIM OF THE VALVE BOX IS EXACTLY LEVEL WITH THE FINISHED PAVEMENT. THE BOX MUST SET EVENLY ON THE CRUSHED ROCK BASE. IT MUST NOT ROCK OR WIGGLE. REMOVE THE BOX AND ADJUST THE CRUSHED ROCK AS OFTEN AS NECESSARY TO ACHIEVE EXACT GRADE WITH PAVEMENT AND UNIFORM BOX SUPPORT. PUT CAST IRON LID ON THE BOX. MAKE SURE IT FITS CORRECTLY AND IS FLUSH WITH THE BOX RIM. REPLACE LID IF INCORRECT FIT. REPLACE ENTIRE VALVE BOX IF BOX RIM PREVENTS A SNUG FIT OF THE LID.
10. ADD 5/8-INCH MINUS CRUSHED ROCK UNIFORMLY IN THE SPACE BETWEEN THE VALVE BOX AND OUTSIDE EARTH WALL IN MAXIMUM 4-INCH LIFTS. COMPACT EACH LIFT COMPLETELY WITH 1-INCH ROD OR PIPE AS BEFORE. FILL AND COMPACT THE SPACE UP TO 2 INCHES BELOW FINISHED PAVEMENT GRADE.
11. ADD HOT MIX ASPHALTIC CONCRETE MATERIAL AND THOROUGHLY COMPACT WITH ROD OR PIPE TO THE FINISH PAVEMENT GRADE. SMOOTH OFF THE SURFACE AS MUCH AS POSSIBLE.
12. USING A BRUSH, PAINT THE SURFACE OF THE PATCH WITH ASPHALT TACK MATERIAL, EXTENDING MINIMUM OF 1 INCH OVER PAVEMENT AND ONTO EDGE OF VALVE BOX METAL RIM. DO NOT ALLOW ANY TACK MATERIAL TO FLOW INTO METAL RIM OR ON BOX COVER. USE A BRUSH TO CONTROL APPLICATION OF THIS TACK COAT AND PROVIDE A NEAT SEAL SURFACE.
13. CHECK AGAIN THAT VALVE CASING IS CLEAR, THAT VALVE WRENCH CAN BE PUT ON OPERATING NUT AND VALVE CAN BE OPERATED PROPERLY.
14. SPREAD CLEAN FINE SAND OVER THE TACK COAT SO THAT VEHICLE TIRES WILL NOT LIFT THE TACK MATERIAL BEFORE IT CURES AND SETS UP.
15. EACH VALVE BOX IN A CLUSTER OF TWO TO FOUR VALVES MUST BE ADJUSTED INDEPENDENTLY AS OUTLINED ABOVE. CUTTING OUT TRIANGLES OR SQUARES OF FINISHED PAVEMENT RESULTS IN VALVE BOXES THAT DO NOT REMAIN EVEN WITH PAVEMENT, LEAN TOGETHER, AND BREAK OUT UNDER TRAFFIC BEATING.

CAREFULLY FOLLOWING THIS OUTLINED PROCEDURE RESULTS IN VALVE BOX SETTINGS THAT WILL REMAIN FIRM AND IN PLACE, AND ARE VIRTUALLY UNNOTICED BY THE PUBLIC PASSING OVER THEM IN THEIR VEHICLES.



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



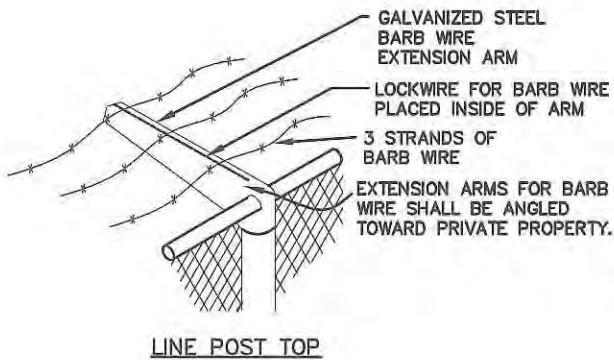
**STANDARD INSTALLATION OF
CAST IRON VALVE BOX &
VALVE OPERATING NUT EXTENSION**

SHEET 2/2

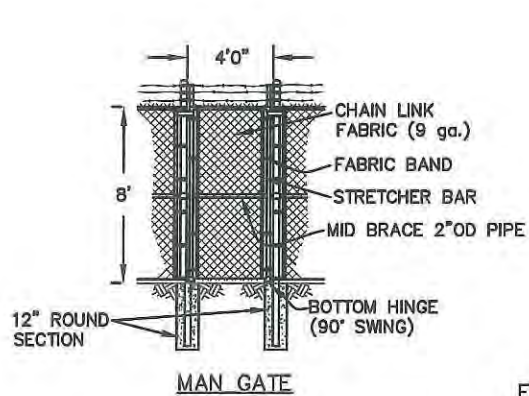
SCALE: NTS
DATE: 3-25-05
REVISED: 7/11/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

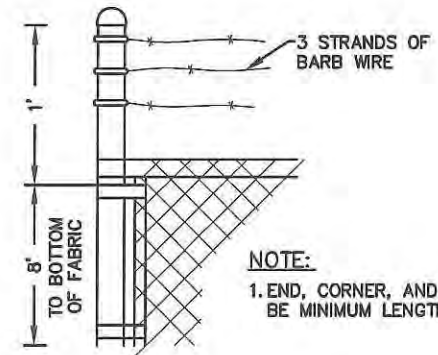
WV-1b



LINE POST TOP



MAN GATE

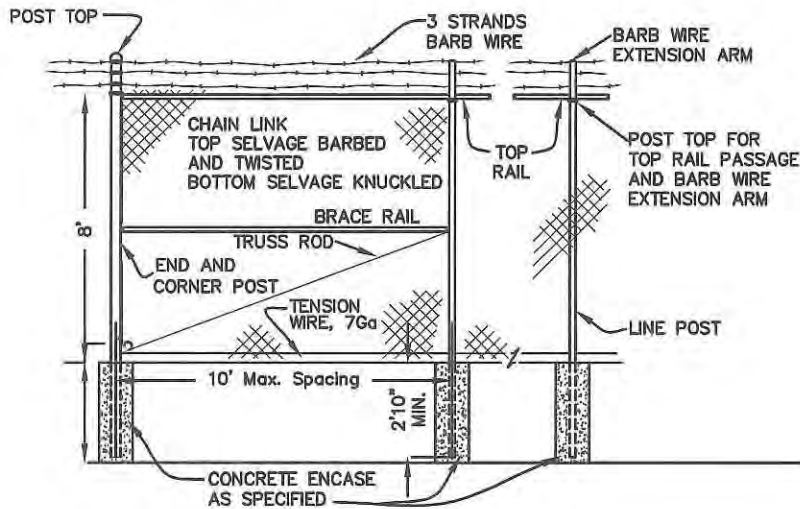


END, CORNER, AND PULL POST TOP

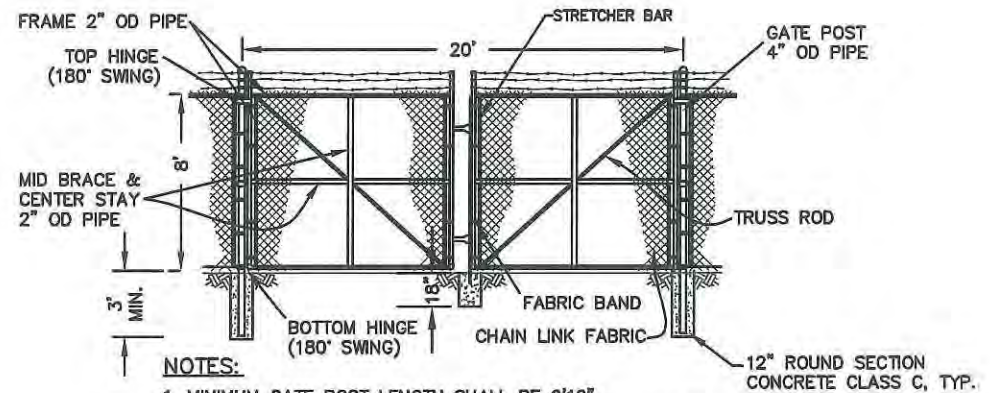
NOTE:
1. END, CORNER, AND PULL POSTS SHALL BE MINIMUM LENGTH OF 9'-10".

NOTES:

1. FOR ADDITIONAL DETAILS SEE WSDOT STANDARD PLAN L-3.
2. FENCE TO BE PER WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION, SECTION 8-12.
3. GATE KEEPERS WITH AUTOMATIC LATCH TO BE PROVIDED TO HOLD GATES OPEN.



TYPE 1 FENCE
PER 9-16.1(7) W/9-GAUGE FABRIC, TYP.



NOTES:
1. MINIMUM GATE POST LENGTH SHALL BE 9'10".
2. CHAIN LINK FABRIC TO MATCH FABRIC ON CHAIN LINK FENCE.

DOUBLE SWING GATE

lf Siddle
PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: *Oct. 24*, 2012

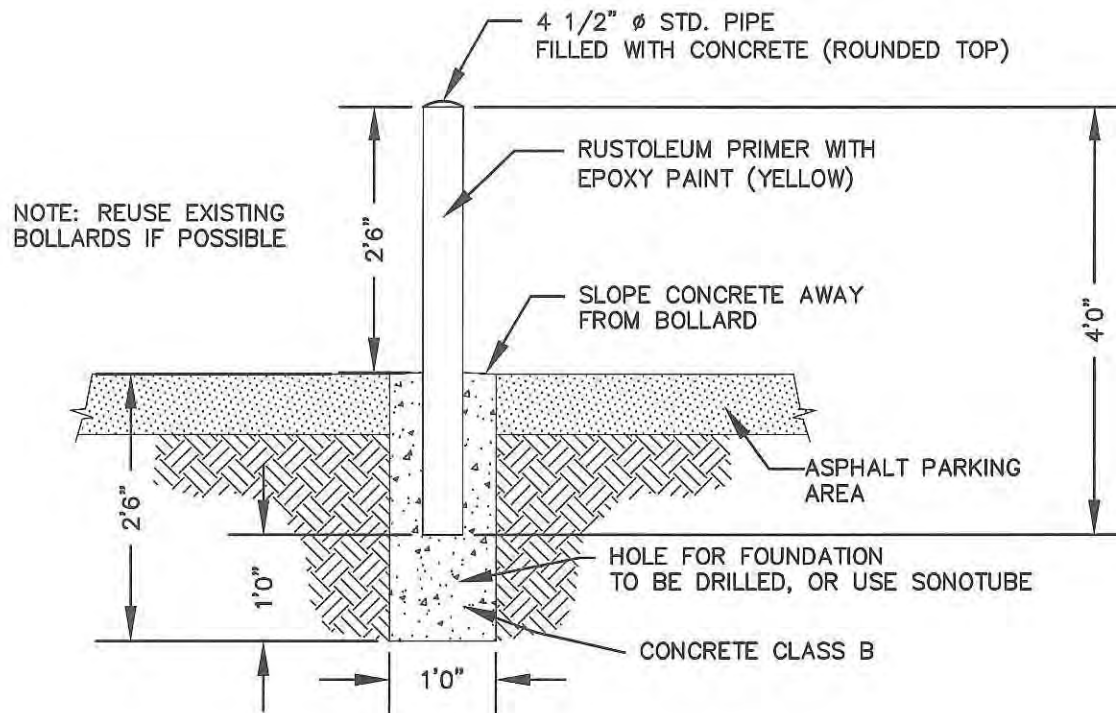


CHAIN LINK FENCE
(TYPE 1 FENCE)

SCALE: NTS
DATE: 3-25-05
REVISED: 10/9/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WF-1



G. S. Smith
PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		15	NIPPLE, BRASS, 3/4"x12" OR 1"x12"	1
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS (FORD #202B) ^a	1	16	CAP, 2" (GALVANIZED)	2
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1	17	HOSE CLAMP, 1-1/2" STAINLESS STEEL	1
4	NIPPLE, BRASS 2X4	1	18	POST, 4"-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
5	ADAPTER, BRASS PAK, 2" F.I.P.T. x 2" POLY (FORD C16-27) ^{a b}	1	19	BUSHING, BRASS 2" M.I.P.T.x1-1/2" F.I.P.T.	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID		20	NIPPLE, BRASS 1-1/2"xCLOSE	2
7	PIPE, 2" PE 3408, SIDR 7, 200 P.S.I.		21	NIPPLE, BRASS 1-1/2"x12"	1
8	COPPERSETTER, 1-1/2", (FORD #VBHH76-12B-11-66) ^a	1	22	NIPPLE, BRASS 3/4"x6" OR 1"x6"	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X POLY (FORD #C86-77) ^a	2	23	TEE, 1-1/2" BRASS	1
10	METER, BADGER, 1-1/2" MODEL 120	1	24	BUSHING, BRASS 1-1/2"x3/4" OR 1-1/2"x1" M.I.P.T.x F.I.P.T.	1
11	CASING, 6" PVC SEWER PIPE	1	25	COPPERSETTER, 3/4" (FORD #VBHC72-9W-11-33) OR 1" (FORD #VBHC74-18W-11-44) ^a	1
12	UTILITY VAULT 444-LA W/#44-332P COVER ^a (SPRING ASSISTED)	1	26	STABILIZER, 1'6" TO 24" LENGTH, ROD OR PIPE	3
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1	27	METER, BADGER, MODEL M25 (5/8") OR M35 (3/4"), BRONZE	1
14	INSERT, STIFFENER, 2" (FORD #75) ^a	2	28	CAP, 1-1/2" (GALVANIZED)	1

^a OR EQUIVALENT APPROVED BY THE DISTRICT ^b ELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

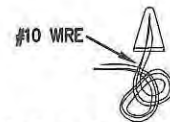
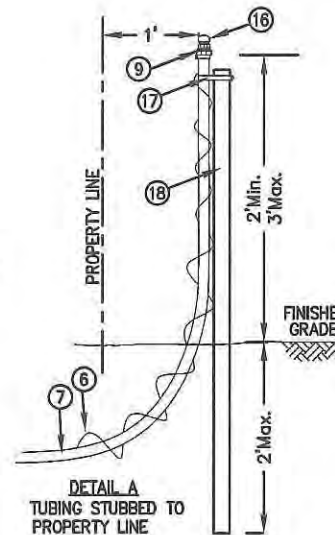
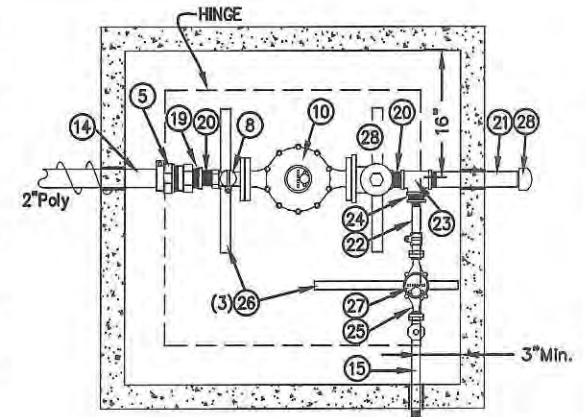
ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES

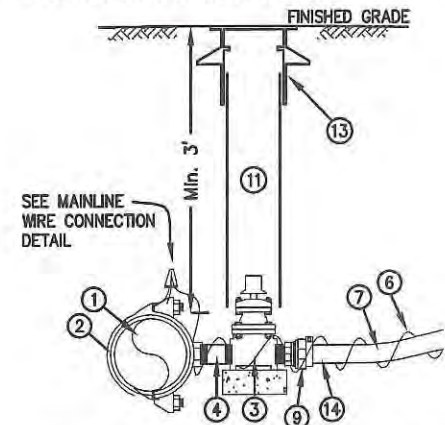
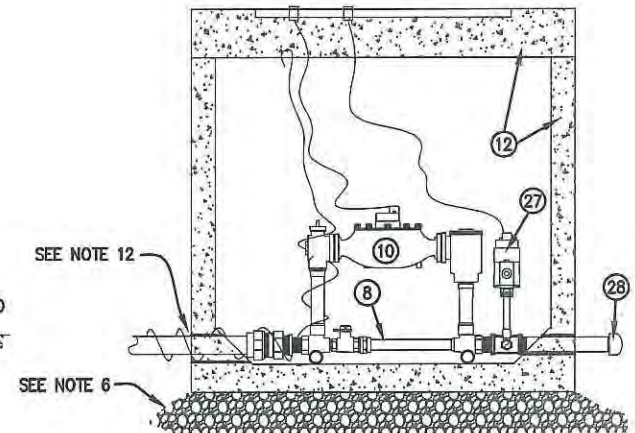
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE.
- IF VAULT AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE TUBING INSTALLATION, THEN TUBING IS TO BE STUBBED UP ABOVE FINISH GRADE AND CAPPED. SEE DETAIL A.
- SUPPORT COPPER SETTERS WITH 1'6" TO 2' OF ROD OR PIPE THROUGH EACH EYELET. SET COPPER SETTER FLUSH AND PLUMB IN VAULT/BOX. LOCK BYPASS WITH P.U.D.-ISSUED PADLOCK.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. DO NOT REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ. FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ. FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
- IF THE METER IS LOCATED IN ASPHALT OR CONCRETE AREA, A CONCRETE UTILITY VAULT WILL BE REQUIRED. IF IN LAWN OR LANDSCAPED AREA, A CARSON INDUSTRIES LLC L SERIES 1730-15 BOX WITH COVER 1730-3L CAN BE INSTALLED WITH APPROVAL BY DISTRICT ENGINEER.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN SIX INCHES OF HINGE NEAR STREET END IN A CARSON INDUSTRIES BOX. PAD IS TO BE LOCATED AT THE STREET END OF THE BOX.
- SEAL VAULT LIDS AND SEGMENTS WITH 1-1/2" X 1" JOINT MASTIC.
- DRAIN VAULT TO DAYLIGHT WHERE POSSIBLE WITH MINIMUM 3" DRAIN PIPE (TO BE DETERMINED IN FIELD BY P.U.D. REPRESENTATIVE).
- NON-SHRINK GROUT OR FOAM SHALL BE INSTALLED AROUND PIPE PENETRATIONS THROUGH VAULT WALL TO ELIMINATE GROUND WATER FLOODING VAULT.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



MAINLINE WIRE CONNECTION DETAIL
NTS
NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a



**STANDARD INSTALLATION OF
DOUBLE 1-1/2" METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE
SERVICE LINE W/ DEDUCT METER**

SCALE: 1" = 2"
DATE: 3-01-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
WS1.5-2**

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		13	EXTENSION, METER BOX, (CARSON INDUSTRIES LLC 1419-6) ^Q	2
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^Q	1	14	TEE, 1", BRASS	1
3	CORP, 1", (FORD #B-500)	1	15	CLAMP, 1-1/4", ALL STAINLESS - STUB ONLY	2
4	ADAPTER, BRASS PAK JOINT, 1" F.I.P.T. X 1-1/4" POLY, (FORD #C16-44) ^Q	1	16	ADAPTER, 1-1/4" M.I.P.T. X 1-1/4" INSERT W/CAP (GALVANIZED)	1
5	ADAPTER, BRASS, 1" F.I.P.T. x 1" INSERT	2	17	NIPPLE, BRASS, 1" x 6"	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOXES, NEAR LID		18	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
7	PIPE, 1-1/4" PE, 340B, SIDR 7, 200 P.S.I.		19	ADAPTER, 1" M.I.P.T. X 1" F.I.P.T., BRASS	2
8	COPPERSETTER, 3/4", (FORD #VBHC72-9W-11-33) ^Q	2	20	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. X 1" P.V.C., (FORD #C87-44) ^Q	2
9	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. X 1-1/4" POLY, (FORD #C86-44) ^Q	1	21	ELL, 1", 90°, BRASS, F.I.P.T.	1
10	METER, BADGER MODEL M25 (5/8") OR M35 (3/4") BRONZE METER	2	22	INSERT, STIFFENER, 1" (FORD #72) ^Q	2
11	PIPE, 1", P.V.C., SCHEDULE 80		23	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
12	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1419-12 W/COVER 1419-3) ^Q	2	24	NIPPLE, BRASS, 1" x 4"	2

^Q OR EQUIVALENT APPROVED BY THE DISTRICT ^bELL, 90° STREET, 1" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

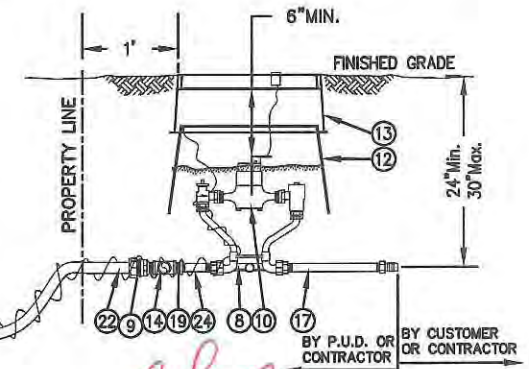
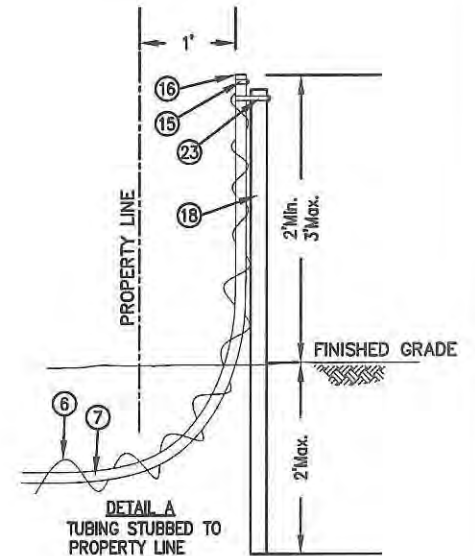
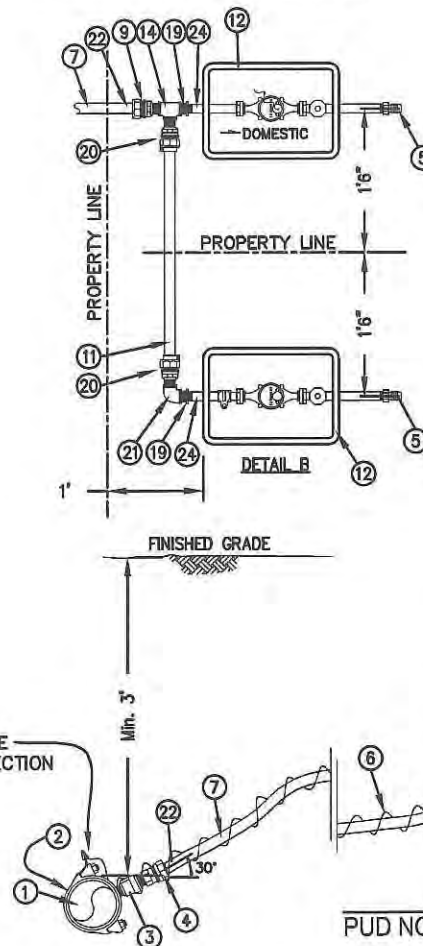
NOTES

- CORP TO BE IN FULL OPEN POSITION BEFORE BACKFILL.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
- WATER SERVICE TUBING INSTALLATION IN PLATTED AREAS WILL BE COMPLETED BY THE CONTRACTOR/DEVELOPER FROM THE PIPELINE TO BEYOND THE PROPERTY LINE. IF METER BOX AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE PIPE INSTALLATION, THEN TUBING IS TO BE STUBBED UP AND COMPLETED AS PER DETAIL A. THE DISTRICT WILL COMPLETE THE ACTUAL METER AND BOX INSTALLATION WHEN NEEDED.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN BOX.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- FILL BOX WITH FINE DIRT TO TOP OF METER.
- IF THE METER BOX IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18)^Q WILL BE REQUIRED. **NOT** FOR THROUGH-WAY TRAFFIC APPLICATIONS.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^Q



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



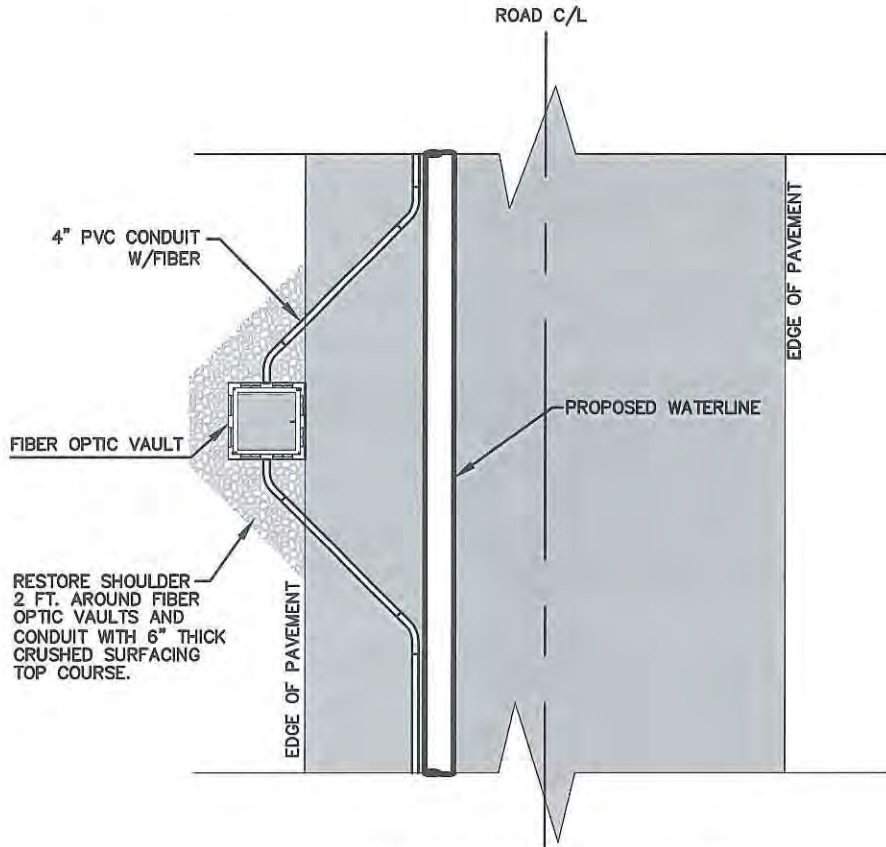
STANDARD INSTALLATION OF
DOUBLE 5/8" OR 3/4" METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE
SERVICE LINE

SCALE: 1" = 2'
DATE: 3-01-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

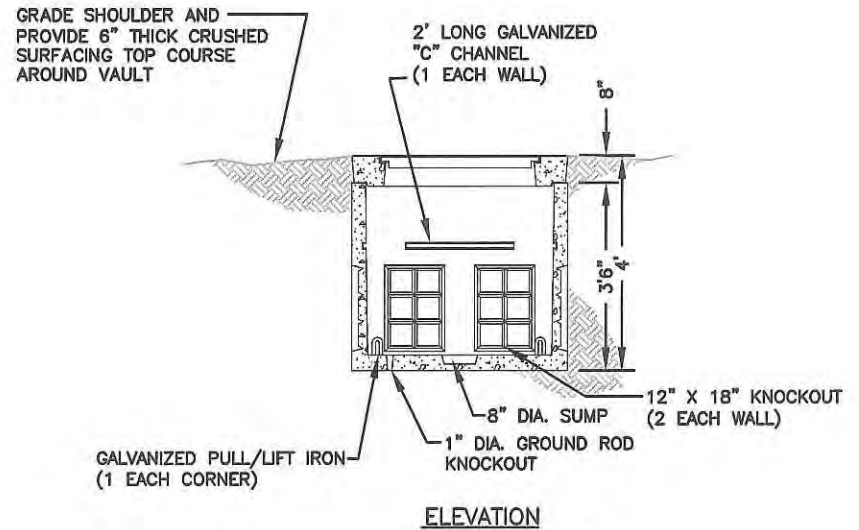
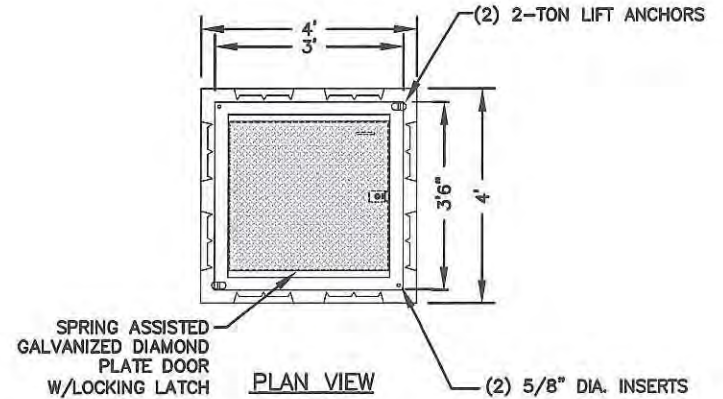
STANDARD
WS58-4

NOTES

1. VAULTS SHALL BE PRE-CAST CONCRETE MEETING ASTM C478. TOP SLAB SHALL BE DESIGNED TO CARRY HS-20 LOADING.
2. RIGID NON-METALLIC CONDUIT (PVC) FOR FIBER SHALL BE U.L. 651 LISTED, NEMA TC-2, SCHEDULE 40 APPROVED FOR CONCRETE ENCASEMENT. PVC CONDUIT SWEEPS SHALL NOT BE USED.
3. FIBERGLASS CONDUIT FOR FIBER SHALL BE U.L. 1684 LISTED, NEMA TC-14, APPROVED FOR CONCRETE ENCASEMENT. FIBERGLASS CONDUIT SWEEPS SHALL BE A MINIMUM RADIUS OF 36 INCHES.
4. CONDUITS SHALL CONTAIN NO MORE THAN THREE-QUARTER BENDS (270 CUMULATIVE DEGREES) BETWEEN FIBER OPTIC VAULTS.
5. DURING FIBER OPTIC CABLE INSTALLATION, A MINIMUM OF 150 FEET OF SLACK CABLE SHALL BE INSTALLED ON MOUNTING HARDWARE WITHIN EACH FIBER OPTIC VAULT.
6. FIBER OPTIC VAULTS SHALL BE A MAXIMUM OF 2,500 FEET APART.



TYPICAL FIBER OPTIC VAULT LAYOUT



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: *Oct. 24*, 2012



**STANDARD FIBER OPTIC VAULT AND
STANDARD FIBER OPTIC VAULT LAYOUT**

SCALE: NO SCALE
DATE: 10/22/12
REVISED: 10/22/12
DRAWN BY: KDM
APPROVED BY: GJS

STANDARD

WFO-1

BILL OF MATERIALS

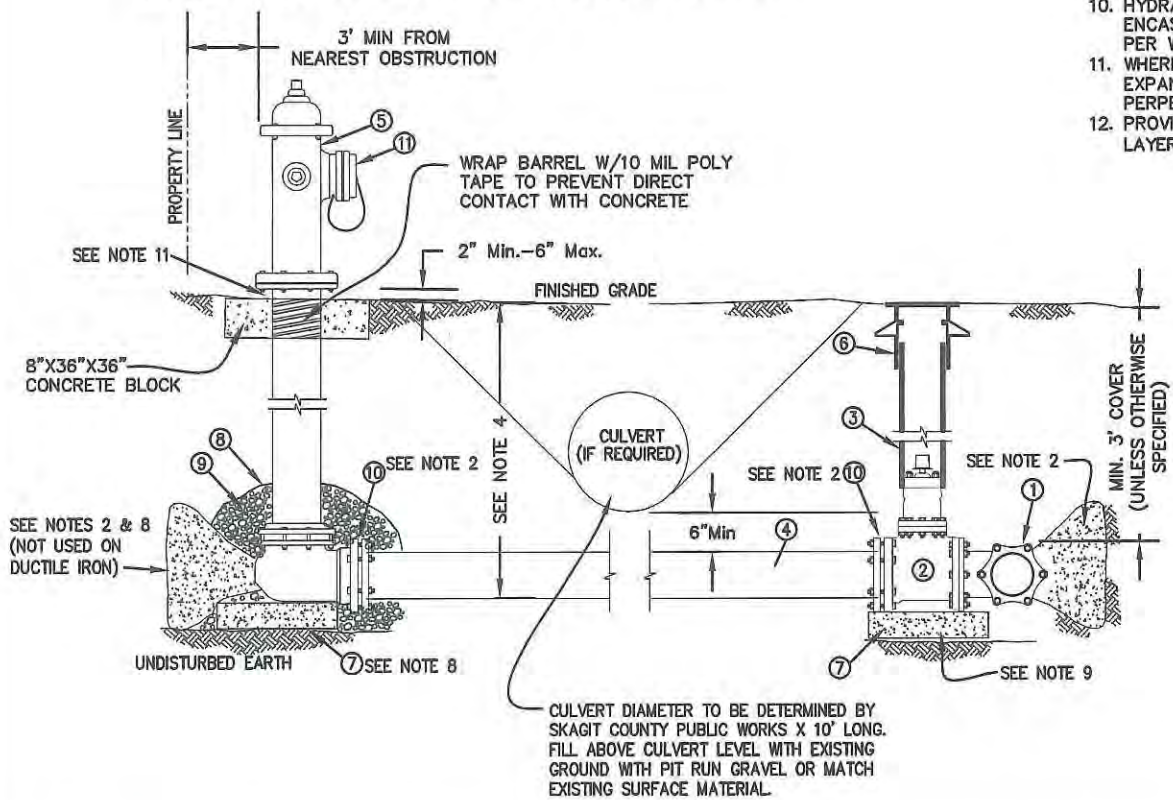
NO.	NOMENCLATURE	REQ'D.
1	TEE WITH FLANGED BRANCH	1
2	6" VALVE WITH FLG&MJ CONNECTIONS (SEE NOTE 6)	1
3	CASING, 6" PVC SEWER PIPE	1
4	PIPE, 6" CLASS 50 DUCTILE IRON, FIELD CUT	
5	FIRE HYDRANT WITH PUMPER PORT, CLOW MEDALLION, OR AS APPROVED BY JURISDICTIONAL FIRE DEPARTMENT DISTRICT	1
6	VALVE BOX, CAST IRON OLYMPIC FOUNDRY V8007/SKAGIT (SEE P.U.D. DETAIL)	1
7	BLOCK, PRECAST CONCRETE, SEE NOTE 8.	1
8	FABRIC, GEOTEXTILE, NON-WOVEN (MIRAFI 140N) ^a	
9	1/4 CY DRAIN ROCK, 1-1/2"-3/4", NO FINES	
10	MEG-A-LUG, 6"/GRIP RING 6"	2
11	HYDRANT ADAPTER STORZ STYLE S-37 W/SC CAP & CABLE, 5"x4"PCT	1

^a OR EQUIVALENT APPROVED BY THE DISTRICT

NOTES:

1. ALL MATERIALS AND BRANDS MUST BE APPROVED BY P.U.D.
2. BLOCK TEE AND HYDRANT WITH POURED CONCRETE ON ALL WATER MAINS OTHER THAN DUCTILE IRON AND ON ALL TAPPING SLEEVES AS REQUIRED PER DISTRICT BLOCKING DETAIL. IN ADDITION, 6" "MEGALUGS" (OR APPROVED EQUIVALENT) ARE TO BE INSTALLED AT VALVE AND HYDRANT M.J. OUTLETS. RESTRAIN ANY JOINTS IN THE PIPELINE WITH "FIELD LOK" GASKETS (OR APPROVED EQUIVALENT) INSTALLED IN THE BELLS OF TYTON JOINT PIPE OR "MEGALUGS" ON M.J. BELLS.
NO THRUST BLOCK REQUIRED BEHIND TEE ON 8" DUCTILE IRON OR LARGER MAINS.
3. PROTECTIVE BARRIER POSTS MAY BE NECESSARY AT SOME HYDRANT INSTALLATIONS. CONTACT FIRE DEPARTMENT/DISTRICT FOR SPECIFIC REQUIREMENTS.
4. HYDRANT LENGTH AND TRENCH DEPTH SHALL BE SO AS TO PROVIDE FOR HYDRANT SETTING AT 2" MIN. AND 6" MAX. ELEVATION ABOVE FINISH GRADE.
5. SET HYDRANT VERTICAL. USE LEVEL. COMPACT ALL BACKFILL.
6. VALVE SHALL BE AWWA STANDARD GATE, "O" RING PACKING, NON-RISING STEM, 2" OPERATING NUT, RESILIENT WEDGE.
7. HYDRANT LOCATIONS ARE DETERMINED BY THE FIRE MARSHAL WITH AUTHORITY FOR AREA CONCERNED.
8. CONCRETE BLOCK WILL BE BELOW THE DRAIN HOLES AND DRAIN ROCK. TAKE CARE TO NOT PLUG DRAIN HOLES OR CONTAMINATE DRAIN ROCK.
9. SET MINIMUM 1 SQ.FT. CONCRETE SUPPORT TIGHT UP UNDER VALVE AND HYDRANT.
10. HYDRANT BARREL, LEAD, TEE, AND VALVE MUST BE WRAPPED WITH POLYETHYLENE PIPE ENCASEMENT PIPE WHICH IS A MINIMUM OF 8-MIL THICK. IT MUST BE INSTALLED AS PER W.S.D.O.T. STANDARDS AND IN ACCORDANCE WITH A.W.W.A. C105.
11. WHERE HYDRANTS ARE INSTALLED IN THE SIDEWALK, THERE SHALL BE A MINIMUM 3/8" EXPANSION JOINT AROUND THE BARREL OF THE HYDRANT AND AN EXPANSION JOINT PERPENDICULAR ACROSS THE SIDEWALK, INTERSECTING THE HYDRANT BARREL.
12. PROVIDE A MINIMUM OF 3'-0" LEVEL WORKING AREA AROUND HYDRANT USING 6" THICK LAYER OF 5/8" MINUS CRUSHED ROCK COMPACTED TO 95%

SEE SHEET 2/2 FOR WALL REQUIREMENTS FOR HYDRANTS



ALL FIRE HYDRANTS SHALL COMPLY WITH THE STANDARDS ISSUED BY THE SKAGIT COUNTY FIRE MARSHAL. HYDRANTS SHALL BE THE DRY BARREL TYPE WITH TWO HOSE OUTLETS WITH AN INSIDE DIAMETER OF 2-1/2 INCHES AND ONE LARGE PUMPER OUTLET WITH AN INSIDE DIAMETER OF 4 INCHES. SMALL PORTS SHALL HAVE NATIONAL STANDARD THREADS MEASURING 3.0625 INCHES OUTSIDE DIAMETER AT 7-1/2 THREADS PER INCH. PUMPER PORTS SHALL BE NO. 3 PACIFIC COAST THREADS MEASURING 4.828 INCHES OUTSIDE DIAMETER AT 6 THREADS PER INCH. THE OPERATING NUT SHALL BE 1-1/4 INCH PENTAGON.

A STORZ QUICK COUPLER CONNECTED TO THE PUMPER PORT MAY BE REQUIRED. CONTACT FIRE DISTRICT/DEPARTMENT.

[Handwritten Signature]

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: DEC. 14, 2012



**STANDARD INSTALLATION OF
FIRE HYDRANT
"CENTER STEM TYPE"**

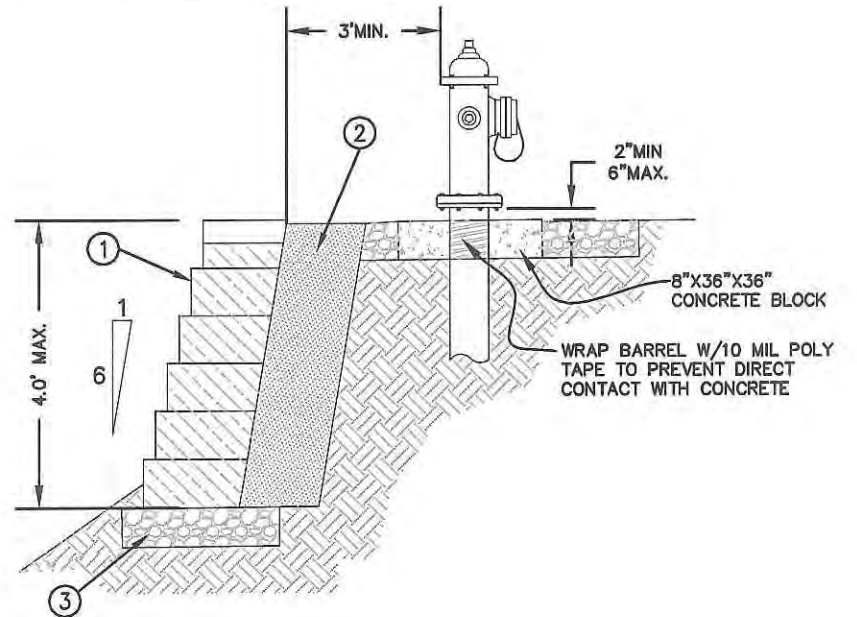
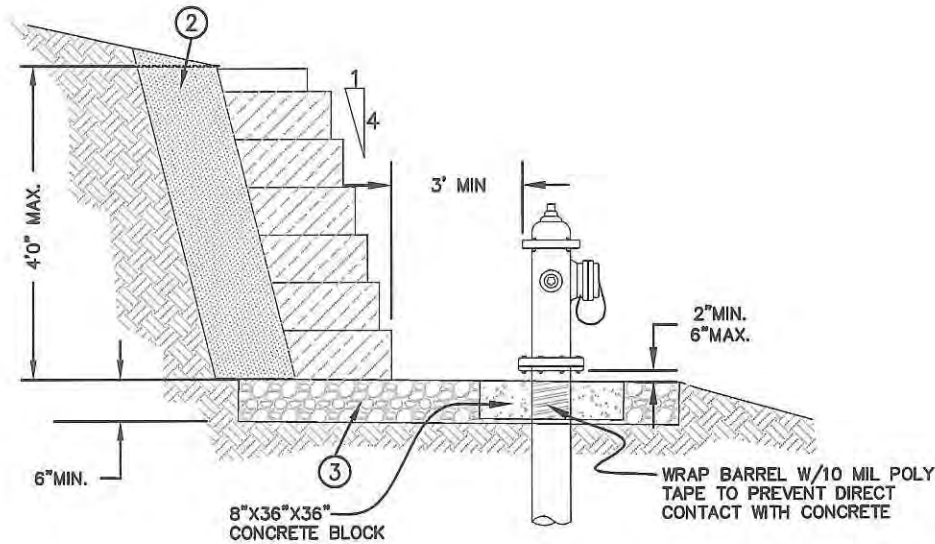
SCALE: NTS
DATE: 3-25-05
REVISED: 12/13/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WH-1a

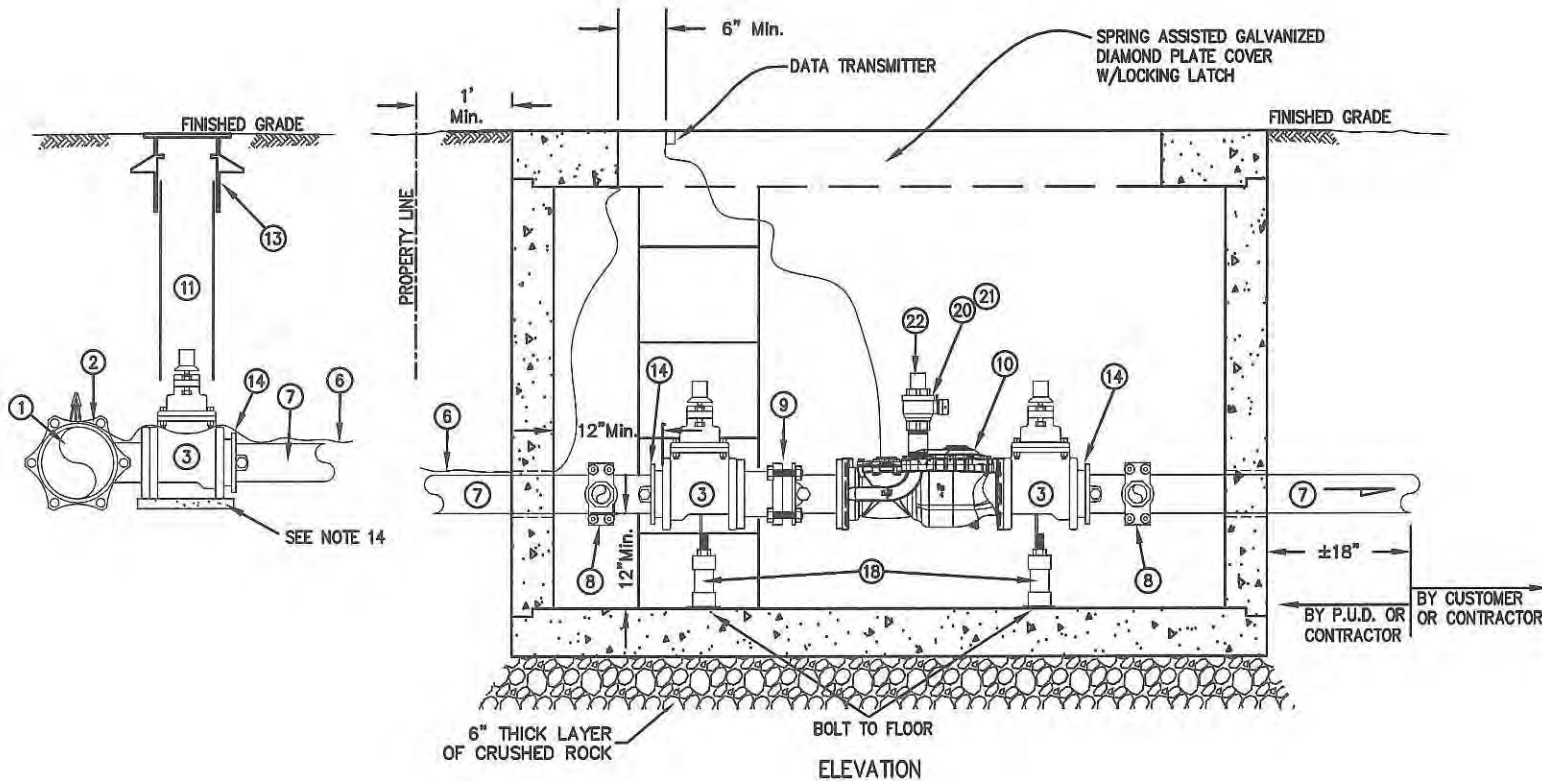
LEGEND

- ①. INSTALL CORNERSTONE F100 BLOCK UNITS WITH CAPS, STACK TO DESIRED HEIGHT (4' MAX.) ADHERE CAPS TO THE BLOCK UNITS WITH A CONCRETE ADHESIVE.
- ②. COMPACTED SELECT FILL MATERIAL AS REQUIRED BY THE DISTRICT'S INSPECTOR.
- ③. ESTABLISH A COMPACTED AGGREGATE LEVELING PAD USING 5/8" MINUS CRUSHED ROCK COMPACTED TO 95%. BASE SHALL BE A MINIMUM 6" DEEP PLUS ONE INCH FOR EVERY ONE FOOT OF WALL HEIGHT. PLACE FIRST COURSE OF BLOCKS ON LEVELING SAND.



lg Sidhu
 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: OCT. 24, 2012



SEE NOTE 14

BOLT TO FLOOR
ELEVATION

[Signature]
PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

REFER TO SHEET 1/2 FOR PLAN VIEW.

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
4" COMPOUND METERED SERVICE
ELEVATION VIEW**

SHEET 2/2

SCALE: 1/2" = 1'
DATE: 4-12-05
REVISED: 10/22/12
DRAWN BY: CAS
APPROVED BY: DJL

STANDARD
WS4-1b

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	TEE, MAINLINE 4" FL OR STAINLESS STEEL TAPPING SLEEVE EQUIVALENT	1
3	VALVE, 4" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	3
4	NIPPLE, BRASS 2x4	4
5	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. x PVC (FORD C87-77) ^α	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND TO TOP OF LADDER	
7	PIPE, 4" CL 50 DUCTILE IRON (FIELD CUT TO LENGTH)	
8	CLAMP, SERVICE, 4"D.I. x 2"I.P.T., DOUBLE STRAP, ALL BRASS (FORD 202B) ^α	2
9	RESTRAINED FLANGE COUPLING ADAPTER, 4" ROMAC IND. INC. ^α	1
10	METER, BADGER, 4" RECORDALL COMPOUND SERIES METER W/ORION & SUMMATOR SPLITTER	1
11	CASING, 6" PVC SEWER PIPE	1
12	UTILITY VAULT 675LA W/#675-TL-2-332P COVER ^α (SPRING ASSISTED) AND LADDER (BILCO LADDER-UP SAFETY POST) ^{α**}	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	RETAINER GLAND, 4" EBAA MEG-A-LUG ^α	3
15	SPOOL, 4" CL 50 D.I., FLxPE, 12" LONG (FIELD CUT TO LENGTH)	1
16	ELL, 2" BRASS, 90°	2
17	PIPE, 2" PVC, SCHEDULE 80 (FIELD CUT TO LENGTH)	
18	PIPE SUPPORT (MATERIAL RESOURCES #S92 OR S89) ^α	2
19	VALVE, 2" BALL, BRASS, I.P.T. x I.P.T., W/PADLOCK WINGS, (FORD B11-777-W) ^α	2
20	NIPPLE, BRASS 2" x 4"	1
21	BALL VALVE, BRASS 2"	1
22	PLUG, BRASS 2"	1

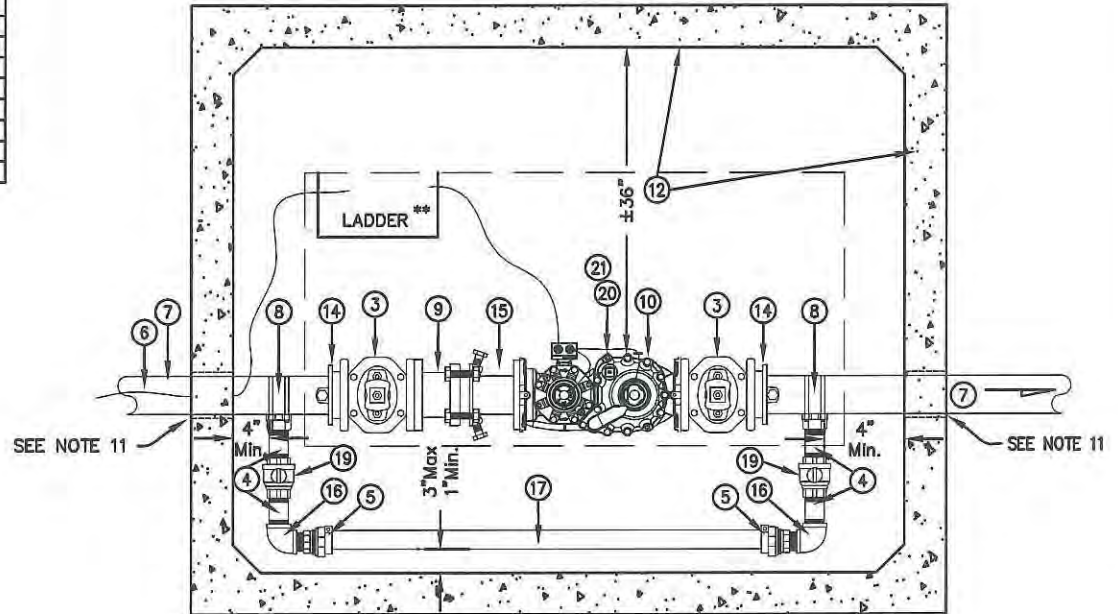
^αOR EQUIVALENT APPROVED BY THE DISTRICT

^{**}LOCATION OF LADDER TO BE DETERMINED AT INSTALLATION BY PUD REPRESENTATIVE.

ALL BRASS FITTINGS TO BE DOMESTIC BRASS, CONTAINING NO LEAD.

NOTES:

- SET VALVE BOX AND VAULT TO FINISH GRADE. SEE P.U.D. VALVE BOX DETAIL.
- SEAL VAULT LIDS AND RISERS OF VAULT WITH 1-1/2"x1" JOINT MASTIC. INSTALL 3" PVC PIPE TO DRAIN TO DAYLIGHT IF POSSIBLE.
- INSTALL SERVICE PIPE PERPENDICULAR TO MAIN OR AS SHOWN ON WATER PLANS APPROVED BY DISTRICT ENGINEER. USE ELLS, AS NECESSARY, TO MEET ELEVATION OF VAULT.
- TEE, VALVE AND PIPE MUST BE WRAPPED WITH 8 MIL POLYETHYLENE PIPE ENCASEMENT. IT IS TO BE INSTALLED AS PER D.I.P.R.A. AND IN ACCORDANCE WITH A.W.W.A. C105.
- BLOCK TEE/TAPPING SLEEVE WITH POURED CONCRETE ON ALL WATER MAINS OTHER THAN DUCTILE IRON. IN ADDITION, THE SERVICE PIPE FROM VALVE AT MAIN TO METER AND THE PRIVATE SERVICE LINE FROM METER ON TO PRIVATE PROPERTY SHALL BE RESTRAINED USING MEG-A-LUGS OR "FIELD LOK" GASKETS (OR APPROVED EQUIVALENT). THE LENGTH OF RESTRAINED PIPE ON PRIVATE PROPERTY SHALL BE DETERMINED BY THE DEVELOPER ENGINEER.
- SET VAULT ON MIN. 6" OF 3/4" MINUS CRUSHED GRAVEL, MECHANICALLY TAMPED TO 95% COMPACTION.
- FLUSH OUT PIPELINE BEFORE INSTALLING METER. DO NOT ALLOW ANY MUD OR FOREIGN MATERIAL TO ENTER PIPE OR FITTINGS.
- IF CONNECTION IS NOT COMPLETED TO CUSTOMER'S PIPE, INSTALL M.J., TAP 2", CAP OVER OPEN END OF PIPE OR PLUG, TAP 2", IN VALVE AND FLUSH OUT PIPE AND METER. MAKE WATER TIGHT.
- METER SENSING PAD IS TO BE LOCATED WITHIN 6" OF HINGE ON VAULT LID AT STREET (INLET) END OF VAULT.
- 4-INCH VALVES SHALL BE A.W.W.A. C509 STANDARD, "O" RING PACKING, NON-RISING STEM, 2" OPERATING NUT, RESILIENT WEDGE, GATE VALVES. (WHEEL OPERATORS INSIDE VAULT.)
- NON-SHRINK GROUT/FOAM AROUND PIPE. MAKE WATER TIGHT.
- 2" BALL VALVES SHALL BE LOCKED UPON INSTALLATION W/P.U.D.-SUPPLIED PADLOCKS.
- BACKFILL AROUND VAULT SHALL BE FIRMLY TAMPED TO ELIMINATE SETTLEMENT.
- CONCRETE BLOCK OR EQUIVALENT UNDER VALVE IS TO KEEP VALVE FACE VERTICAL DURING INSTALLATION.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



PLAN VIEW

REFER TO SHEET 2/2 FOR ELEVATION VIEW.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



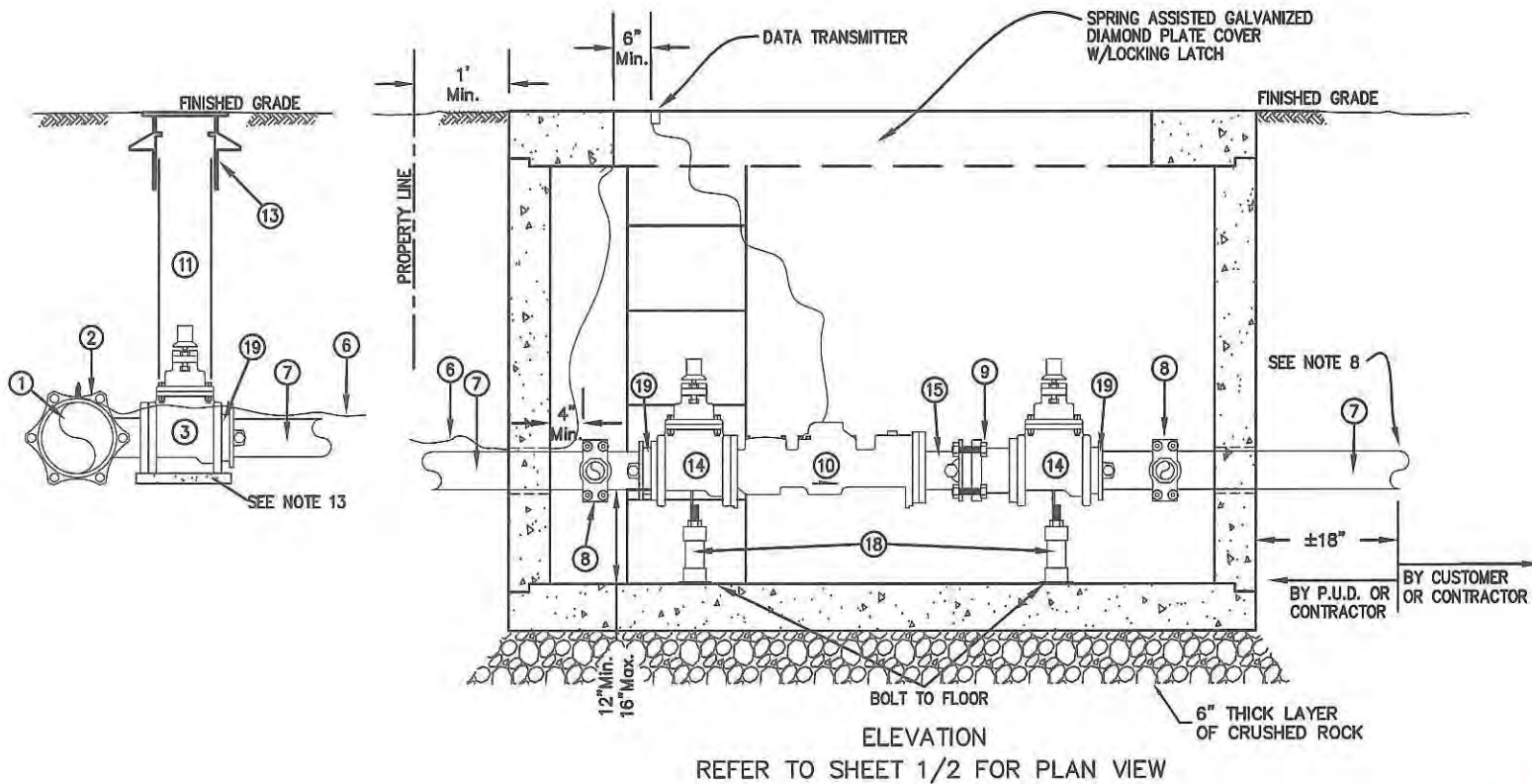
STANDARD INSTALLATION OF
4" COMPOUND METERED SERVICE
PLAN VIEW

SHEET 1/2

SCALE: 1" = 2'
DATE: 4-12-05
REVISED: 10/22/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS4-1a



L. S. S. S.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
4" TURBINE METERED SERVICE
ELEVATION VIEW**

SHEET 2/2

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/22/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS4-2b

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
	WATER MAIN	
2	TEE, MAINLINE 4" FL OR STAINLESS STEEL TAPPING SLEEVE EQUIVALENT	1
3	VALVE, 4" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	1
4	NIPPLE, BRASS 2x4	4
5	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. x PVC (FORD C87-77) ^d	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND TO TOP OF LADDER	2
7	PIPE, 4" CL 50 DUCTILE IRON (FIELD CUT TO LENGTH)	
8	CLAMP, SERVICE, 4"D.I. x 2"I.P.T., DOUBLE STRAP, ALL BRASS (FORD #F202B) ^d	2
9	RESTRAINED FLANGE COUPLING ADAPTER, 4" ROMAC IND. INC. ^d	1
10	METER, BADGER, 4" TURBO SERIES 1000 ^d	1
11	CASING, 6" PVC SEWER PIPE	1
12	UTILITY VAULT 675LA W/#675-TL-2-332P COVER ^d (SPRING ASSISTED) AND LADDER (BILCO LADDER-UP SAFETY POST) ^{d**}	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	VALVE, 4" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	2
15	SPOOL, 4" CL 50 D.I., FLxPE, 12" LONG (FIELD CUT TO LENGTH)	1
16	ELL, 2" BRASS, 90°	2
17	PIPE, 2" PVC, SCHEDULE 80 (FIELD CUT TO LENGTH)	
18	PIPE SUPPORT (MATERIAL RESOURCES #S92 OR #S89) ^d	2
19	RETAINER GLAND, 4" EBAA MEG-A-LUG ^d	3
20	PLUG, 2" BRASS (SEE NOTE 8)	1
21	VALVE, 2" BALL, BRASS, I.P.T. x I.P.T. W/PADLOCK WINGS (FORD B11-777-W) ^d	2

^dOR EQUIVALENT APPROVED BY THE DISTRICT

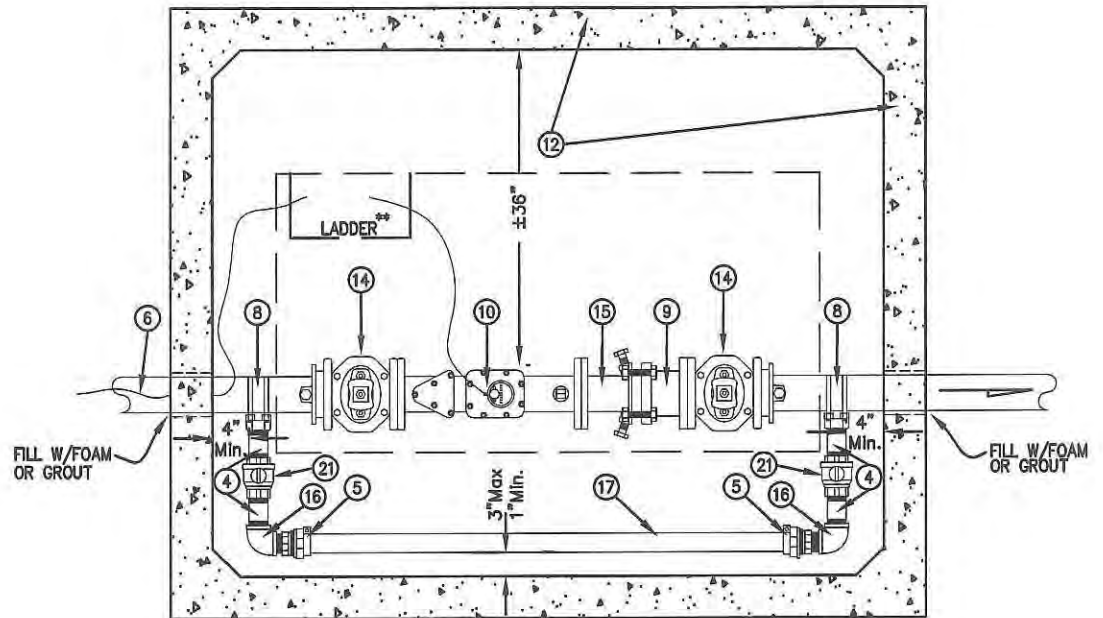
*NOT TO BE USED WHERE FLOW RATE OF LESS THAN 10 GPM OCCURS. COMPOUND METER TO BE USED.

**LOCATION OF LADDER TO BE DETERMINED AT INSTALLATION BY PUD REPRESENTATIVE.

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES:

- SET VALVE BOX AND VAULT TO FINISH GRADE. SEE P.U.D. VALVE BOX DETAIL.
- SEAL VAULT LIDS AND RISERS OF VAULT WITH 1-1/2"x1" JOINT MASTIC. INSTALL 3" PVC PIPE TO DRAIN TO DAYLIGHT IF POSSIBLE.
- INSTALL SERVICE PIPE PERPENDICULAR TO MAIN OR AS SHOWN ON WATER PLANS APPROVED BY DISTRICT ENGINEER. USE ELLS, AS NECESSARY, TO MEET ELEVATION OF VAULT.
- TEE, VALVE AND PIPE MUST BE WRAPPED WITH 8 MIL POLYETHYLENE PIPE ENCASUREMENT. IT IS TO BE INSTALLED AS PER D.I.P.R.A. AND IN ACCORDANCE WITH A.W.W.A. C105.
- IF SERVICE PIPE IS LONGER THAN ONE (1) LENGTH OF PIPE (18"), THEN U.S. PIPE "FIELD-LOK" GASKETS WILL BE INSTALLED IN T.J., OR EBAA "MEG-A-LUG" IN M.J. BELLS.
- SET VAULT ON MIN. 6" OF 3/4" MINUS CRUSHED GRAVEL, MECHANICALLY TAMPED TO 95% COMPACTION.
- FLUSH OUT PIPELINE BEFORE INSTALLING METER. DO NOT ALLOW ANY MUD OR FOREIGN MATERIAL TO ENTER PIPE OR FITTINGS.
- IF CONNECTION IS NOT COMPLETED TO CUSTOMER'S PIPE, INSTALL M.J., TAP 2", CAP OVER OPEN END OF PIPE OR PLUG, TAP 2", IN VALVE AND FLUSH OUT PIPE AND METER. MAKE WATER TIGHT.
- METER SENSING PAD IS TO BE LOCATED WITHIN 6" OF HINGE ON VAULT LID AT STREET (INLET) END OF VAULT.
- 4-INCH VALVES SHALL BE A.W.W.A. C509 STANDARD, "O" RING PACKING, NON-RISING STEM, 2" OPERATING NUT, RESILIENT WEDGE, GATE VALVES. (WHEEL OPERATORS INSIDE VAULT.)
- NON-SHRINK GROUT/FOAM AROUND PIPE. MAKE WATER TIGHT.
- 2" BALL VALVES SHALL BE LOCKED UPON INSTALLATION W/P.U.D.-SUPPLIED PADLOCKS.
- CONCRETE BLOCK OR EQUIVALENT UNDER VALVE IS TO KEEP VALVE FACE VERTICAL DURING INSTALLATION.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



PLAN VIEW

REFER TO SHEET 2/2 FOR ELEVATION VIEW.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



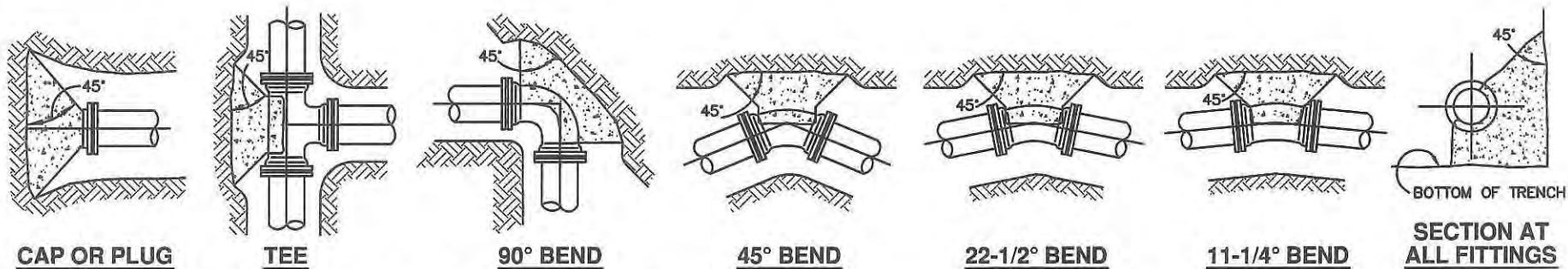
STANDARD INSTALLATION OF
4" TURBINE METERED SERVICE
PLAN VIEW

SHEET 1/2

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/9/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS4-2a



THRUST BLOCK REQUIREMENTS		BEARING AREA REQUIRED IN SQUARE FEET														
PIPE SIZE nominal	PIPE SIZE outside dia.	KEY BLOCK** & TEE/CAP OR PLUG test pressures		90 Degree BEND test pressures			45 Degree BEND test pressures			22.5 Degree BEND test pressures			11.25 Degree BEND test pressures			
		200 psi	225 psi	250 psi	200 psi	225 psi	250 psi	200 psi	225 psi	250 psi	200 psi	225 psi	250 psi	200 psi	225 psi	250 psi
4	4.80	1.8	2.0	2.3	2.6	2.9	3.2	1.4	1.6	1.7	0.7	0.8	0.9	0.4	0.4	0.4
6	6.90	3.7	4.2	4.7	5.3	5.9	6.6	2.9	3.2	3.6	1.5	1.6	1.8	0.7	0.8	0.9
8	9.05	6.4	7.2	8.0	9.1	10.2	11.4	4.9	5.5	6.2	2.5	2.8	3.1	1.3	1.4	1.6
12	13.20	13.7	15.4	17.1	19.4	21.8	24.2	10.5	11.8	13.1	5.3	6.0	6.7	2.7	3.0	3.4
16	17.40	23.8	26.8	29.7	33.6	37.8	42.0	18.2	20.5	22.7	9.3	10.4	11.6	4.7	5.2	5.8
18	19.50	29.9	33.6	37.3	42.2	47.5	52.8	22.9	25.7	28.6	11.7	13.1	14.6	5.9	6.6	7.3
24	25.80	52.3	58.8	65.3	73.9	83.2	92.4	40.0	45.0	50.0	20.4	22.9	25.5	10.2	11.5	12.8

NOTES:

- ALL CONCRETE BLOCKING SHALL BE POURED AGAINST DRY, UNDISTURBED SUBGRADE. TABLE IS BASED ON 2000 POUNDS PER SQUARE FOOT ALLOWABLE SOIL BEARING. WEAKER SOIL WILL REQUIRE INCREASED BEARING AREA. SEE SOIL BEARING LOAD CHART.
- KEEP CONCRETE CLEAR OF JOINTS AND ACCESSORIES. USE FORMING AS NECESSARY.
- HORIZONTAL ANCHOR BLOCKING CONFIGURATIONS FOR FITTINGS NOT SHOWN SHALL HAVE APPROVAL OF THE P.U.D.
- THE SQUARE FOOT AREAS REQUIRED FOR BEARING ARE CALCULATED BY THE FOLLOWING FORMULAS:
 FORMULA AT TEE & CAP OR PLUG:
 $T = PA$
 $T + K =$ BEARING AREA REQUIRED IN SQUARE FEET
 FORMULA AT ALL PIPE BENDS:
 $T = 2PA (\sin 1/2 \text{ ANGLE})$ WHERE ANGLE = THE DEGREE BEND OF THE FITTING
 $T + K =$ BEARING AREA REQUIRED IN SQ. FEET
 WHEN:
 $T =$ THRUST IN POUNDS
 $P =$ TEST PRESSURE IN PSI
 $A =$ CROSS-SECTIONAL AREA OF PIPE IN SQ. INCHES
 $K =$ ASSUMED 2000 PSF SOIL BEARING PRESSURE
- FITTINGS SHALL BE WRAPPED WITH POLYETHYLENE ENCASEMENT WITH A MIN. OF 8-MIL THICKNESS. IT MUST BE INSTALLED AS PER W.S.D.O.T. STANDARDS AND IN ACCORDANCE WITH A.W.W.A. C105.

BEARING AREA REQUIRED IN SQUARE FEET

THE SAFE SOIL BEARING LOADS SHOWN BELOW ARE FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET.

SOIL	SAFE BEARING LOAD LBS/SQ. FT.
*MUCK, PEAT, ETC.....	0
SOFT CLAY, SILT.....	1,000
SAND, SANDY SILT.....	2,000
SAND AND GRAVEL.....	3,000
SAND AND GRAVEL CEMENTED W/ CLAY.....	4,000
HARD SHALE.....	10,000

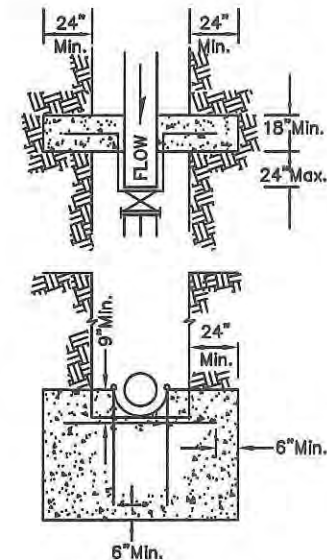
*IN MUCK OR PEAT, ALL THRUSTS SHALL BE RESTRAINED BY PILES OR TIE RODS TO SOLID FOUNDATIONS OR BY REMOVAL OF MUCK OR PEAT AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THRUSTS.

KEY BLOCK USE

THE INSTALLATION OF A KEY BLOCK IS TO BE CONSIDERED ONLY FOR TEMPORARY BLOCKING FOR 5-10 YEARS. IF THE PIPELINE IS TO REMAIN A DEADEND OR AN EXTENSION IS LIKELY TO BE MORE THAN 10 YEARS AWAY, THEN A STANDARD BLOCK FOR CAP OR PLUG WILL BE INSTALLED. USE OF KEY BLOCK IS TO BE APPROVED BY THE DISTRICT.

***KEY BLOCKING SPECIFICATION:**

MATERIALS SHALL INCLUDE 3/4-INCH RESTRAINING RODS, HEX NUTS AND WASHERS OF HIGH STRENGTH LOW ALLOY STEEL MEETING AWWA C-111-90 COMPOSITION SPECIFICATIONS, ROMAC "DUCTILE LUG" OR 90° EYE BOLTS AND "600" SERIES PIPE RESTRAINING SYSTEM. THRUST RESTRAINT TO BE CALCULATED AT 7500 POUNDS PER BOLT OR AS RECOMMENDED BY ENGINEER. ALL RODS, EYE BOLTS AND PIPE RESTRAINTS ARE TO BE CLEAN. TWO SEPARATE BRUSH COATS OF ASPHALT COATING AS APPROVED BY THE ENGINEER TO BE APPLIED. A 3-INCH MINIMUM CLEARANCE IS REQUIRED BETWEEN WATER PIPE AND CONCRETE. SOIL IS TO BE COMPACTED TO 95%. REBAR TO BE MINIMUM #6 (3/4") SIZE AND HAVE A MINIMUM 9-INCH CLEARANCE FROM ANY CONCRETE SURFACE.



KEY BLOCK

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**HORIZONTAL THRUST
BLOCKING DETAILS**

SCALE: NTS
DATE: 3-05-05
REVISED: 8/23/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WT-1

BILL OF MATERIALS

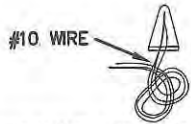
NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		11	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. x 1" PVC, (FORD #C87-44) ^a	4-7
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1	12	UTILITY VAULT 3030-LA W/3030-P COVER (SEE NOTE 4)	1
3	CORP., 1" BRASS FB-500 ^a	1	13	NIPPLE, 1"x12" BRASS	1
4	NIPPLE, BRASS 1X6	1	14	VALVE, 1" COMBINATION AIR (APCO) (W/ STAINLESS STEEL TRIM) ^a	1
5	CURB STOP, 1" B11-444	1	15	PIPE, 1" PVC, SCH. 80	
6	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1	16	HOSE CLAMP, 3/4" STAINLESS STEEL	1
7	CASING, 6" P.V.C. SEWER PIPE	1	17	BEND, 1", COPPER, 180°, WITH INSECT SCREEN	1
8	ELL, 1" BRASS, 90°, STREET	4	18	VALVE, 1" SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID.	
9	ELL, 1" BRASS, 90°	2	19	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED (PRESSURE TREATED 4" X 4" POST W/MARKER WHERE APPROPRIATE)	1
10	UNION, BRASS 1"	1	20	NIPPLE, 1"x2" BRASS	2
			21	CONCRETE SUPPORT, MIN. 1 FT. SQUARE x 1-1/4 IN. THICK	1-2

^a OR EQUIVALENT APPROVED BY THE DISTRICT

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES:

- CORP TO BE IN FULL "ON" POSITION BEFORE BACKFILL.
- SET VALVE CASINGS AND VAULT TO FINISHED GRADE. PROVIDE CONCRETE BLOCK SUPPORT UNDER CASING. DO NOT REST ON PIPE. REFER TO DETAIL OF STANDARD VALVE CASING INSTALLATION.
- INSTALL LINE PERPENDICULAR TO MAIN OR AS SHOWN ON WATER PLAN.
- CARSON INDUSTRIES BOX 1730-15 W/COVER 1730-3L MAY BE USED IN LAWN OR LANDSCAPED AREA UPON APPROVAL BY P.U.D.
- IF THERE IS A GROUND DEPRESSION OR DITCH BETWEEN AIR VALVE LOCATION AND VENT PIPE WHICH AFFECTS THE SLOPE OF THE HORIZONTAL VENT PIPE, INSTALL A CULVERT IF IT IS A DRAINAGE PATH OR FILL WITH DIRT.

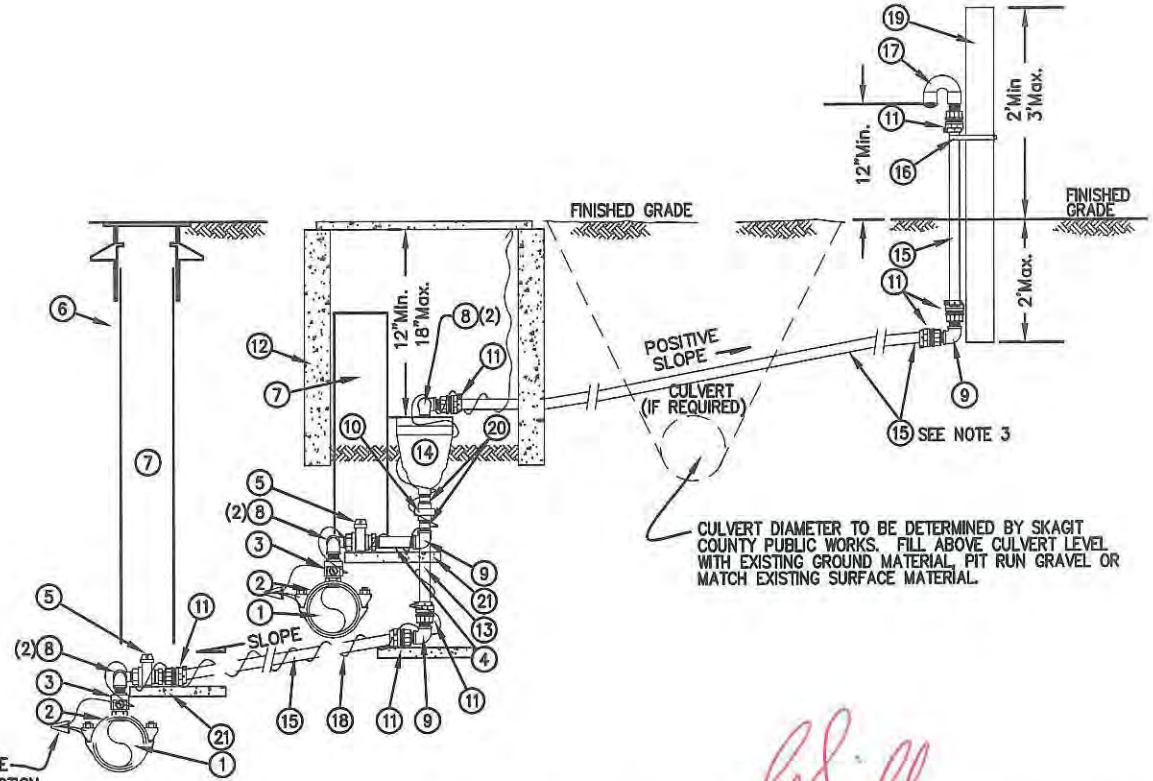


MAINLINE WIRE CONNECTION DETAIL

NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

SEE MAINLINE WIRE CONNECTION DETAIL



[Handwritten Signature]

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: OCT. 24, 2012



**STANDARD INSTALLATION OF
1" COMBINATION AIR
VALVE ASSEMBLY**

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
WV1-1**

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	PIPE, 2" MAINLINE -- P.V.C.*	
2	PLUG, 2" BRASS	1
3	NIPPLE, 1" x 2", BRASS	1
4	VALVE, 1" BALL, B11-444 ^d	1
5	NIPPLE, 1" X 6", BRASS	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID	
7	PIPE, 1" PE 3408, SIDR 7, 200 P.S.I.	
8	CAP, 1" P.V.C.	1
9	TRAFFIC RATED METER BOX AND LID (MID-STATES PLASTIC, INC. MSBCF 1324-18 NOT FOR THROUGH-WAY TRAFFIC APPLICATION) ^d	1
10	CASING, 6" P.V.C. SEWER PIPE	1
11	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. x 2" P.V.C.	1
12	MARKER, BLUE, CARSONITE #CWV-116	1
13	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. x POLY	2
14	ELL, 1" BRASS, 90°	1
15	TEE, 2" BRASS	1
16	INSERT, STIFFENER, 1" (FORD #72) ^d	2
17	CONCRETE BLOCKING	
18	BUSHING, BRASS 2x1	1
19	INSERT, STIFFENER, 2" (FORD #75) (IF POLY ONLY)	

^d OR EQUIVALENT APPROVED BY THE DISTRICT

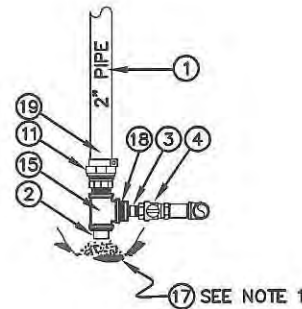
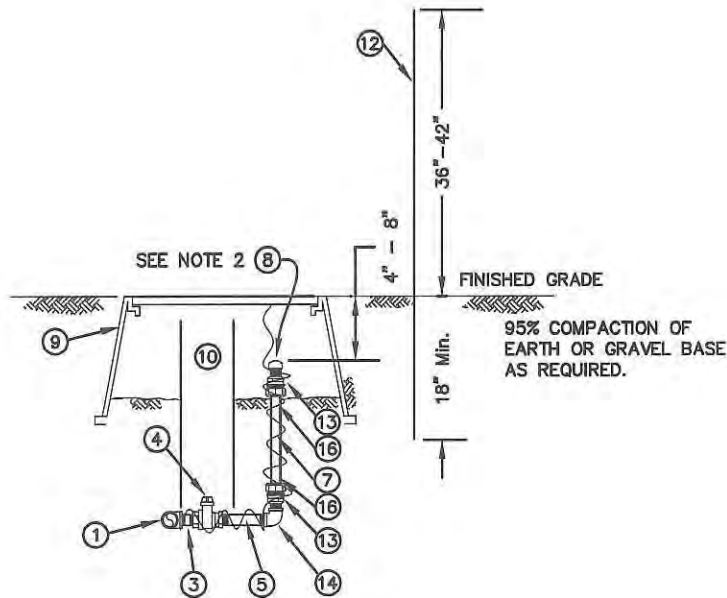
* IF MAINLINE IS P.E., #1 ABOVE WILL CHANGE AND #19 WILL BE REQUIRED.

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES:

1. BLOCK AS PER P.U.D. HORIZONTAL THRUST BLOCKING DETAIL. BEARING AREA TO BE AGAINST UNDISTURBED EARTH AND TO BE DETERMINED BY THE ENGINEER. USE FORMING AS NECESSARY TO PREVENT CONCRETE FROM INTERFERING WITH CAP OR PLUG.

2. PLASTIC THREADED CAPS TO BE HAND TIGHT ONLY.



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

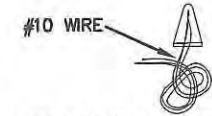
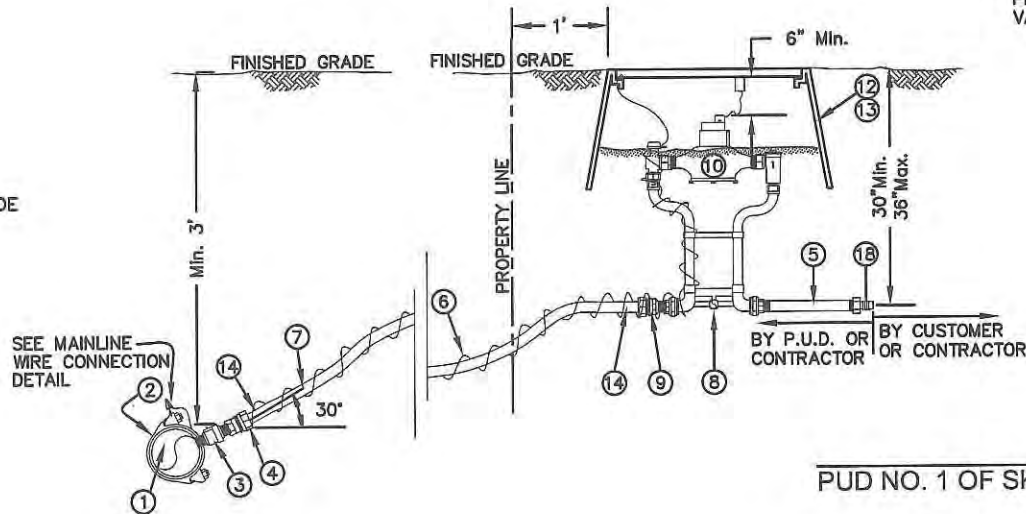
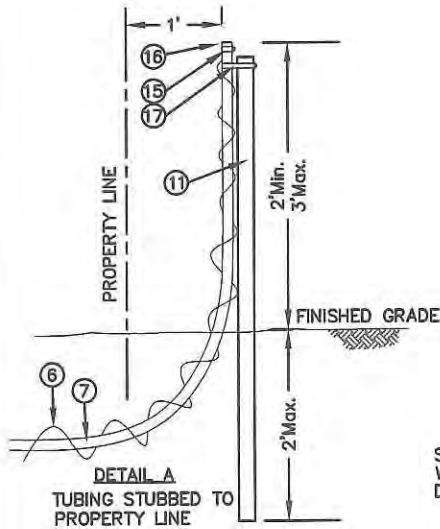
APPROVED ON: DEC. 14, 2012

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		10	METER, BADGER, 1", MODEL M70	1
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1	11	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
3	CORP, 1", (FORD #FB-500) ^a	1	12	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1324-15 W/COVER 1324-3L) ^a	1
4	ADAPTER, BRASS PAK JOINT, 1" F. I.P.T. X 1" POLY, (FORD #C16-44) ^a	1	13	EXTENSION, METER BOX, (CARSON INDUSTRIES LLC, L SERIES 1324-15) ^a (IF NECESSARY)	1
5	NIPPLE, BRASS, 1" x 6"	1	14	INSERT, STIFFENER, 1-1/4" (FORD #72) ^a	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID		15	CLAMP, 1-1/4", ALL STAINLESS - STUB ONLY	2
7	PIPE, 1-1/4" PE 3408, SIDR 7, 200 P.S.I.		16	ADAPTER, 1-1/4" M.I.P.T. x 1-1/4" INSERT W/CAP (GALVANIZED)	1
8	COPPERSETTER, 1", FORD #VBHC74-18W-11-44 ^a	1	17	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
9	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. X 1-1/4" POLY, (FORD #C86-44) ^{a b}	1	18	ADAPTER, BRASS, 1" F.I.P.T. X 1" INSERT	1

^aOR EQUIVALENT APPROVED BY THE DISTRICT
^bELL, 90° STREET, 1" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.



NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

NOTES

- CORP TO BE IN FULL OPEN POSITION BEFORE BACKFILL.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
- WATER SERVICE TUBING INSTALLATION IN PLATTED AREAS WILL BE COMPLETED BY THE CONTRACTOR/DEVELOPER FROM THE PIPELINE TO BEYOND THE PROPERTY LINE. IF METER BOX AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE PIPE INSTALLATION, THEN TUBING IS TO BE STUBBED UP AND COMPLETED AS PER DETAIL A. THE DISTRICT WILL COMPLETE THE ACTUAL METER AND BOX INSTALLATION WHEN NEEDED.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN BOX.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- FILL BOX WITH FINE DIRT TO TOP OF METER.
- IF THE METER BOX IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18)^a WILL BE REQUIRED. **NOT** FOR THROUGH-WAY TRAFFIC APPLICATIONS.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
 1" METERED SERVICE
 WITH 200 P.S.I. POLYETHYLENE
 SERVICE LINE**

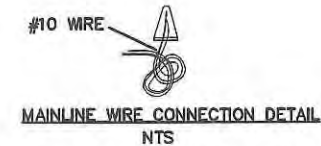
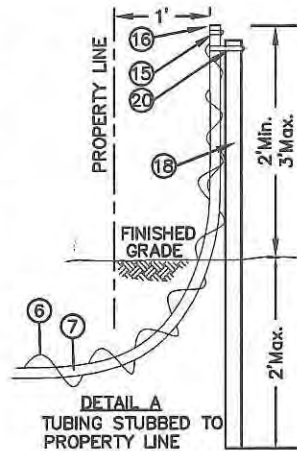
SCALE: 1" = 2'
DATE: 3-01-05
REVISED: 10/3/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
 WS1-1**

BILL OF MATERIALS		
NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	CORP, 1", (FORD #FB-500) ^a	1
4	ADAPTER, BRASS PAK JOINT, 1" F.I.P.T. X 1-1/4" POLY, (FORD #C16-44-Q) ^a	1
5	ADAPTER, BRASS, 1" M.I.P.T. x 1-1/4" POLY (FORD C86-34-Q) ^a	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID.	
7	PIPE, 1-1/4" PE 3408, SIDR 7, 200 P.S.I.	
8	COPPERSETTER, 1", FORD #VBHC74-18W-11-44 ^a	2
9	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. X 1" PVC, (FORD #C87-44) ^a b	2
10	METER, BADGER, 1" MODEL M70	2
11	PIPE, 1" PVC SCH 80 (FIELD CUT TO EXACT LENGTH)	±2'
12	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1324-15 W/COVER 1324-3L)	2
13	EXTENSION, METER BOX, (CARSON INDUSTRIES LLC, L SERIES 1324-15) ^a (IF NECESSARY)	2
14	TEE, 1" BRASS	1
15	CLAMP, 1-1/4", ALL STAINLESS - STUB ONLY	2
16	ADAPTER, 1" M.I.P.T x 1-1/4" INSERT W/CAP (GALVANIZED)	1
17	ADAPTER, BRASS, 1" F.I.P.T. x 1" INSERT	2
18	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
19	INSERT, STIFFENER, 1-1/4" (FORD #72) ^a	3
20	HOSE CLAMP, 1/1/4" STAINLESS STEEL	1
21	NIPPLE, BRASS, 1"x 6"	3

^a OR EQUIVALENT APPROVED BY THE DISTRICT ^bELL, 90° STREET, 1" M X F I.P.T. (IF NEEDED)

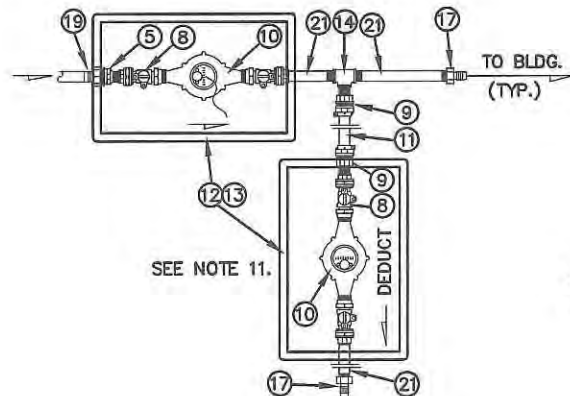
ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.



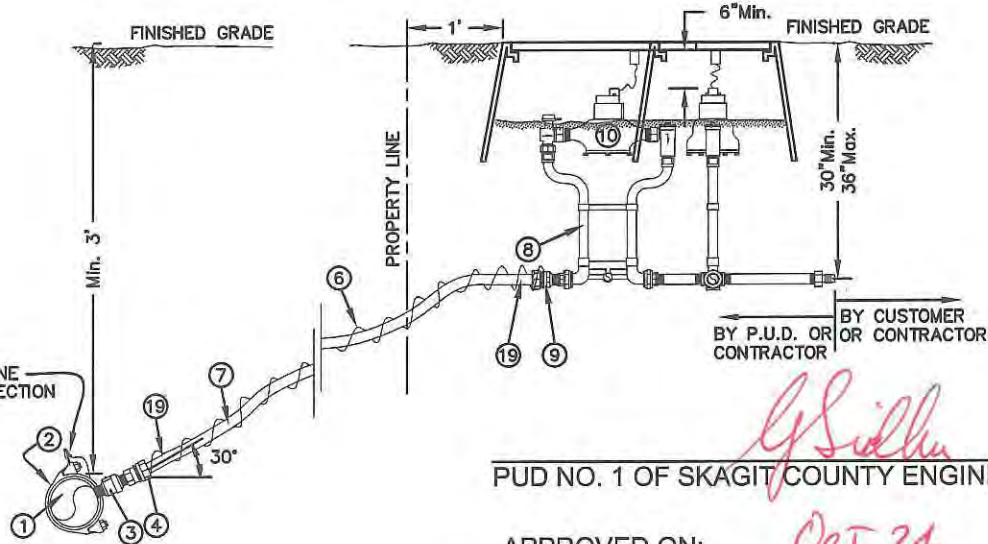
NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

NOTES

- CORP TO BE IN FULL OPEN POSITION BEFORE BACKFILL.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
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- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



SEE MAINLINE WIRE CONNECTION DETAIL



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012

Skagit
PUD
PUBLIC UTILITY DISTRICT

STANDARD INSTALLATION OF
1" METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE
SERVICE LINE WITH DEDUCT METER

SCALE: 1" = 2'
DATE: 3-01-05
REVISED: 10/3/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS1-2

BILL OF MATERIALS

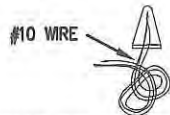
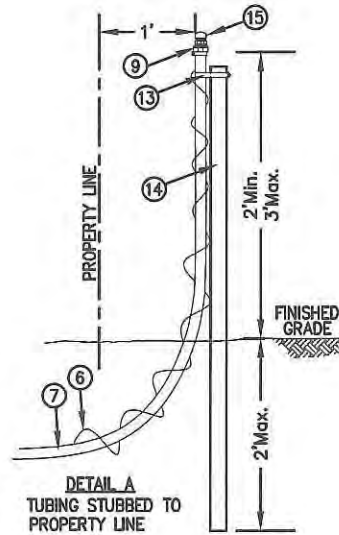
NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	CORP, 1", (FORD #FB-500) ^a	1
4	ADAPTER, BRASS PAK JOINT, 1" F.I.P.T. X 1" COPPER, (FORD #C14-44) ^a	1
5	NIPPLE, BRASS, 1" x 6"	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID	
7	TUBING, 1-1/4" COPPER, TYPE K	
8	COPPERSETTER, 1", FORD #VBHC74-18W-11-44 ^a	1
9	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. X 1-1/4" COPPER, (FORD #C84-44) ^a b	2
10	METER, BADGER, 1" MODEL M70	1
11	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1324-15 W/COVER 1324-3L) ^a	1
12	EXTENSION, METER BOX, (CARSON INDUSTRIES LLC, L SERIES 1324-15) ^a (IF NECESSARY)	1
13	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
14	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
15	CAP, 1" (GALVANIZED)	1
16	ADAPTER, BRASS, 1" F.I.P.T. X 1" INSERT	1

^aOR EQUIVALENT APPROVED BY THE DISTRICT
^bELL, 90° STREET, 1" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

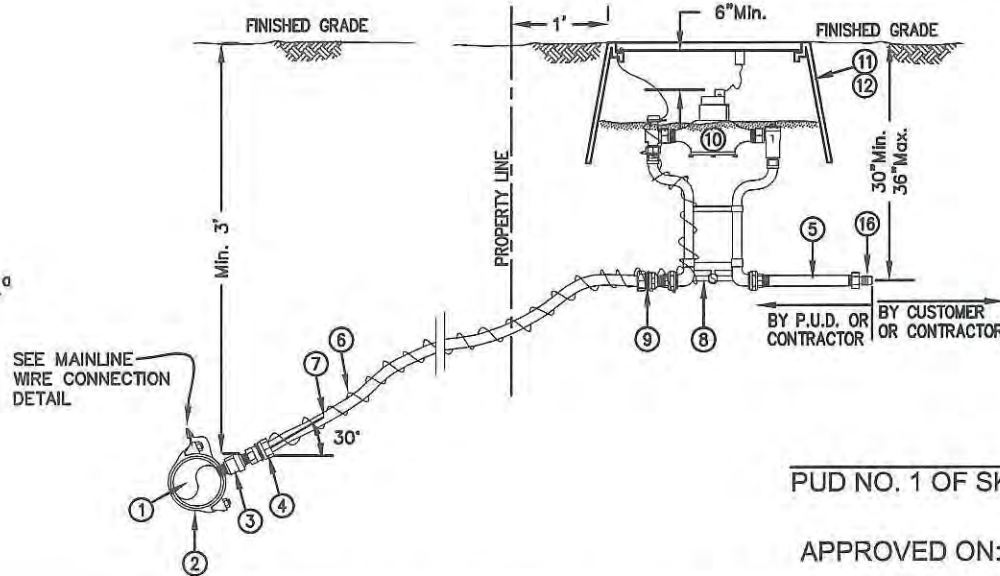
NOTES

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- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
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MAINLINE WIRE CONNECTION DETAIL
 NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



STANDARD INSTALLATION OF
 1" METERED SERVICE
 WITH COPPER TYPE K
 SERVICE LINE

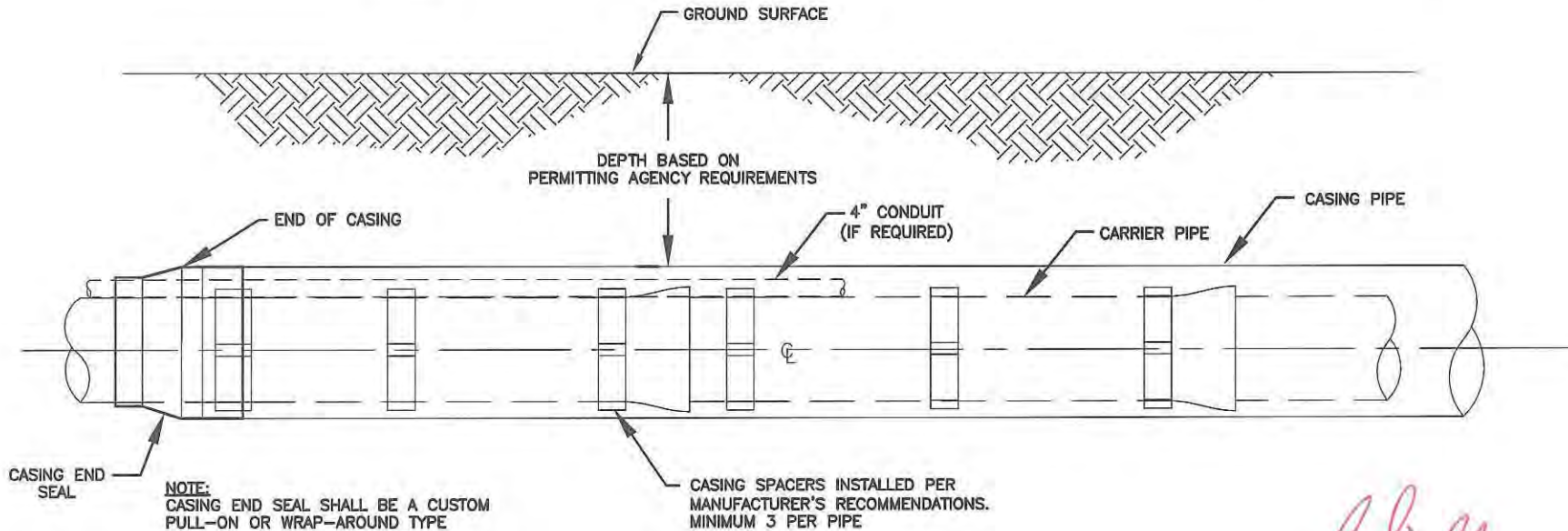
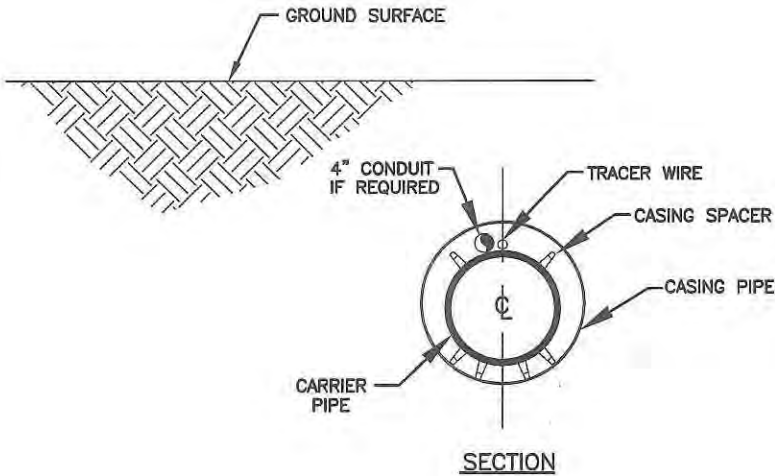
SCALE: 1" = 2'
DATE: 3-01-05
REVISED: 10/3/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS1-3

NOTES

1. CASING PIPE DIAMETER AND THICKNESS DEPENDS ON SPECIFIC APPLICATION AND DESIGN LOAD. SUBMIT CASING PIPE DIAMETER AND THICKNESS TO DISTRICT ENGINEERING DEPARTMENT FOR APPROVAL.
2. CASING PIPE SHALL MEET ASTM A36, WITH MINIMUM 35,000 PSI YIELD STRENGTH.
3. SOILS INVESTIGATION REPORT SHALL BE CONDUCTED PRIOR TO CONSTRUCTION AND REPORT SUBMITTED TO DISTRICT FOR REVIEW.
4. CONTRACTOR IS RESPONSIBLE FOR DESIGN JACKING/RECEIVING PITS, INCLUDING DEWATERING.
5. CASING INSTALLATION SHALL BE PERFORMED IN A MANNER THAT WILL NOT INTERFERE WITH, INTERRUPT OR ENDANGER GROUND SURFACE AND OTHER ADJACENT UTILITIES. CONTRACTOR IS RESPONSIBLE FOR ALL SETTLEMENT FROM CASING PIPE INSTALLATION AND SHALL MAKE RESTORATION TO ALL DAMAGED PROPERTY.
6. CASING SPACER SHALL BE CONSTRUCTED OF TYPE 304 STAINLESS STEEL WITH MINIMUM THICKNESS OF 12 GAUGE. RUNNERS SHALL BE MADE OF REINFORCED POLYMER.
7. CASING END SEAL SHALL BE A SYNTHETIC RUBBER SLEEVE ATTACHED WITH STAINLESS STEEL BAND CLAMPS. GROUT MAY BE USED IF APPROVED BY DISTRICT.
8. A CONDUIT FOR FIBER OPTIC CABLE MAY BE REQUIRED TO BE INSTALLED. IN THAT CASE, THE CASING SPACERS AND END SEALS MAY NEED TO BE MODIFIED.
9. ALL PERMITTING FOR CASING PIPE INSTALLATION TO BE COMPLETED BY CONTRACTOR AND APPROVED PERMITS SHALL BE SUBMITTED TO DISTRICT.
10. ALL CARRIER PIPE WITHIN CASING TO BE POLY ENCASED PER DISTRICT STANDARDS, WITH TRACER WIRE ATTACHED.
11. CARRIER PIPE WITHIN CASING TO BE PRESSURE TESTED SEPARATELY AND PRIOR TO CONNECTING TO PIPE AT EITHER END.



NOTE:
CASING END SEAL SHALL BE A CUSTOM PULL-ON OR WRAP-AROUND TYPE

PROFILE

[Signature]
PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct-24, 2012



**STANDARD PIPE CASING
INSTALLATION**

SCALE: NO SCALE
DATE: 10/22/12
REVISED: 10/23/12
DRAWN BY: KDM
APPROVED BY: GJS

STANDARD

WC-1

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		10	METER, BADGER MODEL M25 (5/8") OR M35 (3/4") BRONZE METER	1
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1	11	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
3	CORP, 1", (FORD #FB-500) ^a	1	12	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1419-12 W/COVER 1419-3) ^a	1
4	ADAPTER, BRASS PAK JOINT, 1" F.I.P.T. X 1-1/4" POLY, (FORD #C16-44) ^a	1	13	EXTENSION, METER BOX, CARSON INDUSTRIES LLC, L SERIES 1419-6 ^a	1
5	NIPPLE, BRASS, 1" x 6"	1	14	INSERT, STIFFENER, 1-1/4" (FORD #72) ^a	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID		15	CLAMP, 1-1/4", ALL STAINLESS - STUB ONLY	2
7	PIPE, 1-1/4" PE 3408, SIDR 7, 200 P.S.I.		16	ADAPTER, 1-1/4" M.I.P.T x 1-1/4" INSERT W/CAP (GALVANIZED)	1
8	COPPERSETTER, 3/4", (FORD #VBHC72-9W-11-44) ^a	1	17	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
9	ADAPTER, BRASS PAK JOINT, 3/4" M.I.P.T. X 1-1/4" POLY, (FORD #C86-44) ^a ^b	1	18	ADAPTER, BRASS, 1" F.I.P.T. x 1" INSERT	1
			19	CURB STOP, BRASS, 1" B11-444	1
			20	NIPPLE, BRASS, 1" X 4"	3
			21	PRV, 1" WILKINS 600HR, SC, 1"	2

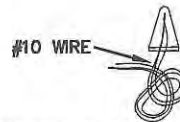
^aOR EQUIVALENT APPROVED BY THE DISTRICT

^bELL, 90° STREET, 3/4" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

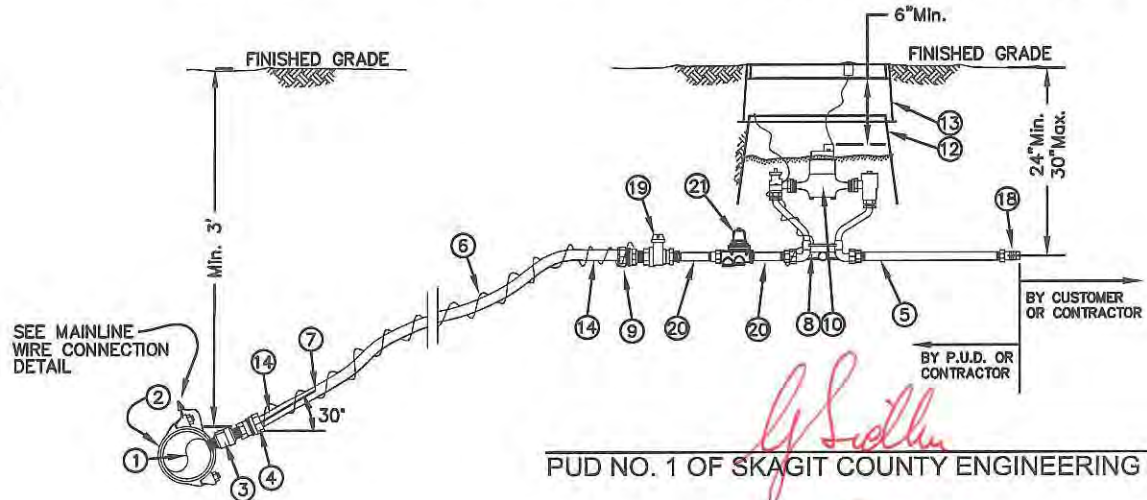
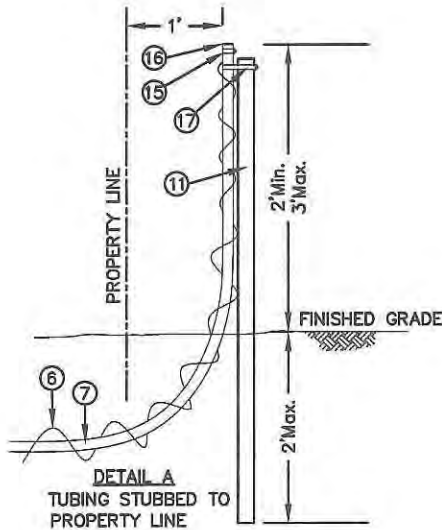
NOTES

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- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
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MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
SINGLE 5/8" OR 3/4" EXISTING METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE SERVICE LINE
ON HIGH PRESSURE TRANSMISSION LINE**

SCALE: 1/2" = 1'
DATE: 5-24-07
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: DJL

**STANDARD
WS58-5**

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		10	METER, BADGER MODEL M25 (5/8") OR M35 (3/4") BRONZE METER	1
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1	11	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
3	CORP, 1", (FORD #FB-500) ^a	1	12	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1419-12 W/COVER 1419-3) ^a	1
4	ADAPTER, BRASS PAK JOINT, 1" F.I.P.T. X 1-1/4" POLY, (FORD #C16-44) ^a	1	13	EXTENSION, METER BOX, CARSON INDUSTRIES LLC, L SERIES 1419-6 ^a	1
5	NIPPLE, BRASS, 1" x 6"	1	14	INSERT, STIFFENER, 1-1/4" (FORD #72) ^a	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LJD		15	CLAMP, 1-1/4", ALL STAINLESS - STUB ONLY	2
7	PIPE, 1-1/4" PE 3408, SIDR 7, 200 P.S.I.		16	ADAPTER, 1-1/4" M.I.P.T x 1-1/4" INSERT W/CAP (GALVANIZED)	1
8	COPPERSETTER, 3/4", (FORD #VBHC72-9W-11-44) ^a	1	17	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
9	ADAPTER, BRASS PAK JOINT, 3/4" M.I.P.T. X 1-1/4" POLY, (FORD #C86-44) ^a b	1	18	ADAPTER, BRASS, 1" F.I.P.T. x 1" INSERT	1

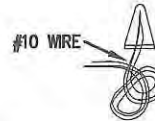
^aOR EQUIVALENT APPROVED BY THE DISTRICT

^bELL, 90° STREET, 3/4" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

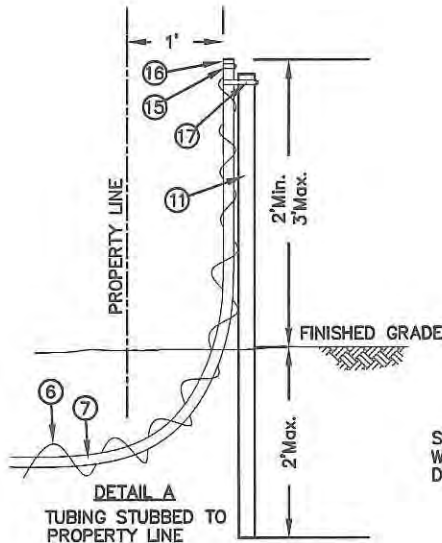
NOTES

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- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- FILL BOX WITH FINE DIRT TO TOP OF METER.
- IF THE METER BOX IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18)^a WILL BE REQUIRED. NOT FOR THROUGH-WAY TRAFFIC APPLICATIONS.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.

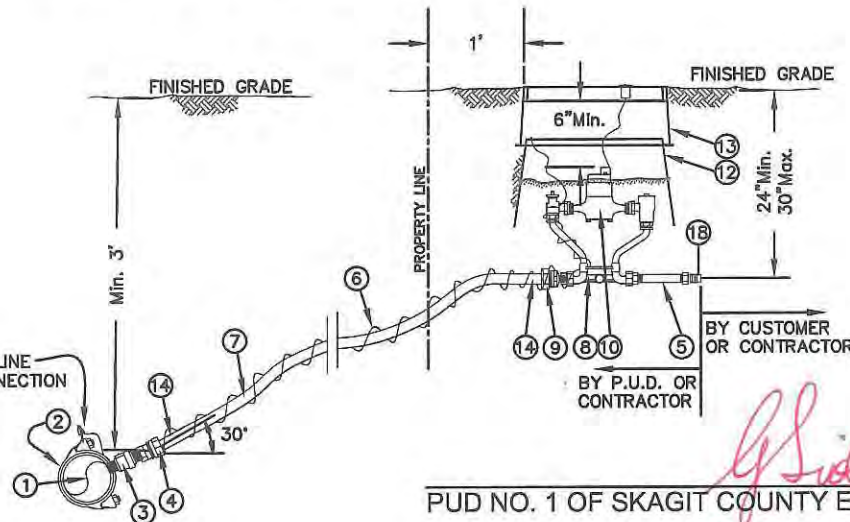


MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a



SEE MAINLINE WIRE CONNECTION DETAIL



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



STANDARD INSTALLATION OF
SINGLE 5/8" OR 3/4" METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE
SERVICE LINE

SCALE: 1"=2'
DATE: 3-01-05
REVISED: 10/2/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

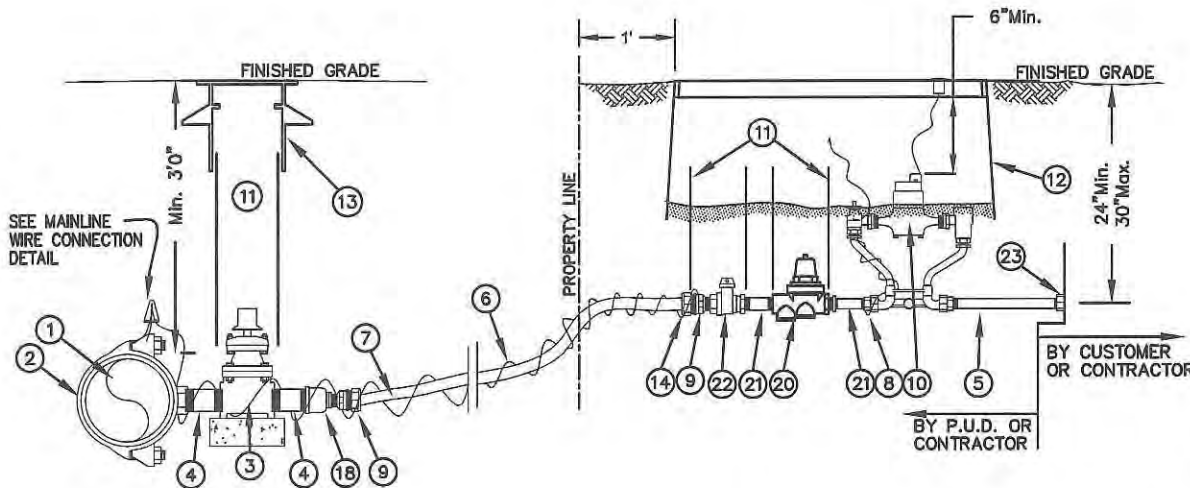
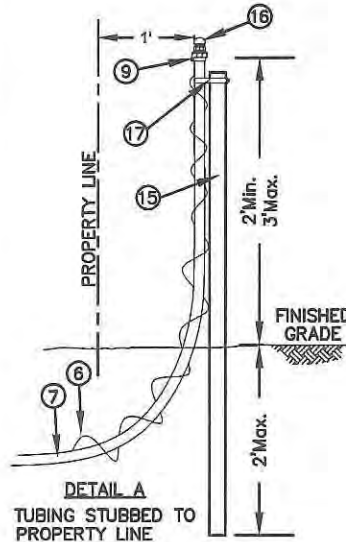
WS58-1

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	VALVE, 2" CAST IRON, RESILIENT WEDGE, I.P.T.xI.P.T.	1
4	NIPPLE, BRASS 2"x4"	2
5	NIPPLE, BRASS 1"x 6"	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID	
7	PIPE, 1-1/4" PE 3408, SIDR 7, 200 P.S.I.	
8	COPPERSETTER, 3/4", FORD (VBHC72-9W-11-33) ^a	1
9	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T. X 1-1/4" POLY (FORD #C86-44) ^{a b}	2
10	METER, BADGER, MODEL M25 (5/8") OR M35 (3/4") BRONZE METER	1
11	CASING, 6" PVC SEWER PIPE	2
12	METER BOX, CARSON IND. MODEL 1730-15 W/1730-3L COVER ^a (LARGE BOX)	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	INSERT, STIFFENER, 1-1/4" (FORD #72) ^a	2
15	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
16	CAP, 1" (GALVANIZED)	1
17	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
18	REDUCER, 2"x1" BRASS	1
19	NIPPLE, BRASS 3/4"x4"	1
20	PRV, WILKENS 600HR, SC, 1" "HIGH RANGE PRV"	1
21	NIPPLE, BRASS 1"x4"	1
22	CURB STOP, 1" BRASS, B11-444	1
23	ADAPTER, BRASS, 1" F.I.P.T. X 1" INSERT	1

^a OR EQUIVALENT APPROVED BY THE DISTRICT
^b ELL, 90° STREET, 1" BRASS (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.



MAINLINE WIRE CONNECTION DETAIL NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

[Handwritten signature]

NOTES:

1. INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
2. IF METER IS NOT INSTALLED IN COPPERSETTER, OR IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A TIGHT FITTING PLUG OR CAP IN OPEN END OF COPPERSETTER AND A TIGHT WRAP OF PLASTIC (ELECTRICAL) TAPE OVER END OF NIPPLE. MAKE WATER TIGHT.
3. IF VAULT AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE TUBING INSTALLATION, THEN TUBING IS TO BE STUBBED UP ABOVE FINISH GRADE AND CAPPED. SEE DETAIL A.
4. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN VAULT/BOX.
5. FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
6. SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. DO NOT REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 3 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
7. IF METER IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18)^a WILL BE REQUIRED. NOT FOR THROUGH-WAY TRAFFIC APPLICATIONS
8. IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
9. METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN 6 INCHES OF HINGE NEAR THE STREET END. IN A CARSON INDUSTRIES BOX PAD IS TO BE LOCATED AT THE STREET END OF BOX.
10. A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.
11. SET PRV TO 125 PSI.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



STANDARD INSTALLATION OF SINGLE 5/8" OR 3/4" METERED SERVICE WITH 200 P.S.I. POLYETHYLENE SERVICE LINE OFF HIGH PRESSURE MAIN LINE GREATER THAN 150 P.S.I.

SCALE: NTS
DATE: 6-26-07
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD
WS58-6

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		11	PIPE, 1" PVC SCH 80 (FIELD CUT TO EXACT LENGTH)	±2
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1	12	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1419-12 W/COVER 1419-3) ^a	2
3	CORP, 1", (FORD #FB-500) ^a	1	13	EXTENSION, METER BOX, CARSON INDUSTRIES LLC, L SERIES 1419-6 ^a	2
4	ADAPTER, BRASS PAK JOINT, 1" F. I.P.T. X 1-1/4" POLY, (FORD #C16-44) ^a W/INSERTS (FORD #72) ^a	1	14	TEE, 1" BRASS	1
5	ADAPTER, BRASS, 1" F.I.P.T. x 1" INSERT	2	15	CLAMP, 1-1/4", ALL STAINLESS - STUB ONLY	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR JLD	2	16	ADAPTER, 1-1/4" M.I.P.T. x 1-1/4" INSERT W/CAP (GALVANIZED)	1
7	PIPE, 1-1/4" PE 3408, SIDR 7, 200 P.S.I.		17	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
8	COPPERSETTER, 3/4", FORD #VBHC72-9W-11-33 ^a	2	18	INSERT, STIFFENER, 1-1/4" (FORD #72) ^a	2
9	ADAPTER, BRASS PAK JOINT, 3/4" M.I.P.T. x 1" PVC (FORD C87-3 ^a)	2	19	ADAPTER, BRASS PAK JOINT, 3/4" M.I.P.T.x1-1/4"POLY (FORD #C86-34) ^a b	1
10	METER, BADGER MODEL M25 (5/8") OR M35 (3/4") BRONZE METER	2	20	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
			21	NIPPLE, BRASS, 1"x 6"	3

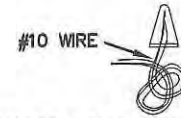
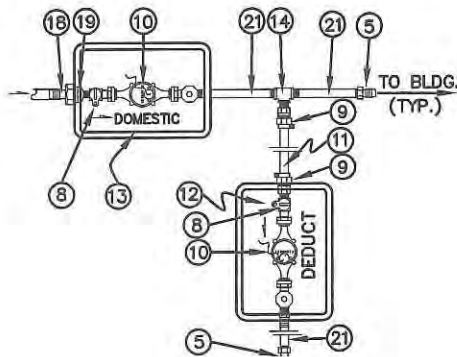
^a OR EQUIVALENT APPROVED BY THE DISTRICT

b ELL, 90° STREET, 3/4" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

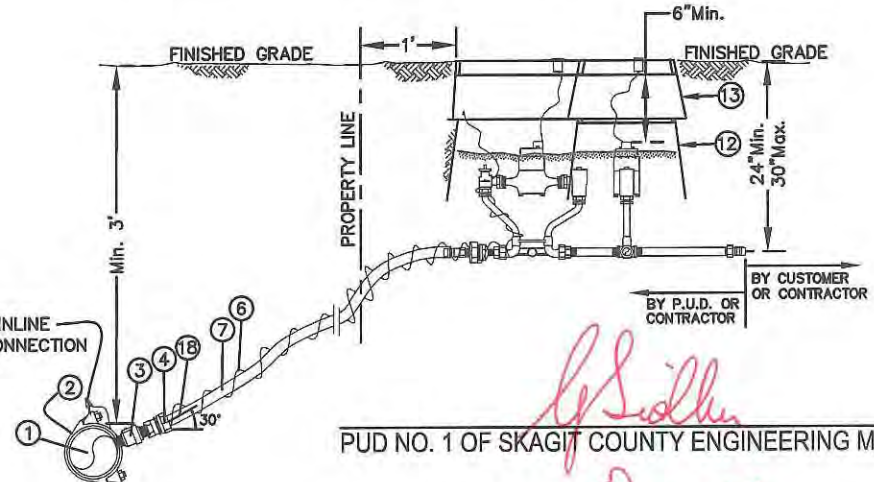
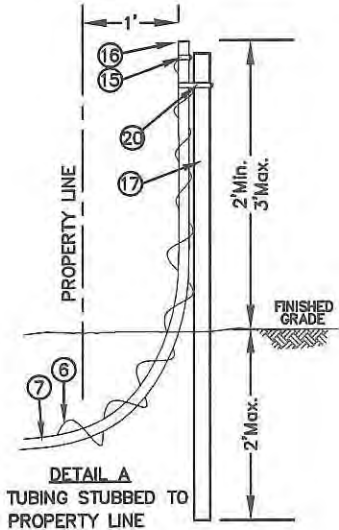
NOTES

- CORP TO BE IN FULL OPEN POSITION BEFORE BACKFILL.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
- WATER SERVICE TUBING INSTALLATION IN PLATTED AREAS WILL BE COMPLETED BY THE CONTRACTOR/DEVELOPER FROM THE PIPELINE TO BEYOND THE PROPERTY LINE. IF METER BOX AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE PIPE INSTALLATION, THEN TUBING IS TO BE STUBBED UP AND COMPLETED AS PER DETAIL A. THE DISTRICT WILL COMPLETE THE ACTUAL METER AND BOX INSTALLATION WHEN NEEDED.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN BOX.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- FILL BOX WITH FINE DIRT TO TOP OF METER.
- IF THE METER BOX IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18)^a WILL BE REQUIRED. **NOI** FOR THROUGH-WAY TRAFFIC APPLICATIONS.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
SINGLE 5/8" OR 3/4" METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE SERVICE
LINE W/DEDUCT METER**

SCALE: 1"=2'
DATE: 3-01-05
REVISED: 8/14/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
WS58-2**

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 1" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	CORP, 1", (FORD #FB-500) ^a	1
4	ADAPTER, BRASS PAK JOINT, 1" F.I.P.T. X 1-1/4" COPPER, (FORD #C14-44) ^a	1
5	NIPPLE, BRASS, 1" x 6"	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID	
7	TUBING, 1-1/4" COPPER, TYPE K	
8	COPPERSETTER, 3/4", FORD #LSVBII-233W ^a	1
9	ADAPTER, BRASS PAK JOINT, 3/4" M.I.P.T. X 1-1/4" COPPER, (FORD #C84-34) ^a b	2
10	METER, BADGER MODEL M25 (5/8") OR M35 (3/4") BRONZE METER	1
11	EXTENSION, METER BOX, (CARSON INDUSTRIES LLC, L SERIES 1419-6) ^a	1
12	METER BOX & COVER, (CARSON INDUSTRIES LLC, L SERIES 1419-12 W/COVER 1419-3) ^a	1
13	HOSE CLAMP, 1-1/4" STAINLESS STEEL	1
14	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
15	CAP, 1" (GALVANIZED)	1
16	ADAPTER, BRASS, 1" F.I.P.T. x 1" INSERT	1

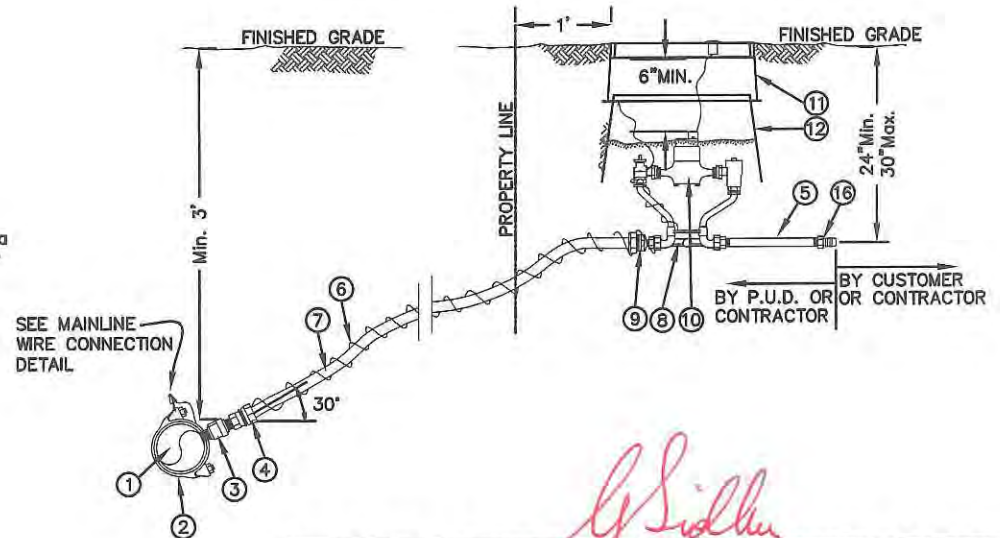
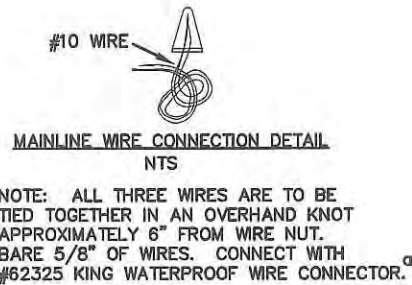
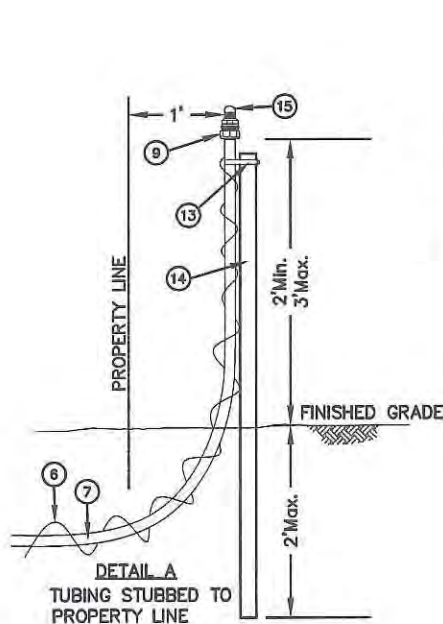
^aOR EQUIVALENT APPROVED BY THE DISTRICT

^bELL, 90° STREET, 3/4" M X F, I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES

- CORP TO BE IN FULL OPEN POSITION BEFORE BACKFILL.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- SERVICE LINE IS TYPICALLY 1'6" TO NORTH OR WEST OF PROPERTY CORNER OR AS OTHERWISE SPECIFIED.
- WATER SERVICE TUBING INSTALLATION IN PLATTED AREAS WILL BE COMPLETED BY THE CONTRACTOR/DEVELOPER FROM THE PIPELINE TO BEYOND THE PROPERTY LINE. IF METER BOX AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE PIPE INSTALLATION, THEN TUBING IS TO BE STUBBED UP AND COMPLETED AS PER DETAIL A. THE DISTRICT WILL COMPLETE THE ACTUAL METER AND BOX INSTALLATION WHEN NEEDED.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN BOX.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- FILL BOX WITH FINE DIRT TO TOP OF METER.
- IF THE METER BOX IS LOCATED IN ASPHALT OR CONCRETE AREA, A TRAFFIC BOX (MID-STATES PLASTICS, INC., MSBCF1324-18)^a WILL BE REQUIRED. NOT FOR THROUGH-WAY TRAFFIC APPLICATIONS.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- IF SERVICE LINE HAS LESS THAN 2'0" OF COVER, CONTACT DISTRICT ENGINEERING DEPARTMENT FOR FREEZE PROTECTION REQUIREMENTS.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

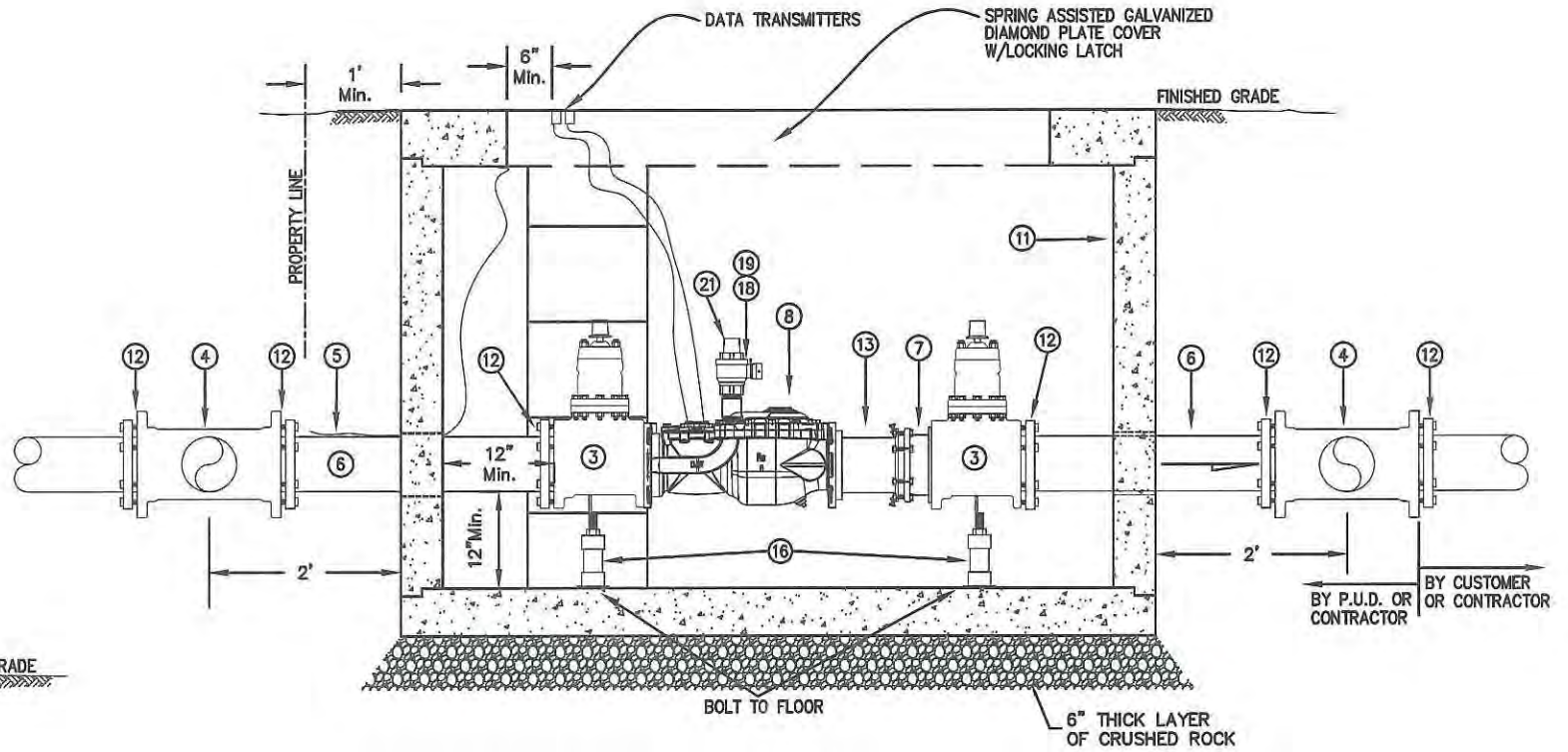
APPROVED ON: Oct-24, 2012



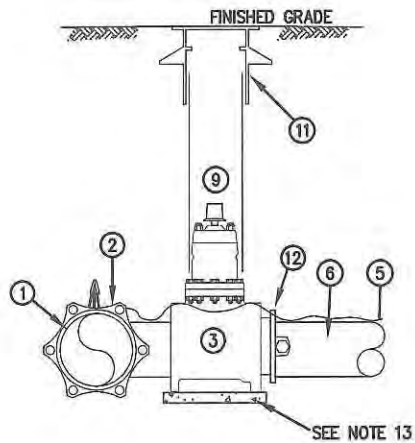
**STANDARD INSTALLATION OF
SINGLE 5/8" OR 3/4" METERED SERVICE
WITH COPPER TYPE K
SERVICE LINE**

SCALE: 1" = 2'
DATE: 3-01-05
REVISED: 10/2/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
WS58-3**



ELEVATION
REFER TO SHEET 1/2 FOR PLAN VIEW



[Signature]
 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER
 APPROVED ON: Oct-24, 2012

NOTES:

1. SET VALVE BOX AND VAULT TO FINISH GRADE. SEE P.U.D. VALVE BOX DETAIL.
2. SEAL VAULT LIDS AND RISERS OF VAULT WITH 1-1/2"x1" JOINT MASTIC. INSTALL 3" PVC PIPE TO DRAIN TO DAYLIGHT IF POSSIBLE.
3. INSTALL SERVICE PIPE PERPENDICULAR TO MAIN OR AS SHOWN ON WATER PLANS APPROVED BY DISTRICT ENGINEER. USE ELLS, AS NECESSARY, TO MEET ELEVATION OF VAULT.
4. TEE, VALVE AND PIPE MUST BE WRAPPED WITH 8 MIL POLYETHYLENE PIPE ENCASUREMENT. IT IS TO BE INSTALLED AS PER D.I.P.R.A. AND IN ACCORDANCE WITH A.W.W.A. C105.
5. BLOCK TEE/TAPPING SLEEVE WITH POURED CONCRETE ON ALL WATER MAINS OTHER THAN DUCTILE IRON. IN ADDITION, THE SERVICE PIPE FROM VALVE AT MAIN TO METER AND THE PRIVATE SERVICE LINE FROM METER ON TO PRIVATE PROPERTY SHALL BE RESTRAINED USING MEG-A-LUGS OR "FIELD LOK" GASKETS (OR APPROVED EQUIVALENT). THE LENGTH OF RESTRAINED PIPE ON PRIVATE PROPERTY SHALL BE DETERMINED BY THE DEVELOPER ENGINEER.
6. SET VAULT ON MIN. 6" OF 3/4" MINUS CRUSHED GRAVEL, MECHANICALLY TAMPED TO 95% COMPACTION.
7. FLUSH OUT PIPELINE BEFORE INSTALLING METER. DO NOT ALLOW ANY MUD OR FOREIGN MATERIAL TO ENTER PIPE OR FITTINGS.
8. IF CONNECTION IS NOT COMPLETED TO CUSTOMER'S PIPE, INSTALL M.J., TAP 2", CAP OVER OPEN END OF PIPE AND FLUSH OUT PIPE AND METER. MAKE WATER TIGHT.
9. METER SENSING PAD IS TO BE LOCATED WITHIN 6" OF HINGE ON VAULT LID AT STREET (INLET) END OF VAULT.
10. 4-INCH VALVES SHALL BE A.W.W.A. C509 STANDARD, "O" RING PACKING, NON-RISING STEM, 2" OPERATING NUT, RESILIENT WEDGE, GATE VALVES.
11. NON-SHRINK GROUT/FOAM AROUND PIPE.
12. BACKFILL AROUND VAULT SHALL BE FIRMLY TAMPED TO ELIMINATE SETTLEMENT.
13. CONCRETE BLOCK OR EQUIVALENT UNDER VALVE IS TO KEEP VALVE FACE VERTICAL DURING INSTALLATION.
14. A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.

BILL OF MATERIALS

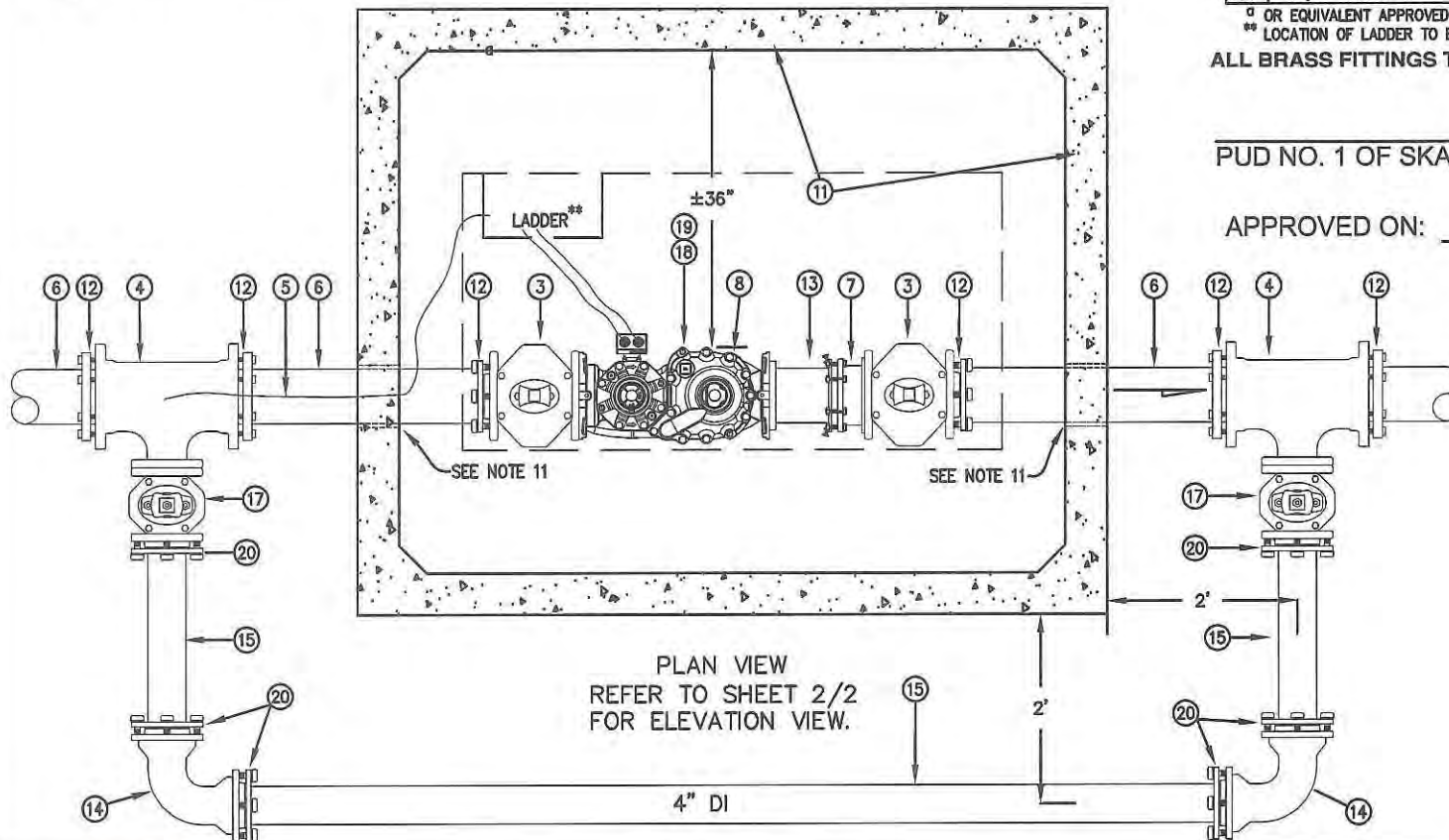
NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	TEE, MAINLINE 6" FL OR STAINLESS STEEL TAPPING SLEEVE EQUIVALENT	1
3	VALVE, 6" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	3
4	TEE, 6" MJx4" FL	2
5	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND TO TOP OF LADDER	
6	PIPE, 6" CL 50 DUCTILE IRON (FIELD CUT TO LENGTH)	
7	RESTRAINED FLANGE COUPLING ADAPTER, 6" ROMAC IND. INC. ^Q	1
8	METER, BADGER, 6" RECORDALL COMPOUND SERIES METER WITH SUMMATOR SPLITTER WITH ORION RTR TRANSMITTER	1
9	CASING, 6" PVC SEWER PIPE	3
10	UTILITY VAULT 675LA W/#675-TL-2-332P COVER (SPRING ^Q ASSISTED) AND LADDER (BILCO LADDER-UP SAFETY POST) ^{Q**}	1
11	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	3
12	RETAINER GLAND, 6" ROMAC GRIP RING ^Q	6
13	SPOOL, 6" CL 50 D.I., FLxPE, 12" MIN. LONG (FIELD CUT TO LENGTH)	1
14	ELL, 4" MJ 90°	2
15	PIPE, 4" CL 52 DI (FIELD CUT TO LENGTH)	
16	PIPE SUPPORT (MATERIAL RESOURCES #S92 OR S89)	2
17	VALVE, 4" FLxMJ, GATE, RW	2
18	NIPPLE, 2"x4", BRASS	1
19	VALVE, 2" BALL, BRASS, IPTxIPT, WITH PADLOCK WINGS (FORD B11-777-W) ^Q	1
20	RETAINER GLAND, 4" ROMAC GRIP RING ^Q	6
21	PLUG, 2" BRASS	1

^Q OR EQUIVALENT APPROVED BY THE DISTRICT
^{**} LOCATION OF LADDER TO BE DETERMINED AT INSTALLATION BY PUD REPRESENTATIVE.

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

G. Sidhu
 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct-24, 2012



PLAN VIEW
 REFER TO SHEET 2/2
 FOR ELEVATION VIEW.



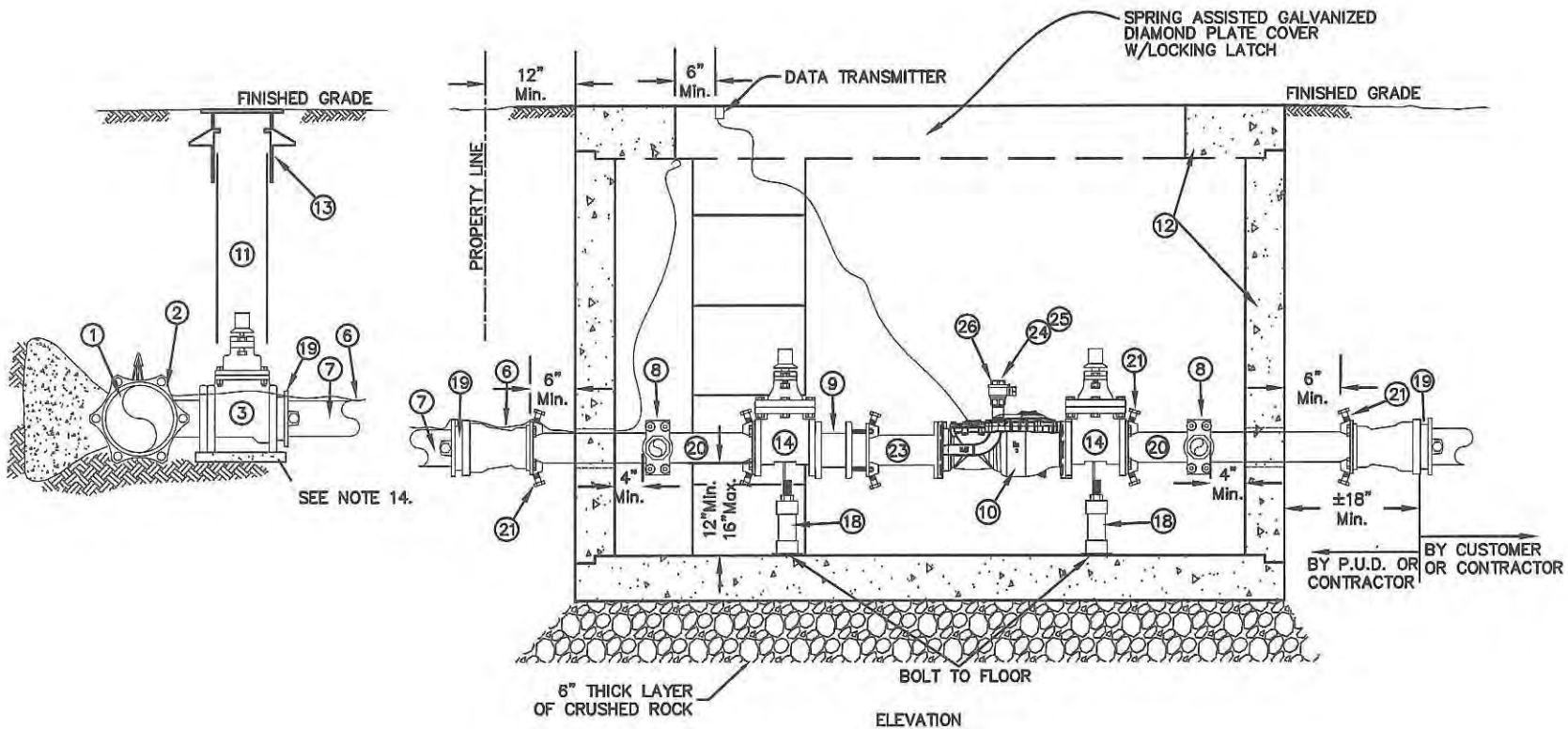
**STANDARD INSTALLATION OF
 6" COMPOUND METERED SERVICE
 PLAN VIEW**

SHEET 1/2

SCALE: 1" = 2'
 DATE: 5-7-07
 REVISED: 10/9/12
 DRAWN BY: CAS
 APPROVED BY: GJS

STANDARD

WS6-1a




 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER
 APPROVED ON: Oct-24, 2012

REFER TO SHEET 1/2 FOR PLAN VIEW.

**STANDARD INSTALLATION OF
 3" COMPOUND METERED SERVICE
 ELEVATION VIEW**

SHEET 2/2

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS3-1b



BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		18	PIPE SUPPORT (MATERIAL RESOURCES #S92 OR #S89) ^o	2
2	TEE, MAINLINE 4" FL OR STAINLESS STEEL TAPPING SLEEVE EQUIVALENT	1	19	RETAINER GLAND, 4" EBAA MEG-A-LUG ^o	3
3	VALVE, 4" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	1	20	PIPE, 3" CL 51 DUCTILE IRON (FIELD CUT TO LENGTH)	
4	NIPPLE, BRASS 2X4	4	21	RETAINER GLAND, 3" EBAA MEG-A-LUG ^o	4
5	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. x PVC (FORD C87-77)	2	22	VALVE, 2" BALL, BRASS, I.P.T. x I.P.T., W/PADLOCK WINGS (FORD B11-777-W) ^o	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND TO TOP OF LADDER		23	SPOOL, 3" CL 51 D.I., FLxPE, 15" MINIMUM (FIELD CUT TO LENGTH)	1
7	PIPE, 4" CL 50 DUCTILE IRON (FIELD CUT TO LENGTH)		24	NIPPLE, BRASS 1 1/2" x 4"	1
8	CLAMP, SERVICE, 3"D.I. x 2"I.P.T., DOUBLE STAINLESS STEEL STRAP, EPOXY COATED (FORD FC202-425-IP7) ^o	2	25	VALVE, 1 1/2" BALL, I.P.T. x I.P.T., W/PADLOCK WINGS (FORD B11-668-W)	1
9	RESTRAINED FLANGE COUPLING ADAPTER, 3", ROMAC IND ^o INC.	1	26	PLUG, 1-1/2" BRASS	1
10	METER, BADGER, 3" RECORDALL COMPOUND SERIES W/ORION	1			
11	CASING, 6" PVC SEWER PIPE	1			
12	UTILITY VAULT 675LA W/#675-TL-2-332P COVER (SPRING ASST) AND LADDER (BILCO LADDER-UP SAFETY POST) ^{o**}	1			
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1			
14	VALVE, 3" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	2			
15	REDUCER, 4" Mx3" MJ, C.I.	2			
16	ELL, 2" BRASS, 90°	2			
17	PIPE, 2" PVC, SCHEDULE 80 (FIELD CUT TO LENGTH)				

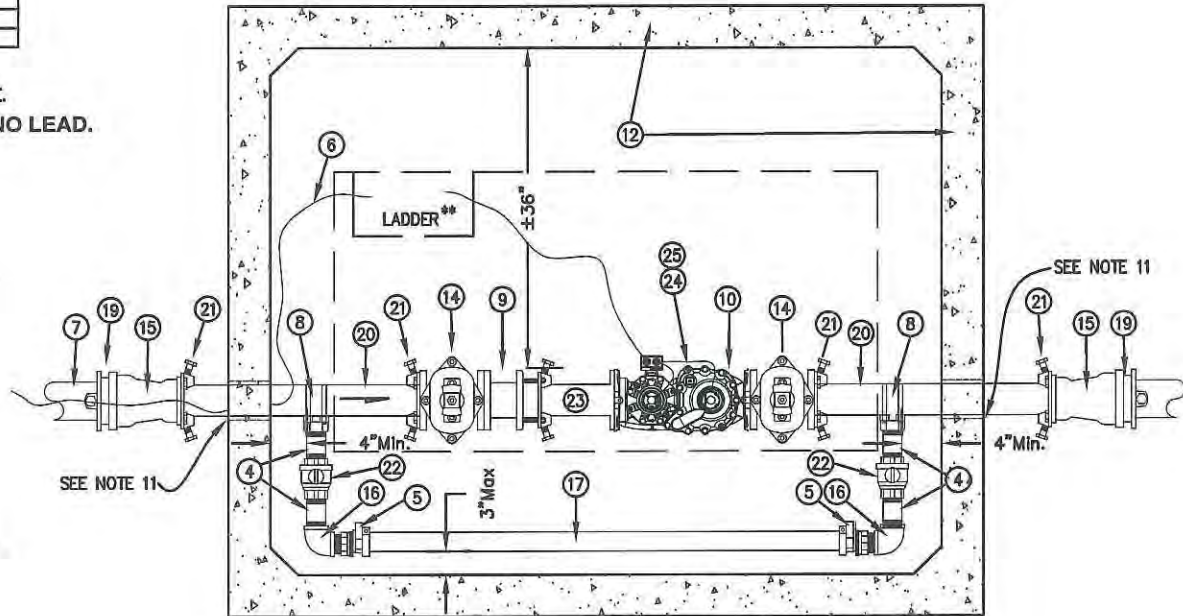
^oOR EQUIVALENT APPROVED BY THE DISTRICT

**LOCATION OF LADDER TO BE DETERMINED AT INSTALLATION BY P.U.D. REPRESENTATIVE.

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES:

- SET VALVE BOX AND VAULT TO FINISH GRADE. SEE P.U.D. VALVE BOX DETAIL.
- SEAL VAULT LIDS AND RISERS OF VAULT WITH 1-1/2"x1" JOINT MASTIC. INSTALL 3" PVC PIPE TO DRAIN TO DAYLIGHT IF POSSIBLE.
- INSTALL SERVICE PIPE PERPENDICULAR TO MAIN OR AS SHOWN ON WATER PLANS APPROVED BY DISTRICT ENGINEER. USE ELLS, AS NECESSARY, TO MEET ELEVATION OF VAULT.
- TEE, VALVE AND PIPE MUST BE WRAPPED WITH 8 MIL POLYETHYLENE PIPE ENCASEMENT. IT IS TO BE INSTALLED AS PER D.I.P.R.A. AND IN ACCORDANCE WITH A.W.W.A. C105.
- BLOCK TEE/TAPPING SLEEVE WITH POURED CONCRETE ON ALL WATER MAINS OTHER THAN DUCTILE IRON. IN ADDITION, THE SERVICE PIPE FROM VALVE AT MAIN TO METER AND THE PRIVATE SERVICE LINE FROM METER ON TO PRIVATE PROPERTY SHALL BE RESTRAINED USING MEG-A-LUGS OR "FIELD LOK" GASKETS (OR APPROVED EQUIVALENT). THE LENGTH OF RESTRAINED PIPE ON PRIVATE PROPERTY SHALL BE DETERMINED BY THE DEVELOPER ENGINEER.
- SET VAULT ON MIN. 6" OF 3/4" MINUS CRUSHED GRAVEL, MECHANICALLY TAMPED TO 95% COMPACTION.
- FLUSH OUT PIPELINE BEFORE INSTALLING METER. **DO NOT** ALLOW ANY MUD OR FOREIGN MATERIAL TO ENTER PIPE OR FITTINGS.
- IF CONNECTION IS NOT COMPLETED TO CUSTOMER'S PIPE, INSTALL M.J., TAP 2", CAP OVER OPEN END OF PIPE OR PLUG, TAP 2", IN VALVE AND FLUSH OUT PIPE AND METER. MAKE WATER TIGHT.
- METER SENSING PAD IS TO BE LOCATED WITHIN 6" OF HINGE ON VAULT LID AT STREET (INLET) END OF VAULT.
- 3" AND 4" VALVES SHALL BE A.W.W.A. C509 STANDARD, "O" RING PACKING, NON-RISING STEM, 2" OPERATING NUT, RESILIENT WEDGE, GATE VALVES. (WHEEL OPERATORS INSIDE VAULT.)
- NON-SHRINK GROUT/FOAM AROUND PIPE. MAKE WATER TIGHT.
- 2" BALL VALVES SHALL BE LOCKED UPON INSTALLATION W/P.U.D.-SUPPLIED PADLOCKS.
- BACKFILL AROUND VAULT SHALL BE **FIRMLY** TAMPED TO ELIMINATE SETTLEMENT.
- CONCRETE BLOCK OR EQUIVALENT UNDER VALVE IS TO KEEP VALVE FACE VERTICAL DURING INSTALLATION.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



PLAN VIEW
REFER TO SHEET 2/2 FOR ELEVATION VIEW.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
3" COMPOUND METERED SERVICE
PLAN VIEW**

SHEET 1/2

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

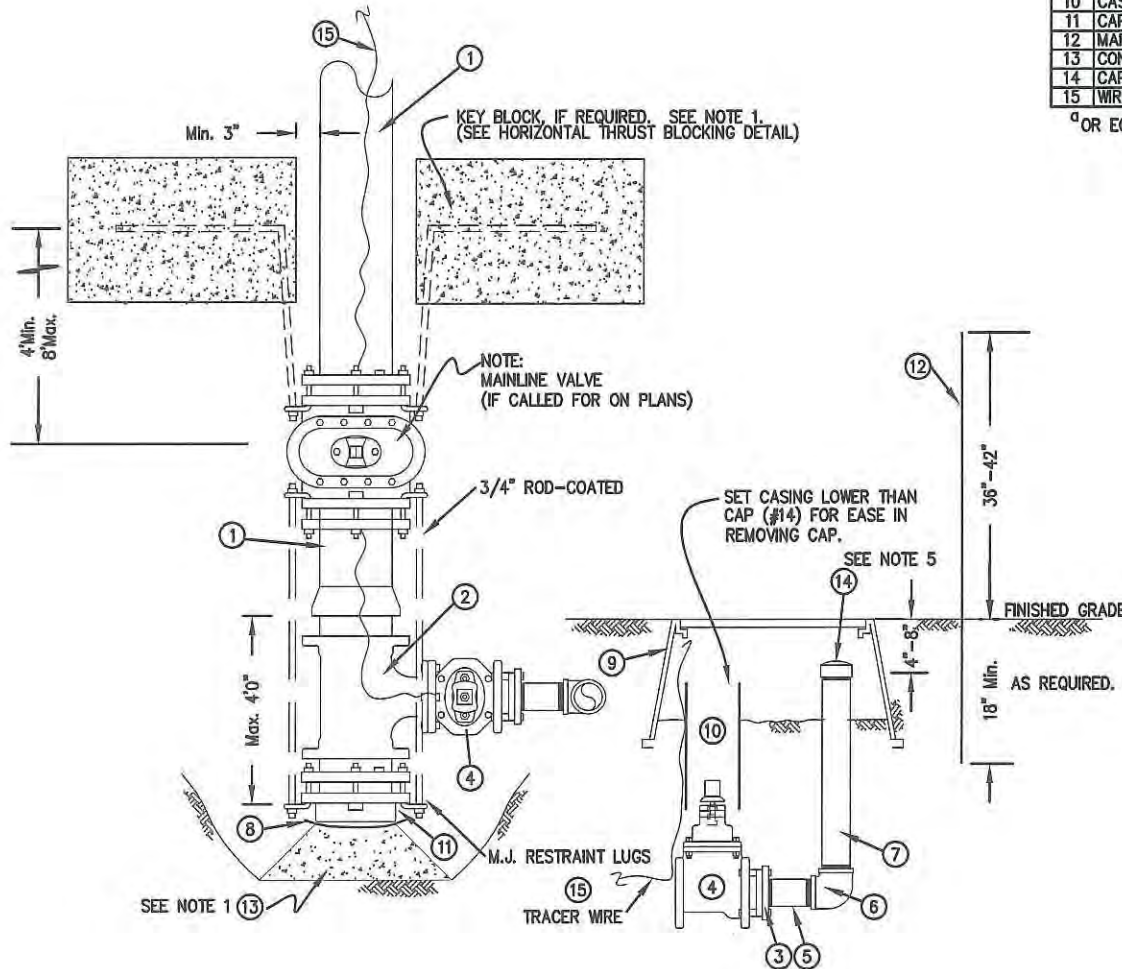
STANDARD

WS3-1a

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN (12")	
2	TEE, WATERMAIN SIZE x 4" FL	1
3	PLUG, 4", TAP 3"	1
4	VALVE, 4" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	1
5	NIPPLE, 3"x4" GALVANIZED	1
6	ELL, 3" 90° GALVANIZED	1
7	PIPE, 3" GALVANIZED, THREAD BOTH ENDS	
8	POLYETHYLENE SHEETING, 8 MIL THICKNESS	
9	TRAFFIC RATED METER BOX AND LID (MID-STATES PLASTIC, INC. MSBCF 1324-18 NOT FOR THROUGH-WAY TRAFFIC APPLICATION) ^d	1
10	CASING, 6" P.V.C. SEWER PIPE	1
11	CAP, PIPE SIZE, M.J. BLIND	1
12	MARKER, BLUE, CARSONITE #CWV-116	1
13	CONCRETE BLOCKING (OR KEY BLOCK IF REQUIRED)	
14	CAP, 3" PLASTIC THREADED	1
15	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID	

^dOR EQUIVALENT APPROVED BY THE DISTRICT



NOTES:

1. BLOCK AS PER P.U.D. HORIZONTAL THRUST BLOCKING STANDARD DETAIL FOR 8" PIPE OR SMALLER. USE KEY BLOCK ARRANGEMENT FOR LARGER THAN 8" PIPE UNLESS PERMANENT DEAD END; THEN STANDARD BLOCKING REQUIRED. BEARING AREA TO BE AGAINST UNDISTURBED EARTH AND TO BE DETERMINED BY THE ENGINEER.
2. USE FORMING AS NECESSARY TO PREVENT CONCRETE FROM INTERFERING WITH CAP (#11), TEE (#2), OR VALVE (#4). IF A VALVE IS INSTALLED UPSTREAM OF BLOW, KEY BLOCK VALVE AND CAP. SEE HORIZONTAL THRUST BLOCKING DETAIL.
3. INSTALL VALVE AS DETERMINED BY DISTRICT ENGINEER.
4. PLASTIC THREAD CAP TO BE HAND TIGHT ONLY.
5. KEY BLOCK TO BE INSTALLED ONLY IF PIPE IS EXPECTED TO EXTEND^d WITHIN TEN (10) YEARS OF INSTALLATION. SEE HORIZONTAL THRUST BLOCKING DETAIL.

[Handwritten Signature]

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: DEC. 14, 2012

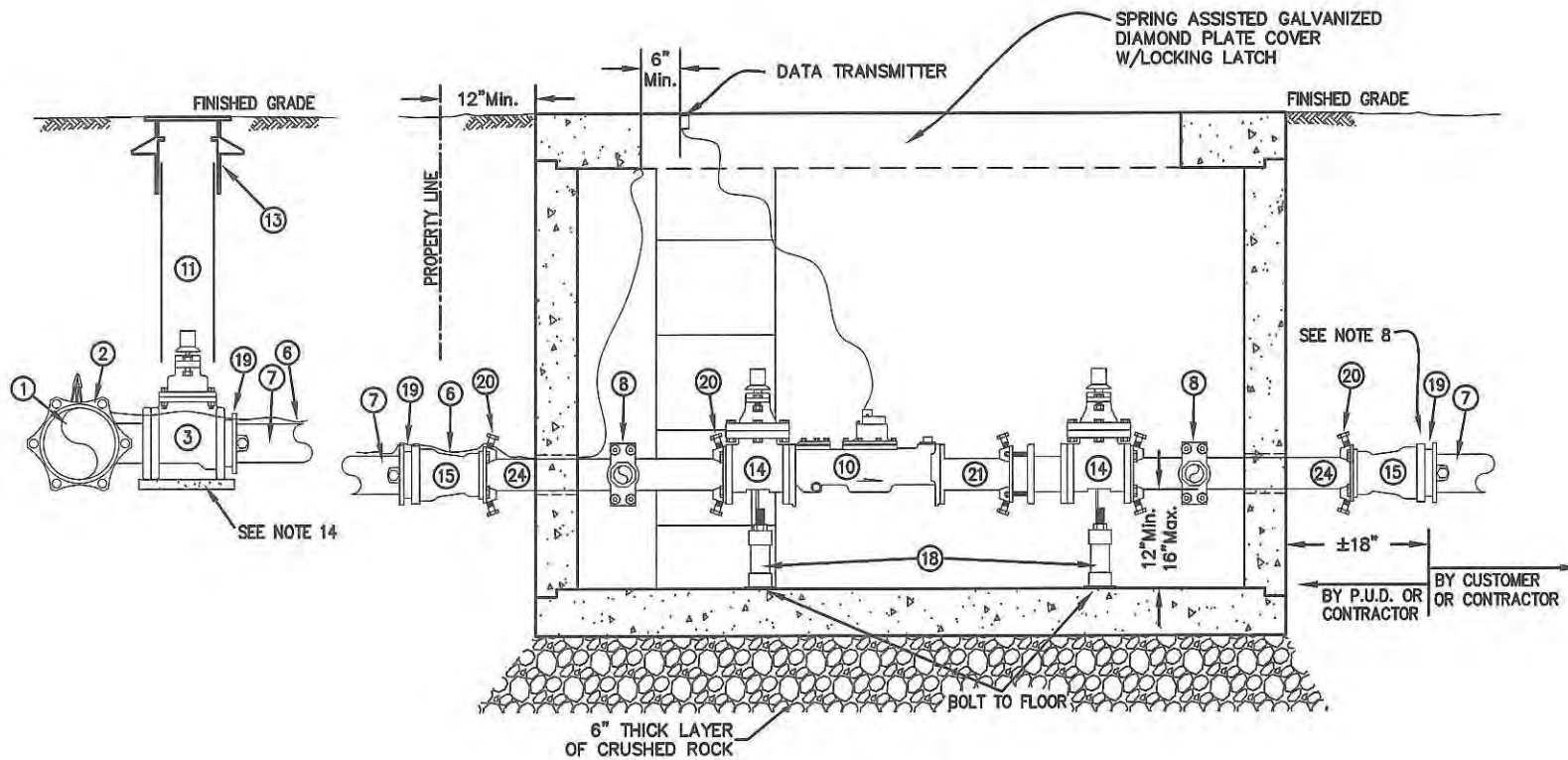


STANDARD INSTALLATION OF 3-INCH FLUSHING ASSEMBLY

SCALE: 1" = 2'
DATE: 3-25-05
REVISED 12/13/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WB3-1



ELEVATION

[Signature]
 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

REFER TO SHEET 1/2 FOR PLAN VIEW

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
 3" TURBINE METERED SERVICE
 ELEVATION VIEW**

SHEET 2/2

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/3/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS3-2b

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		21	SPOOL, 3" CL 51 D.I., FLxPE, (FIELD CUT TO LENGTH)	1
2	TEE, MAINLINEx4" FL OR STAINLESS STEEL TAPPING SLEEVE EQUIVALENT	1	22	PLUG, 2" BRASS (SEE NOTE 8)	1
3	VALVE, 4" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	1	23	VALVE, 2" BALL, BRASS, I.P.T. x I.P.T., W/PADLOCK WINGS (FORD B11-777-W) ^α	2
4	NIPPLE, BRASS 2x4	4	24	PIPE, 3" CL 50 DUCTILE IRON (FIELD CUT TO LENGTH)	
5	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. x PVC (FORD C87-77) ^α	2			
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND TO TOP OF LADDER				
7	PIPE, 4" CL 50 DUCTILE IRON (FIELD CUT TO LENGTH)				
8	CLAMP, SERVICE, 3"D.I. x 2"I.P.T., DOUBLE STAINLESS STEEL STRAP, EPOXY COATED (FORD FC202-425-1P7) ^α	2			
9	RESTRAINED FLANGE COUPLING ADAPTER, 3", ROMAC IND. INC. ^α	1			
10	METER, BADGER, 3" TURBO SERIES 450	1			
11	CASING, 6" PVC SEWER PIPE	1			
12	UTILITY VAULT 675LA W/#675-TL-2-332P COVER (SPRING ASS'T) ^α AND LADDER (BILCO LADDER-UP SAFETY POST) ^{α**}	1			
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1			
14	VALVE, 3" DUCTILE IRON, RESILIENT WEDGE, FLxMJ	2			
15	REDUCER, 4" Mjx3"Mj, CONCENTRIC	2			
16	ELL, 2" BRASS, 90°	2			
17	PIPE, 2" PVC, SCHEDULE 80 (FIELD CUT TO LENGTH)				
18	PIPE SUPPORT (MATERIAL RESOURCES #S92 OR #S89) ^α	2			
19	RETAINER GLAND, 4" EBAA MEG-A-LUG ^α	3			
20	RETAINER GLAND, 3" EBAA MEG-A-LUG ^α	4			

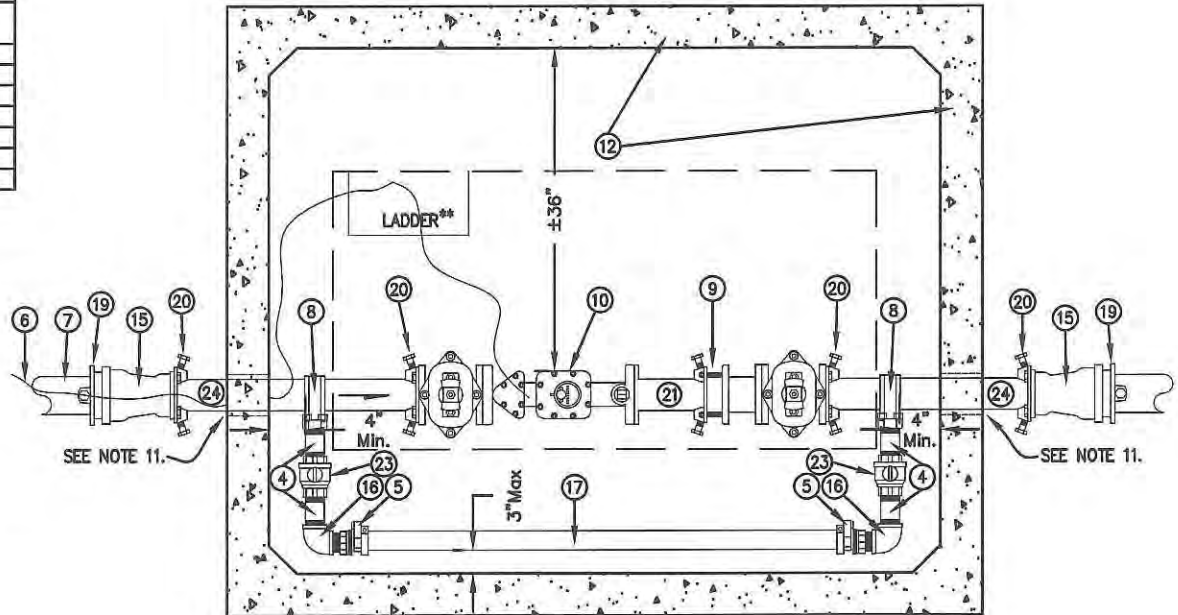
ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

^αOR EQUIVALENT APPROVED BY THE DISTRICT

^{**}LOCATION OF LADDER TO BE DETERMINED AT INSTALLATION BY P.U.D. REPRESENTATIVE.

NOTES:

- SET VALVE BOX AND VAULT TO FINISH GRADE. SEE P.U.D. VALVE BOX DETAIL.
- SEAL VAULT LIDS AND RISERS OF VAULT WITH 1-1/2"x1" JOINT MASTIC. INSTALL 3" PVC PIPE TO DRAIN TO DAYLIGHT IF POSSIBLE.
- INSTALL SERVICE PIPE PERPENDICULAR TO MAIN OR AS SHOWN ON WATER PLANS APPROVED BY DISTRICT ENGINEER. USE ELLS, AS NECESSARY, TO MEET ELEVATION OF VAULT.
- TEE, VALVE AND PIPE MUST BE WRAPPED WITH 8 MIL POLYETHYLENE PIPE ENCASEMENT. IT IS TO BE INSTALLED AS PER D.I.P.R.A. AND IN ACCORDANCE WITH A.W.W.A. C105.
- BLOCK TEE/TAPPING SLEEVE WITH POURED CONCRETE ON ALL WATER MAINS OTHER THAN DUCTILE IRON. IN ADDITION, THE SERVICE PIPE FROM VALVE AT MAIN TO METER AND THE PRIVATE SERVICE LINE FROM METER ON TO PRIVATE PROPERTY SHALL BE RESTRAINED USING MEG-A-LUGS OR "FIELD LOK" GASKETS (OR APPROVED EQUIVALENT). THE LENGTH OF RESTRAINED PIPE ON PRIVATE PROPERTY SHALL BE DETERMINED BY THE DEVELOPER ENGINEER.
- SET VAULT ON MIN. 6" OF 3/4" MINUS CRUSHED GRAVEL, MECHANICALLY TAMPED TO 95% COMPACTION.
- FLUSH OUT PIPELINE BEFORE INSTALLING METER. DO NOT ALLOW ANY MUD OR FOREIGN MATERIAL TO ENTER PIPE OR FITTINGS.
- IF CONNECTION IS NOT COMPLETED TO CUSTOMER'S PIPE, INSTALL M.J., TAP 2", CAP OVER OPEN END OF PIPE OR PLUG, TAP 2", IN VALVE AND FLUSH OUT PIPE AND METER. MAKE WATER TIGHT.
- METER SENSING PAD IS TO BE LOCATED WITHIN 6" OF HINGE ON VAULT LID AT STREET (INLET) END OF VAULT.
- 3" AND 4" VALVES SHALL BE A.W.W.A. C509 STANDARD, "O" RING PACKING, NON-RISING STEM, 2" OPERATING NUT, RESILIENT WEDGE, GATE VALVES. (WHEEL OPERATORS INSIDE VAULT.)
- NON-SHRINK GROUT/FOAM AROUND PIPE. MAKE WATER TIGHT.
- 2" BALL VALVES SHALL BE LOCKED UPON INSTALLATION W/P.U.D.-SUPPLIED PADLOCKS.
- BACKFILL AROUND VAULT SHALL BE FIRMLY TAMPED TO ELIMINATE SETTLEMENT.
- CONCRETE BLOCK OR EQUIVALENT UNDER VALVE IS TO KEEP VALVE FACE VERTICAL DURING INSTALLATION.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



PLAN VIEW

REFER TO SHEET 2/2 FOR ELEVATION VIEW.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



STANDARD INSTALLATION OF
3" TURBINE METERED SERVICE
PLAN VIEW

SHEET 1/2

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/31/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS3-2a

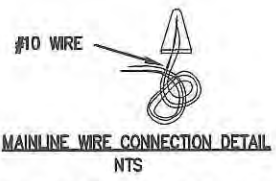
BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		11	CASING, 6" P.V.C. SEWER PIPE	1
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B)	1	12	UTILITY VAULT 3642-LA W/2436P LOCKING STEEL COVER	1
3	VALVE, 2" BALL, BRASS, IPTxIPT (FORD #BF13-977W)	1	13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
4	NIPPLE, BRASS 2X4	1-2	14	VALVE, 2" COMBINATION AIR (APCO 145C.2 SERIES) W/SST TRIM	1
5	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1	15	NIPPLE, BRASS, 2" X CLOSE	3
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID		16	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X PVC (FORD #CB7-77) ^a	4-7
7	PIPE, 2" P.V.C., SCH. 80 (LENGTHS AS REQUIRED)		17	BEND, 2" COPPER, 180°, WITH INSECT SCREEN	1
8	ELL, 2" BRASS, 90°, STREET	4	18	POST, 4"-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
9	ELL, 2" BRASS, 90°	2	19	HOSE CLAMP, 2", STAINLESS STEEL	2
10	UNION, 2" BRASS	1			

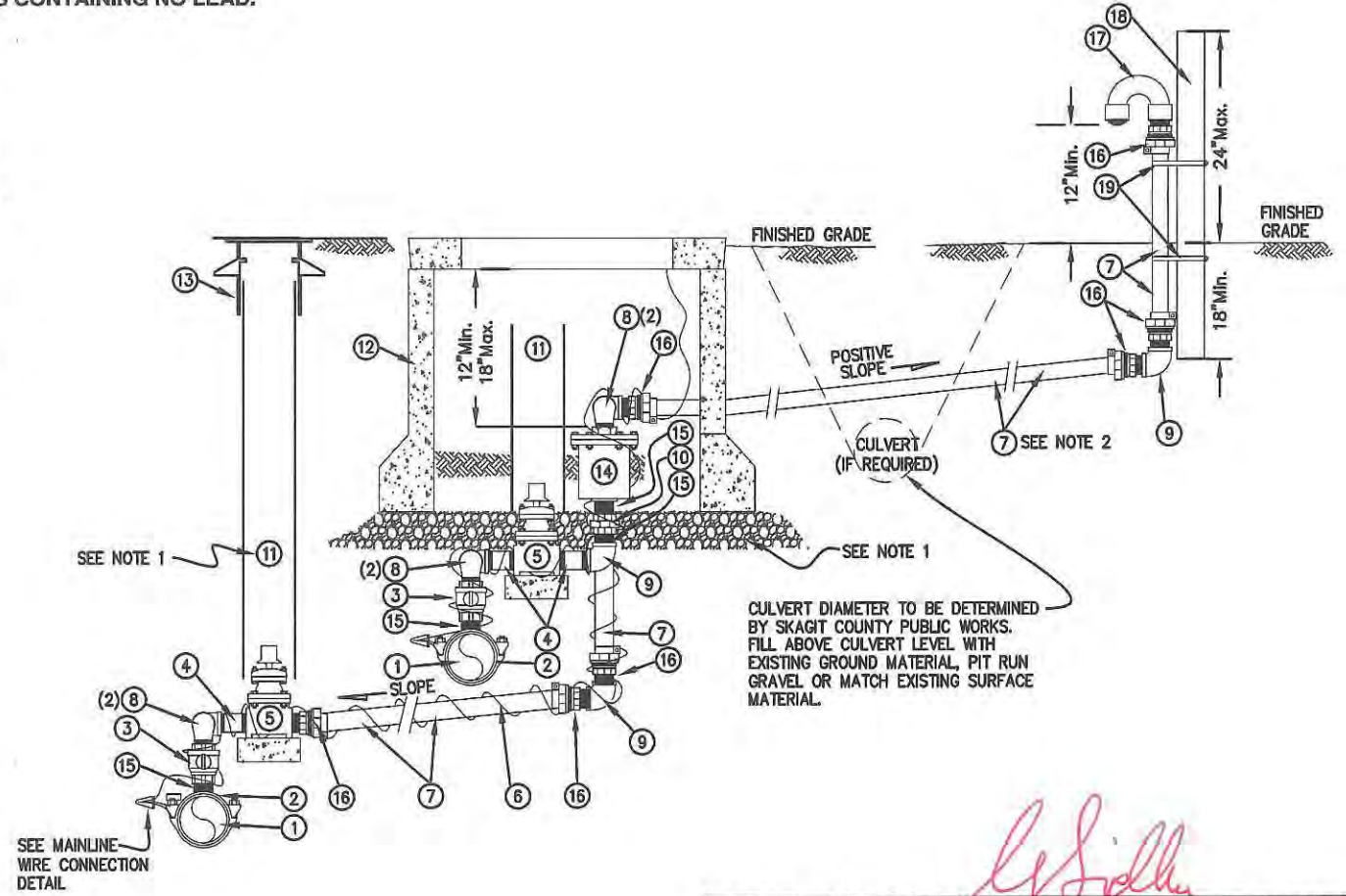
^a OR EQUIVALENT APPROVED BY THE DISTRICT
ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES:

- SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. DO NOT REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
- INSTALL LINE PERPENDICULAR TO MAIN OR AS SHOWN ON WATER PLAN.
- IF THERE IS A GROUND DEPRESSION OR DITCH BETWEEN AIR VALVE LOCATION AND VENT PIPE WHICH AFFECTS THE SLOPE OF THE HORIZONTAL VENT PIPE, INSTALL A CULVERT IF IT IS A DRAINAGE PATH OR FILL WITH DIRT.



NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR. ^a



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct-24, 2012



**STANDARD INSTALLATION OF
 2" COMBINATION AIR
 VALVE ASSEMBLY**

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

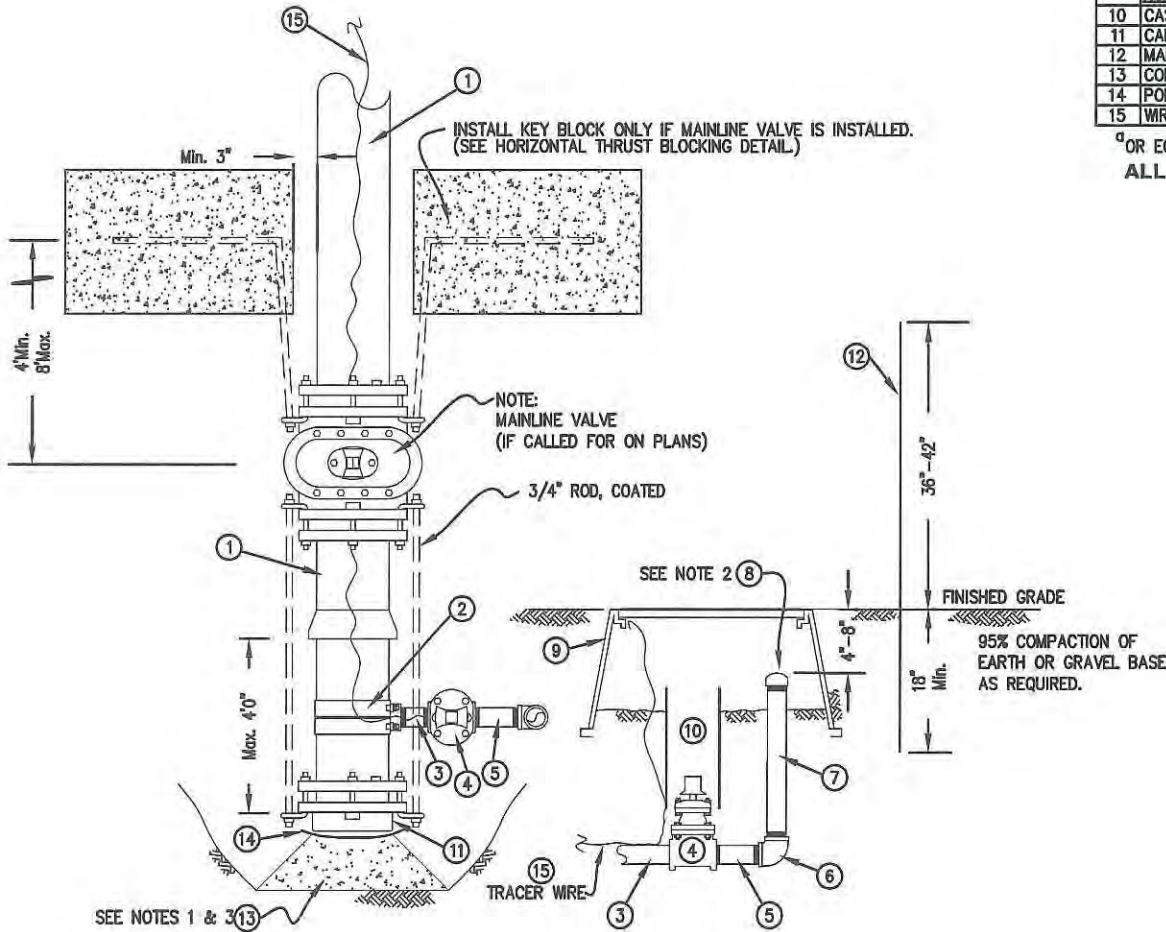
STANDARD

WV2-1

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN (4", 6", OR 8")	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^Q	1
3	NIPPLE, 2" X 4", BRASS	1
4	VALVE, 2" CAST IRON, RESILIENT WEDGE	1
5	NIPPLE, 2" X 6", GALVANIZED	1
6	ELL, 2" 90° GALVANIZED	1
7	PIPE, 2" GALVANIZED, THREAD BOTH ENDS	
8	CAP, 2" PLASTIC, THREADED	1
9	TRAFFIC RATED METER BOX AND LID (MID-STATES PLASTIC, INC. MSBCF 1324-18 NOT FOR THROUGH-WAY TRAFFIC APPLICATION) ^Q	1
10	CASING, 6" P.V.C. SEWER PIPE	1
11	CAP, M.J. BLIND	1
12	MARKER, BLUE, CARSONITE #CWV-116	1
13	CONCRETE BLOCKING (OR KEY BLOCK IF REQUIRED)	
14	POLYETHYLENE SHEETING, 8 MIL THICKNESS	
15	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN.18" INTO BOX, NEAR LID	

^QOR EQUIVALENT APPROVED BY THE DISTRICT
ALL BRASS FITTINGS TO BE DOMESTIC BRASS.



NOTES:

1. BLOCK AS PER P.U.D. HORIZONTAL THRUST BLOCKING DETAIL. BEARING AREA TO BE AGAINST UNDISTURBED EARTH AND TO BE DETERMINED BY THE ENGINEER. USE FORMING AS NECESSARY TO PREVENT CONCRETE FROM INTERFERING WITH CAP (#8), CLAMP (#2) OR VALVE (#4).
2. PLASTIC THREADED CAP (#8) TO BE HAND TIGHT ONLY.
3. IF A MAINLINE VALVE IS INSTALLED UPSTREAM OF FLUSHING ASSEMBLY, KEY BLOCK VALVE AND CAP. SEE THRUST BLOCKING DETAIL.
4. KEY BLOCK TO BE INSTALLED ONLY IF PIPE IS EXPECTED TO EXTEND WITHIN TEN (10) YEARS OF INSTALLATION. SEE HORIZONTAL THRUST BLOCKING DETAIL.

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: DEC-14, 2012

BILL OF MATERIALS

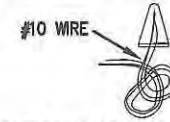
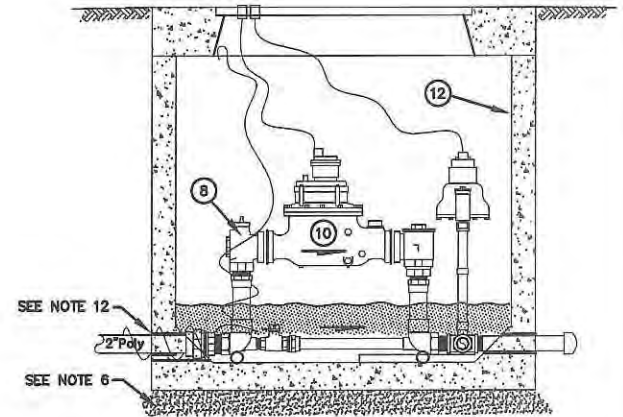
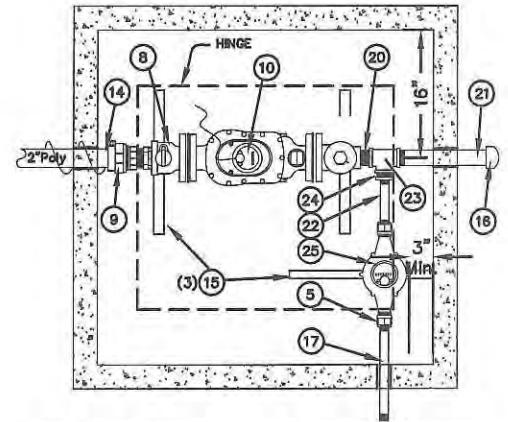
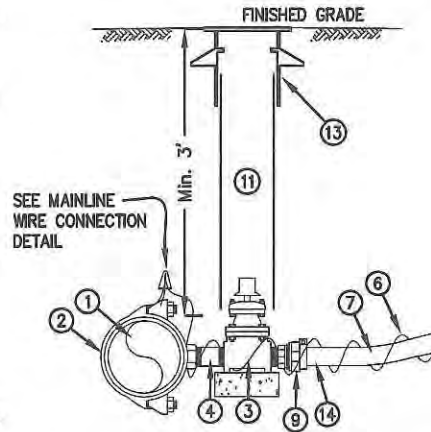
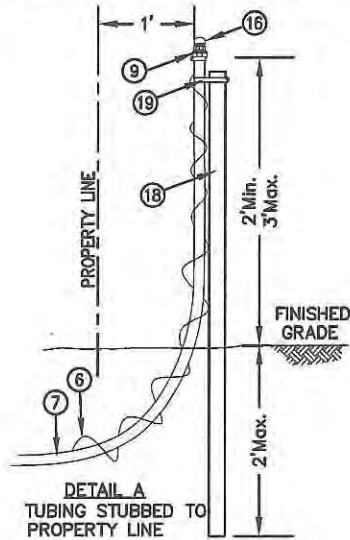
NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		14	INSERT, STIFFENER, 2" (FORD #75) ^a	2
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS (FORD #202B) ^a	1	15	STABILIZER, 1'6" TO 24" LENGTH	3
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1	16	CAP, 2" (GALVANIZED)	2
4	NIPPLE, BRASS 2X4	1	17	NIPPLE, BRASS 3/4"x12" OR 1"x12"	1
5	COPPERSETTER, 3/4" (FORD #VBHC72-9W-11-33) OR 1" (VBHC74-18W-11-44) ^a	1	18	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID.		19	HOSE CLAMP, 3/4" STAINLESS STEEL	1
7	PIPE, 2" PE, 3408, SIDR 7, 200 P.S.I.		20	NIPPLE, BRASS 2"xCLOSE	1
8	COPPERSETTER, 2", FORD #VBHH77-12B-11-77	1	21	NIPPLE, BRASS 2"x12"	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X POLY _v (FORD #C86-77) ^{a b}	3	22	NIPPLE, BRASS 3/4"x6" OR 1"x6"	1
10	METER, BADGER, 2" MODEL 170	2	23	TEE, 2" BRASS	1
11	CASING, 6" PVC SEWER PIPE	1	24	BUSHING, BRASS 2"x3/4" OR 2"x1", M.I.P.T. x F.I.P.T.	1
12	UTILITY VAULT 444-LA W/#44-332P COVER (SPRING ASSISTED)	1	25	METER, BADGER, MODEL M25 (5/8") OR M35 (3/4"), BRONZE	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1			

^a OR EQUIVALENT APPROVED BY THE DISTRICT
^b ELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES:

- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- IF METER IS NOT INSTALLED IN COPPERSETTER, INSTALL PLUGS IN METER CONNECTIONS. IF CONNECTION IS NOT MADE TO CUSTOMER'S PLUMBING, INSTALL A WATERTIGHT WRAP OF ELECTRICAL TAPE OVER END OF NIPPLE.
- IF VAULT AND COPPERSETTER ARE NOT INSTALLED AT TIME OF SERVICE TUBING INSTALLATION, THEN TUBING IS TO BE STUBBED UP ABOVE FINISH GRADE AND CAPPED. SEE DETAIL A.
- SUPPORT LINESSETTERS WITH 1'6" TO 2' OF ROD OR PIPE THROUGH EACH EYELET. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN VAULT/BOX. LOCK BYPASS WITH P.U.D.-ISSUED PADLOCK.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. DO NOT REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
- IF METER IS LOCATED IN ASPHALT OR CONCRETE AREA, A CONCRETE UTILITY VAULT WILL BE REQUIRED. IF IN LAWN OR LANDSCAPED AREA, A CARSON INDUSTRIES LLC L SERIES 1730-15 BOX W/FLUSH COVER 1730-3L AND 1324-15 BOX W/1324-3L COVER CAN BE INSTALLED WITH APPROVAL BY DISTRICT ENGINEER.
- IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, THE PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
- METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN SIX INCHES OF HINGE NEAR THE STREET END. IN A CARSON INDUSTRIES BOX THE PAD IS TO BE LOCATED AT THE STREET END OF THE BOX.
- SEAL VAULT LIDS AND SEGMENTS WITH 1-1/2"x1" JOINT MASTIC.
- DRAIN VAULT TO DAYLIGHT WHERE POSSIBLE WITH MINIMUM 3" DRAIN PIPE. (TO BE DETERMINED IN FIELD BY P.U.D. REPRESENTATIVE.)
- NON-SHRINK GROUT OR FOAM AROUND PIPE PENETRATIONS THROUGH VAULT WALL TO ELIMINATE GROUNDWATER FLOODING VAULT.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #B2325 KING WATERPROOF WIRE CONNECTOR.^a

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



**STANDARD INSTALLATION OF
2" METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE
SERVICE LINE WITH DEDUCT METER**

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
WS2-2**

BILL OF MATERIALS

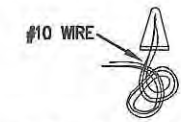
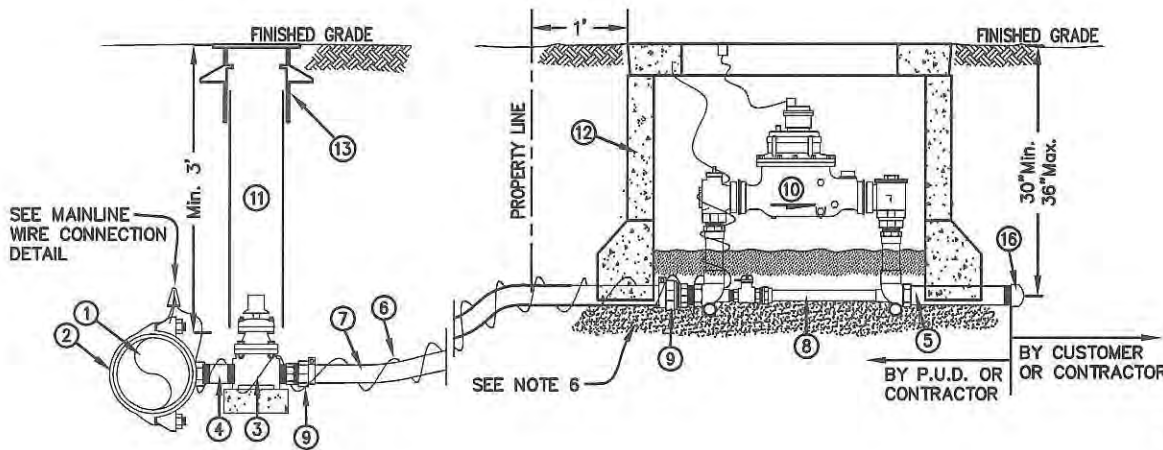
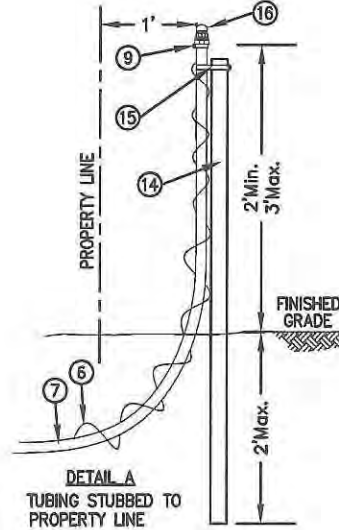
NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1
4	NIPPLE, BRASS 2X4	1
5	NIPPLE, BRASS 2"x12"	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID	
7	TUBING, 2" COPPER, TYPE K	
8	COPPERSETTER, 2", FORD #VBHH77-12B-11-77 ^a	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X COPPER (FORD #C84-77) ^{a b}	3
10	METER, BADGER, 2" MODEL 170	1
11	CASING, 6" PVC SEWER PIPE	1
12	UTILITY VAULT 3642-LA W/3642-2436P COVER ^a	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1
15	HOSE CLAMP, 3/4" STAINLESS STEEL	1
16	CAP, 2" (GALVANIZED)	1

^a OR EQUIVALENT APPROVED BY THE DISTRICT
^b ELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES

- WHERE COPPER SERVICE LINES ARE REQUIRED, THE CONTRACTOR/DEVELOPER WILL BE RESPONSIBLE FOR INSTALLATION OF THE COMPLETE WATER SERVICE EXCEPT FOR THE METER.
- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- IF METER IS NOT INSTALLED IN COPPERSETTER, OR IF CONNECTION IS NOT MADE PRIOR TO CUSTOMER'S PLUMBING, INSTALL A TIGHT FITTING PLUG OR CAP IN OPEN END OF COPPERSETTER AND A TIGHT WRAP OF PLASTIC (ELECTRICAL) TAPE OVER END OF NIPPLE. MAKE WATERTIGHT.
- SUPPORT COPPERSETTER WITH 1'6" TO 2' OF ROD OR PIPE THROUGH EACH EYELET. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN VAULT/BOX. LOCK BYPASS WITH P.U.D.-ISSUED PADLOCK.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. **DO NOT** ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. **DO NOT** REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
- IF METER IS LOCATED IN ASPHALT OR CONCRETE AREA, A CONCRETE UTILITY VAULT WILL BE REQUIRED. IF IN LAWN OR LANDSCAPED AREA, A CARSON INDUSTRIES LLC L SERIES 1730-15 BOX W/COVER 1730-3L CAN BE INSTALLED WITH APPROVAL BY DISTRICT ENGINEER.
- METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN SIX INCHES OF HINGE NEAR STREET END. IN A CARSON INDUSTRIES BOX, PAD IS TO BE LOCATED AT STREET END OF BOX.
- SEAL VAULT LIDS AND SEGMENTS WITH 1-1/2"x1" JOINT MASTIC.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



MAINLINE WIRE CONNECTION DETAIL
 NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

[Handwritten Signature]

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: Oct. 24, 2012



STANDARD INSTALLATION OF
 2" METERED SERVICE
 WITH COPPER TYPE K
 SERVICE LINE

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD
 WS2-3

BILL OF MATERIALS

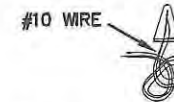
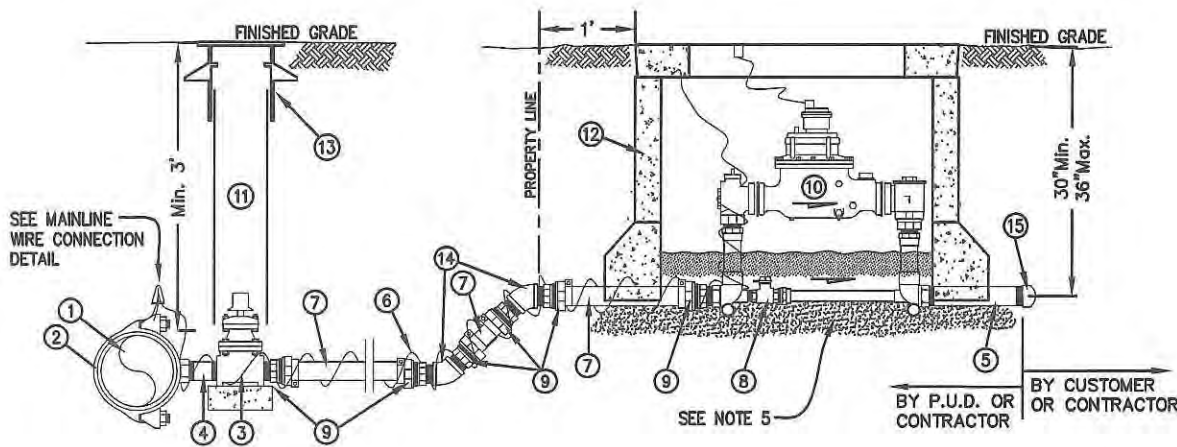
NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN	
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS, (FORD #202B) ^a	1
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1
4	NIPPLE, BRASS 2X4	1
5	NIPPLE, BRASS 2"x12"	1
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID	
7	PIPE, 2" P.V.C., SCHEDULE 80	
8	COPPERSETTER, 2", FORD #VBH77-12B-11-77 ^a	1
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X PVC (FORD #C87-77) ^{a b}	6
10	METER, BADGER, 2" MODEL 170	1
11	CASING, 6" PVC OR SEWER PIPE	1
12	UTILITY VAULT 3642-LA W/3642-2436P COVER ^a	1
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1
14	ELL, BRASS 2", 45° OR 90°	2
15	CAP, 2" (GALVANIZED)	1

^aOR EQUIVALENT APPROVED BY THE DISTRICT
^bELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

NOTES

1. INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
2. IF METER IS NOT INSTALLED IN COPPERSETTER, OR IF CONNECTION IS NOT MADE PRIOR TO CUSTOMER'S PLUMBING, INSTALL A TIGHT FITTING PLUG OR CAP IN OPEN END OF COPPERSETTER AND A TIGHT WRAP OF PLASTIC (ELECTRICAL) TAPE OVER END OF NIPPLE. MAKE WATERTIGHT.
3. SUPPORT COPPERSETTER WITH 1'6" TO 2' OF ROD OR PIPE THROUGH EACH EYELET. SET COPPERSETTER FLUSH, PLUMB AND CENTERED IN VAULT/BOX. LOCK BYPASS WITH P.U.D.-ISSUED PADLOCK.
4. FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. DO NOT ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
5. SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. DO NOT REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
6. IF METER IS LOCATED IN ASPHALT OR CONCRETE AREA, A CONCRETE UTILITY VAULT WILL BE REQUIRED. IF IN LAWN OR LANDSCAPED AREA, A CARSON INDUSTRIES LLC L SERIES 1730-15 BOX W/COVER 1730-3L CAN BE INSTALLED WITH APPROVAL BY DISTRICT ENGINEER.
7. IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
8. METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN SIX INCHES OF HINGE NEAR STREET END. IN A CARSON INDUSTRIES BOX, PAD IS TO BE LOCATED AT STREET END OF BOX.
9. SEAL VAULT LIDS AND SEGMENTS WITH 1-1/2"x1" JOINT MASTIC.
10. A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



MAINLINE WIRE CONNECTION DETAIL
 NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^a

PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: OCT 24, 2012



STANDARD INSTALLATION OF
 2" METERED SERVICE
 WITH P.V.C
 SERVICE LINE

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

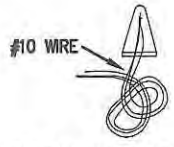
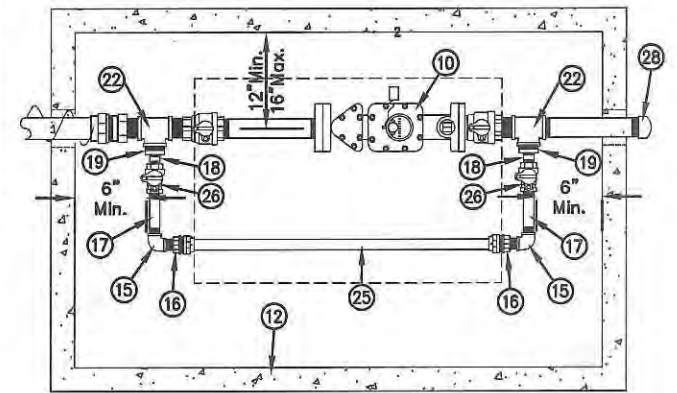
WS2-4

BILL OF MATERIALS

NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		15	ELL, BRASS, 1" 90°	2
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS (FORD #202B) ^d	1	16	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T.xPVC (FORD C87-44) ^d	2
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1	17	NIPPLE, BRASS 1"x6"	2
4	NIPPLE, BRASS 2"x4"	1	18	NIPPLE, BRASS, 1"x2"	2
5	ADAPTER, BRASS PAK JOINT, 2" F.I.P.T. x POLY (FORD C16-77) ^{a b}	1	19	BUSHING, BRASS 2" M.I.P.T. x 1" F.I.P.T.	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID		20	NIPPLE, BRASS 2"xCLOSE	3
7	PIPE, 2" PE, 3408, SIDR 7, 200 P.S.I.		21	NIPPLE, BRASS 2"x12"	2
8	COMPANION FLANGE, BRASS, 2"		22	TEE, 2" BRASS	2
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X POLY (FORD #C86-77) ^d	1	23	VALVE, 2" BRASS BALL, FLGX.I.P.T. (FORD BF13-777W) ^d	1
10	METER, BADGER, 2" TURBO SERIES 200 ELL*	3	24	VALVE, 2" BRASS BALL, I.P.T.x.I.P.T. (FORD BF11-777W) ^d	1
11	CASING, 6" PVC SEWER PIPE	1	25	PIPE, 1" PVC, SCHEDULE 80	
12	UTILITY VAULT 644LA W/#64-2-332P COVER ^d (SPRING ASSISTED)	1	26	CURB STOP, 1" (FORD B11-444W) ^d	2
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1	27	BLOCK, PRECAST CONCRETE, 18"x18"x4" MINIMUM	2
14	INSERT, STIFFENER, 2" (FORD #75) ^d	2	28	CAP, 2" (GALVANIZED)	1
			29	HOSE CLAMP, 2" STAINLESS STEEL	1
			30	POST, 4'-0" MIN. METAL FENCE POST W/SPADE REMOVED	1

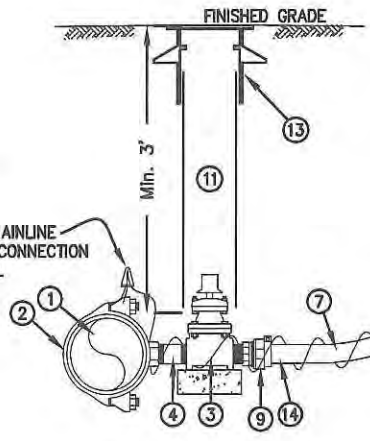
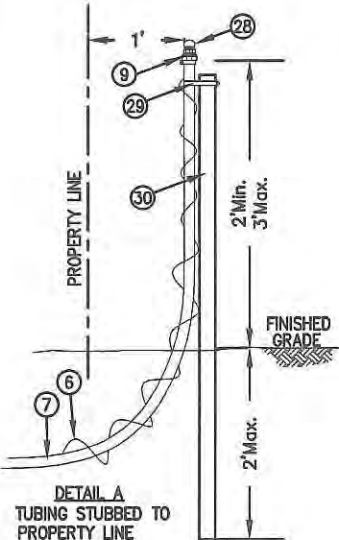
^dOR EQUIVALENT APPROVED BY THE DISTRICT
^bELL, 90° STREET, 2" M X F I.P.T. (IF NEEDED)
^{*}NOT TO BE USED WHERE FLOW RATE OF LESS THAN 3 GPM OCCURS. COMPOUND METER TO BE USED.

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

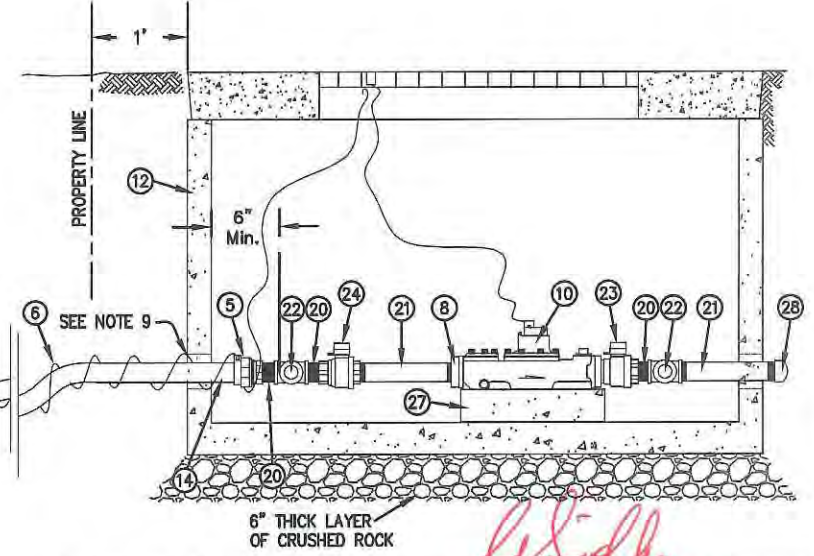


MAINLINE WIRE CONNECTION DETAILS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^d



REFER TO SHEET 2/2 FOR NOTES.



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

APPROVED ON: OCT-24 , 2012



**STANDARD INSTALLATION OF
2" TURBINE METERED SERVICE
WITH 200 P.S.I. POLYETHYLENE
SERVICE LINE**

SHEET 1/2

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/19/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
WS2-5a**

NOTES

1. INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
2. IF METER IS NOT INSTALLED IN COPPERSETTER, OR IF CONNECTION IS NOT MADE PRIOR TO CUSTOMER'S PLUMBING, INSTALL A TIGHT FITTING PLUG OR CAP IN OPEN END OF COPPERSETTER AND A TIGHT WRAP OF PLASTIC (ELECTRICAL) TAPE OVER END OF NIPPLE. MAKE WATERTIGHT.
3. FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. **DO NOT** ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
4. SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. **DO NOT** REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
5. IF THERE IS PETROLEUM-BASED CONTAMINATED SOIL PRESENT, PIPELINE SHALL BE OF TYPE K COPPER WITH BRASS AND COPPER FITTINGS. SEE STANDARD P.U.D. COPPER SERVICE DETAIL.
6. METER SENSING PAD TO BE LOCATED IN STEEL LID OF UTILITY VAULT WITHIN SIX INCHES OF HINGE NEAR STREET END. IN A CARSON INDUSTRIES BOX, PAD IS TO BE LOCATED AT STREET END OF BOX.
7. SEAL VAULT LIDS AND SEGMENTS WITH 1-1/2"x1" JOINT MASTIC.
8. DRAIN VAULT TO DAYLIGHT WHERE POSSIBLE WITH MIN. 3" DRAIN PIPE (TO BE DETERMINED IN FIELD BY P.U.D. REPRESENTATIVE).
9. APPLY NON-SHRINK GROUT OR FOAM AROUND PIPE PENETRATIONS THROUGH VAULT WALL TO ELIMINATE GROUNDWATER FLOODING VAULT.
10. LOCK BYPASS WITH P.U.D. ISSUED PADLOCK.
11. A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.


 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER
 APPROVED ON: Oct. 24, 2012

REFER TO SHEET 1/2 FOR DETAILS.



**STANDARD INSTALLATION OF
 2" TURBINE METERED SERVICE
 WITH 200 P.S.I. POLYETHYLENE
 SERVICE LINE**

SHEET 2/2

SCALE: N/A
DATE: 3-25-05
REVISED: 10/2/12
DRAWN BY: CAS
APPROVED BY: GJS

STANDARD

WS2-5b

BILL OF MATERIALS

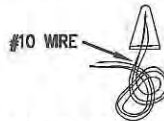
NO.	NOMENCLATURE	REQ'D.	NO.	NOMENCLATURE	REQ'D.
1	WATER MAIN		14	ELL, BRASS, 2", 45° OR 90°	2
2	CLAMP, SERVICE, DOUBLE STRAP X 2" I.P.T., ALL BRASS (FORD #202B) ^d	1	15	ELL, BRASS, 1" 90°	2
3	VALVE, 2" DUCTILE IRON, RESILIENT WEDGE	1	16	ADAPTER, BRASS PAK JOINT, 1" M.I.P.T.xPVC (FORD C87-44) ^d	2
4	NIPPLE, BRASS 2"x4"	1	17	NIPPLE, BRASS 1"x6"	2
5	ADAPTER, BRASS PAK JOINT, 2" F.I.P.T. x PVC (FORD C17-77) ^d b	1	18	NIPPLE, BRASS, 1"x2"	2
6	WIRE, #10 SOLID COPPER, BLUE COATED, EXTEND MIN. 18" INTO BOX, NEAR LID		19	BUSHING, BRASS 2" M.I.P.T. x 1" F.I.P.T.	2
7	PIPE, 2" PVC, SCHEDULE 80		20	NIPPLE, BRASS 2"xCLOSE	3
8	COMPANION FLANGE, BRASS, 2"	1	21	NIPPLE, BRASS 2"x12"	2
9	ADAPTER, BRASS PAK JOINT, 2" M.I.P.T. X PVC (FORD #C87-77) ^d	5	22	TEE, 2" BRASS	2
10	METER, BADGER, 2" TURBO SERIES 200 ELL*	1	23	VALVE, 2" BRASS BALL, FLGd.P.T. (FORD BF13-777W) ^d	1
11	CASING, 6" PVC SEWER PIPE	1	24	VALVE, 2" BRASS BALL, I.P.T.xI.P.T. (FORD BF11-777W) ^d	1
12	UTILITY VAULT 644LA W/#64-2-332P COVER ^d (SPRING ASSISTED)	1	25	PIPE, 1" PVC, SCHEDULE 80	
13	VALVE BOX, CAST IRON OLYMPIC FOUNDRY VB-007-SKAGIT (SEE P.U.D. DETAIL)	1	26	CURB STOP, 1" (FORD B11-444W) ^d	2
			27	BLOCK, PRECAST CONCRETE, 18"x18"x4" MINIMUM	2
			28	CAP, 2" (GALVANIZED)	1

^d OR EQUIVALENT APPROVED BY THE DISTRICT

^b OR EQUIVALENT APPROVED BY THE DISTRICT

* NOT TO BE USED WHERE FLOW RATE OF LESS THAN 3 GPM OCCURS. COMPOUND METER TO BE USED.

ALL BRASS FITTINGS TO BE DOMESTIC BRASS CONTAINING NO LEAD.

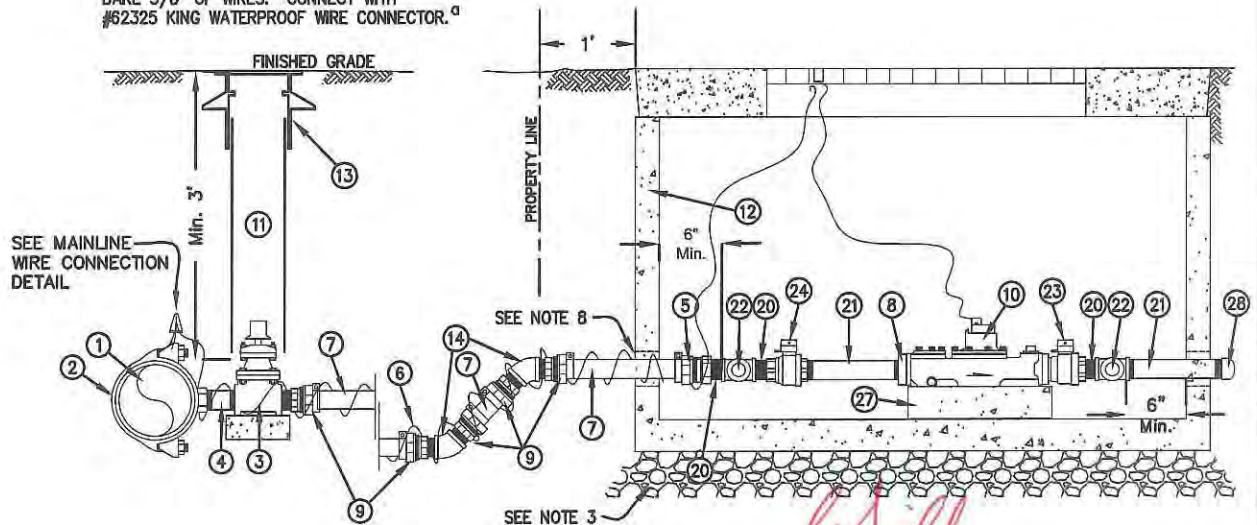
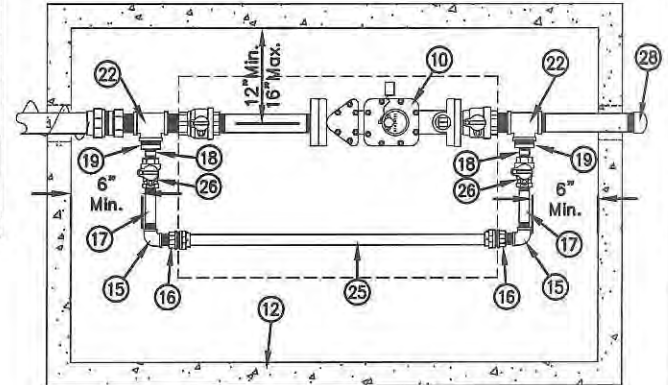


MAINLINE WIRE CONNECTION DETAIL
NTS

NOTE: ALL THREE WIRES ARE TO BE TIED TOGETHER IN AN OVERHAND KNOT APPROXIMATELY 6" FROM WIRE NUT. BARE 5/8" OF WIRES. CONNECT WITH #62325 KING WATERPROOF WIRE CONNECTOR.^d

NOTES

- INSTALL SERVICE LINE PERPENDICULAR TO MAIN UNLESS OTHERWISE SHOWN ON WATER CONSTRUCTION PLAN.
- FLUSH OUT SERVICE TUBING AND COPPERSETTER BEFORE INSTALLING METER. **DO NOT** ALLOW MUD OR FOREIGN MATERIAL TO ENTER ANY TUBING OR FITTINGS.
- SET VALVE CASING AND VAULT/BOX TO FINISH GRADE. **DO NOT** REST CASING OR VAULT ON NIPPLES OR PIPE. PLACE 6 INCHES OF 3/4" MINUS CRUSHED GRAVEL, COMPACTED TO 95%, UNDER CONCRETE VAULTS. SUPPORT VALVE CASING WITH 0.2 SQ.FT. OF CONCRETE ON EACH SIDE OF VALVE. SUPPORT 2" VALVE WITH MIN. OF 1 SQ.FT. OF CONCRETE BLOCK ON UNDISTURBED GROUND OR COMPACTED 3/4" CRUSHED GRAVEL.
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- DRAIN VAULT TO DAYLIGHT WHERE POSSIBLE WITH MIN. 3" DRAIN PIPE (TO BE DETERMINED IN FIELD BY P.U.D. REPRESENTATIVE).
- APPLY NON-SHRINK GROUT OR FOAM AROUND PIPE PENETRATIONS THROUGH VAULT WALL TO ELIMINATE GROUNDWATER FLOODING VAULT.
- LOCK BYPASS WITH P.U.D. ISSUED PADLOCK.
- A SHUTOFF VALVE SHALL BE INSTALLED ON CUSTOMER'S PLUMBING AFTER DISTRICT'S METER, PER U.P.C. SUCH VALVE SHALL BE ACCESSIBLE AT ALL TIMES.



PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER

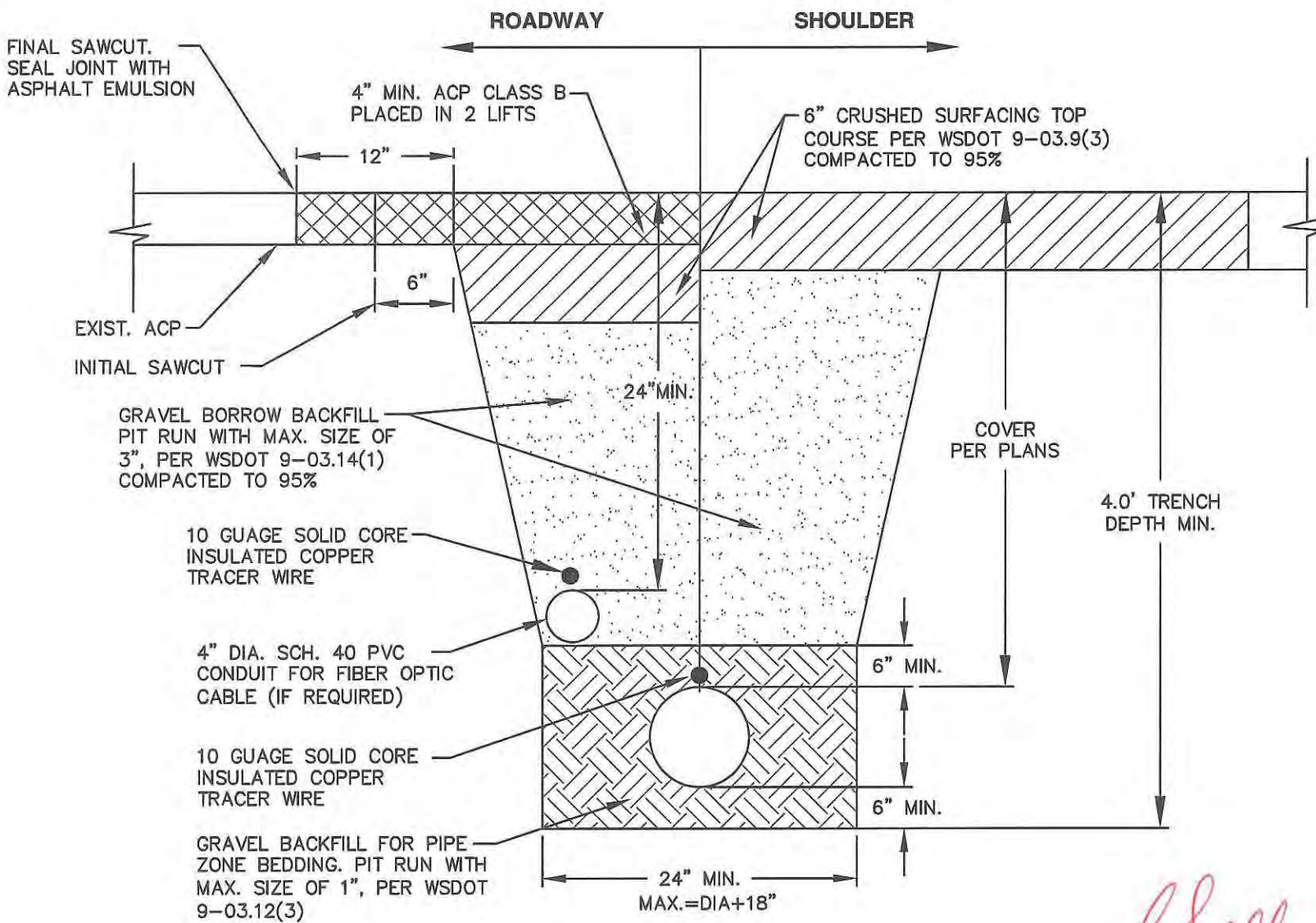
APPROVED ON: Oct 24, 2012



**STANDARD INSTALLATION OF
2" TURBINE METERED SERVICE
WITH P.V.C.
SERVICE LINE**

SCALE: 1" = 2'
DATE: 3-25-05
REVISED: 10/2/12
DRAWN BY: CAS
APPROVED BY: GJS

**STANDARD
WS2-6**



NOTES:

1. DEPTH OF BEDDING BELOW PIPE DEPENDANT ON SOIL CONDITIONS. CONSULT WITH ENGINEER.
2. ALTERNATE TRENCH BACKFILL MATERIAL TO BE USED ONLY WITH ENGINEER'S APPROVAL.
3. SURFACE RESTORATION TO MATCH EXISTING PAVEMENT / SHOULDER SECTION.


 PUD NO. 1 OF SKAGIT COUNTY ENGINEERING MANAGER
 APPROVED ON: OCT. 24, 2012



TYPICAL TRENCH RESTORATION SECTION

SCALE: 1" = 1'
DATE: 11-15-11
REVISED: 10/2/12
DRAWN BY: KDM
APPROVED BY: GJS

STANDARD
WT1-1



DESIGN DRAWING STANDARDS FOR PROPOSED DISTRICT DISTRIBUTION FACILITIES

The following drawing standards apply to the design of any water distribution facilities that are being submitted to the District for approval. In the case of a project that includes the design of multiple utilities, the Design Engineer may use their own AutoCAD standards and cover sheet layout. However, the District still requires that the design of the water distribution facilities be provided separately from the other utilities, following the format as described below.

DRAWING REQUIREMENTS

1. Drawings shall be prepared using the District's drawing standards, including layer names, line types, line weights, symbols, .ctb file, details, etc. All drawings shall be prepared using the District's title block with the Design Engineer's company logo placed in the space provided. All District standards are available at www.skagitpud.org.
2. Final Drawings shall be submitted on good quality reproducible paper copy, along with an electronic file on Compact Disk (CD) media in AutoCAD drawing format and shall be archived so that all x-references, including title block and border, are a permanent part of the drawing. Drawings submitted in .plt or .pdf format are not acceptable.

COVER SHEET

All plan sets must have a cover sheet, followed by the plan and profile sheets, then followed by the detail sheets. The cover sheet shall be Sheet 1 of the plans and must contain the following:

- Project Title: Title shall be in large, bold text, located on the upper center of the cover sheet. Typical project titles shall describe the District area, or primary street name and street termini.
- Project Description: Describe the type of work the project includes, such as: *Replace 100 feet of 4" A.C. pipe with 100 feet of 8" D.I. pipe*
- The District Construction Order Number (C.O. # _____) and the Work Order Number (W.O. # _____).
- Name and contact information of the Engineer.
- Vicinity Map showing the location of the project within the District.
- Sheet index
- Signature block for approval of appropriate fire district.

PLAN/PROFILE/DETAIL SHEETS

- Design drawings for proposed pipelines are required to show a plan view and a profile view of the pipeline on the same sheet.
- Sheet size shall be 22"x34" unless otherwise approved by the District.
- Drawings shall contain a North arrow on each plan /profile sheet with North oriented to the top or right side of the drawing.
- Drawings shall contain a bar scale on each plan sheet. The horizontal scale shall be 1"=20' unless otherwise approved by the District. The vertical scale shall be as appropriate.
- Paper copies of drawings shall contain the stamp and signature of a registered Professional Engineer on each sheet.
- All dimensions shall be shown in feet, tenths and hundredths of a foot.
- Road centerlines in relation to right-of-way shall be shown. The names of public and private roads shall be shown.
- Existing underground utilities, including water mains shall be shown in the appropriate line type.
- All existing underground utilities shown on the plan view that cross the proposed waterline must be shown on the profile at the surveyed depth. If the depth is unknown, then the utility shall be shown at an assumed depth of three feet with a note that states "depth unknown".
- Profile portions of water drawings shall show the proposed waterline in relation to other existing utilities. The profile must include rim elevations of all structures and manholes, invert elevations of all pipes connecting to structures and manholes, length of proposed waterline between structures or pipe grade breaks, pipe grade and utility crossings.
- Items to be called-out on the drawings shall include valves, fittings and their connections, and appurtenances such as air vacuum assemblies, blow-offs, flushing assemblies, hydrants and service connections.
- Drawing Callouts should be formatted as follows:
 - A. Plan View
 - Call out the type of pipe, class of pipe, type of joint and restraint if applicable on plan view.
 - Fittings and deflections that affect horizontal alignment should be called out in plan view only.

- Use following format on leader lines for fitting callouts:

STA XX + XX, XX' RT or LT
[number] – [size] [material] [fitting], [connection type] (Direction)

Example: STA 25 + 75, 10' RT
 1 – 12" x 8" DI TEE, FL
 1 – 8" DI GATE VALVE, FLxMJ (W)
 1 – 8" DI SPOOL, PE_xPE (W)
 1 – 8" FLEX COUPLING (W)
 1 – 12" DI BUTTERFLY VALVE, FLxMJ (N)

B. Profile View

- Fittings and deflections that affect vertical profile should be called out in profile view only.
- Use same fitting callout format as in plan view
- For storm and sanitary callouts on the profile view, use following format:

SSMH [size] or CB [type] [size]
RIM = XX.XX
IE [size] [material] (IN or OUT) (Direction) = XX.XX

Example: SSMH 60"
 Rim = 60.75
 IE 12" PVC IN (W) = 49.95
 IE 12" PVC OUT (N) = 49.00

 CB Type 1 48"
 Rim = 31.75
 IE 6" CONC IN (N) = 27.25
 IE 12" CONC OUT (E) = 26.95

- Standard details and other project specific details should be consolidated and placed on sheets at the end of the plan set. Plan/profile sheets and detail sheets shall be cross referenced with the sheet and detail numbers of appropriate details.
- The Districts General Notes shall be included and District standard details shall be used unless a specific detail has not been developed and an alternative has been approved by the District.
- All new District pipelines shall be shown in bold and referenced to and stationed along the centerline of the street or right of way from West to East or South to North. Stationing shall start at most westerly point and increase to the east, or start at most southerly point and increase to the north. Start all stationing at 1+00. Stationing for points of curve, points of tangent and intersections shall be shown. For pipelines located within easements, stationing shall be along pipeline centerline.

- All existing District pipelines shall be shown on the plan view, along with the District CO number and year of installation. Coordination will be required with the District to research existing pipelines and their location.
- Show all existing water meters along the route and specify that the services are to be re-instated with new 1 ¼" PE pipe, unless otherwise specified.
- All new and existing District pipelines shall be drawn utilizing an offset from the existing right-of-way and/or road centerline.
- Road centerlines shall include length and bearings of all straight lines, curve radii, curve delta angles and arc lengths.
- A typical road or street section with roadway prism, ditches, underground utilities, etc. shall be included.

REVISION BLOCK

- Original submittal of plan set to District for review shall be noted in the revision box located on the District title block.
- All design changes made after District approval shall be noted in the revision box and revised plans shall be re-submitted to District for review.

RECORD DRAWINGS

- Upon completion of the project, the original drawings shall be changed to reflect the actual construction of the project and be submitted to the District as **Record Drawings**. Each sheet shall bear the stamp and signature of the Engineer of Record and the words "Record Drawings" shall be prominently shown.
- All changes made during construction shall be noted in the revision box. Plan and profile sheets should be clouded and noted in all areas where revisions have occurred and cross referenced with the revisions entered in the revision box. Revision clouds and notes shall be placed on a "Revision #" layer so they can be isolated during review.

DESIGN REQUIREMENTS

The following design requirements apply to all new water pipeline construction within the District, regardless of whether the project is being designed for the District, a Developer or another jurisdiction within the District.

- Any new pipelines shall be offset a minimum of 5 feet center to center from existing or retired water pipelines. Department of Health guidelines require a 10-foot horizontal separation and an 18-inch vertical separation between water pipelines and sewer mains. The District requires a minimum 12-inch vertical separation between water pipelines and other utilities.
- Include a 1-inch air/vac assembly for a proposed 8-inch pipeline or a 2-inch air/vac assembly for a 12-inch pipeline at any high points as determined by the profile.

- Include a 2-inch flushing assembly for proposed pipelines, 8-inch diameter or less, and a 3-inch flushing assembly for proposed 12-inch pipelines at the ends of new proposed pipelines. For pipelines larger than 12-inch diameter, contact the District for requirements.

SURVEY REQUIREMENTS

The following survey requirements apply to all survey only projects put out for bid and awarded by the District. Contractors doing work for developers or other jurisdictions may use their own survey standards. The District still requires, however, that NAD83/91 horizontal datum and NAVD 88 vertical datum be used.

1. All surveys shall be completed to NAVD 88 vertical datum, and NAD83, Washington State Plane Coordinates, North Zone horizontal datum. A copy of the original survey notes must be submitted to the District for future reference.
2. The Surveyor shall locate and show on the topographic survey drawing the following information located within the road right of way or other project limits as determined by the District:
 - The location of permanent structures including retaining walls, bridges, and culverts.
 - Description, location and elevation of bench marks used in the survey.
 - All found monuments and property corners shall be shown. All survey points shall also be provided to the District in digital format.
 - Right of way lines and easements shall be shown with appropriate dimensions. Easements shall be labeled with the Auditor's File Number or Book and Page of each referenced document and the name of the owner of the property over which the easement is located.
 - Location and the top elevation of soil borings or monitoring wells if ascertainable.
 - Road cross-sections including road centerline at 50-foot intervals. The location of curbs, gutter lines, sidewalks and ditch centerlines.
 - Intersecting streets shall be shown along with their names, accompanying topography, utilities and other improvements for at least 100 feet on each side of the intersection point.
 - Existing contours shall be drawn to show abrupt elevation changes.
 - Location, diameter, and species of all trees over an 8-inch diameter. Perimeter outline only of thickly wooded areas unless otherwise directed.
 - Electric utilities – the location of power poles, guy wires, anchors, vaults, etc., within the right-of-way or project limits as defined by the District.
 - Storm, sanitary or combined sewers – the location of all observable manholes and other structures such as culverts, headwalls, catch basins and clean-outs within road right-of-way. Include elevations of the top of manholes and catch basins. Show type, size, direction of flow and invert elevation of all pipes or culverts.

- Water – the location of any water valves, water line markers, standpipes, meters, regulators, fire hydrants, etc. that are visible within the road right-of-way.
- Gas – the location of all valves, meters, and gas line markers that are visible within the road right-of-way.
- Telephone – the location of all poles, manholes, boxes, etc. that are visible within the road right-of-way.
- Street lighting – the location of all lamp poles, boxes etc.
- Location of any existing buildings, tanks, fences, miscellaneous structures and driveways within the road right-of-way.
- The Surveyor shall provide the survey data in AutoCAD drawing format. All survey points shall consist of point number, elevation and point description.

APPENDIX D

WATER SERVICE ORDINANCES

CROSS CONNECTION CONTROL ORDINANCE # 183

WHEREAS, Pursuant to Chapters 246-290-490 of the Washington Administrative Code (WAC), April 1999, it is the responsibility of the Town of Lyman Water Department to protect it's drinking water by instituting a cross connection control program.

Section 1; Definitions

Air Break- An air break is a physical separation between the free flowing discharge ends of a waste line, never on a potable water line. The air break is also referred to as an indirect waste. The air break may extend into a trap but must terminate to atmosphere, never a direct connection. The air break must always be preceded by an air gap on the potable end of the waste piping.

Air Gap (AG) - The vertical physical separation between the free flowing discharge end of the potable water supply line and the overflow rim of the receiving vessel. The separation must be at least twice the inside diameter of the supply line, but never less than one inch. When located near walls, the air gap separation must be increased.

Approved/Approval- Approved in writing by the agency having jurisdiction.

Atmospheric Vacuum Breaker (AVB) - A device which contains a float check (poppet) a check seat and air inlet vent. When water pressure is reduced to a gauge pressure of zero or below, air enters the device, preventing backsiphonage. It is designed to protect against backsiphonage only.

Auxiliary Water Supply- Any water supply on or available to premises other than the purveyor's approved public potable water supply.

Auxiliary Water Supply- Approved- Any water supply which has been investigated and approved by the health authority, meets water quality regulations and is accepted by the water purveyor.

Auxiliary Water Supply- unapproved- An auxiliary water supply which is not approved by the health authority.

Backflow- The flow of water or other liquids, gasses or solids from any source back into the distribution piping of the public potable supply system.

Backflow Prevention Assembly- A backflow prevention assembly such as a pressure vacuum breaker, a double check valve or reduced pressure principle assembly plus the attached resilient seated shut off valves in the inlet and outlet ends of the assembly and the appropriate test cocks for testing the assembly.

Backpressure- Water pressure which exceed the operating pressure of the potable water supply.

Backsiphonage- Backflow due to a negative or reduced pressure within the public potable water supply.

Bore sight to Daylight- Providing adequate drainage for backflow prevention assemblies installed in vaults through the use of unobstructed drain pipe.

Certified Backflow Assembly Tester- A person who is certified by the health authority, or other approval agency, to test backflow prevention assemblies.

Certified Cross Connection Specialist- A person who is certified by the health authority or other approval agency, to administer a cross connection control program and conduct cross connection surveys.

Confined Space- Means a space that is large enough and so configured that an employee can bodily enter and perform assigned work and has limited or restricted means for entry or exit and is not designed for continuous occupancy.

Contamination- impairment of the quality of the potable water by a physical, chemical, biological or radiological substance that would present an unreasonable risk to health. Also defined as high hazard.

Critical Level- The point on a vacuum breaker which determines the minimum elevation above the flood level rim of the fixture or receptacle served at which the vacuum breaker may be installed.

Cross Connection- A point in the plumbing system where the potable water supply is connected directly or has the potential of being connected to a source of non-potable substance that is not part of the public potable water supply.

Degree of Hazard- The low or high hazard classification that shall be attached to all actual or potential cross connections.

Double Check Detector Assembly (DCVA) - An approved assembly consisting of two approved double check valve assemblies, set in parallel equipped with a meter on the bypass line to detect small amounts of water leakage or use. This unit must be purchased as a complete assembly. The assembly may be allowed on fire line water services in place of an approved double check valve assembly upon approval by the local water authority.

Double Check Valve Assembly (DCVA) - An approved assembly consisting of two independently operating check valves loaded to closed position by weights or springs and installed as a unit and between two resilient seated shut-off valves and having suitable connections for testing.

Flood Level- The highest level to which water or other liquid will rise within a tank or fixture. (i.e the overflow rim of the receiving vessel).

Health Authority- The appropriate state or provincial department or districts of public health.

Health Hazard- An actual or potential threat of contamination of a physical or toxic nature to the public potable water system or the consumer's potable water system that would be a danger to health.

High Hazard- A condition, device or practice which is conducive to the introduction of waterborne disease organisms or harmful chemical, physical or radioactive substances into a public water system, and which presents an unreasonable risk to health.

In-Plant Protection- The practice of installing backflow prevention assemblies at the point of hazard to protect one or more actual or potential cross connections within the premises.

Internally- Loaded Check Valve- A check valve which is internally load either by springs or weights to the extent it will be drip tight with a 1 psi differential in the direction of flow.

Local Enforcement Authority- Authorized agent of the regulatory authority and/or the water purveyor.

Low Hazard- An internal or plumbing-type cross connection in a consumer's potable water system that may be either a polluttional or a contamination-type hazard.

Non-Potable Fluid- Any water, other liquid, gas or other substance which is not safe for human consumption or is not part of the public potable water supply as described by the health authority.

Plumbing Hazard- An internal or plumbing-type cross connection in a consumer's potable water system that may be either a polluttional or a contamination-type hazard.

Point-of-Use Isolation- The appropriate backflow prevention within a consumer's water system at the point at which an actual or potential cross connection exists.

Polluttional Hazard- An actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system, but which doesn't constitute a health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

Potable Water- Water which is safe for human consumption, free from harmful or objectionable materials, as described by the health authority.

Premises Isolation- The practice of protecting the public water supply by installing backflow prevention assemblies at or near the point where water enters the premises. This type of protection does not provide protection to personnel on the premises.

Pressure- Force per unit area.

Atmospheric Pressure- The pressure exerted by the 7 ½ mile layer of air resting on the surface of the earth. At sea level, the atmospheric pressure is 14.7 psi.

Pressure Vacuum Breaker Assembly (PVBA)- An approved assembly consisting of a spring-loaded check valve loaded in the closed position an independently operating air inlet valve loaded to the open position and installed as a unit with and between two resilient seated shut-off valves and suitable connections for testing. It is designed to protect against backsiphonage only.

Private Hydrant- Any hydrant which is not owned, operated, or maintained by the local water purveyor or his agent.

Public Water System- Any public or privately owned water system which supplies water for public domestic use. The system must meet the entire health requirement set forth by the state health division. The system will include all services, reservoirs, facilities and any equipment used in the process of producing, treating, storing or conveying RPBA water for public consumption.

Reduced Pressure Backflow Assembly (RPBA) - An approved assembly consisting of two independently operating check valve, spring loaded to the closed position, separated by a spring loaded differential pressure relief valve loaded to the open position, and installed as a unit with and between two resilient seated shut-off valves and suitable connections for testing

Reduced Pressure Detector Assembly (RPDA)- An approved assembly consisting of two approved reduced pressure backflow assemblies, set in parallel, equipped with a meter on the bypass lone to detect small amounts of water leakage or use. This unit must be purchased as a complete assembly. The assembly may be allowed on fire line water services in place of an approved reduced pressure backflow assembly upon approval by the local water purveyor.

Service Connection- The point of delivery at which the water purveyor loses control of the water.

System Hazard- An actual or potential threat of severe danger to the physical properties of the public or consumers potable water supply or of a pollution or

contamination that would have a detrimental effect on the quality of the potable water in the system.

Thermal Expansion- The pressure created by heated water or fluid that is not given the room to expand.

Used Water- Any potable water which is no longer in the purveyor's distribution system. In most cases the potable water that has moved past (down stream) of the meter and/or property line.

Vacuum- Pressure below atmospheric pressure. The term vacuum includes all degrees of partial vacuum.

Water Purveyor- Any agency, subdivision of the state, municipal corporation, firm, company, mutual or corporative association, institution, partnership, person or other entity that owns or operates a public potable water system. It also means the authorized agents of such entities as listed above.

Section 2; Purpose.

The purpose of this ordinance is to protect the health of the water consumer and potability of the water in the distribution system. Inspection and regulation of all actual or potential cross connections between potable and non-potable sources is required in order to minimize the danger of contamination or pollution of the public water supply. Controlling and preventing cross connections is accomplished by either removing the cross connection or installing an approved backflow prevention assembly or device to protect the public potable water supply.

WHEREAS, The Town of Lyman Water Department is required to eliminate or control all cross connection in its service area. Anyone wanting or using water from the Town of Lyman Water Department is required to comply with these regulations and no cross connection shall exist except in accordance with this document.

It is the responsibility of all property owners and their renters to abide by the conditions of this Ordinance. In the event of any changes to the plumbing system, it is the responsibility of the property owners and their renters to notify the Town of Lyman Water Department.

All cost associated with this Ordinance and the purchase, installation, testing and repair of assemblies and devices is the responsibility of the property owner and their renters.

Section 3; Requirements.

If a residential or commercial property has been determined to have an actual or potential cross connection an approved Air Gap or Back-flow assembly or device will be required or,

If the nature and extent of any activity on the premises or the materials used in connection with any activity on the premises or materials stored on the premises, could contaminate or pollute the drinking water supply in any way.

All Unified Plumbing Codes must be maintained.

Section 3: Requirements.

An approved backflow assembly, device or air gap will be required if, but not limited too...

A residential or commercial property has been determined to have an actual or potential cross connection.

On premises having any cross connections as that term is defined under definitions.

A repeated history of cross connections being established or reestablished.

Unduly restricted entry so that inspections for cross connections cannot be made with frequency or sufficient notice to assure that cross connections do not exist.

Materials of a toxic or hazardous nature being used such that, if backsiphonage should occur, a health hazard could result.

FAILURE TO FILL OUT AND RETURN THE CROSS CONNECTION REPORT FORM.

Fire sprinkler systems using non-potable piping.

Used water systems.

MOBILE UNITS:

Any mobile apparatus which uses the Town of Lyman Water Departments water from any premises within its water system must obtain a permit from the Water Department.

CAR WASHES:

Car washes are considered high hazard facilities and shall be required to have an approved Air Gap and Reduced Pressure Backflow assembly.

MULTIPLE CONNECTIONS:

Each connection will be required to have an assembly or device if any is required.

UNINTERRUPTIBLE SERVICE CONNECTIONS:

A parallel or side by side assembly of the same type and size as the main line assembly shall be required. There can be no bypass arrangement without equal protection, even if it is a temporary arrangement.

Section 4: Installation requirements.

If a residential or commercial property has been determined to have an actual or potential cross connection an Air Gap or Backflow Assembly or Device will be required commensurate to the degree of hazard as determined by the Town of Lyman Water Department.

No person shall install any water operated equipment or mechanism or use any water treating chemical or substance if it is found that such equipment, mechanism, chemical or substance may cause pollution or contamination of the domestic water supply. Such equipment or mechanism may be permitted only when equipped with an approved backflow prevention assembly or device.

Before any assembly or device is installed for the prevention of backflow, it shall have first been approved by the Town of Lyman Water Department.

All assemblies and devices installed in a potable water supply system for protection against backflow shall be maintained in good working by the person or persons having control of such devices or assemblies. The Administrative Authority or other department having jurisdiction may inspect such devices or assemblies and if found to be defective or inoperative, shall require the repair or replacement thereof. No device or assembly shall be removed from use or relocated or other device or assembly substituted without the approval of the Town of Lyman Water Department.

The premise owner or responsible person shall have the assembly tested by a certified backflow assembly tester at the time of installation, repair or relocation and at least on an annual schedule thereafter or more often when required by the Administrative Authority.

Access and clearance shall be provided for the testing, maintenance and repair. Access and clearance shall require a minimum of one (1) foot between the lowest portion of the assembly and grade, floor or platform. Installations elevated more than five (5) feet above the floor or grade shall be provided with a permanent platform capable of supporting a tester or maintenance person.

Direct connections between potable water piping and sewer connected wastes shall not exist under any condition with or without backflow prevention. Where potable water is discharged to the drainage system it shall be by means of an approved air gap of two (2) pipe diameters of the supply inlet. But in no case shall the gap be less than one (1) inch. Connection may be made to the inlet side of a trap provided that an approved atmospheric vacuum breaker is installed not less than six (6) inches above the flood level rim of such trapped fixture, so that at no time will any such device be subjected to any back-pressure.

Backflow preventers for hot water over 110 degrees F (43.3 C) shall be a listed type designed to operate at temperatures of 110 degrees (43.3C) or more without rendering any portion of the assembly inoperative.

Fixtures, appliances or appurtenances with integral backflow preventers or integral air gaps manufactured as a unit shall be installed in accordance with their listing requirements.

In cold climate areas, backflow assemblies and devices shall be protected from freezing by a method acceptable to the Administrative Authority.

Backflow preventers shall not be located in any area containing fumes that are toxic, poisonous or corrosive.

Non-potable water piping. In cases where it is impractical to correct individual cross-connections on the domestic water line, the line supplying such outlets shall be considered a non-potable water line. No drinking or domestic water outlets shall be connected to the non-potable water line. Whenever possible, all portions of the non-potable waterline shall be exposed and all exposed portions shall be properly identified in a manner satisfactory to the Administrative Authority. Each outlet on the non-potable water line which may be used for drinking or domestic use shall be posted; DANGER-UNSAFE WATER.

Deck mounted vacuum breakers shall be installed in accordance with their listing and the manufactures instructions, with the critical level not less than one (1) foot above the flood level rim.

Potable water supply to carbonators shall be protected by listed reduced pressure principle backflow preventers as approved by the Administrative Authority.

Faucets with hose attached sprays shall vent to atmosphere under back siphonage conditions. Hose end sprayers and radiator flush kits etc. are not permitted without proper backflow prevention and shall be at least a DCVA,

Potable water outlets with hose attachments other than water heater drains and clothes washer connections shall be protected by a listed non-removable hose bib type backflow preventer or by a listed atmospheric vacuum breaker installed at least six (6)

inches above the highest point of usage and located on the discharge side of the last valve. Where freezing temperatures occur, a listed self-draining frost proof hose bib with integral backflow preventer shall be used.

Water closet flushometer tanks shall be protected against backflow by an approved backflow prevention assembly, device or method.

Water closet and urinal flushometer valves shall be equipped with a listed atmospheric vacuum breaker installed on the discharge side of the flushometer valve with the critical level at least six (6) inches or the distance according to its listing above the overflow rim of a water closet bowl or the highest part of a urinal.

Heat exchangers and other assemblies or methods of construction using potable water shall be of listed construction and materials. Potable water shall be separated from the fluids and gasses by a minimum of two separate walls, with a positive, vented leak detection path. The sections in contact with potable water shall be of materials and weights suitable for potable water.

Inlets to tanks, vats, sumps, swimming pools and other receptors when protected by a listed atmospheric vacuum breaker shall have such atmospheric vacuum breaker installed on the discharge side of the last valve with the critical level not less than six (6) inches or in accordance with its listing above the flood level rim of such equipment and all down stream piping. Water supply inlets not protected by atmospheric vacuum breakers shall be protected by an approved air gap. Where atmospheric vacuum breakers or air gaps are not installed other backflow preventers suitable for the possible contamination or pollution may be installed.

Potable water makes up connections to steam or hot water boilers shall be provided with a listed backflow preventing assembly.

Water inlets to water supplied aspirators shall be equipped with a listed atmospheric vacuum breaker mounted at least six (6) inches above the aspirator unit or equipped with a listed backflow preventer installed in accordance with its listing requirements. The discharge shall drain through an air gap. When using a tailpiece of a fixture to receive the discharge of an aspirator, the air gap shall be located above the flood level rim of the fixture.

Water cooled compressors, degreasers or any other water cooled equipment shall be protected by a listed backflow preventer installed in accordance with this chapter.

Lawn sprinkler systems using only potable water and piping shall be equipped with listed atmospheric vacuum breakers installed on the discharge side of each of the last shut off valves. Where atmospheric vacuum breakers cannot be installed because of piping elevation or valves, other listed backflow preventers shall be installed.

Lawn Sprinkler Systems having or using any type of injection port or not potable water piping shall have an approved air gap or RPBA installed.

Further minimum installation guidelines and a list of approved devices and assemblies shall be made available upon request from the Town of Lyman Water Department upon request.

ALL STATE AND LOCAL PLUMBING CODES AND STANDARDS SHALL BE MET.

Section 5: Access to premises.

Authorized employees of the Town of Lyman or its agents shall have free access at reasonable hours of the day to all parts of a premise or within buildings to which water is supplied. Failure to comply with any provision of this Ordinance or to allow access to any premise or property receiving water from the Town of Lyman may result in water service being denied or terminated or that a listed backflow assembly be installed at the meter service to such property with the cost of purchase, installation, testing, maintenance, replacement or repair being the responsibility of the property owner.

Section 6: Testing of assemblies.

All backflow assemblies or devices shall be required to be tested at least annually and all air gaps installed in lieu of an approved back flow prevention assembly shall be inspected at least annually. Completed test reports shall be returned to the Town of Lyman Water Department within 45 days after receiving a test notification.

Backflow assemblies and devices shall also be required to be tested upon installation, assembly is moved, repaired or a backflow incident is believed to have occurred.

All Cross Connection Control Specialists and Backflow Assembly Testers operating within the Town of Lyman or its service area must be certified by the State of Washington or other governing Agency.

The Town of Lyman has the right to ask inspectors and testers to maintain liability insurance and have confined space training.

Section 7: Freezing, flooding, thermal expansion.

It is the responsibility of the property owner to maintain and protect assembled and devices from freezing and flooding and to eliminate the possibility of thermal expansion...

Section 8: Pressure loss

The user will experience some flow and pressure loss when an approved backflow prevention assembly or device is installed on the users supply or branch line. When flow

and pressure are critical to the function of fire sprinkler systems, processing systems or cooling systems consulting with a hydraulic engineer is recommended.

Section 9: Installation Guidelines.

Atmospheric Vacuum Breaker (AVB)

Atmospheric vacuum breakers are approved for very low hazard situations only as they provide minimal protection. AVBs protect against backsiphonage only and should not be installed where the potential for Backpressure exists.

The AVB assembly should be installed a minimum of 6 inches above the highest use outlet or overflow level downstream from the assembly.

Downstream shut-off valves are not permitted.

The use of AVBs is permitted only in situations where there is less than 12 hours per day of continuous use.

An AVB should not be installed in any area which may be subject to flooding or where damage could occur from water discharging through the assembly.

All State and Local Plumbing codes must be maintained.

Pressure Vacuum Breaker (PVB)

Pressure vacuum breakers may be installed at premises where substances used would be objectionable, but not hazardous to health, if they entered the potable water system. A PVB protects against backsiphonage only. It should not be installed where the potential for back pressure exists.

A PVB must be installed between two (2) resilient seated shut off valves. The PVB assembly should be installed a minimum of 12 inches above the highest outlet or overflow level down stream from the assembly.

No PVB should be installed in an area which may be subject to flooding or where damage could occur from water being discharged through the assembly.

The assembly must be protected from freezing, and other severe weather conditions.

Each assembly must be readily accessible for testing and maintenance and should be installed with a minimum clearance of 12 inches all around the assembly.

The PVB should be installed between 12 and 60 inches above ground level.

Prior to installation, all lines should be thoroughly flushed. Installation of a strainer with a removable screen ahead of the assembly may be required.

All PVB assemblies must be tested immediately upon installation and at least once per year thereafter by an approved certified tester. Having tests performed is the responsibility of the assembly owner. The water department must be informed by the owner whenever any backflow assembly is installed.

Variance from these specifications will be evaluated on a case by case basis. Any deviations must have prior approval of the water department. All State and Local plumbing Codes must be maintained.

Double Check Valve Backflow Prevention Assembly (DCVA)

Double check valve assemblies may be installed at premises where substances used would be objectionable, but not hazardous to health if they entered the potable water system.

A DCVA must be installed between two (2) resilient seated shut off valves.

Flow characteristics for DCVAs are not standard, so manufacturer's specifications should be consulted for specific performance data. The DCVA must be sized to provide an adequate supply of water and pressure for the premises being serviced. They should be sized so that either assembly can provide the minimum water requirements when installed and the two together will provide the maximum flow required.

Whenever interruption of the water supply is critical, two parallel assemblies should be installed. They should be sized so that either assembly can provide the minimum water requirements and the two together will provide the maximum flow required.

Bypass lines on assemblies are prohibited. Pipe fittings which could be used for connecting a bypass line must not be installed.

Each assembly must be readily accessible and installed with adequate room for testing and maintenance. DCVAs may be installed below grade, as long as all test cocks are fitted with brass pipe plugs. All vaults should be constructed of suitable materials, well drained and should be sized to allow for the minimum clearances established below.

Assemblies 2 inches and smaller should have at least a 3 inch clearance below and on both sides of the assembly. The bottom of the assembly should not be more than 24 inches below grade, if installed in a vault. All assemblies larger than 2 inches should allow a minimum clearance of 12 inches of space on the backside, 24 inches of space on the test cock side and 12 inches underneath the assembly. In vaults without a fully

removable top, minimum headroom of 6 feet 0 inches is required. An access opening of a minimum of 24 inches square is required on all vault lids.

Assemblies installed more than 5 feet above floor level must have a platform suitable for use by testing and maintenance personnel.

Vertical installations are allowed on sizes up to and including 4 inches, provided they meet the following requirements.

The check valves are internally spring loaded. Water flow is upward through assembly. Manufacturer acknowledges a specific assembly can be used in a vertical position.

Section 9: installation Guidelines Continued.

The assembly must be protected from freezing and other severe weather conditions.

Prior to installation, all lines should be thoroughly flushed. Installation of a strainer with a removable screen ahead of the assembly is recommended and may be required.

All responsibility for leaks and damage is assumed by the property owner. The owner is also responsible for keeping the vault reasonably clean.

All DCVA assemblies must be tested immediately upon installation and at least once per year thereafter by an approved certified tester. Having test performed is the responsibility of the owner of the assembly. The water department must be informed by the owner whenever any backflow assembly is installed.

Variances from these specifications will be evaluated on a case-by-case basis. Any deviations must have prior written approval of the water department. All State and Local codes shall be maintained.

Reduced Pressure Principle Backflow Prevention Assembly (RPBA)

Reduced pressure assemblies may be installed at premises where substances used would be hazardous to health if they entered the potable water system. An RPBA is effective against both backsiphonage and backpressure and is generally used in locations where an air gap is impractical.

A RPBA must be installed between two (2) resilient seated shut off valves.

Flow characteristics for RPBA's are not standard, so manufactures specifications should be consulted for specific performance data. The RPBA must be sized to provide an adequate supply of water and pressure for the premises being served.

Whenever the interruption of the water supply is critical, two parallel assemblies should be installed. They should be sized so that either assembly can provide the minimum water requirements and the two together will provide the maximum flow required.

Bypass lines on assemblies are prohibited. Pipe fittings which could be used for connecting a bypass line must not be installed.

Each assembly must be readily accessible for testing and maintenance and should be located in an area where relief valve discharge will not produce water damage to buildings or furnishings. An approved air gap funnel assembly may be used to control minor discharge while drain lines to handle flow from optimal relief valve discharge should be considered.

An RPBA is generally installed above grade in a well drained area. It may be installed below grade if adequate drainage to daylight is provided.

Enclosures for assemblies must allow ready access and be sized according to the minimum clearances shown below. Smaller assemblies can be protected by removable covers or enclosures. Adequate drainage to daylight must be provided to accommodate full pressure discharge from the assembly.

All assemblies larger than 2 inches shall allow a minimum of 12 inches space on the back side and 24 inches of space on the test cock side. The relief valve opening shall be at least 12 inches plus nominal size of assembly above the floor or above the highest possible water level. In vaults without a fully removable top, minimal headroom of 6 feet 0 inches is required. An access opening of 24 inches square is required on all vault lids.

Assemblies installed more than 5 feet above floor level must have a platform suitable for use by testing and maintenance personnel.

The assembly must be protected from freezing and other severe weather conditions.

Vertical installation is prohibited.

Prior to installation all lines should be thoroughly flushed. Installation of a strainer with a removable screen ahead of the assembly may be required.

All responsibility for leaks and damage is assumed by the property owner. The owner is also responsible for keeping the vault reasonably clean.

All RPBA assemblies must be tested immediately upon installation and at least once per year thereafter by an approved certified tester. Having test performed is the

responsibility of the assembly owner. The water department must be informed by the owner whenever any backflow prevention assembly is installed.

Variances from these specifications will be evaluated on a case-by-case basis. Any deviations must have prior written approval of the water department. All State and Local codes must be maintained.

Air Gap Separation

Air gap separations provide maximum protection from backflow hazards. They may be utilized at premises where substances could be hazardous to health if they entered the potable water system.

The distance of the air gap between the supply line and the top rim of the receiving vessel is usually at least 2 times the diameter of the supply line. It should never be less than 1 inch.

Tubular screens may be attached or the supply line may be cut at a 45 degree angle if splashing is a problem. The air gap distance is measured from the bottom of the angle. Hoses are not permitted.

Air gap separations should not be altered in any way without prior approval from the water department. They must be available for inspections at all reasonable times.

Section 10: Fire Systems

An approved double check valve assembly shall be the minimum protection for fire sprinkler systems using piping material that is not approved for potable water use and/or does not provide for periodic flow through during each 24 hour period, unless a variance has been issued in writing by the water department. An RPBA assembly must be installed if a solution other than potable water can be introduced into the sprinkler system.

Section 11: Enforcement and Penalties.

The Mayor of the Town of Lyman shall enforce the provisions of this Ordinance. The Mayor may delegate responsibilities to a Certified Cross Connection Control Specialist. The provisions of this ordinance may supersede State regulations but in no case shall they be less stringent. All approved prevention assemblies and devices required by this ordinance shall be of a model approved by the Department of Health at the time of installation. Approved prevention assemblies required by this ordinance shall be installed and maintained under the direction of the Town of Lyman Water Department or under the supervision of a Cross Connection Specialist per Town of Lyman Water Department standards.

Failure of the customer to cooperate in the installation, maintenance, repair inspection or testing of backflow prevention assemblies required by this Ordinance shall be grounds for terminating of water service to the premise or the requirement that an reduced pressure assembly to be installed at the service or meter with installation, maintenance and testing costs to be borne by the property owner.

Section 12: Constitutionality and Saving Clause.

That if any provision, section, sentence, clause or phrase of this ordinance or the application of same to any person or set of circumstances are for any reason held to be unenforceable, the validity of the remaining portions of this ordinance or its application to other persons or circumstances, shall not be affected thereby, it being the intent of the City Council of the Town of Lyman in adopting and the Mayor in approving this Ordinance that no portion hereof or provision or regulation contained herein shall become inoperative or fail by reason of any unconstitutionality or invalidity of any other portion, provision or regulation.

This ordinance approved by The Town of Lyman Council _____ 2003


MAYOR CHRIS STORMONT

ORDINANCE # 208

AN ORDINANCE AMENDING ORDINANCE NO 191, SECTION 1 OF THE TOWN OF LYMAN REGARDING WATER RATES FOR THE LYMAN WATER DEPARTMENT

WHEREAS, this Ordinance is intended to repeal and replace Ordinance 191;
and,

WHEREAS, the Town of Lyman, a water purveyor under the rules of Washington State, has a duty to set rules, fees and charges, and represent the best interests of all customers;
and,

WHEREAS, the Town of Lyman has a duty to collect funds due the Town so that financial needs of the water utility may be met;
and,

WHEREAS, the Town of Lyman a water purveyor, desires to describe the rules and procedures to ensure the following;

- Meet regulatory requirements by maintaining financial viability
- Establish water utility rates closely based on customer water usage which ensures fair charges to all customers
- Establish a water utility rate structure that supports efficient use of water

NOW THEREFORE, THE TOWN COUNCIL FOR THE TOWN OF LYMAN DO ORDAIN AS FOLLOWS:

SECTION 1: The Town of Lyman has established a base rate of:

Low Income \$ 11.25, Residential \$21.70, Business \$29.75, School 2" \$70.00.

Residential class will pay \$.0325 per cubic foot. Business class will pay \$.0350 per cubic foot. A 6% utility tax will be charged on the water base and usage.

A 2% increase will be assessed per year if deemed necessary. Base rate will be charged to all water services regardless of usage. Services shut off at owners request will still be charged base rate.

The owner of the property is responsible for the water used by their renters. If renters are late or leave without paying their water bill the landlord is responsible for payment to the Town of Lyman for all water that has been used.

New water users without prior credit from another water district will pay a down payment of \$100.00 to the water department. The water customer will receive his/her down payment back if they keep their payments current for the year.

The new water hookup fee shall be \$3000.00 plus the cost of the meter assembly, for residential in town.

Commercial/business hookup fee shall be \$3500.00

For out of town water hookups the base fee plus all extra costs of installation water meters and materials will be applied.

Passed and approved this 9th day of March, 2010

Debra Heinzman, Mayor

ATTEST

Debra Boyd Clerk/Treasurer

APPENDIX E
AGREEMENTS

TOWN OF LYMAN
WATER DEPARTMENT
P O BOX 1248
LYMAN, WA 98263
360-826-3033

NEW SERVICE RATE: Residence \$3000.00
Commercial: \$3500.00
plus the cost of the meter (Ord 191)

NAME OF APPLICANT: _____

MAILING ADDRESS: _____

WATER SERVICE ADDRESS _____

DATE WHEN WATER IS NEEDED _____

TYPE OF STRUCTURE THAT WILL BE SERVED: _____

(HOME, BUSINESS, MOBILE HOME, FARM,)

Telephone #: _____ Work #: _____

RESIDENTIAL FEE: \$3000.00 METHOD OF PAYMENT _____

COMMERCIAL FEE: \$3500.00 METHOD OF PAYMENT _____

THE APPLICANT IS AWARE THAT THE WATER SUPPLIED IS NOT ROUTINELY TREATED AND IS SOLD AT A FLAT RATE PER MONTH AT THIS TIME. THIS IS SUBJECT TO CHANGE. APPLICANT EXPRESSLY AGREES TO COOPERATE WITH RESPONSIBLE OFFICIALS TO PREVENT CONTAMINATION AND TO AVOID WASTE OF WATER RESOURCES.

SIGN IF YOU AGREE: _____
THIS SERVICE IS APPROVED/_____/ PENDING ON PROPER BUILDING PERMITS

SERVICE CANNOT BE APPROVED BECAUSE _____

RESUBMIT THIS APPLICATION WHEN OBJECTIONS ARE RESOLVED:

SIGNATURE _____ DATE _____
WATER SYSTEM MANAGER

SIGNATURE _____ DATE _____
CLERK/TREASURER

Town of Lyman Water Department

Application for Water Service

OWNER'S NAME: _____ TELEPHONE: _____
MAILING ADDRESS: _____
LOCATION ADDRESS: _____
NUMBER OF PEOPLE IN HOME: _____

The undersigned applicant/customer hereby applies for or has an existing water connection to the above described property. The applicant/customer is the owner of the described property or the authorized agent of the owner. By signing this application, the property owner agrees, as a condition of the Town of Lyman Water Department hereinafter referred to as the Purveyor, providing and continuing service to the above described property, to comply with all provisions of the current Ordinance, Resolution, and/or Water Service Policy of the Purveyor, or latest revision thereof, and other such attached rules and regulations now existing or which may be established from time to time governing the Purveyor's water system. The property owner specifically agrees:

a) to install and maintain at all times his plumbing system in compliance with the most current edition of the WA State and Skagit County Plumbing Codes as it pertains to the prevention of potable water system contamination, prevention of pressure surges and thermal expansion in his water piping (for thermal expansion, it shall be assumed that a check valve is installed by the Purveyor on the water service pipe); the accompanying pamphlet explains this in more detail.

b) as the condition of the Purveyor waiving the requirement for premises isolation by the property owner of a reduced pressure backflow assembly on his/her service pipe; within 30 days complete and return any water questionnaires and to authorize the Purveyor's agents and employees to make periodical water use surveys of the premises; within 30 days of the Purveyor's request, to install, test, maintain, and repair in accordance with the Purveyor's cross connection control standards all backflow prevention assemblies required by the Purveyor to provide equivalent protection for the Purveyor's distribution system, and to report to the Purveyor within 30 days of obtaining the results of all tests and repairs to aforementioned backflow prevention assemblies, and of making any changes to the plumbing system.

c) not to make a claim against the Purveyor or its agents or employees for damages and/or loss of production, sales or service, in case of water pressure variations, or the disruption of the water supply for water system repair, routine maintenance, power outages, and other conditions normally expected in the operation of a water system.

Applicant's Signature

Date

Attachment received:

- Water rates & charges
- Water service connection information
- Water service Policy
- Water use Questionnaire (to be returned within 30 days)

By signing this application parties acknowledge they have received, read and agree to all attachments.

PURVEYOR USE ONLY

INTERLOCAL COOPERATIVE AGREEMENT

BETWEEN

TOWN OF LYMAN
AND
SKAGIT COUNTY

THIS AGREEMENT ("Agreement") is made and entered into by and between TOWN OF LYMAN ("Second Party") and Skagit County, a political subdivision of the State of Washington ("County") pursuant to the authority granted by Chapter 39.34 RCW, INTERLOCAL COOPERATION ACT. The Second Party and the County may be individually referred to herein as a "party", and may be collectively referred to herein as the "parties". In consideration of the following, the parties mutually agree as follows:

1. **PURPOSE:** The County will perform work, provide materials, and provide the use of County equipment operated by a County operator, for work for the Second Party as requested, to be reimbursed to the County at the actual cost incurred by the County for said work, materials, and equipment rentals, including, but not limited to maintenance repairs and the use of County equipment by a County operator.

1.1 In the event that the Second Party shall use any equipment owned by the County pursuant to this Agreement, the Second Party agrees that any user and/or operator of such equipment shall be a Skagit County operator properly trained and/or certified in accordance with applicable law and industry standards, and (to the fullest extent allowed by law) shall further agree to defend, indemnify, and hold harmless the County for all liability, cost, loss, expense, claims, settlements, and/or judgments against the County arising from and/or related to the use and/or operation of the County's equipment by the County on behalf of the Second Party, pursuant to the terms herein.

2. **RESPONSIBILITIES:** The County and the Second Party in the performance of this Agreement, shall abide by the provisions of RCW 39.34, the terms of this Agreement and/or any other applicable law.

3. **TERM OF AGREEMENT:** The term of this Agreement shall be from date of mutual execution through December 31, 2017, unless sooner terminated pursuant to the terms herein.

4. **MANNER OF FINANCING:** The County will perform work, provide materials, and/or the use of County equipment (to be operated by a County operator), for work on the Second Party's facilities upon their request and acceptance by the County, to be reimbursed by Second Party to the County at the actual cost incurred by the County for said work, materials and use of County equipment (and wages for the County operator provided by the County to operate the equipment); and, In addition thereto, nine percent (9%) of the total cost shall be added for overhead costs for accounting, billing, and administrative services, provided that the County shall submit to the Second Party a

certified statement of the costs, and within thirty (30) days thereafter, Second Party shall pay to the County the amount of said statement.

5. ADMINISTRATION: The following individuals are designated as representatives of the respective parties. The representatives shall be responsible for administration of this Agreement and for coordinating and monitoring performance under this Agreement. In the event such representatives are changed, the party making the change shall notify the other party.

5.1 The County's representative shall be the Skagit County Public Works Operations' Division Manager.

5.2 Second Party's representative shall be the Mayor.

6. TREATMENT OF ASSETS AND PROPERTY: No fixed assets or personal or real property will be jointly or cooperatively, acquired, held, used, or disposed of pursuant to this Agreement.

7. NO PARTNERSHIP OR JOINT VENTURE: No partnership and/or joint venture exists between the parties, and no partnership and/or joint venture is created by and between the parties by virtue of this Agreement. No agent, employee, contractor, subcontractor, consultant, volunteer, and/or other representative of the parties shall be deemed an agent, employee, contractor, subcontractor, consultant, volunteer, or other representative of the other party.

8. INDEMNIFICATION: Each party agrees to be responsible and assume liability for its own wrongful and/or negligent acts or omissions or those of their officials, officers, agents, or employees to the fullest extent required by law, and further agrees to save, indemnify, defend, and hold the other party harmless from any such liability. It is further provided that no liability shall attach to the County by reason of entering into this contract except as expressly provided herein.

9. TERMINATION: Any party hereto may terminate this Agreement upon thirty (30) days notice in writing either personally delivered or mailed postage-prepaid by certified mail, return receipt requested, to the party's last known address for the purposes of giving notice under this paragraph. If this Agreement is so terminated, the parties shall be liable only for performance rendered or costs incurred in accordance with the terms of this Agreement prior to the effective date of termination.

10. CHANGES, MODIFICATIONS, AMENDMENTS AND WAIVERS: The Agreement may be changed, modified, amended or waived only by written agreement executed by the parties hereto. Waiver or breach of any term or condition of this Agreement shall not be considered a waiver of any prior or subsequent breach.

11. SEVERABILITY: In the event any term or condition of this Agreement or application thereof to any person or circumstances is held invalid, such invalidity shall not affect other terms, conditions or applications of this Agreement which can be given effect without the invalid term, condition, or application. To this end the terms and conditions of this Agreement are declared severable.

12. ENTIRE AGREEMENT: This Agreement contains all the terms and conditions agreed upon by the parties. All items incorporated herein by reference are attached. No other understandings, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind any of the parties hereto.

13. **COMPLIANCE WITH LAWS AND TERMS OF GRANTS:** The parties to this Agreement shall comply with all applicable federal, state, and local laws, rules, and regulations in carrying out the terms and conditions of this Agreement.

14. **ASSIGNMENT AND SUBCONTRACTING:** Unless otherwise expressly provided herein, no portion of this Agreement may be assigned, contracted, and/or subcontracted to any other individual, firm, company, and/or other entity without the express and prior written approval of the parties.

15. **VENUE AND CHOICE OF LAW:** In the event that any litigation should arise concerning the construction or interpretation of any of the terms of this Agreement, the venue of such action of litigation shall be in the Superior Court of the State of Washington in and for the County of Skagit. This Agreement shall be governed by the laws of the State of Washington.

16. **CAPTIONS & COUNTERPARTS:** The captions in this Agreement are for convenience and reference only and do not define, limit, or describe the scope or intent of this Agreement. This Agreement may be executed in any number of counterparts, and each such counterpart hereof shall be deemed to be an original instrument, but all such counterparts together shall constitute but one agreement.

17. **NEUTRAL AUTHORSHIP:** Each of the terms and provisions of this Agreement have been reviewed and negotiated, and represents the combined work product of the parties hereto. No presumption or other rules of construction which would interpret the provisions of this Agreement in favor of or against the party preparing the same shall be applicable in connection with the construction or interpretation of any of the provisions of this Agreement. The parties represent that they have had a full and fair opportunity to seek legal advice with respect to the terms of this Agreement and have either done so, or have voluntarily chosen not to do so. The parties represent and warrant that they have fully read this Agreement, that they understand its meaning and effect, that they are duly authorized to execute this Agreement, and that they enter into this Agreement with full knowledge of its terms. The parties have entered into this Agreement without duress or undue influence.

GOVERNMENT AGENCY:

Debra K. Heintzman

Signature

(Date 12-11-12)

Debra K Heintzman, Mayor
Print Name & Title of Signatory

Mailing Address:

(Street address required
in addition to P.O. Box)

Town of Lyman

PO 1248

Lyman, WA 98263

Responsibility for repair of service pipe and Adjustment of water bill

1. The maintenance and repair of the service pipe on the user side of the water meter is the responsibility of the owner of the premises being served. The owner shall keep said service pipe in good working order.
2. Requests for adjustments are to be made in writing to Public Works.
3. Public Works will assist customers in checking for leaks, and may monitor meters for a period of time to determine that the meter is in proper working order. In the event a meter fails to register water usage properly, the customer will be charged at the base rate, for the time the meter is deemed faulty.
4. In case of a leak in the service pipe, the owner may be entitled to an adjustment on his water bill; provided the owner submits to the city an invoice showing that the leak has been repaired. A leak adjustment shall be available to the owner once every 12 months. Appeals may be made to the Town Council.
5. If the conditions in #4 are met, the water bill in the month the leak was detected shall be adjusted. The adjusted rate for the month in which the leak was detected shall be equal to the average of the water charges of the three-month period prior to the month in which the leak is discovered, plus a \$20.00 charge.
6. The reduction provided for this section shall not be allowed if such excess water consumption is due to a customer's neglect or failure to repair the broken pipe. A reduction in billing shall not be permitted if such excess consumption is due simply to leaky faucets or other plumbing fixtures.
7. Public works may discontinue service to any premises if the owner of property refuses to make repairs necessary to avoid waste of water. If after reasonable efforts to contact the customer at the premises are not successful, and it is observable that water is being lost through leakage, the department at its option may terminate water service and shall leave written notice as to its action and the reason why.

MANDATORY WATER USE QUESTIONNAIRE

Dear Customer,

In compliance with the WA Department of Health regulations the Town of Lyman Water Department carries out a program of “cross connection control” to protect the water distribution system from contamination. A cross connection is a point in a plumbing system where the drinking water is directly connected or could be connected to a contaminated source. The accompanying pamphlet explains this in more detail. A copy of the entire Ordinance available upon request.

An essential part of our cross connection control program is our assessment of the degree of hazard posed by each of our customer’s plumbing systems upon the public water system. For most residential customers, the hazard is minimal; the installation of your plumbing in compliance with the plumbing code should have provided adequate protection of your potable water piping and our water distribution system.

However, customers with special plumbing or activities may pose an increased health risk. To achieve an acceptable level of risk of contamination, it may be necessary to have a backflow preventer installed on your service pipe or alternate protection provided for the public water system.

Questionnaire must be completed and returned to:

LYMAN TOWN HALL
8405 S MAIN ST.
PO BOX 1248

LYMAN, WA 98263 by _____ to avoid possible surcharges being added to your bill or backflow preventer being installed at the meter at your expense.

If you have checked any of the boxes on the questionnaire we may contact you to request further information.

Your cooperation in completing this questionnaire is most appreciated. If you have any questions, please contact:

Lyman Water Department
Water Distribution Manager

360-826-3033 office

New customers must complete and return this questionnaire before new service is connected or restored.

Residential Survey Form

1. Is this residential or commercial property? Residential____ Commercial____
If commercial, please specify business name_____

2. Are you renting or do you own this property? Rent ____ Own _____
If renting, please provide name and address of owner_____

3. Your water meter serves how may homes? _____ How many buildings? _____

4. Do you have any of the following?

a. Swamp cooler	Yes	No
b. Hot tub	Yes	No
c. Swimming pool	Yes	No
d. Jacuzzi	Yes	No
e. Underground sprinkler system	Yes	No
f. Drip irrigation system	Yes	No
g. Greenhouse	Yes	No
h. Solar system	Yes	No
i. Utility sink with threaded faucet	Yes	No
j. Fire sprinkler system	Yes	No
k. Ghost pipes (unidentifiable piping)	Yes	No
l. Waterbed	Yes	No

5. Do you use:

a. Antifreeze flush kits	Yes	No
b. Insecticide sprayers (that attach to a garden hose)	Yes	No
c. Darkroom equipment	Yes	No

6. Does anyone on the premises use a portable Dialysis machine? Yes No

7. Do you have a bathtub that fills from the bottom, or does not have an overflow drain and is not air gapped? Yes No

8. Do you have a water softener or any other treatment system connected to you drinking water supply? Yes No

9. Do you have auxiliary water supply on your premises? Yes No

10. Do you have livestock (horses, cows, etc.) and use a trough? Yes No

11. Is you home or building elevated above you water meter? Yes No

12. Does a creek, river, or spring run near your property? Yes No
 - a. Do you pump or draw water from this source? Yes No

13. Do you have a booster pump, well pump, or any other type of water pump? Yes No

14. Do you receive irrigation water from a different source? Yes No

- | | | | |
|-----|---|-----|----|
| 15. | Do you have backflow preventer on your property now? | Yes | No |
| 16. | Do you have any situation that you are aware of that could create a cross connection? | Yes | No |
| 17. | Do you have any other water using equipment on your property not mentioned above? | Yes | No |

Comments: _____

Please notify Lyman Water Department at 360-826-3033, if any of the above conditions ever changes on your property

Signature of Water Client

Phone Number

Print you Name

Best time to call

Today's Date _____

Mailing address:

Physical address of property:

Please answer all of the above questions and return questionnaire within 60 days.
This form will be kept on file.

Please return to: Town Of Lyman PO Box 1248 Lyman, WA 98263

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7

LEONARD & ASSOCIATES, INC.
PROFESSIONAL ENGINEERS AND LAND SURVEYORS

JOHN E. LEONARD, P.E. & L.S.
ROBERT C. BOUDINOT, JR., P.E.

P. O. Box 327 - 612 EAST FAIRHAVEN
BURLINGTON, WASHINGTON 98233
TELEPHONE 755-0431

January 12, 1979

TOWN OF LYMAN
WATERMAIN EASEMENT ACROSS
RUTH CRAWFORD'S PROPERTY

An exclusive easement for watermains, power lines, and access to a well site over, under, and across a twenty-foot-wide strip of land being ten feet on either side of the following described line:

Commencing at the North quarter corner of Section 17, Township 35 North, Range 6 East, W.M.; thence South 87° 01' 31" East, 1309.22 feet along the North line of said Section 17; thence South 81° 23' 32" West 1373.02 feet to a point on the South right-of-way line of the Great Northern Railroad; thence South 80° 41' 29" West along said South right-of-way line a distance of 10.18 feet to the TRUE POINT OF BEGINNING of the watermain easement centerline; thence South 01° 23' 32" West, 71.24 feet; thence North 80° 41' 29" East, 195.52 feet; thence South 9° 49' 40" East, 90.00 feet to the termination of said easement.

LUJELIA HENRY
SKAGIT COUNTY CLERK

79 MAR 19 AM 11:15

RECORDED
REQUEST OF _____

William R. McCann
PO BOX 405
Sedro Woolley, Wn. 98284

Official Record

7903190008

State of Washington)
County of Skagit) ss

I, the undersigned, a Notary Public in and for the above named County and State, do hereby certify that on this 27 day of January 1979, personally appeared before me Ruth B. Crawford to me known to be the individual described in and who executed the within instrument, and acknowledge that they signed and sealed the same as HER free and voluntary act and deed for the uses and purposes therein mentioned.

GIVEN under my hand and official seal the day and year last above written.



Jacob Hoopes Jr
Notary Public in and for the State of
Washington residing at Lyman

Official Record

VOL. 355 PAGE 221

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RESTRICTIVE COVENANT

The grantor herein is the owner of the following described real estate situated in Skagit County, State of Washington, to wit:

That part of the Southeast quarter of the Northeast quarter of Section 17, Township 35 North, Range 6 East of the W.M., lying South and East of Garland Creek and North of the James Young and Cape Horn County Road; also beginning at the Northeast corner of the Southeast quarter of the Northeast quarter of Section 17, Township 35 North, Range 6 East of the W.M.; thence South to Garland Creek; thence Southwesterly and Southerly along said creek to the North line of the James Young and Cape Horn County Road; thence along said North line of said county road to a point 670 feet East of the Southeast corner of Lot 1, Block "E", "Town of Lyman", according to the recorded plat thereof in the office of the Auditor of Skagit County, Washington in Volume 1 of Plats, Page 8; thence North 100 feet; thence West 100 feet; thence North 70 feet; thence West 276 feet; thence North to the South line of the Great Northern Railway right-of-way; thence Easterly along said right-of-way line to a point on the North line of the Southeast quarter of the Northeast quarter; thence East to the point of beginning; EXCEPT the right-of-way of the Pacific Northwest Traction Company.

Received for record at
at Request of Wm. R. McCann
Luella Henry, Auditor Skagit Co., Washington
Mar. 19 1979 11:55am

William R. McCann
PO Box 405
Lyman, WA

The grantee herein, the Town of Lyman, owns and operates a well and waterworks supplying water for public use, located upon the following described real estate situated in Skagit County, State of Washington, to wit:

A well located 1503.99 feet East and 1532.46 feet South of the North quarter corner of Section 17, Township 35 North, Range 6 East, W.M.

Which well and waterworks is in close proximity to the land of the grantor, and said grantee is required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantor's land which might contaminate said water supply.

NOW, THEREFORE, in consideration One Dollar (\$1.00) in hand paid and other good and valuable consideration received by said grantor, the grantor agrees and covenants with the grantee, their successors, and assigns said covenants to run with the land for the benefit of the land of the grantee, that said grantor, their heirs, successors, and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor and within 100 feet of the well of the grantee, so long as the same is operated to furnish water for public consumption, any of the following: cesspools, sewers, privies, septic tanks, drainfields, manure piles, garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens, or other enclosures or structures for the keeping or maintenance of fowls or animals, or storage of liquid or dry chemicals, herbicides, or insecticides.



[Signature]
WITNESS

hand 27 this 27 day of January

[Signature]
Grantor

Official Record

7903190009

TOWN OF LYMAN
RESOLUTION 2009-4

A RESOLUTION WAIVING THE FEE FOR WATER SERVICE TO
ANDY HAWKINGS

WHEREAS, the Town of Lyman does provide water service to its residents and water service area, and

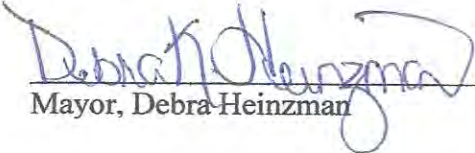
WHEREAS, Town of Lyman does acknowledge the cost of providing water service at the base rate for 1 year is \$478.32, and

WHEREAS, the Town of Lyman has made an agreement with Andy Hawkings 8168 Pipeline Rd, regarding the waiving of the fee for water service at 8168 Pipeline Rd as long as he is the legal owner of said property,

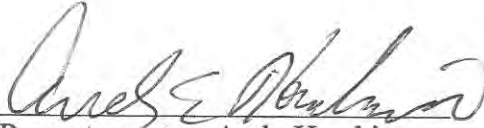
BE IT RESOLVED BY THE LYMAN TOWN COUNCIL:

The fee for water service for Andy Hawkings residing at 8168 Pipeline Rd is hereby waived, as long as he is the legal owner of said property.

Dated this 10th day of March, 2009

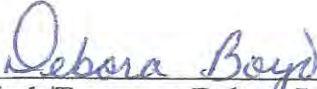


Mayor, Debra Heinzman



Property owner, Andy Hawkings

ATTEST



Clerk/Treasurer, Debra Boyd

**TOWN OF LYMAN
RESOLUTION 2009-6
A RESOLUTION REPLACING RESOLUTION 2009-5
WAIVING THE FEE FOR WATER SERVICE TO
KEN GOODPASTER**

WHEREAS, the Town of Lyman does provide water service to its residents and water service area, and

WHEREAS, Town of Lyman does acknowledge the cost of providing water service at the base rate for 1 year is \$478.32, and

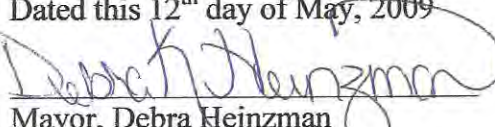
WHEREAS, the Town of Lyman has made an agreement with Ken Goodpaster 8271 Crawford Lane, regarding the waiving of the fee for water service at property, as described below:


BE IT RESOLVED BY THE LYMAN TOWN COUNCIL:

The Town of Lyman will supply a perpetual supply of water for one single family residence on the below described real estate and waive the fee.

INCLUDING MANUFACTURED HOME 1991 LIBERTY FLEETWOOD 48X28 SERIAL NUMBER 09L24667XU AND ALSO INCLUDING 1991 FLEETWOOD BERKSHIRE 56X28 SERIAL NUMBER ORFL48A11825BS BEGINNING AT THE NORTHEAST CORNER OF THE SE1/4 OF THE NE1/4 THENCE SOUTH TO GARLAND CREEK THENCE SOUTHWESTERLY ALONG SAID CREEK TO THE COUNTY ROAD THENCE ALONG SAID ROAD TO A POINT 670 FEET E OF SOUTHEAST CORNER OF LOT 1 BLOCK E THENCE NORTH 100 FEET THENCE WEST 100 FEET THENCE NORTH 70 FEET THENCE WEST 276 FEET THENCE NORTH TO THE GREAT NORTHERN RAILWAY RIGHT-OF-WAY THENCE EASTERLY ALONG SAID RIGHT-OF-WAY TO A POINT WEST OF THE POINT OF BEGINNING THENCE EAST TO POINT OF BEGINNING LESS P.N.T. RIGHT-OF-WAY. ALSO EXCEPT THE FOLLOWING DESCRIBED PROPERTY: THAT PORTION OF THE SOUTH 1/2 OF THE NORTHEAST 1/4 OF SECTION 17, TOWNSHIP 35 NORTH, RANGE 6 EAST, W.M., DESCRIBED AS FOLLOWS: COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST 1/4 OF SAID SECTION 17; THENCE SOUTH TO GARLAND CREEK; THENCE SOUTHWESTERLY AND SOUTHERLY ALONG SAID CREEK TO THE NORTH LINE OF THE JAMES YOUNG AND CAPE HORN COUNTY ROAD; THENCE ALONG SAID NORTH LINE OF SAID ROAD TO A POINT 670 FEET EAST OF THE SOUTHEAST CORNER OF LOT 1, BLOCK E, "THE TOWN OF LYMAN, W.T.," AS PER PLAT RECORDED IN VOLUME 1 OF PLATS, PAGE 8, RECORDS OF SKAGIT COUNTY, WASHINGTON; THENCE NORTH 100 FEET; THENCE WEST 100 FEET; THENCE NORTH 70 FEET; THENCE WEST 276 FEET TO A POINT ON THE WEST LINE OF THAT CERTAIN TRACT CONVEYED TO PETER W. TRUMAN BY DEED DATED JANUARY 16, 1902, AND RECORDED FEBRUARY 6, 1902, IN VOLUME 44 OF DEEDS, PAGE 295, RECORDS OF SKAGIT COUNTY, WASHINGTON; THENCE NORTH ALONG THE WEST LINE OF SAID TRUMAN TRACT A DISTANCE OF 125 FEET TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING NORTH ALONG SAID WEST LINE A DISTNCE OF 112.27 FEET; THENCE SOUTHEASTERLY A DISTANCE OF 161.79 FEET TO A POINT THAT IS 116.50 FEET EAST OF THE TRUE POINT OF BEGINNING; THENCE WEST 116.50 FEET TO THE TRUE POINT OF BEGINNING. ALSO EXCEPT PORTION OF THE SOUTHWEST 1/4 OF THE NORTHEAST 1/4 OF SECTION 17, TOWNSHIP 35 NORTH, RANGE 6 EAST, W.M. DESCRIBED AS FOLLOWS: COMMENCING AT A POINT 100 FEET NORTH AND 670 FEET EAST OF THE SOUTHEAST CORNER OF LOT 1, BLOCK "E" IN THE TOWN OF LYMAN, ACCORDING TO THE OFFICIAL PLAT OF SAID TOWN NOW ON FILE IN THE OFFICE OF THE AUDITOR OF SAID SKAGIT COUNTY; SAID POINT ALSO BEING THE NORTHEAST CORNER OF THAT PARCEL CONVEYED TO CHARLES THOMAS MEYERS BY DEED RECORDED ON JULY 7, 1983 UNDER AUDITOR'S FILE 8307070007 RECORDS OF SKAGIT COUNTY; THENCE IN A NORTHWESTERLY DIRECTION 128 FEET TO A POINT 100 FEET WEST AND 180 FEET NORTH OF POINT OF BEGINNING; THENCE WEST 71 1/2 FEET MORE OR LESS TO THE EASTERLY BOUNDARY OF THAT PARCEL CONVEYED TO DONALD ADKERSON BY DEED RECORDED JANUARY 5, 2006 UNDER AUDITOR'S NUMBER 200601050088 RECORDS OF SKAGIT COUNTY; THENCE IN A SOUTHEASTERLY DIRECTION 12 1/2 FEET ALONG THE EASTERLY BOUNDARY OF SAID ADKERSON PARCEL TO A POINT 70 FEET NORTH AND 164 FEET WEST OF THE POINT OF BEGINNING SAID POINT ALSO BEING A POINT ON THE NORTH BOUNDARY OF THAT PARCEL CONVEYED TO CHARLES T. MEYERS BY DEED RECORDED ON APRIL 21, 2003 UNDER AUDITOR'S FILE NUMBER 200304210251 RECORDS OF SKAGIT COUNTY; THENCE EAST 64 FEET MORE OR LESS TO A POINT ON THE MOST NORTHEASTERLY CORNER OF THAT PARCEL CONVEYED TO MEYERS UNDER SAID AUDITOR'S FILE 8307070007; THENCE SOUTH 70 FEET ALONG THE EAST BOUNDARY OF SAID MEYERS PARCEL; THENCE EAST 100 FEET ALONG A NORTH LINE OF SAID MEYERS PARCEL TO THE POINT OF BEGINNING.

Dated this 12th day of May, 2009


Mayor, Debra Heinzman
ATTEST


Clerk/Treasurer, Debora Boyd

Property owner, Ken Goodpaster

TOWN OF LYMAN RESOLUTION 2009-7
REPLACING
RESOLUTION 2009-3
A RESOLUTION WAIVING THE FEE FOR WATER SERVICE TO DEAN AND
DIANE E E STILES

WHEREAS, the Town of Lyman does provide water service to its residents and water service area, and

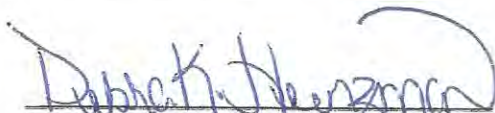
WHEREAS, Town of Lyman does acknowledge the cost of providing water service at the base rate for 1 year is \$478.32, and

WHEREAS, the Town of Lyman has made an agreement with Dean & Diane Stiles 31773 Pipeline Lane, regarding the waiving of the fee for water service at 31773 Pipeline Lane,

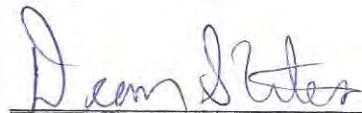
BE IT RESOLVED BY THE LYMAN TOWN COUNCIL:

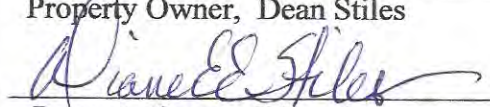
The fee for water service for Dean and Diane Stiles residing at 31773 Pipeline Lane is hereby waived,

Dated this 14th day of July, 2009




Mayor, Debra Heinzman



Property Owner, Dean Stiles


Property Owner, Diane Stiles

ATTEST



Clerk/Treasurer, Debora Boyd

**AGREEMENT FOR ESTABLISHING
WATER UTILITY SERVICE AREA BOUNDARIES**

RECEIVED

SEP 17 1992

SKAGIT COUNTY
HEALTH DEPT.

PREAMBLE

This Agreement for water utility service area boundaries identifies and establishes between the undersigned parties the external boundary of the service area for which the designated water purveyor has assumed direct retail water service responsibility. The responsibilities accepted by the water purveyor are outlined in the Skagit County Coordinated Water System Plan (CWSP), and as defined by the adopted rules and regulations of the Washington State Department of Health (DOH). Except as specifically provided herein, this Agreement does not give new authorities or responsibilities to any water purveyor or to Skagit County or State regulatory agencies, but acknowledges the geographical area for these designated service responsibilities.

The terms used within this Agreement shall be as defined in the implementing regulations of Chapter 70.116 RCW, except as identified below.

1. Skagit County Critical Water Supply Service Area Map shall mean the map incorporated into this Agreement as Attachment A for the retail service area, except as amended in accordance with the CWSP procedures and with the concurrence of the affected water purveyors.
2. Retail Service Area shall mean the designated geographical area in which a purveyor shall supply water either by direct connection to the existing system, by a remote/detached system, or through interim service by an adjacent utility under agreement with the designated utility.
3. Wholesale Service Area shall mean the designated geographical area in which a purveyor, a group of purveyors, or another organization provides water to other water purveyors on a wholesale basis. A wholesale water supplier shall not provide water to individual customers in another purveyor's retail service area except with the written concurrence of the purveyor responsible for the geographical service area in question.
4. Lead Agency for administering the Agreement For Establishing Water Utility Service Area Boundaries shall be the Skagit County Department of Health, unless otherwise established by amendment to the CWSP.

The authority for this Agreement is granted by the Public Water System Coordination Act of 1977, Chapter 70.116 RCW.

TERMS OF AGREEMENT

WHEREAS, Such an Agreement is required in WAC 246-293-250, Service Area Agreements-Requirement, of the Public Water System Coordination Act; and

WHEREAS, Designation of retail water service areas, together with the cooperation of utilities, will help assure that time, effort, and money are best used by avoiding unnecessary duplication of service; and

WHEREAS, Definite future service areas will facilitate efficient planning for, and provision of, water system improvements within Skagit County as growth occurs; and

WHEREAS, Responsibility for providing water service through ownership and/or management of water systems in a designated service area is vested in the designated utility; and

WHEREAS, Definite retail and wholesale service areas will help assure that water reserved for public water supply purposes within Skagit County will be utilized in the future in an efficiently planned manner,

NOW, THEREFORE, the undersigned parties, having entered into this Agreement by signature of its authorized representatives, concur with and will abide by the following provisions:

Section 1. Service Area Boundaries. The undersigned parties acknowledge that the Skagit County Critical Water Supply Service Area Map, included as Attachment A to this Agreement and as may be subsequently updated, identifies the purveyor's future water service area. The undersigned further acknowledge that there are no service area conflicts with adjacent water purveyors, or, where such conflicts exist, agrees that no new water service will be extended within disputed areas until such conflicts are resolved.

Section 2. Common Service Area Transfer. It is understood that purveyors may initially continue existing water service within the boundaries of neighboring purveyors, as defined in Attachment A. Such common service areas, if they exist, are described in Attachment B to this agreement. Also included in Attachment B are copies of, or a list of, all resolutions, ordinances, or agreements permitting these uncontested overlays. The undersigned parties agree that any water line for retail service extending outside of the retail service area boundary, as set forth in Attachment A, shall be phased out and service transferred to the designated adjacent purveyor on an economic basis or by mutual agreement.

Economic basis considerations shall include, but are not limited to:

- (a) A determination by the present owner of service lines that maintenance, repair, and/or replacement costs exceed attributable income.
- (b) Planned or imminent major street improvements or major improvements to either or both water systems which include an opportunity to transfer service.

The terms of the transfer of service area described in this Section shall be established in a separate agreement among the adjacent purveyors whose boundaries are affected.

Section 3. Boundary Streets. Unless separate agreements exist with adjacent purveyors concerning water services or other utility services, the parties agree that the water purveyor which is located to the north or east of boundary streets between this purveyor and adjacent purveyors shall be entitled to provide future water service on both sides of those streets. Depth of service on boundary streets shall be limited to one platted lot or as otherwise agreed by the utilities. Existing services on boundary streets shall remain as connected unless transfer of service is agreed to by both purveyors, as per Section 2. These provisions do not disallow the placement of mains in the same street by adjacent purveyors where geographic or economic constraints require such placement for the hydraulic benefit of both purveyors.

Section 4. Boundary Adjustments. If, at some time in the future it is deemed appropriate by one or both of the undersigned parties to make service area boundary adjustments, such modifications must receive written concurrence (which shall not be unreasonably withheld) of all purveyors that would be directly affected by such a boundary adjustment and the legislative authority(ies) having jurisdiction. These written modifications shall be noted and filed with the designated Skagit County lead agency and DOH. It is understood by the undersigned parties that if, as provided by RCW 70.116.040, the purveyor is unable to provide service within its designated service area boundary it may decline to do so. But, in that case, an applicant will first be referred to adjacent purveyors with an approved water system plan that provides for expansion. An existing system shall be considered "adjacent" to the proposed development if service can be provided with a waterline extension not to exceed one-half mile in length. If service will not be provided by an adjacent purveyor, the developer will be referred to the Skagit County PUD. The original service area boundary will be adjusted accordingly. This provision does not apply where boundary adjustments are made as a result of municipal annexations or incorporations, nor is it intended to modify the provisions of state law.

Section 5. Service Extension Policies. The undersigned parties agree that prior to expanding the purveyor's water service area, other than by addition of retail customers to existing water mains, the purveyor shall have adopted design standards

customers to existing water mains, the purveyor shall have adopted design standards and utility service extension policies. The design standards shall meet or exceed the Skagit County CWSP Minimum Design Standards.

Municipalities further agree that if an individual municipality identifies a service area outside of its existing municipal corporate boundaries, said municipality shall assume full responsibility for providing water service equivalent to (excluding rates and charges) the level of service provided for their inside-city customers. This shall be in conformance with applicable land use policies.

Section 6. Systems Placed in Receivership. RCW 43.70.195 enacted in the 1990 Regular Session of the Washington State Legislature provides that whenever an action is brought in superior court to place a public water system in receivership, the petition to the court shall name candidates for receiver who have consented to assume operation of the water system. The undersigned purveyor agrees to be named as receiver in such actions initiated for systems within its designated service area. By this consent, the undersigned does not waive its rights to appear and participate in the court proceedings to determine acceptable conditions of receivership.

This agreement by reference includes the following attachments:

Attachment A - Skagit County Critical Water Supply Service Area Map. (see Section 1)

Attachment B - Common Service Area Agreement - Optional - Utility may attach copies or list such agreements if relevant. (see Section 2)

IN WITNESS WHEREOF, the undersigned parties have executed this Agreement.

Board of County Commissioners
Skagit County, Washington

W.W. Vaux
W. W. Vaux, ~~Chairman~~ *Comm.*

Robby Robinson
Robby Robinson, Commissioner

Ruth Wylie
Ruth Wylie, Commissioner

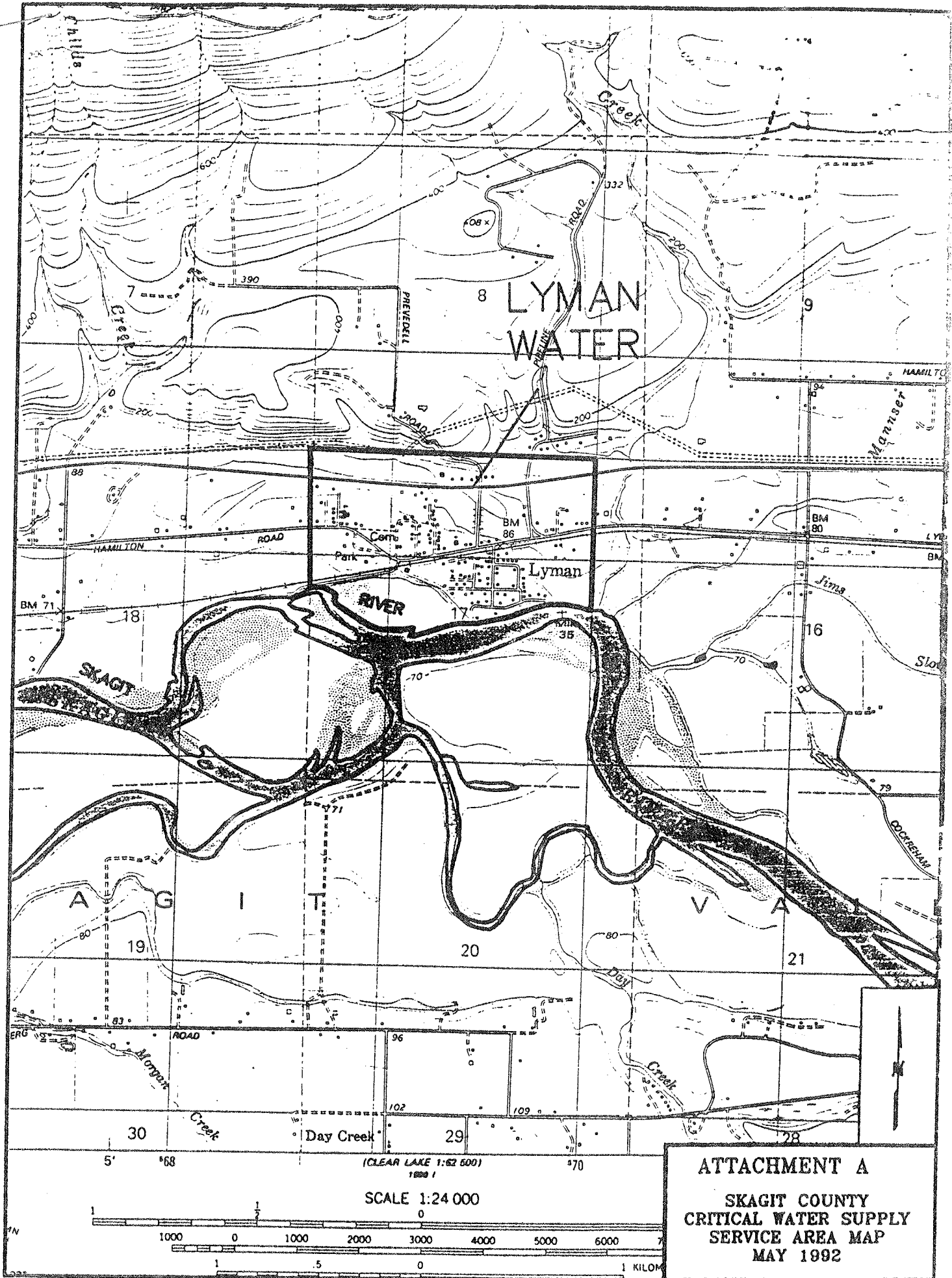
10/6/92
Date

TOWN OF LYMAN
Water Purveyor

Barbee Anderson
Representative *(initials)*

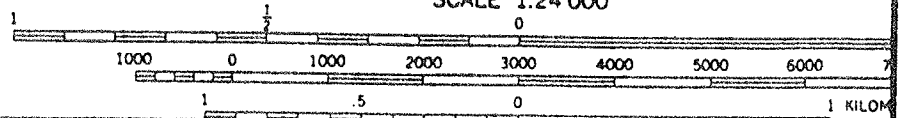
MAYOR
Title

SEPTEMBER 17, 1992
Date



ATTACHMENT A
SKAGIT COUNTY
CRITICAL WATER SUPPLY
SERVICE AREA MAP
MAY 1992

SCALE 1:24 000



Town of Lyman Water Department Service Agreement

CONDITIONS FOR PROVIDING SERVICE:

Water service is provided based on the following terms and limitations:

- 1) The customer agrees to take all measures necessary to prevent the contamination of the plumbing system within his premises and the Purveyor's distribution system that may occur from backflow through a cross connection. These measures shall include the prevention of backflow under any back pressure or backsiphonage condition, including the disruption of supply from the Purveyor's system that may occur by reason of routine maintenance or during emergency conditions, such as a water main break.
- 2) The customer agrees to install, operate and maintain at all times, his plumbing system in compliance with the current edition of the Plumbing Code having jurisdiction as it pertains to the prevention of contamination, and protection from thermal expansion due to a closed system that could occur with the present or future installation of backflow preventers on the customer's service and/or at plumbing fixtures.
- 3) For cross connection control or other public health related surveys, the customer agrees to provide free access for the employees or agents of the Purveyor to all parts of the premises during reasonable working hours of the day for routine surveys, and at all times during emergencies. Where agreement for free access for the Purveyor's survey is denied, water service may be supplied by the Purveyor, provided premises isolation is provided through a Purveyor/WA DOH approved reduced pressure backflow assembly (RPBA).
- 4) The customer agrees: (a) to have tested upon installation, annually thereafter or when requested by the Purveyor, after repair and after relocation his RPBA or DCVA installed to protect the Purveyor's distribution system, (b) to have all testing done by a Purveyor approved and State Department of Health currently certified Backflow Assembly Tester (BAT) with certification as a Cross Connection Control Specialist (CCS), (c) to have the RPBA or DCVA tested following the procedures approved by the WA DOH with the recommended additional procedures in the "*Cross Connection Control Manual, Accepted Procedures and Practice*", Sixth Edition, December 1995, or latest edition thereof, and (d) to submit to the Purveyor the results of the test(s) on the Purveyor supplied test report form within the time period specified by the Purveyor.

The customer agrees to bear all costs for the aforementioned installed, testing, repair, maintenance and replacement of the RPBA or DCVA or derivative thereof installed to protect the Purveyor's distribution system.

- 5) At the time of application for service, if required by the Purveyor, the customer agrees to submit plumbing plans and/or a cross connection control survey of the premises by a Purveyor approved and Washington Department of Health certified Cross Connection Control Specialist (CCS).

The survey shall assess the cross connection hazards and list the backflow prevention provided within the premises. The results of the survey shall be submitted prior to the Purveyor turning on water service to a new customer. The cost of the survey shall be borne by the customer.

- 6) For classes of customers other than single family residential, when required by the Purveyor, the customer agrees to submit a cross connection control re-survey of the premises by the person described above. The Purveyor may require the re-survey to be performed in response to changes in customer's plumbing, or performed periodically (annual or less frequent) where the Purveyor considers the customer's plumbing system to be complex or subject to frequent changes in water use. The cost of the re-survey shall be borne by the customer.
- 7) Within 30 days of a request by the Purveyor, a residential customer shall agree to complete and submit to the Purveyor a "Water Use Questionnaire" for the purpose of surveying the health hazard posed by the customer's plumbing system of the Purveyor's distribution system. Further, the residential customer agrees to provide within 30 days of the request by the Purveyor a cross connection control survey of the premises by a Purveyor approved and Washington Department of Health certified Cross Connection Control Specialist (CCS).
- 8) The customer agrees to obtain the prior approval from the Purveyor for all changes in water use, and alterations and additions to the plumbing system, and shall comply with any additional requirements imposed by the Purveyor for cross connection control.

- 9) The customer agrees to immediately notify the Purveyor and the local public health Inspection jurisdiction of any backflow incident occurring within the premises, (i.e., entry into the potable water of any contaminant or pollutant) and shall cooperate fully with the Purveyor to determine the reason for the incident.
- 10) The customer acknowledges the right of the Purveyor to discontinue water supply within 72 hours of giving notice, or a lesser period of time if required to protect the public health if the customer fails to cooperate with the Purveyor in the survey of premises, in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies or air gaps required by the Purveyor, or in the Purveyor's effort to contain a contaminant or pollutant that is detected in the customer's system.

Without limiting the generality of the foregoing, in lieu of discontinuing water service the Purveyor may install a reduced pressure backflow assembly (RPBA) on its service pipe to provide premises isolation, and recover all of its costs for the installation and subsequent maintenance and repair of the assembly, appurtenances and enclosure from the customer as fees and charges for water. The failure of the customer to pay these fees and charges may result in termination of service in accordance with the Purveyor's water billing policies.

- 11) The customer agrees to indemnify and hold harmless the Purveyor for all contamination of the customers plumbing system or the Purveyor's distribution system that results from an unprotected or inadequately protected cross connection within his premises. This indemnification shall pertain to all backflow conditions that may arise from the Purveyor's suspension of water supply or reduction of water pressure, recognizing that the air gap separation otherwise required would require the customer to provide adequate facilities to collect, store and pump water for his premises.
- 12) The customer agrees that, in the event legal action is required and commenced between The Purveyor and the customer to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.
- 13) The customer acknowledges that the Purveyor's survey of a customer's premises is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, commensurate within the Purveyor's assessment of the degree of hazard.

It shall not be assumed by the customer or any regulatory agency that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by the Purveyor personnel constitutes an approval of the customer's plumbing system, or an assurance to the customer of the absence of cross connection therein.

- 14) The customer acknowledges the right of the Purveyor, in keeping with changes to State regulations, industry standards, or the Purveyor's risk management policies, to impose retroactive requirements for additional cross connection control measures.

The Purveyor shall record the customer's agreement to the above terms for service on an "Application of Water Service", "Application for Change of Water Service" or other such forms prepared by the Purveyor and signed by the customer.

TOWN OF LYMAN
WATER POLICY
JUNE 10, 2008

Water meters will be read on or about the 25th of each month. Water bills will be sent on or about the last day of the month to insure they are received by customers no later than the 2nd day of the month.

Water bills will be due on the 10th of the month

A bill will be considered past due on the 25th of the month and subject to a \$5.00 late fee.

If a water bill is not paid by the 10th of the following month it will be considered delinquent. The delinquent amount of the bill must be paid by the 25th or a shut off notice will be issued, and the terms of the shut off must be met.

A shut off means: A \$50.00 charge will be added to your water bill. In order to have your water turned back on, your water bill will have to be paid in full, plus a reconnect fee of \$50.00. This applies to all water customers.

Shut off notices will be issued the Monday after the 25th.

If a customer falls on hard times and comes in and makes arrangements for payments, a contract may be drawn up. The payments on the contract must be followed. If a customer breaks the contract, the shut off rules will apply.

To voluntarily have your water shut off there will be a \$25.00 fee.

Property owners are liable for their renter's water bill that is unpaid.

INTERLOCAL COOPERATIVE AGREEMENT
BETWEEN
PUBLIC UTILITY DISTRICT NO. 1 OF SKAGIT COUNTY
AND
TOWN OF LYMAN

THIS AGREEMENT is made and entered into by and between the Town of Lyman (“Town”) and Public Utility District No. 1 of Skagit County, Washington (“District”) pursuant to the authority granted by Chapter 39.34 RCW, INTERLOCAL COOPERATION ACT.

1. PURPOSE: The purpose of this agreement is to provide a framework under which the District may provide materials, equipment, and personnel to assist the Town of Lyman with installation of new water service connections, emergency repairs to failed or damaged system infrastructures, and additional technical services as requested.

2. RECITALS

A. The District is authorized to operate water systems pursuant to Title 54 RCW and employs certified water system operators for its water systems in Skagit County.

B. The District is willing to provide Town’s water system with temporary operators (“Crew”) and equipment to meet Town’s needs as provided in Section 3, Paragraph A. A Crew typically consists of a Foreman, two Construction Workers and a dump truck, backhoe & trailer, crew truck, or other equipment as required.

C. Installation of New Water Services

- i. From time to time the Town has a need for the installation of water service connections.
- ii. The District is willing to provide certified water system operators, equipment, and materials on an as needed basis for the installation of water services according to the fee schedule attached as Exhibit “A”, so long as the installation may reasonably be accomplished within an 8-hour work day. Additional time beyond this duration that is used to perfect site conditions such as rock excavation, unsuitable soils, structure excavation, discovery of contaminated soils, unknown conflicting utilities, and the like will be charged at a time and materials rate. The District shall be reimbursed for establishment of services with sizes different than those in Exhibit “A” at a rate equal to the District’s cost, including overhead and administration charges. Town is willing to pay the fixed fees listed in Exhibit “A” for establishment of 1-inch, 1½ – inch, and 1-inch double services.

D. Emergency Repairs

- i. From time to time the Town has a need for emergency equipment and personnel to provide or assist with emergency repairs to failed or damaged system infrastructures.

- ii. The District is willing to provide Town with certified water system operators, equipment, and materials on an as needed basis at a reimbursement rate equal to District cost, including overhead and administrative fees, for labor, equipment, materials, tools, and incidentals, including any overtime hours incurred to reasonably meet the needs of the Town and in accordance with Section 3. These rates are subject to change based upon the Labor Agreement between the District and Teamsters Local #231.
 - iii. Town is willing to pay for all expenses incurred by the District for such services as tracked with a Customer Job Order (CJO) plus taxes and overhead and administration fees.
- E. Technical Assistance
- i. From time to time the Town has a need for technical assistance with operations, maintenance, and construction activities.
 - ii. The District is willing to provide certified water system operators and technical staff on an as needed basis including any overtime hours incurred to reasonably meet the needs of the District and Town and in accordance with Section 3. These rates are subject to change based upon the Labor Agreement between the District and Teamsters Local #231.
 - iii. Town is willing to pay for all expenses incurred by the District for such services as tracked with a Customer Job Order (CJO) plus taxes and overhead and administration fees.
- F. The Parties have an existing Interlocal Cooperative Agreement entered into April 14, 2010.
- G. The Parties agree to repeal the previous Agreement.
- H. The Parties desire to enter into this agreement pursuant to RCW 39.34, the Interlocal Cooperation Act, to assist Town with continued operation of its System and to utilize the District's certified operators and equipment on an as-needed basis and to establish fixed fees for the installation of 1-inch, 1¹/₂-inch, and 1-inch double services.

NOW, THEREFORE, in light of the foregoing Recitals, which are incorporated herein as part of the agreement of the Parties, and the mutual terms, conditions, and covenants set forth below, the Parties agree as follows:

3. District's Obligations.

A. Emergency and Call-Out Services. The District will provide Crew resources and equipment to meet Town's Water System emergency operational needs as requested by Town providing such District resources are available at the time of the request. The operational needs of the District's Facilities will take precedence over any work requested by Town. Subject to District priorities taking precedence and the availability of crews and equipment, the District will provide emergency and call-out services, based on a two hour minimum during a regular work week (Monday through Friday), on week-ends, and after regular business hours (8 a.m. to 5 p.m.) to Town as needed upon request.

B. Work Order. The District will create a Work Order to track all time and material expenses incurred by the District for any assistance requested by Town, or to track fixed fee services contained in Exhibit "A". Rates to Town for labor, including overtime, equipment, and materials shall be at the District's current rates for labor and equipment. Material costs will reflect current purchase price through District vendors.

C. Overhead and Administration Fees. The District will add 20% as administration costs to each invoice that is billed to Town. Added to the District's labor rates are a fringe benefit labor cost of 60% and warehouse handling expenses of 35% for materials removed from District's warehouse inventory.

D. Approval and Authorization of Work. The request by Town may be initially approved by oral agreement by the District's Operations Manager (or his/her designee). All oral agreements will be followed with written confirmation or written notice to proceed with the work. If the work is completed without written confirmation, the lack of a written confirmation will not affect Town's obligation to pay the costs of the work.

E. Invoice. The District shall provide an itemized invoice to Town for services rendered based on actual expenditures incurred, or the fixed fee on the Work Order plus taxes and overhead and administration fees.

F. District Employees. District personnel involved in this Agreement shall remain District employees paid from District funds with reimbursement from Town.

G. Auditor Filing. The District shall in compliance with RCW 39.34, upon execution of this Agreement, file it with the Auditor of Skagit County.

4. Town's Obligations.

A. Overtime. Town acknowledges that the District's water system operators or Crew are also providing service to District Facilities and therefore, depending on the needs of the System and the District's Facilities, overtime may be incurred and Town agrees to reimburse the District for all overtime incurred for work performed under this agreement.

B. Reimbursement. Town shall reimburse the District within 30 days of receipt of each invoice. Town agrees to pay actual costs incurred on the Work Order plus taxes and overhead and administration fees. Any estimates provided by the District are not binding and Town is responsible for all costs of the work regardless of the accuracy of any estimate that may have been provided by the District prior to the start of work.

C. Insurance. Town shall provide liability insurance coverage for the duration of this Agreement for its officers, agents and employees' activities while they are involved in the performance of this Agreement in an amount not less than one million dollars (\$1,000,000). The District's Auditor shall be provided proof of such insurance within thirty (30) days of the execution of this Agreement and the District will be named as an additional insured as respects this Agreement. If Town is self-insured, evidence of one million dollars (\$1,000,000) per occurrence coverage for general liability shall be provided to the District's Risk Manager by the administrator of the self-insurance program.

D. Indemnification. Town shall indemnify, defend, and hold harmless the District and any and all of the District's officers, principals, agents and employees from any liability,

loss, damage, cost, charge or expense, whether direct or indirect, and whether occasioned by injury or loss to persons or property to which the District or said other indemnities may be put or subject by reason of any act, action, neglect, error, omission or default under this Agreement or otherwise on the part of Town or any of its officers or employees. Town agrees to indemnify, defend, and hold harmless the District from any and all claims by Town's customers for interruption of service.

E. Communication. Town shall be responsible for all contact with and notice to its customers with regard to any interruption of services.

5. Town May Provide Assistance to District upon Request. The parties recognize that the primary purpose of this Agreement is to outline the responsibilities of the Parties when Town receives assistance from the District. The parties recognize that there may also be times that Town will be able to offer assistance to the District through its certified water manager and use of its equipment. If the District requests assistance from Town, the term of this Agreement will apply to that work. The rates to be charged by Town will be agreed upon in advance of any work being done.

6. Organization/Administration.

A. General Manager (or designee) shall be the Administrator of this Agreement for the District insofar as it relates to the coordination and implementation of the emergency services.

B. The Town's Water System Operator (or designee) shall be the Administrator of this Agreement for Town insofar as it relates to agreed upon services.

7. No Warranties or Guarantees. The District makes no warranties or guarantees the Crews and/or equipment will be available to complete work as requested by Town. Further, the District makes no warranties or guarantees as to the timeliness in response to a request, the level of service in response to a request, or the ability to restore service to Town's customers within any particular time frame.

8. Term and Effective Date of Agreement. The effective date of this Agreement shall be _____, 2013. This agreement may be terminated upon sixty (60) days written notice by either Party.

9. Attorneys' Fees and Costs. In the event it is necessary for either Party to utilize the services of an attorney to enforce any of the terms of this Agreement, such enforcing Party shall be entitled to compensation for its reasonable attorneys' fees and costs. In the event of litigation regarding any of the terms of this Agreement, the substantially prevailing Party shall be entitled, in addition to other relief, to such reasonable attorneys' fees and costs as determined by the court.

10. Independent Contractor. The District is an independent contractor with respect to all activities associated with this Agreement. Nothing in this Agreement shall be considered to create the relationship of employer and employee between the Parties. The District and its employees shall not be entitled to any benefits afforded Town's employees. The District shall be

solely responsible for withholding federal income tax and associated employment related taxes from wages paid to its employees.

11. Notices. Any notices shall be effective if personally served upon the other Party or if mailed by registered or certified mail, return receipt requested, to the following addresses, or such other address as a Party may designate in writing and shall be deemed given on the date of mailing:

12. Remedies. In the event of default of any provision of this Agreement, the non-defaulting Party shall have all rights and remedies existing at law including the right to recover monies paid and wrongfully expended, and to seek other damages allowed by law.

13. Entire Agreement. This Agreement contains the entire Agreement between the Parties with respect to the subject matter hereof and supersedes all prior Agreements or understandings between the Parties with respect thereto.

IN WITNESS WHEREOF, the Parties have executed this Agreement this 23rd day of October, 2013.

PUBLIC UTILITY DISTRICT NO. 1
OF SKAGIT COUNTY

By: [Signature]
Title: General Manager

TOWN OF LYMAN

By: [Signature]
Title: Mayor

Exhibit "A"
TO
INTERLOCAL COOPERATIVE AGREEMENT
BETWEEN
PUBLIC UTILITY DISTRICT NO. 1 OF SKAGIT COUNTY
AND
TOWN OF LYMAN

- I. Included Work:
 - a. Mobilization to and from the Town of Lyman.
 - b. Pavement removal and restoration.
 - c. Tapping of live watermain.
 - d. Either trenching and backfill, according to jurisdictional standards, or trenchless establishment of service line as determined by District.
 - e. Supply of all equipment, tools, material, labor and incidentals to establish a "200 PSI Poly" service according to the District's most current standard detail, of the applicable diameter, with the exception of the supply and installation of the meter itself.
 - f. Required pressure and bacterial testing.
 - g. Clean up.
 - h. Restoration of ditch and non-decorative concrete and asphalt pavement.

- II. Excluded Work:
 - a. Traffic Control.
 - b. Restoration of lawns and private landscape both in and out of the public right-of-way.
 - c. Restoration of decorative concrete and other decorative pavements including asphalt, concrete pavers or bricks, and retaining walls composed of natural or manmade material.
 - d. Obtaining permits to work within the rights-of-way.

- III. Fixed Fee Schedule
 - a. 1 - inch Service \$2,017.46
 - b. 1½ - inch Service \$3,223.56
 - c. 1 - inch Double Service \$2,971.88

APPENDIX F
TREATMENT INFORMATION

DISINFECTION CT SUMMARY

System Name : Lyman Water Dept

ID#: 490500

County: Skagit

Source Name/ID: Wells 1&2 (S01,S02)

CT Study Approved (m/d/yy): 1/8/01

Submittal # (if known): 00-1212

Maximum flowrate: 370 Units: gpm

Other conditions: 1. PHF=370 gpm based on both wells pumping, as reported by system operator

2.

3.

Seq No.	Description (include dimensions)	Disinfectant	T ₁₀ method	Baffling Efficiency 1 = plug flow	CT Volume (gal)	Effective Volume (gal)	How PHF determined	Daily Calculation Method for "t"
1	1100 LF 8 in diam PVC C900	Hypochlorite	Empirical	1.0	1616	1616	see conditions	3.2
2	500 LF 8 in diam HDPE	Hypochlorite	Empirical	1.0	1305	1305		2.6
3	700 LF 6 in diam DI	Hypochlorite	Empirical	1.0	1028	1028		2.0
4	TOTAL	none	none			3949		t=10.7 min
5		none	none					
6		none	none					

Why is this system disinfecting?

- SWTR or GWI
- GWI-hydraulic connection
- Groundwater Rule
- Coliform
- Voluntary/Precautionary
- Other (describe):

CT Performance Standard:

- SWTR-
 - log Giardia inact
 - log viral inactivation
- Viral inactivation (CT=6)
 - 0.6 mg/l min residual at entry
- None

Distribution Residual Requirements:

- Detectible
- 0.2 mg/l
- None

Reviewed by: N Feagin

Date: (m/d/yy) 5/15/06

Corrosion Control Water Quality/Water System Data Sheet

-Please mark one of the following options and complete the information sheet-

I am requesting that the Department of Health (DOH) use this information to select an appropriate corrosion control treatment process for the public water system listed below. I understand that the water system will be billed \$162.00 for the first source, and \$81.00 for each additional source that is considered in selecting the treatment process.

I (will have) or (have had) a corrosion control recommendation report prepared by a private consultant and submitted to DOH by the date assigned by DOH in the cover letter.

System Name: Lyman Water Dept.

Contact Person: Chris Stoesmont

PWS ID#: 49050 - 0

Phone Number: (360) 826 - 3033

Address: P.O. Box 1248

Lyman, WA 98263

(Attach copies of lab report forms for general IOC and WQP sampling, and all field pH and Temp results taken by a qualified lab or person)

Sampling Site Location and Date	pH field test	Alkalinity mg/L CaCO ₃	Calcium mg/L CaCO ₃	Conductivity umhos/cm (optional)	Temperature degrees F. (optional)	Iron mg/L (if needed)	Manganese mg/L (if needed)
1. Well #1 3/14/00	6.4	40.0	9.90	99.3	9.5C in field	ND \emptyset	\emptyset
2. Well #2 3/14/00	7.0	37.5	9.10	94.3	9.3C in field	0.25	0.002
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Signature: _____

Date: 3-14-00

**Recommended Corrosion Control Treatment Process Using EPA's
Guidance Manual for Selecting Lead and Copper Control Strategies**

PWS Name: Lyman Water Department

PWS #: 490500

Reviewed by: Nancy Feagin

Date: June 7, 2000

Data Provided by PWS:

System Exceeded COPPER Action Level

Source	pH	Alkalinity mg/l as CaCO ₃	Calcium mg/l as CaCO ₃	DIC	Other
S01-well #1	6.3-6.4	39.5-40.0	9.9-10.0	18.9-21.6	Mn<0.05 mg/l Fe<0.2 mg/l
S02-well #2	6.6-7.0	35.6-37.5	9.0-9.1	11.2-13.5	Mn<0.05 mg/l Fe<0.2 mg/l*

*one iron measurement from well #2 was greater than 0.2 mg/l. The other three measurements were below 0.2 mg/l as follows:

6/11/93 ND

11/9/99 0.06 mg/l

11/18/99 0.05 mg/l

3/14/00 0.25 mg/l

Treatment Strategy:

Feasible treatment strategies to raise the pH include aeration, soda ash or potash addition, or addition of caustic. An efficiently designed aeration system is recommended for safety and reliability reasons.



STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20435 72nd Avenue South, Suite 200, Kent, Washington 98032-2358

SYSTEM INSPECTION/MEETING SUMMARY

DATE OF VISIT: August 22, 2011

NAME OF SYSTEM: Lyman Water Department (ID#490500)

COUNTY: Skagit

THOSE ATTENDING: ⁷³ Nancy Feagin, Mark Kitchen, Cas Hancock, Mayor Debra Heinzman

REASON FOR INSPECTION: Routine Sanitary Survey

----- OBSERVATIONS -----

General. This system is located about nine miles east of Sedro Woolley on the North Cascades Highway. It serves 202 residential and 15 non-residential/commercial connections. The Town made significant upgrades to the source, storage and distribution system in 1994 using funding from the USDA.

Source. The Town receives its drinking water from two groundwater wells: Well no. 1 (AKF855) & Well no. 2 (ABR314). Well no. 1 is the primary source and is 35 feet deep. Well no. 2 is the backup source and is ⁵¹41 feet deep. The maximum flow rate with both wells pumping is 370 gpm.

Treatment. Continuous disinfection and corrosion control treatment are required for this system. The flow from the two wells is combined at well #1 where sodium hypochlorite and sodium hydroxide (caustic) are injected. Sodium hypochlorite is generated on-site. A minimum residual of 0.6 mg/L is required at the reservoir inlet and the distribution residual must be maintained at or above 0.2 mg/L. Distribution residuals have been averaging in the range of 0.7 to 0.8 mg/L. A target pH of 7.6 has been established and has been successful at controlling copper corrosion as shown by lead and copper tap samples.

Distribution. The majority of the distribution system was replaced in 2004. Nonetheless, the Town is experiencing high distribution system leakage, around 40 percent. They will be hiring a leak detection contractor shortly to identify leaks.

Finished Water Storage. Water is pumped to a 158,600 gallon Mount Baker silo concrete storage reservoir installed in 2004. The reservoir provides gravity flow to the entire distribution system. Although the system does not have standby power at the well site, the capacity of this reservoir is sufficient for at least 2 to 3 days.



Pumping Facilities and Controls. Other than the two submersible well pumps, the Town does not have any pumping facilities.

Water Quality Monitoring/Reporting. The Town is currently in compliance with all primary and secondary standards and has completed all of the required water quality testing.

System Management & Operation. The Town's water system plan was approved on March 6, 2002 and was valid for a period of six years. As an update is overdue, a preplanning conference was held last month.

The design of the system has been approved by the department for up to 257 residential and 15 non-residential connections. The previous water system plan indicates that the system capacity is limited by the annual quantity on the water right certificate. Because of the significant drop in water usage since the system improvements were completed, capacity of the system should be re-evaluated in the water system plan update.

Several years ago, the water utility took a loan from the Town's general fund to make its annual USDA payment. They are currently working under a three year deadline to repay these funds. This has lead to a short term cash shortage. Water rates were increased last year to provide a more sustainable financial future for the water utility.

Operator Certification. Cas is a certified water distribution manager 2 (WDM2) and meets the operator certification requirement for the Town. She is also a certified cross connection control specialist and oversee's the Town's cross connection control program. Mark is the public works superintendent, is certified as a WDM1 and provides day-to-day operation of the system.

Previous Survey Deficiencies. The previous sanitary survey was completed on April 21, 2006. The following deficiencies were found:

- Inspect the top of the reservoir at least once per quarter. *(completed)*
- Send photos of the reservoir hatch, hatch seal, vent and vent screen. *(not completed)*
- Screen reservoir overflow pipe *(completed)*
- Lock reservoir ladder cage *(completed)*
- Survey existing customers for cross connection hazard *(completed)*
- Develop procedure to evaluate new customers for cross connection hazard *(not completed)*
- Maintain 0.6 mg/L chlorine residual at reservoir inlet. *(completed)*
- Confirm CT piping dimensions *(completed)*
- Start calculating unaccounted-for water, now distribution system leakage *(completed)*

APPENDIX G

HYDRAULIC MODELING AND NODE MAPS

Fire Flow 2013

ID	Total Demand (gpm)	Critical Node 1 ID	Critical Node 1 Pressure (psi)	Critical Node 1 Head (ft)	Adjusted Fire-Flow (gpm)	Available Flow at Hydrant (gpm)	Critical Node 2 ID	Critical Node 2 Pressure (psi)	Critical Node 2 Head (ft)	Adjusted Available Flow (gpm)	Design Flow (gpm)
J-1	1,001	J-45	55.78	237.72	6,204	4,166	J-17	14.02	127.15	3,881	3,881
J-5	1,002	J-45	55.78	237.72	6,205	2,649	J-5	20	131.86	2,649	2,649
J-31	1,001	J-45	55.78	237.72	6,204	5,553	J-31	20	144.16	5,553	5,553
J-49	1,002	J-45	55.78	237.72	6,205	2,261	J-49	20	130.16	2,261	2,261
J-55	1,001	J-55	33.75	171.9	1,234	1,234	J-55	20	140.16	1,234	1,234
J-59	1,001	J-59	50.89	210.45	1,950	1,950	J-59	20	139.16	1,950	1,950
J-63	1,002	J-45	55.78	237.72	6,205	2,673	J-127	18.7	137.15	2,630	2,630
J-67	1,001	J-45	55.78	237.72	6,204	3,221	J-127	19.56	139.15	3,203	3,203
J-69	1,002	J-127	54.97	220.86	2,454	2,507	J-127	18.27	136.16	2,454	2,454
J-73	1,002	J-73	47.75	202.19	1,713	1,713	J-73	20	138.16	1,713	1,713
J-79	1,002	J-79	20.41	138.11	1,007	1,007	J-79	20	137.16	1,007	1,007
J-107	1,002	J-105	39.81	186.39	1,404	1,416	J-105	19.35	139.15	1,404	1,404
J-109	1,002	J-109	32.78	170.15	1,214	1,214	J-109	20	140.66	1,214	1,214
J-125	1,001	J-125	29.14	147.24	1,117	1,118	J-125	20	126.16	1,118	1,117
J-129	1,002	J-127	54.46	219.69	2,378	2,366	J-59	19.13	137.15	2,341	2,341
J-135	1,003	J-135	48.08	202.97	1,735	1,735	J-135	20	138.16	1,735	1,735
J-141	1,002	J-193	38.4	172.63	1,303	1,315	J-193	19.13	128.16	1,303	1,303
J-159	1,002	J-45	55.78	237.72	6,205	5,152	J-17	16.18	132.13	4,919	4,919
J-175	1,000	J-175	54.45	234.67	4,192	4,192	J-175	20	155.16	4,192	4,192
J-193	1,001	J-193	34.13	162.78	1,209	1,210	J-193	20	130.16	1,210	1,209
J-213	1,001	J-213	20.57	138.96	1,008	1,008	J-213	20	137.66	1,008	1,008
J-223	1,002	J-223	43.86	193.71	1,531	1,531	J-223	20	138.66	1,531	1,531

Fire Flow 2019

ID	Total Demand (gpm)	Critical Node 1 ID	Critical Node 1 Pressure (psi)	Critical Node 1 Head (ft)	Adjusted Fire-Flow (gpm)	Available Flow at Hydrant (gpm)	Critical Node 2 ID	Critical Node 2 Pressure (psi)	Critical Node 2 Head (ft)	Adjusted Available Flow (gpm)	Design Flow (gpm)
J-1	1,001	J-45	55.76	237.7	6,199	4,162	J-17	14.02	127.15	3,877	3,877
J-5	1,002	J-45	55.76	237.7	6,200	2,647	J-5	20	131.86	2,647	2,647
J-31	1,001	J-45	55.76	237.7	6,200	5,549	J-31	20	144.16	5,549	5,549
J-49	1,002	J-45	55.76	237.7	6,200	2,260	J-49	20	130.16	2,260	2,260
J-55	1,001	J-55	33.66	171.69	1,232	1,232	J-55	20	140.16	1,232	1,232
J-59	1,001	J-59	50.84	210.34	1,948	1,948	J-59	20	139.16	1,948	1,948
J-63	1,002	J-45	55.76	237.7	6,201	2,670	J-127	18.7	137.15	2,628	2,628
J-67	1,001	J-45	55.76	237.7	6,200	3,217	J-127	19.56	139.15	3,200	3,200
J-69	1,002	J-127	54.93	220.76	2,451	2,505	J-127	18.27	136.16	2,452	2,451
J-73	1,002	J-73	47.7	202.08	1,712	1,712	J-73	20	138.16	1,712	1,712
J-79	1,002	J-79	20.32	137.89	1,006	1,006	J-79	20	137.16	1,006	1,006
J-107	1,003	J-105	39.73	186.2	1,402	1,414	J-105	19.35	139.15	1,402	1,402
J-109	1,002	J-109	32.69	169.94	1,213	1,213	J-109	20	140.66	1,213	1,213
J-125	1,001	J-125	29.09	147.13	1,117	1,118	J-125	20	126.16	1,118	1,117
J-129	1,002	J-127	54.42	219.59	2,375	2,364	J-59	19.13	137.15	2,339	2,339
J-135	1,003	J-135	48.03	202.86	1,733	1,733	J-135	20	138.16	1,733	1,733
J-141	1,002	J-193	38.38	172.57	1,302	1,315	J-193	19.13	128.16	1,302	1,302
J-159	1,002	J-45	55.76	237.7	6,200	5,148	J-17	16.17	132.13	4,915	4,915
J-175	1,000	J-175	54.44	234.64	4,190	4,190	J-175	20	155.16	4,190	4,190
J-193	1,001	J-193	34.11	162.71	1,208	1,209	J-193	20	130.16	1,209	1,208
J-213	1,001	J-213	20.47	138.74	1,007	1,007	J-213	20	137.66	1,007	1,007
J-223	1,002	J-223	43.81	193.6	1,530	1,530	J-223	20	138.66	1,530	1,530

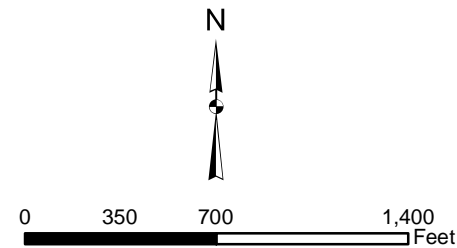
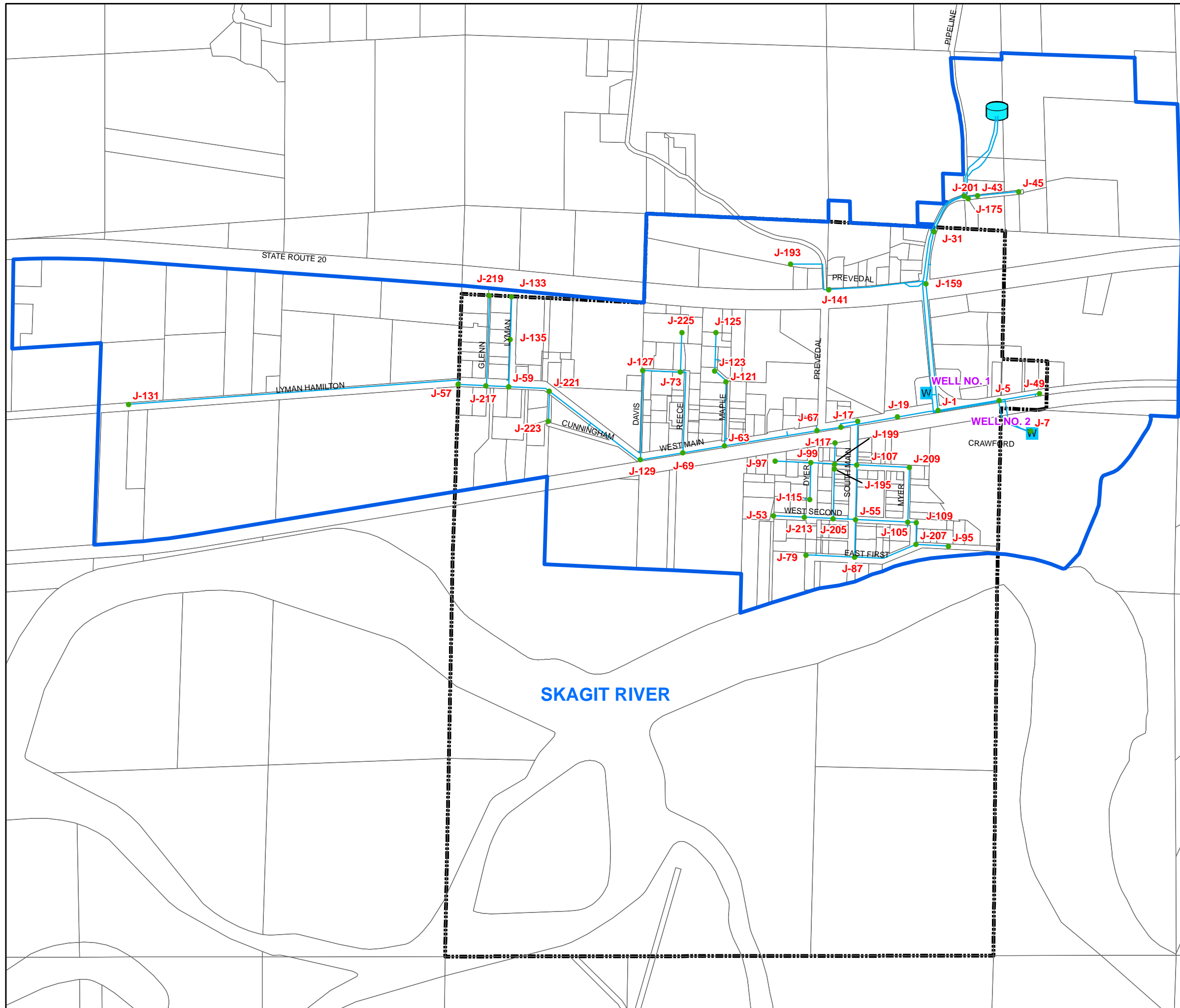
Fire Flow 2033

ID	Total Demand (gpm)	Critical Node 1 ID	Critical Node 1 Pressure (psi)	Critical Node 1 Head (ft)	Adjusted Fire-Flow (gpm)	Available Flow at Hydrant (gpm)	Critical Node 2 ID	Critical Node 2 Pressure (psi)	Critical Node 2 Head (ft)	Adjusted Available Flow (gpm)	Design Flow (gpm)
J-1	1,001	J-45	55.73	237.63	6,188	4,152	J-17	14.01	127.14	3,867	3,867
J-5	1,002	J-45	55.73	237.63	6,189	2,643	J-5	20	131.86	2,643	2,643
J-31	1,002	J-45	55.73	237.63	6,188	5,539	J-31	20	144.16	5,539	5,539
J-49	1,002	J-45	55.73	237.63	6,189	2,257	J-49	20	130.16	2,257	2,257
J-55	1,001	J-55	33.42	171.14	1,228	1,228	J-55	20	140.16	1,228	1,228
J-59	1,001	J-59	50.71	210.04	1,942	1,943	J-59	20	139.16	1,943	1,942
J-63	1,002	J-45	55.73	237.63	6,189	2,663	J-127	18.7	137.15	2,620	2,620
J-67	1,001	J-45	55.73	237.63	6,188	3,208	J-127	19.56	139.14	3,191	3,191
J-69	1,002	J-127	54.81	220.5	2,444	2,498	J-127	18.27	136.16	2,445	2,444
J-73	1,003	J-73	47.58	201.8	1,708	1,708	J-73	20	138.16	1,708	1,708
J-79	1,003	J-79	20.07	137.31	1,003	1,004	J-79	20	137.16	1,004	1,003
J-107	1,003	J-105	39.52	185.71	1,398	1,409	J-105	19.35	139.15	1,398	1,398
J-109	1,002	J-109	32.45	169.39	1,209	1,209	J-109	20	140.66	1,209	1,209
J-125	1,002	J-125	28.95	146.82	1,116	1,116	J-125	20	126.16	1,116	1,116
J-129	1,002	J-127	54.3	219.32	2,368	2,357	J-59	19.13	137.15	2,332	2,332
J-135	1,003	J-135	47.9	202.55	1,729	1,729	J-135	20	138.16	1,729	1,729
J-141	1,002	J-193	38.31	172.41	1,301	1,314	J-193	19.13	128.16	1,301	1,301
J-159	1,002	J-45	55.73	237.63	6,189	5,138	J-17	16.17	132.12	4,905	4,905
J-175	1,000	J-175	54.41	234.58	4,185	4,185	J-175	20	155.16	4,185	4,185
J-193	1,001	J-193	34.04	162.55	1,207	1,208	J-193	20	130.16	1,208	1,207
J-213	1,001	J-213	20.21	138.15	1,004	1,004	J-213	20	137.66	1,004	1,004
J-223	1,002	J-223	43.67	193.29	1,527	1,527	J-223	20	138.66	1,527	1,527

Peak Hour Demand 2013				
ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-1	1.74	81	257.7	76.56
J-5	4.64	85.7	257.7	74.53
J-7	0.58	83	257.7	75.7
J-17	1.16	94.8	257.64	70.56
J-19	0.58	82.7	257.67	75.82
J-31	3.47	98	257.83	69.26
J-43	2.31	109	257.88	64.51
J-45	4.05	109	257.67	64.42
J-49	4.05	84	257.7	75.26
J-53	4.05	90	257.32	72.5
J-55	2.31	94	257.33	70.77
J-57	4.05	92.3	257.54	71.6
J-59	2.9	93	257.55	71.3
J-63	5.21	91	257.58	72.18
J-67	2.9	93	257.63	71.33
J-69	5.21	90	257.57	72.61
J-73	5.81	92	257.56	71.74
J-79	5.81	91	257.33	72.07
J-87	4.05	90	257.33	72.5
J-95	2.9	90	257.33	72.5
J-97	4.64	93.5	257.14	70.9
J-99	2.31	94	257.37	70.79
J-105	2.9	94.5	257.33	70.55
J-107	6.38	93	257.37	71.22
J-109	4.05	94.5	257.33	70.55
J-115	1.16	93	257.35	71.21
J-117	1.74	93	257.35	71.21
J-121	4.64	92.5	257.57	71.53
J-123	2.31	82	257.57	76.08
J-125	3.47	80	257.57	76.94
J-127	4.05	94	257.56	70.87
J-129	4.05	91	257.56	72.17
J-131	8.1	80	251.51	74.32
J-133	1.16	89	257.52	73.02
J-135	6.95	92	257.54	71.73
J-141	5.21	82	257.78	76.17
J-159	4.05	86	257.79	74.44
J-175	0.58	109	257.88	64.51
J-185	1.74	86	257.55	74.33
J-193	2.9	84	257.78	75.3
J-195	1.16	93	257.37	71.22
J-199	4.64	93	257.01	71.06
J-201	1.16	109	257.88	64.51
J-203	0	109	257.88	64.51
J-205	5.21	93	257.32	71.2
J-207	2.9	93	257.33	71.2
J-209	6.38	94	257.34	70.78
J-213	2.31	91.5	257.32	71.85
J-217	2.31	92.5	257.55	71.51
J-219	2.9	89	257.3	72.93
J-221	4.64	92	257.55	71.73
J-223	5.21	92.5	257.55	71.52
J-225	3.47	90	257.41	72.54

Peak Hour Demand 2019				
ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-1	1.83	81	257.67	76.55
J-5	4.92	85.7	257.66	74.51
J-7	0.61	83	257.66	75.68
J-17	1.23	94.8	257.6	70.54
J-19	0.61	82.7	257.64	75.8
J-31	3.68	98	257.82	69.25
J-43	2.46	109	257.86	64.5
J-45	4.29	109	257.63	64.4
J-49	4.29	84	257.66	75.25
J-53	4.29	90	257.25	72.47
J-55	2.46	94	257.26	70.74
J-57	4.29	92.3	257.49	71.58
J-59	3.06	93	257.5	71.28
J-63	5.51	91	257.54	72.16
J-67	3.06	93	257.58	71.31
J-69	5.51	90	257.52	72.59
J-73	6.13	92	257.51	71.72
J-79	6.13	91	257.25	72.04
J-87	4.29	90	257.25	72.47
J-95	3.06	90	257.25	72.47
J-97	4.92	93.5	257.04	70.86
J-99	2.46	94	257.3	70.76
J-105	3.06	94.5	257.26	70.52
J-107	6.74	93	257.3	71.19
J-109	4.29	94.5	257.26	70.52
J-115	1.23	93	257.28	71.18
J-117	1.83	93	257.27	71.18
J-121	4.92	92.5	257.53	71.51
J-123	2.46	82	257.53	76.06
J-125	3.68	80	257.53	76.92
J-127	4.29	94	257.51	70.85
J-129	4.29	91	257.51	72.15
J-131	8.56	80	250.81	74.01
J-133	1.23	89	257.47	73
J-135	7.34	92	257.49	71.71
J-141	5.51	82	257.76	76.16
J-159	4.29	86	257.77	74.43
J-175	0.61	109	257.86	64.5
J-185	1.83	86	257.5	74.31
J-193	3.06	84	257.76	75.29
J-195	1.23	93	257.3	71.19
J-199	4.92	93	256.9	71.02
J-201	1.23	109	257.86	64.5
J-203	0	109	257.86	64.5
J-205	5.51	93	257.25	71.17
J-207	3.06	93	257.25	71.17
J-209	6.74	94	257.27	70.75
J-213	2.46	91.5	257.25	71.82
J-217	2.46	92.5	257.49	71.49
J-219	3.06	89	257.23	72.89
J-221	4.92	92	257.5	71.71
J-223	5.51	92.5	257.5	71.49
J-225	3.68	90	257.35	72.51

Peak Hour Demand 2033				
ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-1	2.09	81	257.57	76.51
J-5	5.59	85.7	257.57	74.47
J-7	0.69	83	257.57	75.64
J-17	1.4	94.8	257.49	70.49
J-19	0.69	82.7	257.54	75.76
J-31	4.2	98	257.77	69.23
J-43	2.8	109	257.83	64.49
J-45	4.89	109	257.53	64.36
J-49	4.89	84	257.57	75.21
J-53	4.89	90	257.04	72.38
J-55	2.8	94	257.05	70.65
J-57	4.89	92.3	257.36	71.52
J-59	3.49	93	257.36	71.22
J-63	6.29	91	257.41	72.11
J-67	3.49	93	257.47	71.27
J-69	6.29	90	257.39	72.53
J-73	6.97	92	257.38	71.66
J-79	6.97	91	257.05	71.95
J-87	4.89	90	257.05	72.38
J-95	3.49	90	257.05	72.38
J-97	5.59	93.5	256.78	70.75
J-99	2.8	94	257.1	70.67
J-105	3.49	94.5	257.05	70.43
J-107	7.69	93	257.11	71.11
J-109	4.89	94.5	257.05	70.43
J-115	1.4	93	257.08	71.09
J-117	2.09	93	257.08	71.09
J-121	5.59	92.5	257.4	71.45
J-123	2.8	82	257.4	76
J-125	4.2	80	257.4	76.87
J-127	4.89	94	257.38	70.79
J-129	4.89	91	257.38	72.09
J-131	9.79	80	248.79	73.14
J-133	1.4	89	257.33	72.94
J-135	8.39	92	257.36	71.65
J-141	6.29	82	257.69	76.13
J-159	4.89	86	257.7	74.4
J-175	0.69	109	257.83	64.49
J-185	2.09	86	257.36	74.25
J-193	3.49	84	257.69	75.26
J-195	1.4	93	257.11	71.11
J-199	5.59	93	256.6	70.89
J-201	1.4	109	257.83	64.49
J-203	0	109	257.83	64.49
J-205	6.29	93	257.04	71.08
J-207	3.49	93	257.05	71.08
J-209	7.69	94	257.07	70.66
J-213	2.8	91.5	257.04	71.73
J-217	2.8	92.5	257.36	71.43
J-219	3.49	89	257.02	72.8
J-221	5.59	92	257.36	71.65
J-223	6.29	92.5	257.36	71.43
J-225	4.2	90	257.17	72.43



- LEGEND:**
- NODES
 - WATERLINES:
 - RESERVOIR
 - W WELL
 - RETAIL SERVICE AREA
 - PARCELS
 - - - LYMAN TOWN LIMITS

TOWN OF LYMAN

WATER SYSTEM PLAN
FIGURE G-1
NODE MAP



Gray & Osborne, Inc.
CONSULTING ENGINEERS

APPENDIX H

CONSUMER CONFIDENCE REPORT

LYMAN WATER DEPARTMENT

Issue 14

Public Water System ID# 490500

June 2012

CONSUMER CONFIDENCE REPORT, 2011 WATER SAMPLING RESULTS

A MESSAGE FROM Mark Kitchen, Certified Water Operator

We very pleased to provide you with this year's Annual Water Quality Report. We want to keep you informed about the excellent water and services delivered to you over the past years. The goal has always been to provide you with a safe and dependable water supply. Your water comes from two wells. Well #1 is located at the treatment plant and Well #2 is off Crawford Drive. The wells draw water from an aquifer approximately 30 and 50 feet below the surface. We are pleased to report that your drinking water is safe and meets all current federal and state drinking water standards. We had no coliform detections last year. Coliform are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. The Council meets the second Tuesday of each month at 7:00 p.m. at Town Hall if you have questions about our water. If there is a water emergency please call me, Mark Kitchen, 360-661-6417 or 360-826-3033.

WHAT DO YOU MEAN BY THAT?

Parts per million (ppm) or Milligrams per liter (mg/L) - one part per million corresponds to one minute in two years or a single penny in \$10,000.

Parts per billion (ppb) or Micrograms per liter (ug /L) - one part per billion corresponds to one minute in 2,000 years, or a single penny in \$10,000,000.

Parts per trillion (ppt) or Nanograms per liter (nanograms/L) - one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in \$10,000,000,000.

Parts per quadrillion (ppq) or Picograms per liter (picograms/L) - one part per quadrillion corresponds to one minute in 2,000,000,000 years or one penny in \$10,000,000,000,000.

Picocuries per liter (pCi/L) - picocuries per liter is a measure of the radioactivity in water that can be absorbed by the body.

Millirems per year (mrem/yr) - measure of radiation absorbed by the body.

Million Fibers per Liter (MFL) - million fibers per liter is a measure of the presence of asbestos fibers that are longer than 10 micrometers.

Nephelometric Turbidity Unit (NTU) - nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Other terms used in this publication

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

Maximum Residual Disinfectant Level (MRDL): *The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants (e.g. chlorine, chloramines, chlorine dioxide).*

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

Maximum Residual Disinfectant Level Goal (MRDLG): *The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.*

Action Level (AL): the concentration of a contaminant which, when exceeded, triggers treatment or other requirements which a water system must follow.

Treatment Technique (TT): A treatment technique is a required process intended to reduce the level of a contaminant in drinking water. **N/A**: Not Applicable **ND**: Not Detectable at testing limit . **SRL**: State Reporting Level

In This Issue:

Message From Operator	1
What Do You Mean by That?	1
Water Use Efficiency	2
Federally Required Information	2
Testing Results	3, 4, 5

REQUIRED FEDERAL INFORMATION

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radio-active material, and can pick up substances resulting from the presence of animals or from human activity.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. We treat our water according to EPA's regulations. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

WATER USE EFFICIENCY REPORT

AS CUSTOMERS OF LYMAN WATER, YOU CHOSE TO USE EDUCATION AND LEAK REPAIR AS YOUR CONTRIBUTIONS TO OUR WATER USE EFFICIENCY. SEVERAL LARGE LEAKS HAVE BEEN REPAIRED AND THE CONSERVATION WORD IS SPREADING. THE AVERAGE QUANTITY OF WATER USED PER CUSTOMER HAS BEEN REDUCED BY 4%.

GOOD JOB KEEP IT UP

More measures you might consider for using water more efficiently are:

Installing new low-flow toilets

Installing low-flow faucets (bubblers)

Watering lawns, flowers and vegetables by hand

Contaminants that may be present in source water before we provide it include:

- ***Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.*
- ***Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.*
- ***Pesticides and herbicides**, which may come from a variety of sources such as agriculture and residential uses.*
- ***Radioactive contaminants**, which are naturally occurring.*
- ***Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.*

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the

SAFE DRINKING WATER HOTLINE

1-800-426-4791

OR

WWW.EPA.GOV/SAFEWATER

2011 Water Sample Results-Well #1

Constituent	MCL or AL	MCLG	Lyman Water	SRL	Sample Date	Violation	Typical Source
Nitrate (ppb)	10	10	0.97	0.2	July 2010	NO	Run off from fertilizer; leaching septic tanks; sew age; or erosion of natural deposits in rocks or soils

2011 Water Sample Results-Well #2

Constituent	MCL or AL	MCLG	Lyman Water	SRL	Sample Date	Violation	Typical Source
Nitrate (ppb)	10	10	0.67	0.2	July 2010	NO	Run off from fertilizer; leaching septic tanks; sew age; or erosion of natural deposits in rocks or soils

About Nitrate: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, you should ask for advice from your health care provider.

2011 Distribution System Sample Results

Lead & Copper samples are taken from inside some homes scattered around our system to see the how the results differ. We took samples from 10 homes August 2011 as required. The 90th percentile of all lead or copper samples collected is compared against its respective action level. This means that no more than 10 percent of our samples can be above either action level. The results reported below are the 90th percentile values of each set of samples.

Constituent	MCL or AL	MCLG	Lyman Water	SRL	Sample	Date	Violation	Typical Source
Lead (ppb)	15	15	2.0	0.002	Aug 2011	NO	Leaches from pipes, plumbing	
Copper (ppm)	1.3	1.3	0.0950	0.020	Aug 2011	NO	Leaches from pipes, plumbing	

About Copper: Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

About Lead: . Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the Safe Drinking Water Hotline (1-800-426-4791).

For those of you who are new to the Town, we treat our water with Sodium Hydroxide to reduce the amount of copper that leaches from your pipes and plumbing. Since we began treatment the results of Lead and Copper sampling have been well under the Maximum Contaminant Level (MCL) set for each of those contaminants.



2010 Distribution System Results

Constituent	MRDL	MRDLG	Lyman Water	SRL	Sample Date	Violation	Typical Source
Halo-Acetic Acids (ppb)	60	60	1.3	15	Aug 2010	NO	Result of chlorination
Dichloroacetic acid (ppb)			1.3	1.0	Aug 2010	NO	Result of chlorination
Total Trihalomethanes (ppb)	80	80	8.0	8.00	Aug. 2010	NO	Result of chlorination
Chloroform (ppb)			3.4	0.25	Aug 2010	NO	Result of chlorination
Bromodichloromethane (ppb)			2.2	0.50	Aug 2010	NO	Result of chlorination
Dibromochloromethane (ppb)			0.90	1.5	Aug 2010	NO	Result of chlorination

About Haloacetic Acids: Some people who drink water containing Haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.

About TTHMs [Total Trihalomethanes]: Some people who drink water containing trihalomethanes (which include Chloroform, Bromodichloromethane and Dibromochloromethane) in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

2009 Water Sample Results-Well #1

Constituent	MCL or AL	MCLG	Lyman Water	SRL	Sample Date	Violation	Typical Source
Radium 228(pCi/l)	5	NA	1.25	1.0	Nov 2009	NO	Erosion of natural deposits

2009 Water Sample Results-Well #2

Constituent	MCL or AL	MCLG	Lyman Water	SRL	Sample Date	Violation	Typical Source
Radium 228 (pCi/l)	5	NA	1.75	1.0	Nov 2009	NO	Erosion of natural deposits

About Radium 228: Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

2007 Water Sample Results-Well #1

Constituent	MCL or AL	MCLG	Lyman Water	SRL	Sample Date	Violation	Typical Source
Hardness (ppm)	N/A	N/A	41.3	10.0	Aug. 2007	NO	Erosion of natural deposits
Turbidity (NTU)	N/A	N/A	0.06	0.10	Aug. 2007	NO	Erosion of natural deposits
Total Dissolved Solids (ppm)	500	N/A	0.002	100	Aug. 2007	NO	Erosion of natural deposits

2007 Water Sample Results-Well #2

Constituent	MCL or AL	MCLG	Lyman Water	SRL	Sample Date	Violation	Typical Source
Iron (ppm)	0.30	N/A	0.15	0.10	Aug. 2007	NO	Erosion of natural deposits
Hardness (ppm)	N/A	N/A	39.5	10.0	Aug. 2007	NO	Erosion of natural deposits
Turbidity (NTU)	N/A	N/A	0.68	0.10	Aug. 2007	NO	Erosion of natural deposits
Color (CU)	15.0	N/A	5.0	15.0	Aug. 2007	NO	Erosion of natural deposits

All of the following constituents are secondary and are not considered a health risk. They are usually associated with taste and odor problems. As the water travels over the rocks and soil, these constituents are absorbed. Although they may be unpleasant to see or smell, they are not detrimental to your health. They can cause a bitter metallic taste in water and leave stains on fixtures.

About Iron: Iron is an abundant and widespread constituent of rocks and soils in Washington. At sufficient concentrations, iron can affect the taste of water and beverages and can leave rust-colored stains on laundry, plumbing fixtures and porcelain.

About Hardness, Turbidity, Total Dissolved Solids (TDS) and Color: All these, while less abundant than Iron, cause similar problems. They can cause a bitter metallic taste in water and leave stains on fixtures. TDS can cause hardness & leave stains & salty taste. Color leaves a visible tint to the water.

The federal regulations require us to report the results of the most recent samples of compounds that are not tested for every year or those that were not tested for in 2011. We are not required to provide sampling information that is more than 5 years old or that had no detections.

APPENDIX I

COLIFORM MONITORING PLAN

COLIFORM MONITORING PLAN

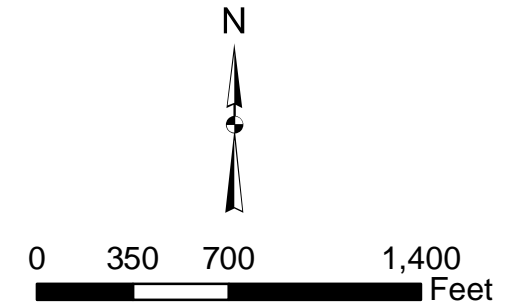
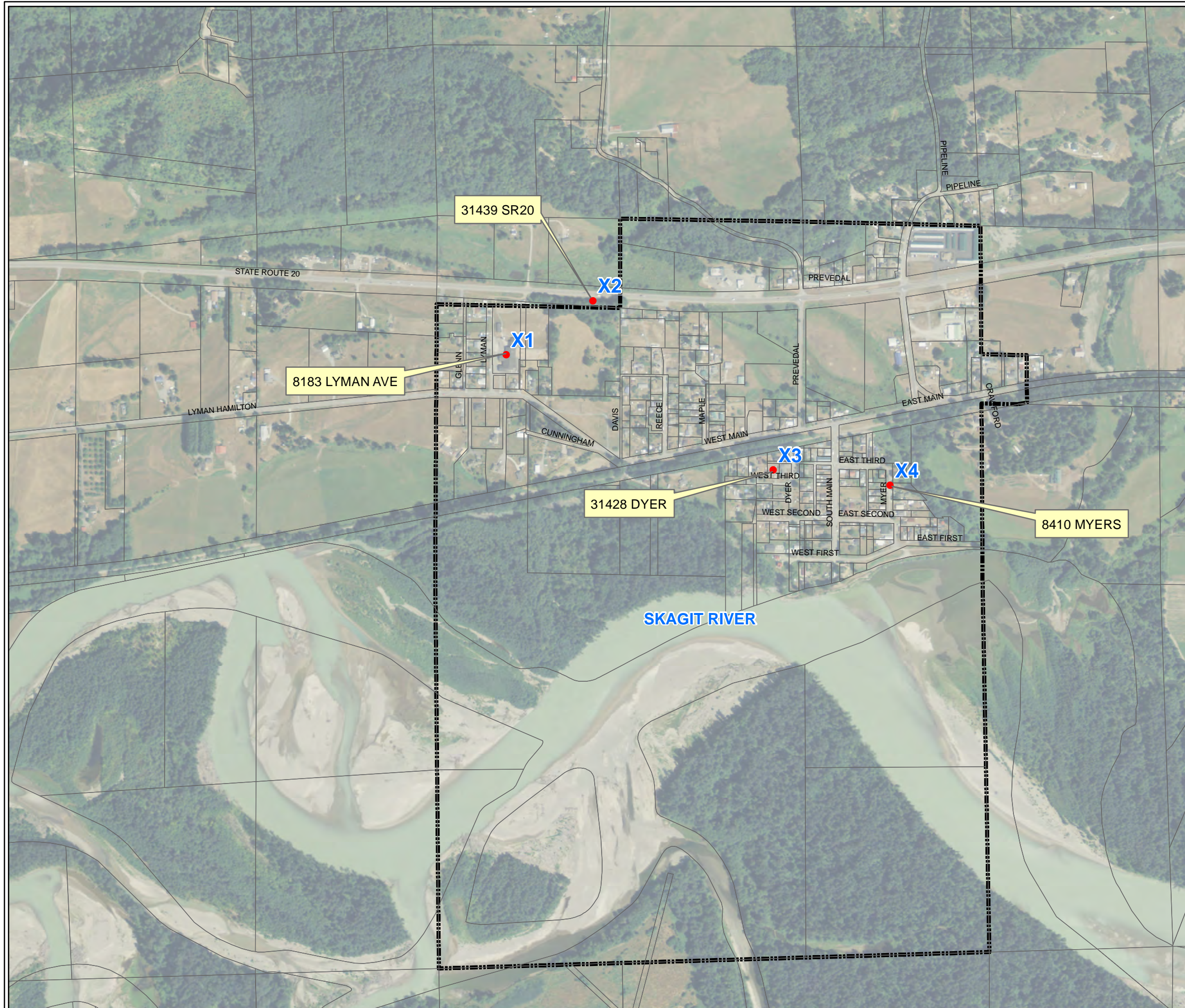
Water System Name: Town of Lyman	ID#: 490500	County: Skagit
Number of service connections: 217		Peak Population served: 473
Source Type: WELL SO1 WELL SO2	Treatment Purpose & Process: Chlorine Caustic Soda	Storage Capacity: 158,000 Gal.
Completed by: Revised: Cas Hancock & Mark Kitchen	Date: 05/07/13 revised	Position & Daytime Phone#: OPERATOR -Mark 360-661-6417 Relief Operator Cas 360-770-4633

Location/Address for ROUTINE SAMPLE SITES:	Location/Address for REPEAT SAMPLE SITES:	Location/Address for FOLLOWING MONTH ROUTINE SAMPLE SITES:
X1: School 8183 Lyman Ave Jan., May, Sept.	1. School-8183 Lyman Ave 2. Melton-8190 Lyman Ave 3. Welsh-8178 Lyman Ave 4. Wartchow-8132 Lyman Ave 5. Well-(SO1)(SO2)	1. School-8183 Lyman Ave 2. Melton-8190 Lyman Ave 3. Welsh-8178 Lyman Ave 4. Wartchow-8132 Lyman Ave 5. WELL (SO1)(SO2) 6. Rest. 31439 SR 20
X2: Restaurant 31439 SR 20 Feb., June, Oct.	1. Rest. 31439 SR 20 2. Store-31387 SR 20 3. Queen-31442 Prevedell 4. Haveman-31446 Prevedell 5. Well-(SO1)(SO2)	1. Rest. 31439 SR20 2. Store-31437 SR20 3. Queen-31442 Prevedell 4. Haveman-31446 Prevedell 5. WELL (SO1)(SO2) 6. Heinzman-31428 Dyer
X3: Heinzman 31428 Dyer Mar., July, Nov.	1. Heinzman-31428 Dyer 2. Kinzer-8340 Dyer 3. Lord-31418 Dyer 4. Kohler-41451 3RD. 5. Well-(SO1)(SO2)	1. Heinzman-31428 Dyer 2. Kinzer-8340 Dyer 3. Lord-31418 Dyer 4. Kohler-41451 3RD 5. WELL (SO1)(SO2) 6. Kitchen-8410 Meyer
X4: Kitchen 8410 Meyer APR., Aug., Dec	1. Kitchen-8410 Meyer 2. Right Way-31578 2ND. 3. Wood-8403 Meyer 4. Adkerson-8413 Meyer 5. Well-(SO1)(SO2)	1. Kitchen-8405 Meyer 2. Right Way-31578 2ND. 3. Wood-8403 Meyer 4. Adkerson-8413 Meyer 5. Well-(SO1)(SO2) 6. School-8183 Lyman

All monitoring requirements are established in WAC 246-290-300. Where 1 ROUTINE sample is required, sample sites (X1, X2, X3, X4) may be rotated monthly to represent the entire distribution system.

Following any ROUTINE unsatisfactory coliform sample result, immediately collect at least 5 REPEAT samples to identify the source of the coliform contamination (do NOT batch or shock chlorinate unless prior authorization is given by DOH staff). If any REPEAT sample results are unsatisfactory, contact your DOH Regional office. Generally for smaller systems, REPEAT sample sites should include: the ROUTINE site that failed, upstream & downstream of the ROUTINE site and the well or reservoir. (Often the well or reservoir is the site of contamination).

The month following a COLIFORM POSITIVE SAMPLE, 6 ROUTINE SAMPLES, REPRESENTING NORMAL OPERATING CONDITIONS IN THE DISTRIBUTION SYSTEM, MUST BE COLLECTED TO VERIFY THAT THE PROBLEM HAS BEEN SUCCESSFULLY ADDRESSED.



LEGEND:

- SAMPLE SITE
- LYMAN TOWN LIMITS
- PARCELS

TOWN OF LYMAN

WATER SYSTEM PLAN
FIGURE I-1
COLIFORM MONITORING PLAN SAMPLE SITES

Gray & Osborne, Inc.
CONSULTING ENGINEERS

APPENDIX J

**ANNUAL WATER USE
EFFICIENCY PERFORMANCE REPORT**



Date Submitted: 6/9/2011

Water Use Efficiency Annual Performance Report - 2010

WS Name: LYMAN WATER DEPARTMENT

Water System ID# : 49050

WS County: SKAGIT

Report submitted by: *Mark Kitchen*

Meter Installation Information:

Is your water system fully metered? *Yes*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2010* To *12/31/2010*

Incomplete or missing data for the year? *No*

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	<i>18,440,000</i> gallons
Authorized Consumption (AC) – Annual Volume	<i>10,816,236</i> gallons
Distribution System Leakage – Annual Volume TP – AC	<i>7,623,764</i> gallons
Distribution System Leakage – Percent DSL = $[(TP - AC) / TP] \times 100$	<i>41.3 %</i>
3-year annual average	<i>13.8 %</i>

Goal-Setting Information:

Date of Most Recent Public Forum: *04/08/2008* Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Reduce average daily consumption by 1% by 2014.

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

Being proactive in repairing leaks; working on high water use reduction; educating customers about meters and registers and how we can tell when a customer has a leak.

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

Goal: reduce unaccounted for water by 10% by 2014. We are working to calibrate source meters; working with Evergreen Rural Water leak detection program. GOAL: Reduce average daily consumption by 1%. New rate structure has been completed; we are very proactive with customer water leaks.

Do not mail, fax, or email this report to DOH



Date Submitted: 6/14/2012

Water Use Efficiency Annual Performance Report - 2011

WS Name: LYMAN WATER DEPARTMENT

Water System ID# : 49050

WS County: SKAGIT

Report submitted by: *Mark Kitchen*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2011 To 12/31/2011*

Incomplete or missing data for the year? *No*

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	<i>17,676,000</i> gallons
Authorized Consumption (AC) – Annual Volume	<i>11,875,496</i> gallons
Distribution System Leakage – Annual Volume TP – AC	<i>5,800,504</i> gallons
Distribution System Leakage – Percent DSL = $[(TP - AC) / TP] \times 100$	<i>32.8 %</i>
3-year annual average	<i>24.7 %</i>

Goal-Setting Information:

Date of Most Recent Public Forum: *04/08/2008* Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Reduce average daily consumption by 1% by 2014

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

Being proactive in repairing leaks and working on high water use reduction. Educating customers about meters and registers and how we can tell when a customer has a leak. Working as a team.

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:



Date Submitted: 1/29/2013

Water Use Efficiency Annual Performance Report - 2012

WS Name: LYMAN WATER DEPARTMENT

Water System ID# : 49050

WS County: SKAGIT

Report submitted by: *Mark Kitchen*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2012* To *12/31/2012*

Incomplete or missing data for the year? *No*

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	<i>17,492,000</i> gallons
Authorized Consumption (AC) – Annual Volume	<i>9,957,770</i> gallons
Distribution System Leakage – Annual Volume TP – AC	<i>7,534,230</i> gallons
Distribution System Leakage – Percent DSL = $[(TP - AC) / TP] \times 100$	<i>43.1 %</i>
3-year annual average	<i>39.1 %</i>

Goal-Setting Information:

Date of Most Recent Public Forum: *04/08/2008* Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Reduce average daily consumption by 1% by 2014.

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

Being proactive in repairing leaks. Working on high water use reduction. Educating customers about meters and registers and how we can tell when a customer has a leak. Working as a team.

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

The town of Lyman completed a water line leak detection project on 10/24/2011 and 10/25/2011. We were able to locate and pinpoint three leaks. Estimated 12 gpm loss. We have repaired one of the leaks at an estimated 5 gpm loss. Due to funding, The remaining two leaks have been put on hold. We are also having trouble with the source meter at the pump station reading high. Due to funding, This also has been on hold.

Do not mail, fax, or email this report to DOH

APPENDIX K

**INTERNATIONAL WATER
ASSOCIATION WATER AUDIT FORM**

AWWA WLCC Free Water Audit Software: Reporting Worksheet

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WAS v4.2

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[?](#) Click to access definition

Water Audit Report for: **Town of Lyman**
 Reporting Year: **2012** 1/2012 - 12/2012

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED

<< Enter grading in column 'E'

Volume from own sources:	<input type="text" value="5"/>	<input type="text" value="17.429"/>	Million gallons (US)/yr (MG/Yr)
Master meter error adjustment (enter positive value):	<input type="text" value="3"/>	<input type="text" value="0.000"/>	MG/Yr
Water imported:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
Water exported:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
WATER SUPPLIED:		17.429	MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:	<input type="text" value="8"/>	<input type="text" value="9.922"/>	MG/Yr
Billed unmetered:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
Unbilled metered:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
Unbilled unmetered:	<input type="text" value="4"/>	<input type="text" value="0.040"/>	MG/Yr
AUTHORIZED CONSUMPTION:		9.962	MG/Yr

Click here: [?](#) for help using option buttons below

Pcnt: Value:

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption)

MG/Yr

Apparent Losses

Unauthorized consumption:	<input type="text" value="5"/>	<input type="text" value="0.044"/>	MG/Yr
Customer metering inaccuracies:	<input type="text" value="6"/>	<input type="text" value="0.522"/>	MG/Yr
Systematic data handling errors:	<input type="text" value="5"/>	<input type="text" value="0.001"/>	MG/Yr
Apparent Losses:		0.567	

Pcnt: Value:

Value:

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	<input type="text" value="7.467"/>	<input type="text" value="0.567"/>	<input type="text" value="6.900"/>	MG/Yr
WATER LOSSES:			7.467	MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	<input type="text" value="5"/>	<input type="text" value="5.0"/>	miles
Number of active AND inactive service connections:	<input type="text" value="8"/>	<input type="text" value="217"/>	
Connection density:	<input type="text" value="43"/>	<input type="text" value="43"/>	conn./mile main
Average length of customer service line:	<input type="text" value="6"/>	<input type="text" value="30.0"/>	ft (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	<input type="text" value="8"/>	<input type="text" value="70.0"/>	psi

COST DATA

Total annual cost of operating water system:	<input type="text" value="8"/>	<input type="text" value="\$115,000"/>	\$/Year
Customer retail unit cost (applied to Apparent Losses):	<input type="text" value="6"/>	<input type="text" value="\$3.25"/>	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	<input type="text" value="8"/>	<input type="text" value="\$200.00"/>	\$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	<input type="text" value="43.1%"/>
Non-revenue water as percent by cost of operating system:	<input type="text" value="3.3%"/>
Annual cost of Apparent Losses:	<input type="text" value="\$2,462"/>
Annual cost of Real Losses:	<input type="text" value="\$1,380"/>

Operational Efficiency Indicators

Apparent Losses per service connection per day:	<input type="text" value="7.16"/>	gallons/connection/day
Real Losses per service connection per day*:	<input type="text" value="87.12"/>	gallons/connection/day
Real Losses per length of main per day*:	<input type="text" value="N/A"/>	
Real Losses per service connection per day per psi pressure:	<input type="text" value="1.24"/>	gallons/connection/day/psi
Unavoidable Annual Real Losses (UARL):	<input type="text" value="Not Valid"/>	

*** UARL cannot be calculated as either average pressure, number of connections or length of mains is too small: SEE UARL DEFINITION ***

From Above, Real Losses = Current Annual Real Losses (CARL):

Infrastructure Leakage Index (ILI) [CARL/UARL]:

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Volume from own sources
- 2: Customer metering inaccuracies
- 3: Customer retail unit cost (applied to Apparent Losses)

[For more information, click here to see the Grading Matrix worksheet](#)

AWWA WLCC Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: **Town of Lyman**
 Reporting Year: **2012** 1/2012 - 12/2012

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED

<< Enter grading in column 'E'

Volume from own sources:	<input type="text" value="5"/>	<input type="text" value="17.429"/>	Million gallons (US)/yr (MG/Yr)
Master meter error adjustment (enter positive value):	<input type="text" value="3"/>	<input type="text" value="0.000"/>	MG/Yr
Water imported:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
Water exported:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
WATER SUPPLIED:		17.429	MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:	<input type="text" value="8"/>	<input type="text" value="9.922"/>	MG/Yr
Billed unmetered:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
Unbilled metered:	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	MG/Yr
Unbilled unmetered:	<input type="text" value="4"/>	<input type="text" value="0.040"/>	MG/Yr
AUTHORIZED CONSUMPTION:		9.962	MG/Yr

Click here: for help using option buttons below

Pcnt: Value:

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption)

7.467 MG/Yr

Apparent Losses

Unauthorized consumption: MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	<input type="text" value="6"/>	<input type="text" value="0.522"/>	MG/Yr
Systematic data handling errors:	<input type="text" value="5"/>	<input type="text" value="0.001"/>	MG/Yr
Apparent Losses:		0.567	

Pcnt: Value:

5.00%

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: MG/Yr

WATER LOSSES: **7.467** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	<input type="text" value="5"/>	<input type="text" value="5.0"/>	miles
Number of active AND inactive service connections:	<input type="text" value="8"/>	<input type="text" value="217"/>	
Connection density:	<input type="text" value="43"/>	<input type="text" value="43"/>	conn./mile main
Average length of customer service line:	<input type="text" value="6"/>	<input type="text" value="30.0"/>	ft (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	<input type="text" value="8"/>	<input type="text" value="70.0"/>	psi

COST DATA

Total annual cost of operating water system:	<input type="text" value="8"/>	<input type="text" value="\$115,000"/>	\$/Year
Customer retail unit cost (applied to Apparent Losses):	<input type="text" value="6"/>	<input type="text" value="\$3.25"/>	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	<input type="text" value="8"/>	<input type="text" value="\$200.00"/>	\$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	<input type="text" value="43.1%"/>
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Annual cost of Apparent Losses:	<input type="text" value="\$2,462"/>
Annual cost of Real Losses:	<input type="text" value="\$1,380"/>

Operational Efficiency Indicators

Apparent Losses per service connection per day:	<input type="text" value="7.16"/>	gallons/connection/day
Real Losses per service connection per day*:	<input type="text" value="87.12"/>	gallons/connection/day
Real Losses per length of main per day*:	<input type="text" value="N/A"/>	
Real Losses per service connection per day per psi pressure:	<input type="text" value="1.24"/>	gallons/connection/day/psi
Unavoidable Annual Real Losses (UARL):	<input type="text" value="Not Valid"/>	

*** UARL cannot be calculated as either average pressure, number of connections or length of mains is too small: SEE UARL DEFINITION ***

From Above, Real Losses = Current Annual Real Losses (CARL):

Infrastructure Leakage Index (ILI) [CARL/UARL]:

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Volume from own sources
- 2: Customer metering inaccuracies
- 3: Customer retail unit cost (applied to Apparent Losses)

[For more information, click here to see the Grading Matrix worksheet](#)

AWWA WLCC Free Water Audit Software: Water Balance

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Water Audit Report For:

Report Yr:

Town of Lyman

2012

		Billed Water Exported			
Own Sources (Adjusted for known errors)	Water Exported 0.000	Authorized Consumption 9.962	Billed Authorized Consumption 9.922	Billed Metered Consumption (inc. water exported) 9.922	Revenue Water 9.922
	17.429		Unbilled Authorized Consumption 0.040	Billed Unmetered Consumption 0.000	
Water Supplied 17.429		Apparent Losses 0.567	Unbilled Metered Consumption 0.000		
			Unbilled Unmetered Consumption 0.040		
			Unauthorized Consumption 0.044		
Water Imported 0.000		Water Losses 7.467	Real Losses 6.900	Customer Metering Inaccuracies 0.522	
				Systematic Data Handling Errors 0.001	
	Leakage on Transmission and/or Distribution Mains Not broken down				
			Leakage and Overflows at Utility's Storage Tanks Not broken down		
			Leakage on Service Connections Not broken down		

AWWA WLCC Free Water Audit Software: Grading Matrix

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In the Reporting Worksheet, grades were assigned to each component of the audit to describe the confidence and accuracy of the input data. The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading											
	n/a	1	2	3	4	5	6	7	8	9	10
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing	Conditions between 4 and 6	At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration conducted semi-annually, with less than 10% found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Volume from own Sources" component:		<u>to qualify for 2:</u> Organize efforts to begin to collect data for determining volume from own sources	<u>to qualify for 4:</u> Locate all water production sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters		<u>to qualify for 6:</u> Formalize annual meter accuracy testing for all source meters. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		<u>to qualify for 8:</u> Conduct annual meter accuracy testing on all meters. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		<u>to qualify for 10:</u> Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 6% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		<u>to maintain 10:</u> Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Master meter error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply, either its own source, and/or imported (purchased) water sources	Inventory information on meters and paper records of measured volumes in crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records. Tank/storage elevation changes are not employed in calculating "Volume from own sources" component. Data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data adjusted to correct gross error from equipment malfunction and error confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component.	Conditions between 6 and 8	Continuous production meter data logged automatically & reviewed daily. Data adjusted to correct gross error from equipment malfunction & results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results reviewed daily. Mass balance technique compares production meter data to raw (untreated) water and treatment volumes to detect anomalies. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter error adjustment" component:		<u>to qualify for 2:</u> Develop plan to restructure recordkeeping system to capture all flow data; set procedure to review data daily to detect input errors	<u>to qualify for 4:</u> Install automatic datalogging equipment on production meters. Identify tanks/storage facilities and include estimated daily volume of water added to, or subtracted from, "Water Supplied" volume based upon changes in storage		<u>to qualify for 6:</u> Review hourly production meter data for gross error on, at least, a weekly basis. Begin to install instrumentation on tanks/storage facilities to record elevation changes. Use daily net storage change to balance flows in calculating "Water Supplied" volume.		<u>to qualify for 8:</u> Complete installation of elevation instrumentation on all tanks/storage facilities. Continue to use daily net storage change in calculating balanced "Volume from own sources" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		<u>to qualify for 10:</u> Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters.		<u>to maintain 10:</u> Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and/or electronic calibration conducted semi-annually, with less than 10% found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Imported Volume" component:		<u>to qualify for 2:</u> Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	<u>To qualify for 4:</u> Locate all imported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters		<u>to qualify for 6:</u> Formalize annual meter accuracy testing for all imported water meters. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		<u>to qualify for 8:</u> Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters. Repair or replace meters outside of +/- 6% accuracy.		<u>to qualify for 10:</u> Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 6% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		<u>to maintain 10:</u> Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Grading											
	n/a	1	2	3	4	5	6	7	8	9	10
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered, other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered, other sources estimated. Occasional meter accuracy testing	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted semi-annually, with less than 10% found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component:		to qualify for 2: Review bulk water sales agreements with partner suppliers; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	To qualify for 4: Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		to qualify for 6: Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all imported water meters. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 6% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billed for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billed for others. Manual meter reading, under 50% read success rate, remainder estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based billing from meter reads; flat or fixed rate billed for remainder. Manual meter reading used, at least 50% meter read success rate, failed reads are estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters replaced only upon complete failure. Computerized billing records, but only periodic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads, remaining accounts are estimated. Manual customer meter reading gives at least 80% customer meter reading success rate, failed reads are estimated. Good customer meter records, limited meter accuracy testing, regular replacement of oldest meters. Computerized billing records with routine auditing of global statistics.	Conditions between 6 and 8	At least 97% of customers with volume-based billing from meter reads. At least 90% customer meter read success rate, or minimum 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics; verified periodically by third party.	Conditions between 8 and 10	At least 99% of customers with volume-based billing from meter reads. At least 95% customer meter reading success rate, or minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) trials underway. Statistically significant customer meter testing and replacement program in place. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts. Annual audit verification by third party.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	to qualify for 4: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		to qualify for 6: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Conduct routine audit of global statistics.		to qualify for 8: Purchase and install meters on unmetered accounts. Assess cost-effectiveness of Automatic Meter Reading (AMR) system for portion or entire system; or achieve ongoing improvements in manual meter reading success rate. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Refine routine auditing procedures based upon third party guidance.		to qualify for 10: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) system trials if manual meter reading success rate of at least 95% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue routine auditing and require annual third party review.		to maintain 10: Regular internal and third party auditing, and meter accuracy testing ensures that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management.
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter, i.e. no unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billed. No data collected on customer consumption. Only estimates available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption recorded on portable dataloggers. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing but lacks written procedures and employs casual oversight, resulting in up to 20% of billed accounts believed to be unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but exemption exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy requires metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because because installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy requires metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Grading											
	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		<p><u>to qualify for 2:</u> Investigate a new water utility policy to require metering of the customer population, and a reduction of unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and datalogging the water consumption.</p>	<p><u>to qualify for 4:</u> Implement a new water utility policy requiring customer metering. Expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes.</p>		<p><u>to qualify for 6:</u> Budget for staff resources to review billing records to identify unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significantly reduce the number of unmetered accounts</p>		<p><u>to qualify for 8:</u> Install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Implement procedures to obtain reliable consumption estimate for unmetered accounts awaiting meter installation.</p>		<p><u>to qualify for 10:</u> Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties to devise means to install water meters or otherwise measure water consumption.</p>		<p><u>to maintain 10:</u> Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed unmetered accounts as is economically feasible.</p>
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	<p>Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.</p>	<p>Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.</p>	Conditions between 2 and 4	<p>Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.</p>	Conditions between 4 and 6	<p>Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.</p>	Conditions between 6 and 8	<p>Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.</p>	Conditions between 8 and 10	<p>Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.</p>
Improvements to attain higher data grading for "Unbilled metered Consumption" component:		<p><u>to qualify for 2:</u> Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.</p>	<p><u>to qualify for 4:</u> Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum.</p>		<p><u>to qualify for 6:</u> Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts.</p>		<p><u>to qualify for 8:</u> Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings.</p>		<p><u>to qualify for 10:</u> Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.</p>		<p><u>to maintain 10:</u> Reassess philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.</p>
Unbilled unmetered:		<p>Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.</p>	<p>Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.</p>	Conditions between 2 and 4	<p>Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running x typical flowrate x number of events).</p>	Default value of 1.25% of system input volume is employed	<p>Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.</p>	Conditions between 6 and 8	<p>Clear policies and good recordkeeping exist for some uses (ex: unmetered fire connections registering consumption), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time x typical flow) or temporary meters, and relatively subjective estimates of less regulated use.</p>	Conditions between 8 and 10	<p>Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time x typical flow) or use of temporary meters.</p>

Grading											
	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		<p><u>to qualify for 5:</u> Utilize accepted default value of 1.25% of system input volume as an expedient means to gain a reasonable quantification of this use.</p> <p><u>to qualify for 2:</u> Establish a policy regarding what water uses should be allowed as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushings).</p>	<p><u>to qualify for 5:</u> Utilize accepted default value of 1.25% of system input volume as an expedient means to gain a reasonable quantification of this use.</p> <p><u>to qualify for 4:</u> Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need for water from fire hydrants).</p>		<p><u>to qualify for 5:</u> Utilize accepted default value of 1.25% of system input volume as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.</p>	<p><u>to qualify for 6 or greater:</u> Finalize policy and do field checks. Proceed if top-down audit exists and/or a great volume of such use is suspected.</p>	<p><u>to qualify for 8:</u> Assess water utility policy and procedures to ensure that fire hydrant permits are issued for use by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel.</p>		<p><u>to qualify for 10:</u> Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.</p>		<p><u>to maintain 10:</u> Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.</p>
APPARENT LOSSES											
Unauthorized consumption:		<p>Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.</p>	<p>Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.</p>	<p>conditions between 2 and 4</p>	<p>Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running x typical flowrate x number of events).</p>	<p>Default value of 0.25% of system input volume is employed</p>	<p>Coherent policies exist for some forms of unauthorized consumption but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records. Unsupervised uses are guesstimated.</p>	<p>Conditions between 6 and 8</p>	<p>Clear policies and good recordkeeping exist for certain events (ex: tampering with water meters); other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.</p>	<p>Conditions between 8 and 10</p>	<p>Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is quantified via formulae (time x typical flow) or similar methods.</p>
Improvements to attain higher data grading for "Unauthorized Consumption" component:		<p><u>to qualify for 5:</u> Use accepted default of 0.25% of system input volume.</p> <p><u>to qualify for 2:</u> Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)</p>	<p><u>to qualify for 5:</u> Use accepted default of 0.25% of system input volume</p> <p><u>to qualify for 4:</u> Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)</p>		<p><u>to qualify for 5:</u> Utilize accepted default value of 0.25% of system input volume as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.</p>	<p><u>to qualify for 6 or greater:</u> Finalize policy and do field checks. Proceed if top-down audit exists and/or a great volume of such use is suspected.</p>	<p><u>to qualify for 8:</u> Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for use and documentation of various occurrences of unauthorized consumption as they are uncovered.</p>		<p><u>to qualify for 10:</u> Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.</p>		<p><u>to maintain 10:</u> Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in documentation and enforcement efforts.</p>
Customer metering inaccuracies:	<p>select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.</p>	<p>Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program. Workflow is driven chaotically by customer complaints with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.</p>	<p>Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population.</p>	<p>Conditions between 2 and 4</p>	<p>Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters. Limited number of oldest meters replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.</p>	<p>Conditions between 4 and 6</p>	<p>A reliable electronic recordkeeping system for meters exists. Population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.</p>	<p>Conditions between 6 and 8</p>	<p>Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Testing is conducted on samples of meters at varying lifespans to determine optimum replacement time for various types of meters.</p>	<p>Conditions between 8 and 10</p>	<p>Good records of number, type and size of customer meters; ongoing meter replacement occurs. Regular meter accuracy testing gives reliable measure of composite inaccuracy volume for the system. New metering technology is embraced to keep overall accuracy improving.</p>
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	<p>If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.</p>	<p><u>to qualify for 2:</u> Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of metering group and budget for necessary resources to better organize meter management.</p>	<p><u>to qualify for 4:</u> Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.</p>		<p><u>to qualify for 6:</u> Standardize procedures for meter recordkeeping with the electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.</p>		<p><u>to qualify for 8:</u> Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.</p>		<p><u>to qualify for 10:</u> Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.</p>		<p><u>to maintain 10:</u> Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new technology in Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering and customer consumption data.</p>

Grading											
	n/a	1	2	3	4	5	6	7	8	9	10
Systematic Data Handling Error:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Vague policy for permitting (creating new customer accounts) and billing. Billing data maintained on paper records which are in disarray. No audits conducted to confirm billing data handling efficiency. Unknown number of customers escape routine billing due to lack of billing process oversight.	Policy for permitting and billing exists but needs refinement. Billing data maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work conducted to confirm billing data handling efficiency. Volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for permitting and billing exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy for permitting and billing is adequate and reviewed periodically. Computerized billing system in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	Permitting and billing policy reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Annual internal checks conducted with periodic third party audit. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound policy exists for permitting of all customer billing accounts. Robust computerized billing system gives high functionality and reporting capabilities. Assessment of policy and data handling errors conducted internally and audited by third party annually, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		<u>to qualify for 2:</u> Draft written policy for permitting and billing. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	<u>to qualify for 4:</u> Finalize written policy for permitting and billing. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		<u>to qualify for 6:</u> Refine permitting and billing procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		<u>to qualify for 8:</u> Formalize regular review of permitting and billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error.		<u>to qualify for 10:</u> Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that internal and third party audits are conducted annually.		<u>to maintain 10:</u> Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA											
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound policy and procedures for permitting and documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation; or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases.
Improvements to attain higher data grading for "Length of Water Mains" component:		<u>to qualify for 2:</u> Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedure that result in poor documentation.	<u>to qualify for 4:</u> Complete inventory of paper records of water main installations & abandonments for a number of years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation and abandonments.		<u>to qualify for 6:</u> Finalize updates/improvements to policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		<u>to qualify for 8:</u> Launch random field checks of limited number of locations. Convert to electronic databases with backup as justified.		<u>to qualify for 10:</u> Link Geographic Information System (GIS) and asset management databases, conduct field verification of data.		<u>to maintain 10:</u> Continue with standardization and random field validation to improve knowledge of system.
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Permitting policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Permitting policy and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more that 3%.	Conditions between 6 and 8	Permitting policy and procedures reviewed at least biannually. Well-managed computerized information management system and routine, periodic field checks and internal system audits allows counts of connections that is no more than 2% in error.	Conditions between 8 and 10	Sound permitting policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections believed to be in error by less than 1%.

Grading											
	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Number of Active and Inactive customer service connections" component:		<u>to qualify for 2:</u> Draft new policy and procedures for permitting and billing. Research and collect paper records of installations & abandonments for several years prior to audit year.	<u>to qualify for 4:</u> Refine policy and procedures for permitting and billing. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		<u>to qualify for 6:</u> Refine procedures to ensure consistency with permitting policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		<u>to qualify for 8:</u> Formalize regular review of permitting policy and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		<u>to qualify for 10:</u> Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		<u>to maintain 10:</u> Continue with standardization and random field validation to improve knowledge of system.
Average length of customer service line:	Note: if customer water meters are located outside of the customer building next to the curbstop or boundary separating utility/customer responsibility, follow the grading description for 10(a). Also see the Service Connection Diagram worksheet.	Grading 1-9 apply if customer properties are unmetered , if customer meters exist and are located inside the customer building premises , or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building . In any of these cases the average distance between the curbstop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gratings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									
		Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curbstops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curbstops.	Policy requires that the curbstop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curbstop is the property of the water utility; and the piping from the curbstop to the customer building is owned by the customer. Curbstop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curbstop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curbstops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records.	Conditions between 4 and 6	Clear policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curbstops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curbstops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: a) The customer water meter is located outside of the customer building adjacent to the curbstop or boundary separating utility/customer responsibility for the service connection piping. In this case enter a value of zero in the Reporting Worksheet with a grading of 10. b) Customer water meters are located inside customer buildings, or the properties are unmetered. In either case the distance is highly reliable since data is drawn from a Geographic Information System (GIS) and confirmed by routine field checks.
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:		<u>to qualify for 2:</u> Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curbstops. Obtain the length of this small sample of connections in this manner.	<u>to qualify for 4:</u> Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		<u>to qualify for 6:</u> Establish coherent procedures to ensure that policy for curbstop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		<u>to qualify for 8:</u> Implement an electronic means of recordkeeping, typically via a customer information system or customer billing system. Standardize the process to conduct field checks of limited number of locations.		<u>to qualify for 10:</u> Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		<u>to maintain 10:</u> Continue with standardization and random field validation to improve knowledge of system.
Average operating pressure:		Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breach pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breach pressure zones. Well-covered telemetry monitoring of the distribution system logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable SCADA System data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data.

Grading

	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Average Operating Pressure" component:		<p><u>to qualify for 2:</u> Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics</p>	<p><u>to qualify for 4:</u> Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.</p>		<p><u>to qualify for 6:</u> Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.</p>		<p><u>to qualify for 8:</u> Install a Supervisory Control and Data Acquisition (SCADA) System to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.</p>		<p><u>to qualify for 10:</u> Obtain average pressure data from hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.</p>		<p><u>to maintain 10:</u> Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.</p>

APPENDIX L

**WELLS 1 AND 2 SUSCEPTIBILITY
ASSESSMENT SURVEYS**

**Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2**

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : Chris Stormont

Water system name : Lyman Water Department

County: Skagit

Water system number: 490500 Source number: SO1

Well depth: 35 (ft.) (From WFI form)

Source name: Well #1

WA well identification tag number: -

well not tagged

Number of connections: 184 Population served: 420

Township: 35 North Range: 6 East

Section: 17 1/4 1/4 Section: NW^{1/4}NE^{1/4}

Latitude/longitude (if available): 48°31'38" / 122°3'26"

How was lat./long. determined?

global positioning device survey topographic map

other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 05 / / 61 month/day/year

last reconstruction: / / month/day/year

information unavailable

2) Well driller: Moody Well Drillers Burlington, WA

well driller unknown

3) Type of well:

Drilled: rotary bored cable (percussion) Dug

Other: spring(s) lateral collector (Ranney)

driven jetted other:

Additional comments: _____

4) Well report available? YES (attach copy to form) NO (See Exhibit 1)

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 250 (gallons/min)

Source of information: Current pumping records

If not documented, how was pumping rate determined? _____

Pumping rate unknown

6) Is this source treated? YES NO

If so, what type of treatment:

disinfection filtration carbon filter air stripper other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Water from Well #1 is currently not treated and has not been treated in the past. A system
to disinfect water from Well #1 and provide corrosion control is currently being designed.

7) If source is chlorinated, is a chlorine residual maintained: YES NO

Residual level: N/A (At the point closest to the source.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

< 20 ft 20-50 ft 50-100 ft 100-200 ft >200 ft

information unavailable ('<' means less than; '>' means greater than)

2) Depth to ground water (static water level):

< 20 ft 20-50 ft 50-100 ft >100 ft

flowing well/spring (artesian)

How was water level determined?

well log other: _____

depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure: N/A

_____ psi (pounds per square inch)

or

_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: YES NO N/A

5) Wellhead elevation (height above mean sea level): 80 (ft)

How was elevation determined? topographic map Drilling/Well Log altimeter

other: _____

information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

evidence of a confining layer in well log

no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? YES NO N/A

information unavailable

7) Sanitary setback:

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 28,600,000 (gallons)

How was this determined?

meter (average total use from both Well #1 and Well #2 between 1996 and 2000)

estimated: pumping rate (_____)

pump capacity (_____)

other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 530 (ft)

1 year ground water travel time : 740 (ft)

5 year ground water travel time: 1700 (ft)

10 year ground water travel time: 2400 (ft)

Information available on length of screened/open interval?

YES NO

Length of screened/open interval: 10 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? YES NO (mark and identify on map). (see Exhibit 2)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? YES NO (mark and identify on map).

Comments: Ponded water is often present in a topographic depression located approximately 200 feet west of Well #1. The Skagit River and Jones Creek at normal stage are located approximately 1200 feet south and 1500 feet east of Well #1, respectively. Lyman does not have a centralized system for collection and/or treatment of stormwater or wastewater. Residential septic systems are likely located within the 6 month time of travel boundary.

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application.....	<u> X </u>	<u> X </u>	<u> X </u>	<u> </u>
stormwater injection wells	<u> </u>	<u> </u>	<u> </u>	<u> </u>
other injection wells	<u> </u>	<u> </u>	<u> </u>	<u> </u>
abandoned ground water well	<u> </u>	<u> </u>	<u> X </u>	<u> </u>
landfills, dumps, disposal areas	<u> </u>	<u> </u>	<u> </u>	<u> </u>
known hazardous materials clean-up site	<u> </u>	<u> </u>	<u> X </u>	<u> </u>
water system(s) with known quality problems.....	<u> </u>	<u> </u>	<u> </u>	<u> </u>
population density > 1 house/acre.....	<u> </u>	<u> X </u>	<u> X </u>	<u> </u>
residences commonly have septic tanks.....	<u> X </u>	<u> X </u>	<u> X </u>	<u> </u>
Wastewater treatment lagoons	<u> </u>	<u> </u>	<u> </u>	<u> </u>
sites used for land application of waste	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? *(Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)* (See Exhibit 2)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

Potential sources of contamination within a half-mile radius of Well #1 were identified by conducting a walking/driving survey, interviewing people with local knowledge, and reviewing databases compiled by the U.S.E.P.A., Washington Department of Ecology, and Washington Department of Health. Agriculture within a half mile of Well #1 is limited to small pastures and gardens at homeowner residences. Well #1 is located approximately 25 feet from Pipeline Road, 200 feet from an abandoned railroad right-of-way, and 700 feet from State Highway 20. Abandoned wells were not observed but may occur outside the incorporated town boundary. All residences in the vicinity of Well #1 are assumed to have septic tanks and/or drainfields since Lyman does not have a sanitary sewer. Potential residential sources of contamination could also include pesticide use, household hazardous waste storage and disposal, and heating tanks. A small cabinet making shop and a former Leaking Underground Storage Tank site are located approximately 400 feet northeast and 1300 feet northwest of Well #1, respectively. The Lyman Cemetery is located approximately 2000 feet west of Well #1.

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions:
(Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l) YES
Results greater than MCL.....
< 2 mg/liter nitrate..... X
2–5 mg/liter nitrate.....
> 5 mg/liter nitrate.....
Nitrate sampling records unavailable

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.) YES
Results greater than MCL or SAL.....
VOCs detected at least once.....
VOCs never detected X
VOC sampling records unavailable

C. EDB/DBCP: YES
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)
EDB/DBCP detected below MCL at least once.....
EDB/DBCP detected above MCL at least once

D. Other SOCs (pesticides and other synthetic organic chemicals): YES
Other SOCs detected

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: EPA Methods 515.1, 525.2, and 531.1

E. Bacterial contamination: YES

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)..... _____

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source..... _____

Source sampling records for bacteria unavailable _____

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

YES NO (See Exhibit 2)

Describe with references to map produced in Part IV:

The Skagit River and Jones Creek at normal stage are located approximately 1200 feet south and 1500 feet east of Well #2, respectively.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

YES NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

YES NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

YES NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6 month–1 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1–5 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5–10 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1–5 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5–10 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Potential hydrologic boundaries and sources/sinks were identified by interpreting the U.S.G.S.

Lyman 7.5-Minute Quadrangle and reviewing the Washington Department of Health SADIE Database.

Well #1 is located in the Skagit River floodplain and is completed in alluvial sand and gravel deposits.

No other high capacity municipal or irrigation wells (except for Lyman Well #2) are located within the 10 year time of travel boundary. Lyman's Well #1 and Well #2 are not operated concurrently.

**Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2**

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : Chris Stormont

Water system name : Lyman Water Department

County: Skagit

Water system number: 490500 Source number: SO2

Well depth: 51 (ft.) (From WFI form)

Source name: Well #2

WA well identification tag number: A B R - 3 1 4

 well not tagged

Number of connections: 184 Population served: 420

Township: 35 North Range: 6 East

Section: 17 1/4 1/4 Section: SE^{1/4}NE^{1/4}

Latitude/longitude (if available): 48°31'35" / 122°03'13"

How was lat./long. determined?

 global positioning device survey X topographic map

 other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 08 / 15 / 79 month/day/year

last reconstruction: / / month/day/year

 information unavailable

2) Well driller: Hayes Well Drilling Bow, WA

well driller unknown

3) Type of well:

Drilled: rotary bored cable (percussion) Dug

Other: spring(s) lateral collector (Ranney)

driven jetted other:

Additional comments: _____

4) Well report available? YES (attach copy to form) NO (See Exhibit 1)

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 285 (gallons/min)

Source of information: Current pumping records

If not documented, how was pumping rate determined? _____

Pumping rate unknown

6) Is this source treated? YES NO

If so, what type of treatment:

disinfection filtration carbon filter air stripper other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Water from Well #2 is currently not treated and has not been treated in the past. A system to disinfect water from Well #2 and provide corrosion control is currently being designed.

7) If source is chlorinated, is a chlorine residual maintained: YES NO

Residual level: N/A (At the point closest to the source.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

< 20 ft 20-50 ft 50-100 ft 100-200 ft >200 ft

information unavailable ('<' means less than; '>' means greater than)

2) Depth to ground water (static water level):

< 20 ft 20-50 ft 50-100 ft >100 ft

flowing well/spring (artesian)

How was water level determined?

well log other: _____

depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure: N/A

_____ psi (pounds per square inch)

or

_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: YES NO N/A

5) Wellhead elevation (height above mean sea level): 80 (ft)

How was elevation determined? topographic map Drilling/Well Log altimeter

other: _____

information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

evidence of a confining layer in well log

no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? YES NO N/A

information unavailable

7) Sanitary setback:

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 28,600,000 (gallons)

How was this determined?

meter (average total use from both Well #1 and Well #2 between 1996 and 2000)

estimated: pumping rate (_____)

pump capacity (_____)

other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 560 (ft)

1 year ground water travel time : 780 (ft)

5 year ground water travel time: 1800 (ft)

10 year ground water travel time: 2500 (ft)

Information available on length of screened/open interval?

YES NO

Length of screened/open interval: 9 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? YES NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? YES NO (mark and identify on map).

Comments: The Skagit River and Jones Creek at normal stage are located
approximately 800 feet south and 800 feet east of Well #2, respectively. Lyman does not have a
centralized system for collection and/or treatment of stormwater or wastewater. Residential
septic systems are likely located within the 6 month time of travel boundary.

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application.....	<u> X </u>	<u> X </u>	<u> X </u>	<u> </u>
stormwater injection wells	<u> </u>	<u> </u>	<u> </u>	<u> </u>
other injection wells	<u> </u>	<u> </u>	<u> </u>	<u> </u>
abandoned ground water well	<u> X </u>	<u> X </u>	<u> X </u>	<u> </u>
landfills, dumps, disposal areas	<u> </u>	<u> </u>	<u> </u>	<u> </u>
known hazardous materials clean-up site	<u> </u>	<u> </u>	<u> </u>	<u> </u>
water system(s) with known quality problems.....	<u> </u>	<u> </u>	<u> </u>	<u> </u>
population density > 1 house/acre.....	<u> </u>	<u> </u>	<u> X </u>	<u> </u>
residences commonly have septic tanks.....	<u> X </u>	<u> X </u>	<u> X </u>	<u> </u>
Wastewater treatment lagoons	<u> </u>	<u> </u>	<u> </u>	<u> </u>
sites used for land application of waste	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.) (See Exhibit 1)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

Potential sources of contamination within a half-mile radius of Well #2 were identified by conducting a walking/driving survey, interviewing people with local knowledge, and reviewing databases compiled by the U.S.E.P.A., Washington Department of Ecology, and Washington Department of Health. Agriculture within a half mile of Well #2 is limited to small pastures and gardens at residential properties. Well #2 is located approximately 200 feet from an abandoned railroad right-of-way, 250 feet from the Lyman-Hamilton Road, and 1000 feet from State Highway 20. Abandoned wells were not observed but may occur outside the incorporated town boundary. All residences in the vicinity of Well #2 are assumed to have septic tanks and/or drainfields since Lyman does not have a sanitary sewer system. Potential residential sources of contamination could also include pesticide use, household hazardous waste storage and disposal, and heating tanks. A small cabinet making shop and a former Leaking Underground Storage Tank site are located approximately 700 feet north and 2000 feet northwest of Well #2, respectively.

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions:
(Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l) YES
Results greater than MCL.....
< 2 mg/liter nitrate..... X
2–5 mg/liter nitrate.....
> 5 mg/liter nitrate.....
Nitrate sampling records unavailable

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.) YES
Results greater than MCL or SAL.....
VOCs detected at least once.....
VOCs never detected X
VOC sampling records unavailable

C. EDB/DBCP: YES
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)
EDB/DBCP detected below MCL at least once.....
EDB/DBCP detected above MCL at least once

D. Other SOCs (pesticides and other synthetic organic chemicals): YES
Other SOCs detected

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: EPA Methods 515.1, 525.2, and 531.1

E. Bacterial contamination: YES

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)..... _____

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source..... _____

Source sampling records for bacteria unavailable _____X_____

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

X YES ___ NO (See Exhibit 2)

Describe with references to map produced in Part IV:

The Skagit River and Jones Creek at normal stage are located approximately 800 feet south and 800 feet east of Well #2, respectively.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES X NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

X YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

YES NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6 month–1 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1–5 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5–10 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1–5 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5–10 year travel time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Potential hydrologic boundaries and sources/sinks were identified by interpreting the U.S.G.S.

Lyman 7.5-Minute Quadrangle and reviewing the Washington Department of Health SADIE Database.

Well #2 is located in the Skagit River floodplain and is completed in alluvial sand and gravel deposits.

No other high capacity municipal or irrigation wells (except for Lyman Well #1) are located within the 10 year time of travel boundary. Lyman's Well #1 and Well #2 are not operated concurrently.

APPENDIX M

WELLHEAD PROTECTION NOTIFICATION LETTERS

January 31, 2001

3-00-228

Mr. Stuart Harr, President
S.H. Fine Wood Products, Inc.
P.O. Box 1368
Lyman, WA 98263

Subject: Town of Lyman
Wellhead Protection Notification Letter

Dear Mr. Harr:

In order to protect the drinking water supply for the Town of Lyman, we are developing a wellhead protection program in accordance with Washington Department of Health regulations. As part of our wellhead protection program, we mapped the area overlying the short term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

After mapping the wellhead protection area, we conducted an inventory of **potential** sources of ground water contamination within the area. The nature of your business and its relative proximity to both town wells means your activities have the potential to affect the towns drinking water supply.

We realize you are already careful to protect the environment as you conduct your business. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

Thank you for your support in protecting our drinking water.

Sincerely,

Chris Stormont
Mayor, Town of Lyman

January 31, 2001

3-00-228

Ms. Stephanie Kaaland, Manager
Cascade Mercantile LLC
31387 Highway 20
Lyman, WA 98263

Subject: Town of Lyman
Wellhead Protection Notification Letter

Dear Ms. Kaaland:

In order to protect the drinking water supply for the Town of Lyman, we are developing a wellhead protection program in accordance with Washington Department of Health regulations. As part of our wellhead protection program, we mapped the area overlying the short term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

After mapping the wellhead protection area, we conducted an inventory of **potential** sources of ground water contamination within the area. The nature of your business and its relative proximity to both town wells means your activities have the potential to affect the towns drinking water supply.

We have notified the regulatory agency that regulates your facility of your presence within our wellhead protection area. You should contact them to request technical assistance to help manage your business in a way that will best prevent ground water contamination. We realize you are already careful to protect the environment as you conduct your business. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

Thank you for your support in protecting our drinking water.

Sincerely,

Chris Stormont
Mayor, Town of Lyman

January 31, 2001

3-00-228

Lyman Cemetery
P.O. Box 1298
Lyman, WA 98263

Subject: Town of Lyman
Wellhead Protection Notification Letter

To Whom It May Concern:

In order to protect the drinking water supply for the Town of Lyman, we are developing a wellhead protection program in accordance with Washington Department of Health regulations. As part of our wellhead protection program, we mapped the area overlying the short term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

After mapping the wellhead protection area, we conducted an inventory of **potential** sources of ground water contamination within the area. The nature of your business and its relative proximity to Well #1 means your activities have the potential to affect the towns drinking water supply.

We realize you are already careful to protect the environment as you conduct your business. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

Thank you for your support in protecting our drinking water.

Sincerely,

Chris Stormont
Mayor, Town of Lyman

January 31, 2001

3-00-228

Mr. Ben Forsom
Department of Ecology, Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Subject: Town of Lyman
Wellhead Protection Notification Letter

Dear Mr. Forsom:

As part of the wellhead protection program for the Town of Lyman, we are hereby informing the Department of Ecology Toxics Cleanup Program of the findings of our wellhead protection area delineation. This is in accordance with Washington Department of Health regulations (WAC 246-290-135).

The leaking underground storage tank site at 31387 Highway 20 in Lyman, Washington is within the town's wellhead protection area. This site is listed as Ecology ID No. 6927 and referred to as Skagit Cardlock Systems in the Ecology LUST Database.

The enclosed map shows the 6 month, 1 year, 5 year, and 10 year time of travel boundaries for our wellhead protection area around Well #1. Any ground water contamination that occurs within this wellhead protection area may impact one of our wells. It is therefore of utmost importance to us that all reasonable steps be taken to ensure that land use activities within this area do not contaminate our town's drinking water supplies.

Thank you for your support in protecting our drinking water.

Sincerely,

Chris Stormont
Mayor, Town of Lyman

Enclosure

APPENDIX N

EMERGENCY RESPONSE PLAN

**Emergency
Response Plan
for
Town of Lyman
Drinking Water
System**

October 2013

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Introduction: Protecting public health

Safe and reliable drinking water is vital to the Town of Lyman. Emergency response planning is an essential part of managing a drinking water system.

Lyman water system has had routine operating emergencies such as pipe breaks, pump malfunctions, coliform contamination, and power outages. These are manageable if the water system has an emergency response plan that can be put into action quickly.

More serious non-routine emergencies may result from intentional acts of sabotage, chemical spills, floods, earthquakes, volcanic eruptions, windstorms, or droughts. These can drastically affect the system and the community that depends on it.

Each emergency has unique effects on different parts of a water system. Floods can cause widespread bacterial contamination, earthquakes can damage sources and distribution systems, and storms can disrupt power supplies. The common element is that each emergency may threaten the system's ability to deliver safe and reliable drinking water.

Emergency response planning is a process by which water system managers and staff explore vulnerabilities, make improvements, and establish procedures to follow in an emergency. It is also a process that encourages people to form partnerships and get to know one another. Preparing a response plan and practicing it can save lives, prevent illness, enhance system security, minimize property damage, and lessen liability.



Section 1. Emergency Response Mission and Goals

Emergency response mission and goals

Mission statement for emergency response	In an emergency, the mission of the Lyman water system is to protect the health of our customers by being prepared to respond immediately to a variety of events that may result in contamination of the water or disruption of supplying water.
Goal 1	Be able to quickly identify an emergency and initiate timely and effective response action.
Goal 2	Be able to quickly notify local, state, and federal agencies to assist in the response.
Goal 3	Protect public health by being able to quickly determine if the water is not safe to drink or use and being able to immediately notify customers effectively of the situation and advise them of appropriate protective action.
Goal 4	To be able to quickly respond and repair damages to minimize system down time.



Section 2. System Information

Keep this basic information readily available for when you need it for emergency responders, repair people, and the news media.

System information

System identification number	490500		
System name and address	Lyman Water 8218 Pipeline Road Lyman WA 98263		
Directions to the system	Travel east on E. Hwy. 20 to Pipeline Road. Turn right. Well #1 and treatment plant is one block on right.		
Basic description and location of system facilities	System has two wells. Well#1 35ft. is located in treatment plant on Pipeline Road. Well#2 51ft. is located one block east on Crawford Dr. Storage facility is located at north end of Pipeline Lane at top of the hill with the approximate address 31733 Pipeline Lane, Sedro-Woolley, WA 98284.		
Location/Town	Lyman, WA		
Population served and service connections from Division of Drinking Water records.	473 people	217 connections	
System owner (the owner should be listed as a person's name)	Town of Lyman		
Name, title, and phone number of person responsible for maintaining and implementing the emergency plan.	Mark Kitchen Certified Operator	360-708-5708 360-661-6417	Phone Cell
	Cas Hancock Relief Certified Operator	360-853-7497 360-770-4633	Phone Cell



Section 3. Chain of Command – Lines of Authority

The first response step in any emergency is to inform the person at the top of this list, who is responsible for managing the emergency and making key decisions.

Chain of command – lines of authority

Name and title	Responsibilities during an emergency	Contact numbers
<p>Debra Heinzman, Mayor P. O. Box 188, Lyman 98263</p> <hr/> <p>Mike Couch, Mayor Pro-Tem P. O. Box 1371 Lyman 98263</p>	<p>Responsible for overall management and decision making for the water system. The Water System Manager is the lead for managing the emergency, providing information to regulatory agencies, the public and news media. All communications to external parties are to be approved by the water system manager.</p>	<p>Phone: (360) 826-3033 Cell: (360) 333-7631 Work: (360) 826-4131</p> <hr/> <p>Phone: 360-826-5105 Cell: 360-708-1400</p>
<p>Mark Kitchen Certified Operator 30073 L/H Hwy. Lyman 98263</p>	<p>In charge of running system and water treatment plant, performing inspections, maintenance and sampling and relaying critical information, assessing facilities, and providing recommendations to the water system manager or Relief Operator.</p>	<p>Phone: 360-708-5708 Cell: 360-661-6417</p>
<p>Cas Hancock Relief Certified Operator 46451 Baker Lp Rd Concrete 98237</p>	<p>In charge of relaying critical information, assessing facilities, and providing recommendations to Certified Operator and the water system manager.</p>	<p>Phone: 360-853-7497 Cell: 360-770-4633</p>
<p>Debbie Boyd Office Administrator P. O. Box 842 Lyman 98263</p>	<p>Responsible for administrative functions in the office including receiving phone calls and keeping a log of events. This person will provide a standard carefully pre-scripted message to those who call with general questions. Additional information will be released through the water system manager. Co-Ordinates delivery and/or delivers door hangers.</p>	<p>Phone: 360-826-3033 Cell: 360-661-6411</p>



Section 4. Events that Cause Emergencies

The events listed below may cause water system emergencies. They are arranged from highest to lowest probable risk.

Events that cause emergencies

Type of event	Probability or risk (High-Med-Low)	Comments
Earthquake	High	Quake possible area.
Flood	Med	System is located in an area vulnerable to flooding.
High winds	High	System is vulnerable to high wind events. Power is disrupted.
Ice storm	Med	Minor damage possible.
Drought	Med	Need to plan for decrease well yield during dry summers.
Terrorism	Low	Need to be trained on suspicious activity
Construction accident	Med	Construction crews may hit pipes.
Chemical spill	Low	Complete wellhead protection plan.
Equipment Failure Caustic Overfeed	Low	Common equipment failure possible.
Volcanic Eruption	Low	Need to plan for complete equipment failure



Section 5. Severity of Emergencies

Decisions on severity should be collaborative among system personnel, but are ultimately made by the person in charge of the emergency. The information for making such a decision will accumulate over time, and may result in changes in the assessment of severity.

Communicate each assessment of severity immediately to all those dealing with the emergency. Make sure staff has cell phones, pagers, or radios when they are in the field.

Level I – Normal-Routine Emergency

Description: The Lyman water system considers the following as level I emergencies:

- Distribution line breaks.
- Short power outages.
- Minor mechanical problems in pump-houses.
- Other minor situations where it is not likely that public health will be jeopardized.

The system has specific response activities identified for these types of emergencies, including proper sampling, disinfection, and pressure testing activities. System personnel are advised and are directed to work on the problem and are usually capable of resolving the problem within 24 hours. If it is determined that the problem will take longer than 24 hours to resolve and storage is likely to be drawn down below a safe operating level, the situation will be elevated to level II.

Level II – Minor Emergency

Description: The Lyman water system considers the following to be level II emergencies:

- Disruption in supply such as a transmission main line break, pump failure with a potential for backflow, and loss of pressure.
- Storage is not adequate to handle disruption in supply.
- An initial positive coliform or E. coli sample.
- An initial primary chemical contaminant sample.
- A disruption in chlorine/chemical feed from the groundwater sources.
- A minor act of vandalism.
- Drought, with a noticeable and continuing decline of water level in the well.

Level III – Emergency

Description: The Lyman water system considers the following as level III or actual emergencies:

- A verified acute confirmed coliform MCL or E. coli/fecal positive sample requiring immediate consideration of a health advisory notice to customers.
- A confirmed sample of another primary contaminant requiring immediate consideration of a health advisory notice to customers.
- A loss or complete malfunction of the water treatment facilities for the surface water source, including chlorination.
- A major line break or other system failure resulting in a water shortage or requiring system shutdown.
- An act of vandalism or terrorist threat such as intrusion or damage to a primary facility.
- An immediate threat to public health of the customers and an advisory is required.
- Severe drought significantly affecting well yield.

Level IV – Catastrophic Disaster/Major Emergency

Description: The Lyman water system considers the following events to be level IV or major emergencies:

- Earthquake that shuts down the system or impacts sources, lines, etc.
- Act of terrorism possibly contaminating the water system with biological or chemical agents.
- Flood that infiltrates system facilities and sources.
- Chemical spill within 2000 feet of the system's sources.
- Storm that significantly damages power grid and system facilities.
- Volcano eruption that shuts down all system facilities that are vulnerable to lava dust.
- Mudslide or other earth shift that causes failure of transmission or loss of water in well.



Section 6. Emergency Notification

Notification call-up lists

Use these lists to notifying important parties during of an emergency.

Local notification list

Local Law Enforcement day – 911	Local Law Enforcement night – 911
Fire Dept. day – Andy Hawkins 360-724-4703	Fire Dept. night – Andy Hawkins 360-826-3644
Ambulance service day – 911	Ambulance service night – 911
Local Health Jurisdiction day- Skagit Health District (SHD) 360-336-9380	Local Health Jurisdiction after hours- SHD- 911
Water System Operator day 360-661-6417	Water System Operator night 360-661-6417 or 360-708-5708
Water System Relief Operator day 360-770-4633	Water System Relief Operator night 360-770-4633
Hamilton Water System, Mayor Cromley, day 360-826-3027	Hamilton Water System, Mayor Cromley, night 360-826-4953
News Media Contact	KIRO Radio Station 206-726-5476

State notification list

State Patrol day 360-757-1175 Emergency only 800-283-7807	State Patrol night 360-757-1175 Emergency only 800-283-7807
Division of Drinking Water Regional Office day 253-395-6765- Nancy Feagin, Reg. Engineer	Division of Drinking Water after hours 1-877-481-4901
Washington State Department of Ecology – day Bellevue – NW Regional Office –425-649-7000	WA State Department of Ecology – night Bellevue – NW Regional Office –425-649-7000

Service/repair notification list

Electrician day- Bob Gaddis 360-661-0626	Electrician night- Bob Gaddis 360-661-0626
Electric Utility day – PSE 888-225-5773	Electric Utility night- PSE 888-225-5773
Plumber day- Aaction Excavating -Ian Pocock 360-661-6271 Or Excavation West -Bill Swartz 360-661-6160	Plumber night- Aaction Excavating -Ian Pocock 360-661-6271 Or Excavation West -Bill Swartz 360-661-6160
Pump Specialist day- Dahlman Pump 360-757-6666	Pump Specialist night- Dahlman Pump 360-757-6666
Soil Excavator day- Aaction Excavating -Ian Pocock 360-661-6271 Or Excavation West -Bill Swartz 360-661-6160	Soil Excavator night- Aaction Excavation -Ian Pocock 360-661-6271 Or Excavation West -Bill Swartz 360-661-6160
Equipment Rental day – Birch Equipment Rental 360-428-7788	Equipment Rental night – Birch Equipment Rental 360-428-7788

Notification procedures

Notifying water system customers

Who is Responsible:	The water system manager is ultimately responsible for making the decision to notify customers regarding a potential water shortage and the need for water use restrictions. The water system manager should consult with field staff to make the decision. Once the decision is made procedures for notification will be initiated.
Procedures:	<ul style="list-style-type: none">• Water system manager confers with key staff to verify problems.• Water system manager organizes staff to develop the message to be delivered to the customers.• Water system operator consults with state and county drinking water staff regarding the problem.• Water system manager, with assistance from staff, prepares door hangers, signs and radio message.• Water system operator continues to investigate problem and make repairs as necessary.• The water shortage notification will be distributed by:<ul style="list-style-type: none">✓ Field staff placing “water shortage notices” on doors and along travel routes.✓ Staff will place signs on main travel routes into the community.✓ Water system manager contacts KIRO am radio and requests issuance of the water shortage notice and request to curtail water use.✓ Administrative support person will provide a pre-scripted message to phone callers and log in each phone call.• Water system operator continuously updates the water system manager on water shortage.• Once water shortage is resolved, re-notify customers.

Alerting local law enforcement, state drinking water officials, and local health

Who is Responsible:	The water system manager is ultimately responsible for making the decision to notify local law enforcement, state and local drinking water officials regarding a potential water shortage and the need for water use restrictions. The water system manager should consult with field staff to make the decision. Once the decision is made procedures for notification will be initiated.
Procedures:	<ul style="list-style-type: none"> • Water system manager confers with key staff to verify problems. • Water system manager organizes staff to develop the message to be delivered to law enforcement and drinking water officials. • Water system operator consults with state and county drinking water staff regarding the problem. • Water system manager, with assistance from staff, prepares door hangers, signs and radio message. • Water system operator continues to investigate problem and make repairs as necessary. • Water system manager contacts local law enforcement with water emergency information. • Water system operator continuously updates the water system manager on water emergency. • Once water emergency is resolved, re-notify customers.

Contacting service and repair contractors

Who is Responsible:	The water system manager is ultimately responsible for making the decision to notify customers regarding a potential water shortage and the need for water use restrictions. The water system manager should consult with field staff to make the decision. Once the decision is made procedures for notification will be initiated.
Procedures:	<ul style="list-style-type: none"> • Water system manager confers with key staff to verify problems. • Water system manager organizes staff to contact the appropriate contractors. • Water system operator continuously updates the water system manager on repair progress.

Contact neighboring water systems, if necessary

<p>Who is Responsible:</p>	<p>The water system manager is ultimately responsible for making the decision to contact neighboring water systems regarding a potential water emergency and the need for possible assistance. The water system manager should consult with field staff to make the decision. Once the decision is made procedures for notification will be initiated.</p>
<p>Procedures:</p>	<ul style="list-style-type: none"> • Water system manager confers with key staff to verify problems. • Water system manager organizes staff to develop the message to be delivered to neighboring system and what staff is to deliver the message. • Water system operator consults with state and county drinking water staff regarding the problem. • Water system operator continues to investigate problem and make repairs as necessary. • Water system operator continuously updates the water system manager on water emergency.

Procedures for issuing a health advisory

<p>Who is Responsible:</p>	<p>The water system manager is ultimately responsible for making the decision to notify customers regarding a potential health advisory and the need for water use restrictions. The water system manager should consult with field staff to make the decision. Once the decision is made procedures for notification will be initiated.</p>
<p>Procedures:</p>	<ul style="list-style-type: none"> • Water system manager confers with key staff to verify problems. • Water system manager organizes staff to develop the message to be delivered to the customers. • Water system operator consults with state and county drinking water staff regarding the problem. • Water system manager, with assistance from staff, prepares door hangers, signs and radio message. • Water system operator continues to investigate problem and make repairs as necessary. • The water shortage notification will be distributed by: <ul style="list-style-type: none"> ✓ Field staff placing “health advisory notices” on doors and along travel routes. ✓ Staff will place signs on main travel routes into the community. ✓ Water system manager contacts KIRO am radio and requests issuance of the health advisory notice and request to boil water. ✓ Administrative support person will provide a pre-scripted message to phone callers and log in each phone call. • Water system operator continuously updates the water system manager on health advisory. • Once health issue is resolved, re-notify customers.

Other procedures, as necessary

<p>Who is Responsible:</p>	<p>The water system manager is ultimately responsible for making the decision to notify customers regarding a potential water shortage and the need for water use restrictions. The water system manager should consult with field staff to make the decision. Once the decision is made procedures for notification will be initiated.</p>
<p>Procedures:</p>	<ul style="list-style-type: none"> • Water system manager confers with key staff to verify problems. • Water system manager organizes staff to develop the message to be delivered to the customers. • Water system manager consults with state and county drinking water staff regarding the problem. • Water system manager with assistance from staff prepares door hangers, signs and radio message. • Water system operator continues to investigate problem and make repairs as necessary. • The water shortage notification will be distributed by: <ul style="list-style-type: none"> ✓ Field staff placing “water shortage notices” on doors and along travel routes. ✓ Staff will place signs on main travel routes into the community. ✓ Water system manager contacts KIRO am radio and requests issuance of the water shortage notice and request to curtail water use. ✓ Administrative support person will provide a pre-scripted message to phone callers and log in each phone call. • Water system operator continuously updates the water system manager on water shortage. • Once water shortage is resolved, re-notify customers.



Section 7. Water Quality Sampling

If contamination is suspected, notify and work with the Skagit Health District (SHD) and State DOH, Office of Drinking Water (ODW) regional office to help identify what testing should be done. This may help prevent illness or even death.

Water quality sampling

Sampling parameter	Do we have procedures? Yes/No	Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, contacts, etc.)
Coliform Bacteria	Yes	All system locations available, Edge Analytical, Burlington, WA
Heterotrophic Plate Count (HPC)	No	
Chlorine Residual	Yes	All system locations available, staff
Chlorine Demand	No	
Nitrate/Nitrite	Yes	Both wells, Edge Analytical
Total Organic Carbon (TOC)	No	
Total Halogenated Organic Carbon (TOX)	No	
Cyanide	No	



Section 8. Effective Communication

Communication with customers, the news media, and the general public is a critical part of emergency response.

Designated public spokesperson

Designate a spokesperson (and alternates) for delivering messages to the news media and the public (see Section 6 for news media contacts in local notification list).

Designate a spokesperson and alternates

Spokesperson	Alternate 1	Alternate 2
Mayor Debra Heinzman	Mayor Pro Tem Mike Couch	Certified Operator Mark Kitchen

Key messages

Possible message (update as the emergency develops):

- We are taking this incident seriously and doing everything we can to resolve it.
- Our primary concern is protecting our customers' health.
- Another important concern is keeping the system operational and preventing damage.
- What we know right now is _____
- The information we have is incomplete. We will keep you informed as soon as we know more.
- We have contacted state and local officials to help us respond effectively.
- If you think you may be ill or need medical advice, contact a physician.
- We are sampling the water and doing tests to determine whether there is contamination.
Etc.

Health advisories

During events when water quality and human health are in question, it may be necessary to issue a health advisory that gives advice or recommendations to water system customers on how to protect their health when drinking water is considered unsafe. These advisories are issued when the health risks to the consumers are sufficient, in the estimation of the water system or state or county health officials, to warrant such advice.

Health advisories usually take the form of a drinking water warning or boil water advisory. Communication during these times is critical. Health advisories should always be well thought out and provide very clear messages.



Section 9. The Vulnerability Assessment

Facility vulnerability assessment and improvements identification

System component	Description and condition	Vulnerability	Improvements or mitigating actions	Security improvements
Source	Two groundwater wells. Well#1- 35ft. and Well#2 - 51ft. They are located within the Town limits. The sources are in excellent condition.	The wells are most vulnerable to contamination from above ground activities because they are 35 and 51 feet deep. The well houses are highly secure so they should not be vulnerable to acts of vandalism.	Implement wellhead protection program.	Upgrade well house #2: Replace roof
Storage	Storage reservoir is in sound condition. Reservoir hatch is not easily accessed, but locks could be broken.	Vandals could access reservoir hatches. Also, the reservoir could be prone to shaking and settling resulting from an earthquake.	Provide earthquake strapping to secure reservoir to the foundation.	Install signage to protect against unauthorized entry and access to reservoir hatches.
Treatment	There is a chlorination generating and injection system and a sodium hydroxide injection system in well/pump-house #1. Both are in sound operating condition.	These systems are subject to power outages and vandalism if a pump-house is vandalized. Tanks are not secured and may tip over during an earthquake.	Purchase a back-up generator and have it wired in or have system wired with a jack where a back-up generator could be rented and plugged in. Secure tanks with earthquake straps.	Install signage to protect against unauthorized entry.
Pump-house and pumping facilities	Pump-house #1 and pumping facilities are in good condition. Pump-house #2 needs minor repair.	Pump-house #2 is subject to vandalism. It is also vulnerable to equipment failure/flood during earthquake.	Replace roof and pipeline bracing for outgoing pipeline in Pump-house # 2.	Install new roof and pipeline bracing at pumphouse #2.

System component	Description and condition	Vulnerability	Improvements or mitigating actions	Security improvements
Computer and telemetry system	Computer and telemetry systems are located in pump-house #1. All systems are in good operating condition.	Computers are currently well protected against cyber attack or hacking, however, pump#2 is vulnerable to “no alarm condition” if it fails.	Correct deficiencies of the alarm system.	Contract consultant to correct computers and telemetry wiring and alarms.
Vocanic Eruption	All system components are vulnerable to lava dust in case of volcano eruption	System components are currently protected against everything except airborne particulates.	Investigate possible solutions to airborne dust/lava particles	Contact DOH/DOE/SHD for advice regarding volcanic eruptions



Section 10. Response Actions for Specific Events

In any event there are a series of general steps to take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate actions to save lives.
3. Take action to reduce injuries and system damage.
4. Make repairs based on priority demand.
5. Return the system to normal operation.

The following tables identify the assessment, set forth immediate response actions, define what notifications need to be made, and describe important follow-up actions.

A. Power outage

Assessment	The Lyman water system is vulnerable to power outages, experiencing an average of three outages per year that last several hours. The system does not have a back-up generator. Most of the time, storage is able to supply the system for 24 to 48 hours until power is restored.
Immediate actions	<ul style="list-style-type: none"> • Assess whether the outage is likely to last more than 6 hours. If no, be on alert for changing conditions and monitor storage tank. If yes, complete the following steps: • Call on availability of back-up generator at Birch Equipment Rental. • Obtain generator if available. • Connect generator to system and resume operations. • Implement water shortage response actions to inform customers to cut back on water usage until power is restored.
Notifications	<ul style="list-style-type: none"> • Power Company – Let them know that a public water system is experiencing an outage and the generator will be turned on until power is restored. • Birch Equipment Rentals – Obtain generator • Customers – cut back on water usage until power is restored.
Follow-up actions	<ul style="list-style-type: none"> • Turn off and disconnect back-up generator • Return system to general power supply • Inspect reservoirs and pumping facilities to ensure proper operation. • Return generator to Birch Equipment Rental.

A. Distribution line break

Assessment	The Lyman water system is vulnerable to distribution main breaks. The system does not have the equipment to repair main breaks. Licensed contractors must be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the break is able to be isolated by closing specific valves. If no, notify all customers of break, water is to be turned off and anticipated time of repair and restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify select customers (those between valves that need to be closed) of water shortage. ✓ Call on availability of repairman at Dahlman Pump. ✓ Obtain repair materials. ✓ Repair and disinfect break, and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH /SHD– Let them know that Lyman water system is experiencing a major line break and loss of pressure to system will remain until repairs are effected. ● Fire Service - Hydrants on certain streets are not available; no hydrants are available. ● Customers (all or selected) – No water available until break is repaired; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate break ● Return system to general water supply ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Transmission line break

Assessment	The Lyman water system is vulnerable to transmission line breaks. The system does not have the equipment to repair transmission line breaks. Licensed contractors must be available for repairs.
Immediate actions	<ul style="list-style-type: none">● Assess whether the break is able to be isolated by closing specific valves. If no, notify all customers of break, water is to be turned off and anticipated time of repair and restoration of water service. If yes, complete the following steps:<ul style="list-style-type: none">✓ Close appropriate valves to stop water flow at leak.✓ Notify all customers of water shortage.✓ Call on availability of repairman at Dahlman Pump.✓ Obtain repair materials.✓ Repair and disinfect break, and resume operations.● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none">● Fire Service - No hydrants are available until repairs are effected.
Follow-up actions	<ul style="list-style-type: none">● Open valves used to isolate break● Return system to general water supply● Inspect reservoirs and pumping facilities to ensure proper operation.● Take required coliform samples and submit to lab.● Notify customers of satisfactory test results and lift boil water notice.

A. Chlorine treatment equipment failure

Assessment	The Lyman water system is vulnerable to chlorine treatment equipment failure. The system does not have the staff or equipment to effect major repairs. Licensed contractors may be needed for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the failure is able to be repaired by staff within 24 to 48 hours. If yes, it is not necessary to notify customers. If no, complete the following steps: <ul style="list-style-type: none"> ✓ Notify system manager of equipment failure. ✓ Obtain repair materials. ✓ Repair equipment and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/SHD – It is not necessary to contact DOH/SHD if the repair can be made in a timely manner & no non-chlorinated water is sent to the reservoir or the distribution system. If there is a possibility that non-chlorinated water will be delivered to customers, let DOH/SHD know that Lyman water system is experiencing a major equipment failure and will remain on line until repairs are affected, and will implement boil water notice. <ul style="list-style-type: none"> ● Fire Service –If water is turned off, no hydrants are available. ● Customers –Water is available until equipment is repaired; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Return chlorination system to general water supply ● Take coliform samples and submit to lab if necessary. ● Notify customers of satisfactory test results and lift boil water notice, if necessary.

A. Caustic Soda Treatment equipment

Assessment	The Lyman water system is vulnerable to caustic soda equipment failure or caustic overfeed. The system does not have the equipment to make major equipment repairs. Licensed contractors may need to be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the equipment is able to be repaired by system staff. If yes, action necessary: <ul style="list-style-type: none"> ✓ Repair equipment /adjust feed rate / reduce concentration ✓ Resume operations. If no, complete the following steps: <ul style="list-style-type: none"> ✓ Call on availability of repairman at Dahlman Pump or TMG Services. ✓ Obtain repair materials. ✓ Repair equipment/ correct feed/ reduce concentration and resume operations.
Notifications	<ul style="list-style-type: none"> ● DOH/SHD – It is not necessary to inform DOH/SHD unless untreated or over-treated water is allowed to enter the reservoir or the distribution system. ● Fire Service - Hydrants on certain streets are not available; no hydrants are available. ● Customers (all or selected) – No water available until break is repaired or caustic concentration is reduced to satisfactory levels; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Notify system manger that equipment repair has been completed or overfeed has been corrected.

A. Source pump failure

Assessment	The Lyman water system is vulnerable to source pump failure. The system does not have the equipment to repair pumps. Licensed contractors must be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the failure requires replacement of pump. If no, notify system manager of failure and anticipated time of repair. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Switch system to alternate pump. ✓ Call on availability of repairman at Dahlman Pump. ✓ Obtain repair materials. ✓ Repair and disinfect pump & casing, and resume normal operations.
Notifications	<ul style="list-style-type: none"> ● System manager -
Follow-up actions	<ul style="list-style-type: none"> ● Return regular water pump to system operation.

A. Microbial (coliform, E. coli) contamination

Assessment	The Lyman water system is vulnerable to coliform contamination. The system has some of the equipment and expertise to track down contamination. Licensed contractors may need to be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the contamination is able to be isolated by system staff. If no, notify all customers of contamination and anticipated time of repair and restoration of normal water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify customers of water contamination. ✓ Call on availability of assistance from DOH/SHD. ✓ Obtain samples and submit to lab. ✓ Eliminate contamination and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/SHD – Let them know that Lyman water system is experiencing a contamination problem and the system will remain on line until contamination is eliminated. ● Customers –Water available until contamination is eliminated but they must boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Return system to general water supply ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Chemical contamination

Assessment	The Lyman water system is vulnerable to Chemical contamination. The system does not have the equipment to test for chemical contamination. Samples must be collected and taken to the lab.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the chemical contamination is able to be isolated by closing specific valves. If no, notify all customers of break, water is to be turned off and anticipated time of repair and restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify select customers (those between valves that need to be closed) of contamination. ✓ Call on availability of assistance from DOH/SHD. ✓ Obtain isolation or neutralization materials. ✓ Isolate or deactivate the chemical and resume operations. ● Implement possible chemical contamination response actions to inform customers of lack of water until contamination is isolated or neutralized.
Notifications	<ul style="list-style-type: none"> ● DOH/SHD – Let them know that Lyman water system is experiencing a chemical contamination in the system and we were / were not able to isolate the contamination. We have interrupted service until problem is solved and system flushed/cleaned. ● Fire Service - No hydrants are available. ● Customers (all or selected) – No water available until contamination is eliminated or neutralized.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate break. ● Flush system. ● Return system to general water supply. ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required samples and submit to lab. ● Notify customers of satisfactory test results and resume water service.

A. Vandalism or terrorist attack

Assessment	The Lyman water system is vulnerable to vandalism or terrorist attack. The system does not have the equipment or expertise to address all acts of vandalism or terrorism. Licensed contractors must be available for assessment and correction.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the vandalism/terrorism is able to be isolated by closing specific valves. If no, notify all customers of incident, water is to be turned off and anticipated time of correction and restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify select customers (those between valves that need to be closed) of no water. ✓ Call on availability of assistance from DOH or SHD. ✓ Obtain repair materials. ✓ Repair or neutralize and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/SHD – Let them know that Lyman water system is experiencing an act of vandalism/terrorism and loss of pressure to system will remain until repairs are effected. ● Fire Service - Hydrants on certain streets are not available; or no hydrants are available. ● Customers (all or selected) – No water available until vandalism is repaired.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate vandalism. ● Return system to general water supply. ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and resume water service.

A. Reduction or loss of water in the well

Assessment	The Lyman water system may be vulnerable to reduction or loss of water in the well. The system does not have the expertise to effect resolution of this problem. Licensed contractors must be available for assistance.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the reduction or loss is able to be corrected by switching system to alternate well. If no, notify all customers of loss, water is to be turned off and anticipated time of correction and restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify system manager of water shortage. ✓ Switch system to alternate pump. ✓ Call on availability of assistance from DOH, DOE or SHD. ✓ Obtain assistance and necessary materials. ✓ Resolve loss and resume operations. ● Implement curtailment actions to inform customers to curtail water use until the reduction/loss is corrected. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/DOE/SHD – Let them know that Lyman water system is loss of water in both wells and loss of pressure to system and will remain off line until restoration is affected. ● Fire Service -No hydrants are available. ● Customers – No water available until loss is corrected; after service is restored, to boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate break ● Return system to general water supply ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Drought

Assessment	The Lyman water system is vulnerable to drought. The system does not have the expertise to alleviate drought.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the drought is expected to be prolonged. If no, notify all customers of loss, water is to be turned off and anticipated time of restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify customers of water shortage. ✓ Obtain alternate water for customers. ✓ Disinfect system and flush lines when operations resume. ● When service is resumed, implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/DOE/SHD – Let them know that Lyman water system is experiencing a drought and loss of pressure to system and will remain off line until water supply is restored. ● Fire Service -No hydrants are available. ● Customers– No water available until supply is restored; directions to receive alternate water supply.
Follow-up actions	<ul style="list-style-type: none"> ● Return system to general water supply ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Flood

Assessment	The Lyman water system is vulnerable to flood. Licensed contractors may be needed for repairs, depending upon flood damage.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the flood poses difficulty. If no, notify all customers of continuation of service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Close any valves that can isolate the break. ✓ Notify select customers of water shortage. ✓ Call on availability of repairman at Dahlman Pump and G& S Electric. ✓ Obtain repair materials. ✓ Make repairs, disinfect any breaks, and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/DOE/SHD – Let them know if Lyman water system is experiencing a flood with a major line break or loss of pressure to system. ● Fire Service - Hydrants on certain streets are not available; no hydrants are available. ● Customers (all or selected) – No water available until break is repaired; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate break. ● Return system to general water supply. ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Earthquake

Assessment	The Lyman water system is vulnerable to earthquakes. The system does not have the equipment to repair major breaks. Licensed contractors must be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether any breaks are able to be isolated by closing specific valves. If no, notify all customers of breaks, water is to be turned off and anticipated time of repair and restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify select customers (those between valves that need to be closed) of water shortage. ✓ Call on availability of repairman at Dahlman Pump and G&S Electric. ✓ Obtain repair materials. ✓ Repair and disinfect breaks, and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<p>DOH/SHD – Let them know that Lyman water system is experiencing a major line break and loss of pressure to system and will remain off line until repairs are effected.</p> <ul style="list-style-type: none"> ● Fire Service - Hydrants on certain streets are not available; no hydrants are available. ● Customers (all or selected) – No water available until break is repaired; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate break ● Return system to general water supply ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Hazardous materials spill in vicinity of sources or system lines

Assessment	The Lyman water system is vulnerable to hazardous materials spills. The system does not have the equipment to contain or clean up hazardous materials. Licensed contractors must be available for cleanup.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the spill is able to be isolated. If no, notify all customers of spill, water is to be turned off and anticipated time of containment/cleanup and restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify customers of water shortage. ✓ Call on availability of licensed hazardous materials workmen. ✓ Obtain repair materials. ✓ Contain and clean up spill, and resume operations. ● Implement possible contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/DOE/SHD – Let them know that Lyman water system is experiencing a major hazardous materials spill and will remain off line until repairs are effected. ● Fire Service -No hydrants are available. ● Customers– No water available until spill is cleaned up; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Return system to general water supply ● Disinfect and flush entire system. ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Electronic equipment failure

Assessment	The Lyman water system is vulnerable to electronic equipment failure. The system does not have the equipment to repair electronics. Licensed contractors must be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether the failure will disrupt supply or treatment process. If no, notify all customers of failure, water use is to be curtailed and anticipated time of repair and restoration of normal water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify select customers of water use curtailment. ✓ Call on availability of repairman at TMG or TSI. ✓ Obtain repair materials. ✓ Correct failure and resume operations.
Notifications	<ul style="list-style-type: none"> ● Fire Service -No hydrants are available.
Follow-up actions	<ul style="list-style-type: none"> ● Return system to regular water usage ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Notify customers of repair and return to normal service.

A. Cyber attack

Assessment	The Lyman water system is not very vulnerable to cyber attack. The system does not have the equipment to repair computer failure. Licensed contractors must be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess if attack affects water supply/distribution. If no, it is not necessary to notify customers. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify customers of computer attack and no water service. ✓ Call on availability of repairman at TSI. ✓ Obtain repair materials. ✓ Repair computer and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<ul style="list-style-type: none"> ● DOH/SHD – Let them know that Lyman water system is experiencing a cyber attack and will remain off line until repairs are effected.. ● Fire Service –If service is interrupted and no hydrants are available. ● Customers – No water available until computer is repaired; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate break ● Return system to general water supply ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.

A. Volcano eruption

Assessment	The Lyman water system is vulnerable to volcanic eruption. The system does not have the equipment to repair major breaks or electronic equipment. Licensed contractors must be available for repairs.
Immediate actions	<ul style="list-style-type: none"> ● Assess whether any breaks or equipment failures are able to be isolated by closing specific valves. If no, notify all customers of breaks/failures, water is to be turned off and anticipated time of repair and restoration of water service. If yes, complete the following steps: <ul style="list-style-type: none"> ✓ Notify select customers (those between valves that need to be closed) of water shortage. ✓ Call on availability of repairman at Dahlman Pump, G&S Electric, TSI and TMG. ✓ Obtain repair materials. ✓ Repair and disinfect breaks, and resume operations. ● Implement possible coliform contamination response actions to inform customers to boil water until satisfactory sample results are obtained from lab.
Notifications	<p>DOH/DOE/SHD – Let them know that Lyman water system is experiencing fallout from a volcano and a major line break and loss of pressure to system and will remain off line until repairs are effected.</p> <ul style="list-style-type: none"> ● Fire Service - Hydrants on certain streets are not available; no hydrants are available. ● Customers (all or selected) – No water available until break is repaired; boil water until satisfactory results received from lab.
Follow-up actions	<ul style="list-style-type: none"> ● Open valves used to isolate break ● Return system to general water supply ● Inspect reservoirs and pumping facilities to ensure proper operation. ● Take required coliform samples and submit to lab. ● Notify customers of satisfactory test results and lift boil water notice.



Section 11. Alternative Water Sources

Intertie to adjacent water supply system

Water systems within one-quarter mile of our system	Feasibility of connecting
There is no water system located within one-quarter mile of the Lyman water system.	Connecting to a neighboring system is not an alternative.

Alternate source(s) of water

Alternative sources	Names	Phone	Availability	Is the water safe for drinking?
Bottled water suppliers	Not Available		Up to 1000 gallons in 1 gallon jugs within 24 hours	
Tanker trucks in the area available to deliver bulk water	None Available		5000 gallons in less than 6 hours	



Section 12. Curtailing Water Usage

Curtailing water use

Water curtailment measures	Actions
Restrict outside water usage including watering lawns, washing cars, etc. Request curtailment of inside usage.	<ul style="list-style-type: none">• Upon making the decision that curtailment is needed:• Draft door hanger with curtailment messages.• Post on customer doors.• Contact KIRO AM news to announce curtailment message.• Monitor system usage and spot check meter usage if time is available.• Continue message as long as curtailment is warranted.



Section 13. Returning to Normal Operation

Returning to normal operations

Action	Description and actions
Inspect, flush, and disinfect the system,	Water system operator and support staff inspect all system facilities, ensure all water quality tests have been done and the system has been flushed and disinfected if necessary. Water system operator makes a report to the water system manager. Water system manager makes decision on current condition of system.
Verification of water quality	Water system manager verifies water quality sampling results.
Coordinate with DOH/DOE/SHD	Water system operator coordinates with DOH/DOE/SHD on system condition and water quality results.
Notify customers	Water system manager meets with water system operator and communications lead to write notice to customers. Water system manager directs communications lead to distribute public notice.



Section 14. Training and Rehearsals

Training

Identify staff position training needs and expectations.

Position	Training needs and expectations
Water System Manager	Emergency response communications, emergency response planning, issuing health advisories
Water System Operator	Emergency response communications, emergency response planning, suspicious activity training
Field support	Emergency response communications, suspicious activity training
Administrative Support	Emergency response communications, emergency response planning, Issuing health advisories

Emergency rehearsals

Schedule for drills, tabletop exercises, and other ways to practice emergency response:

Event	Description	People and organizations involved	Date
Rehearsal	Conduct actual emergency drill	Water system staff	Unannounced
On-site training drills	Conduct specific drills, i.e., communications, water line breaks, sampling with a professional trainer	Water system staff and professional trainer	Spring 2014



Section 15. Plan Approval

Plan approval

This plan is officially in effect when reviewed, approved, and signed by the following people:

Name/Title	Signature	Date
Debra Heinzman, Mayor		November 12, 2013
Mike Couch, Mayor Pro Tem		November 12, 2013
Edward Hills, Council Member		November 12, 2013
Rita Burke, Council Member		November 12, 2013
Gail Ganga, Council Member		November 12, 2013
Mike Swanson, Council Member		November 12, 2013
Mark Kitchen, Certified Water Operator and Public Works		November 12, 2013
Cas Hancock, Relief Certified Water Operator		November 12, 2013
Debbie Boyd, Clerk/Treasurer		November 12, 2013



Appendix A. Sample News Releases Sample Public Notices DOH Guidelines

Town of Lyman
Water Department

News Release

For Immediate Release: <DATE>

Contact: Lyman Water Department/Mayor Debra Heinzman at 360-826-3033

Lyman Water Department announces boil water advisory for all customers on Lyman Water System

LYMAN — The Lyman Water Department is advising all water customers to boil their drinking water after recent samples showed the presence of <fecal coliform, E. coli, total coliform>. The Washington State Department of Health (DOH) has been notified and Lyman Water Department is working closely with the Office of Drinking Water to find the source of contamination and fix the problem, which may include disinfecting the system. The boil water advisory will remain in effect until further notice.

Mayor Heinzman (e.g. “We are doing all we can to eliminate the bacteria from the water system. Safe and reliable drinking water is critical to good health and responding to this kind of emergency is our highest priority,” said system spokesperson.)

<NUMBER or NO> illnesses related to the community’s drinking water have been reported. To correct the problem <WHAT IS BEING DONE> (e.g. Chlorine was applied to the entire system on DATE.)

The boil water advisory includes several precautionary steps that customers should take. These include using purchased treated bottled water or boiled water for any water that might be consumed: drinking, brushing teeth, dishwashing, preparing food and making ice. Water should be boiled for 1 minute, then allowed to cool before using.

The advisory will remain in effect until Lyman Water Department and DOH are confident there is no longer a threat of illness to their customers. Once satisfactory results are reported, customers will be notified that the advisory has been lifted.

If you have any questions, please call us at 360-826-3033.

WARNING:
**Do not drink tap water
without boiling it first!**

- Fecal coliform
- E. coli bacteria
- Other: _____

were detected in the water supply on:
(date)_____.

Boiling kills bacteria and other organisms in the water:

- **Bring water to a boil**
- **Continue boiling for 1 minute**
- **Let water cool before using**

To avoid possible illness: use boiled or purchased bottled water for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice.

Contact your doctor, if you experience one or more of these symptoms: nausea, cramps, diarrhea, jaundice, headache and/or fatigue. People with chronic illnesses, infants and the elderly may be at higher risk and should seek medical advice.

Water System: Lyman Water Department

I.D.: 490500

County: Skagit

Contact: _____

Telephone: _____

Date notice distributed: _____

See reverse side for more information

What is fecal coliform and E. coli?

Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these waters can cause short-term effects, such as diarrhea, cramps, nausea, headaches or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

How long will this warning be in effect?

We will consult with the Washington State Department of Health and Skagit Health District about this incident. We will notify you when you no longer need to boil the water.

DRINKING WATER WARNING

The Town of Lyman Water System, ID# 490500, located in Skagit County is contaminated with fecal coliform/ *E. coli* bacteria.

Fecal coliform/ *E. coli* bacteria were detected/confirmed in the water supply on _____. These bacteria can make you sick and are a particular concern for people with weakened immune systems.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a boil, let it boil 1 minute, and let it cool before using. Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until *further notice*. Boiling kills bacteria and other organisms in the water.

Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. *The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care provider.*

What happened? What is the suspected or known source of contamination?

The following is being done to correct the problem:

We have consulted with the Washington State Department of Health and Skagit Health District about this incident. We will notify you when you no longer need to boil the water. We anticipate resolving the problem by _____.

For more information, please contact _____ at (360)826-3033 or at
(owner or operator) (phone number)

(address)

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

This notice is sent to you by Town of Lyman Water System on ___/___/___



Truck Transportation Guidelines

Emergency Water Supply For Public Use

Introduction

These guidelines are for water system utilities, companies or associations that need to deliver potable water to the public during emergencies. Although the Washington State Department of Health (DOH) does not encourage this method of supplying water, trucked water may be the only viable alternative in some situations. When trucking water, there are important considerations for protection of public health.

DOH recommends that someone with water treatment expertise be responsible for the operation and management of trucked potable water. Usually this expertise is found in municipal water utilities.

A water system that plans to use trucked water in response to an emergency should first contact the appropriate regional office of the DOH Office of Drinking Water (DOH-ODW) or local health department to discuss current requirements and approve the proposed operation. [see WAC 246-290-415(2)(d) and 246-290-451(4)].

Guidelines

Truck Container

The truck container must be contaminant-free and capable of being maintained so that water contamination is prevented. Appropriate trucks include milk trucks, military-style water trucks, or others approved by DOH, the state Emergency Management Office, or local health departments. All container interiors must be visually inspected, flushed with disinfected water (see “Initial Truck Disinfection” guidelines), filled with water to be transported, and then tested for coliform organisms. Initial testing must show absence of coliform organisms before the truck is used for routine water hauling. Once the routine hauling operation has begun and precautions are in place to prevent contamination, testing does not need to be repeated during the course of the emergency response.

If a truck container has been previously used only for potable water and has been protected from possible contamination, it may be used without disinfection and testing for bacteria. The DOH-ODW regional office or the local health jurisdiction must approve use of

these truck containers, unless the state or local Emergency Management division has pre-approved their use in emergencies.

Truck containers that cannot pass the initial testing criteria after disinfection (i.e. absence of coliforms) shall not be used. Trucks previously used for substances other than potable water will be evaluated on an individual basis. Consult with DOH-ODW before using trucks that may have previously carried toxic or other non-potable liquids.

All truck containers must be filled or emptied through an air gap or approved double-check valve assembly, in accordance with WAC 246-290-490. All containers must be completely enclosed and tightly sealed, with lockable lids or hatches. Containers that are open to the atmosphere during hauling are not acceptable for use.

Initial Truck Disinfection

To insure that water-hauling equipment is adequately disinfected before using, all rust and sediment must be rinsed or flushed from the tank. The tank should then be completely filled with water containing at least 50-60 parts per million (ppm) of chlorine. This chlorine solution should be held in the tank for at least 24 hours. All hoses, pumps, and other equipment used in handling water, should be disinfected in the same manner.

About one gallon of liquid bleach is required in every 1,000 gallons of water to produce 50-60 ppm. Bleach should be 5.25-6 percent hypochlorite with no additives, such as scent or cleaning enhancers. To insure adequate mixing, the bleach should be added in proportion to the water as the tank is being filled. For example: add approximately one-half gallon of bleach with each 500 gallons of water.

The chlorine solution must be flushed from the tank after 24 hours. It should not be discharged directly into a stream because it can kill fish and plants. In some cases, the chlorinated water may be treated with citric acid or thiosulfate to remove the chlorine before discharging it. Once the tank is emptied, refill it with the water to be transported, and test for coliform bacteria. If coliforms are present, repeat the process. If the tank cannot be disinfected to eliminate coliforms, it must not be used.

Source of Water

The source for emergency trucked water must come from an approved public water supply. Another source of water can be used only with a formal written agreement between DOH or the local health department and the receiving purveyor. The unapproved source must be shown to be safe to use when treated to the minimal levels described in the "Handling" guidelines.

Every precaution should be taken to ensure that the water remains potable once it is collected and transported. The receiving water system should check that the truck hauler is familiar with proper handling procedures at the source and during transport.

Handling

All hoses and other handling equipment used in the operation must be stored off the ground at all times. They must be thoroughly flushed, disinfected, and then flushed again with the source water prior to use. Hoses should be capped at each end when they are not in use. The disinfection solution should be the same as that used for disinfecting the truck container.

All equipment surfaces that contact the potable water, including fill-point equipment, containers, caps, valves, filters, fittings, and other plumbing attachments should be regularly inspected and either disinfected or replaced as needed.

All equipment associated with the collection, transport, and delivery should be designed for potable water and must be able to be disinfected.

Water to be transported by tank trucks should contain a free chlorine residual of about one part per million (1 pip or mg/l) at the beginning of the haul. This is done by adding 5-6 tablespoons (2.5 – 3 ounces) of common household bleach to each 1,000 gallons. The bleach should be 5.25-6 percent strength, unscented and without additives. It should be added in proportion to the quantity of water during filling to insure uniform distribution.

Receiving Tank

The water system's receiving tanks must be inspected to assure that water quality issues will not occur during filling and later distribution to consumers. Receiving tanks must be cleaned and disinfected using the same procedures identified for the truck containers (see "Initial Truck Disinfection" guidelines). The receiving tanks must be kept secure and protected from contamination throughout the emergency response. Comments regarding receiving tanks should be documented in written records.

The customer's receiving tank must be filled through an air gap or an approved double-check valve assembly in accordance with WAC 246-290-490.

Documentation And Record-Keeping

The receiving water system is responsible for documenting and keeping proper records of the emergency trucked water operation. This includes:

- written records of the names and contact numbers of the hauler(s),
- the quantity delivered per trip,
- the approved water source(s) used,
- dates and times of delivery, free chlorine residual at point of delivery,
- assurance by the hauler (or a representative of the receiving system at the fill site) that proper disinfection was performed for each trip,
- the chlorine dose at the fill point and the free chlorine residual, if taken, after filling,

- any notes regarding the receiving tank.

These records should be retained for at least six months for review upon request by health agencies, haulers, or the supplying water system.

For more information

For more information on this issue, please call the regional office nearest you:

Northwest Regional Office (Kent) – 253/395-6750

Southwest Regional Office (Olympia) – 360/236-3030

Eastern Regional Office (Spokane) – 509/456-3115

You may also call toll free: 1-800-521-0323, or email: dwinfo@doh.wa.gov

DOH Pub#: 331-063

APPENDIX O

NOTIFICATION LETTERS TO SCFD AND SCDEM

January 31, 2001

3-00-228

Mr. Thomas Sheahan, Director
Skagit County Department of Emergency Management
2911 East College Way #B
Mount Vernon, WA 98273

Subject: Town of Lyman
Wellhead Protection Notification Letter

Dear Mr. Sheahan:

In order to protect the drinking water supply for the Town of Lyman, we are developing a wellhead protection program in accordance with Washington Department of Health regulations. As part of our wellhead protection program, we mapped the area overlying the short term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

A majority of the Town of Lyman and a portion of State Highway 20 is located within the wellhead protection area. We are notifying Skagit County Department of Emergency Management since your department would be a responder in the event of an accidental spill of contaminants along State Highway 20.

The enclosed map shows the 6 month, 1 year, 5 year, and 10 year time of travel boundaries for our wellhead protection area around Well #1. A contaminant spill within this wellhead protection area has the potential to impact one of our wells. It is therefore of utmost importance to us that reasonable spill response measures are taken in the event of an accidental spill in order to protect our town's drinking water supplies.

Thank you for your support in protecting our drinking water.

Sincerely,

Chris Stormont
Mayor, Town of Lyman

Enclosure

January 31, 2001

3-00-228

Mr. James Allen, Chief
Skagit County Fire District No. 8
20464 Prairie Road
Sedro Wooley, WA 98284

Subject: Town of Lyman
Wellhead Protection Notification Letter

Dear Mr. Allen:

In order to protect the drinking water supply for the Town of Lyman, we are developing a wellhead protection program in accordance with Washington Department of Health regulations. As part of our wellhead protection program, we mapped the area overlying the short term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

A majority of the Town of Lyman and a portion of State Highway 20 is located within the wellhead protection area. We are notifying Skagit County Fire District No. 8 since you would be the first responder in the event of an accidental spill of contaminants along State Highway 20.

The enclosed map shows the 6 month, 1 year, 5 year, and 10 year time of travel boundaries for our wellhead protection area around Well #1. A contaminant spill within this wellhead protection area has the potential to impact one of our wells. It is therefore of utmost importance to us that reasonable spill response measures are taken in the event of an accidental spill in order to protect our town's drinking water supplies.

Thank you for your support in protecting our drinking water.

Sincerely,

Chris Stormont
Mayor, Town of Lyman

Enclosure

APPENDIX P

**DISINFECTION BYPRODUCTS
MONITORING PROGRAM**

**TOWN OF LYMAN
DISINFECTION BYPRODUCTS
MONITORING PLAN**

DOH WATER SYSTEM ID# 490500

Prepared By

Mark Kitchen
Certified Operator
Kathleen "Cas" Hancock
Certified Operator
Town of Lyman

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1.0 PHASE 1 ROUTINE SAMPLING INFORMATION

1.1 Number of Samples:

Until the population exceeds 10,000, Lyman is required by the Washington State Department of Health (DOH) Group A Regulations WAC 246-290-300 (7)(a)(iv)(C) in accordance with 40 CFR141.132((b)(1)(i) and (ii)] to collect a minimum of *one sample* per monitoring period.

1.2 Sample Collection Schedule:

Sample collection will be conducted during the month with the warmest weather. For example, this sample will be taken in mid-August.

1.3 Sample Site Location:

This site was selected to be indicative of the system's longest chlorine residence time. The sample site location is shown on the accompanying map; Routine Disinfection By-Products Sampling Site.

Site 1: 30659 Lyman-Hamilton Road

Site location(s) may be revised in response to changes in regulations, accessibility, flooding, population growth, "looping" of mains, consolidation with other systems, addition of pressure zones, or extension of water service to new areas. Any time that routine sampling site location(s) are revised, this plan shall be updated to reflect the revisions (any such revisions shall also be sent to DOH).

1.4 Sample Collection Procedures:

To insure samples are representative of maximum chlorine residence time within the main and are viable samples, the samples shall be taken according to DOH TTHM Sampling Procedure publication #331-226 and HAA5 Sampling Procedure publication # 331-223.

1.5 Sample Integrity:

Following collection of the sample, it shall be kept in a cool dark place, and transport shall be as promptly as feasible, with the goal of transporting to the laboratory within 3 hours of the time that the sample is collected. If immediate transport is not feasible, storage of the sample requires refrigeration. In no case shall a sample that is over 20-hours old be turned into the lab.

1.6 Laboratory and Sample Analysis Methods:

Lyman utilizes the services of state-certified laboratories to perform all analysis of water samples. The standard analysis method in accordance with 40 CFR 141.131 for TTHM and HAA5 testing by these laboratories will be used.

2.0 PHASE 2 DISINFECTION BY-PRODUCTS MONITORING PLAN

2.1 Number of Samples:

Until the population exceeds 10,000, Lyman may be required by the Washington State Department of Health (DOH) Group A Regulations [WAC 246-290-300(3) (c)(i)] to collect more than *one sample* per monitoring period. Phase 2 of the Disinfection By-Products Rule will be administered by the U. S. Environmental Protection Agency (USEPA), which allows for a Very Small System Waiver (VSSW). Based on sample results from the Phase 1 samples collected in July 2005 and August 2007, Lyman qualified for a VSSW and will adjust additional numbers of samples or locations as directed by the USEPA.

2.2 Sample Collection Schedule:

Sample collection will be conducted during the month with the warmest weather. For example, this sample will be taken in mid-August.

2.3 Sample Site Location:

Collection site(s) will be selected to be indicative of the system's longest chlorine residence times. The sample site location will be shown on a Phase 2 Routine Disinfection By-Products Sampling Site.

Number and location of sites to be selected as directed by USEPA

Site location(s) may be revised in response to changes in accessibility, flooding, population growth, "looping" of mains, consolidation with other systems, addition of pressure zones, or extension of water service to new areas. Any time that routine sampling site location(s) are revised, this plan shall be updated to reflect the revisions (any such revisions shall also be sent to DOH).

2.4 Sample Collection Procedures:

To insure samples are representative of chlorine residence time within the main, the samples shall be taken according to DOH TTHM Sampling Procedure publication #331-226 and HAA5 Sampling Procedure publication # 331-223.

2.5 Sample Integrity:

Following collection of the sample, it shall be kept in a cool dark place, and transport shall be as promptly as feasible, with the goal of transporting to the laboratory within 3 hours of the time that the sample is collected. If immediate transport is not feasible, storage of the sample requires refrigeration. In no case shall a sample that is over 20-hours old be turned into the lab.

2.6 Laboratory and Sample Analysis Methods:

Lyman utilizes the services of state-certified laboratories to perform all analysis of water samples. The standard analysis method in accordance with 40 CFR 141.131 for TTHM and HAA5 testing by these laboratories will be used.

3.0 REPORTING RESULTS

3.1 Reporting Responsibility:

The Certified Operator is responsible for reporting all water quality sample results to the customers served and to DOH *with publication of the annual Consumer Confidence Report that is due by July 1 of each calendar year.*

4.0 REVISIONS TO DISINFECTION BY-PRODUCTS MONITORING PLAN

The DBPMP shall be reviewed by the Certified Operator and Town Engineer periodically and revised on an as needed basis. The conditions that may warrant revisions in the future include:

- Changes in regulations
- Population changes
- Loss of sample site availability
- Changes in sample site location
- Service to new areas
- Changes in pressure zones or flow patterns
- Consolidation of systems

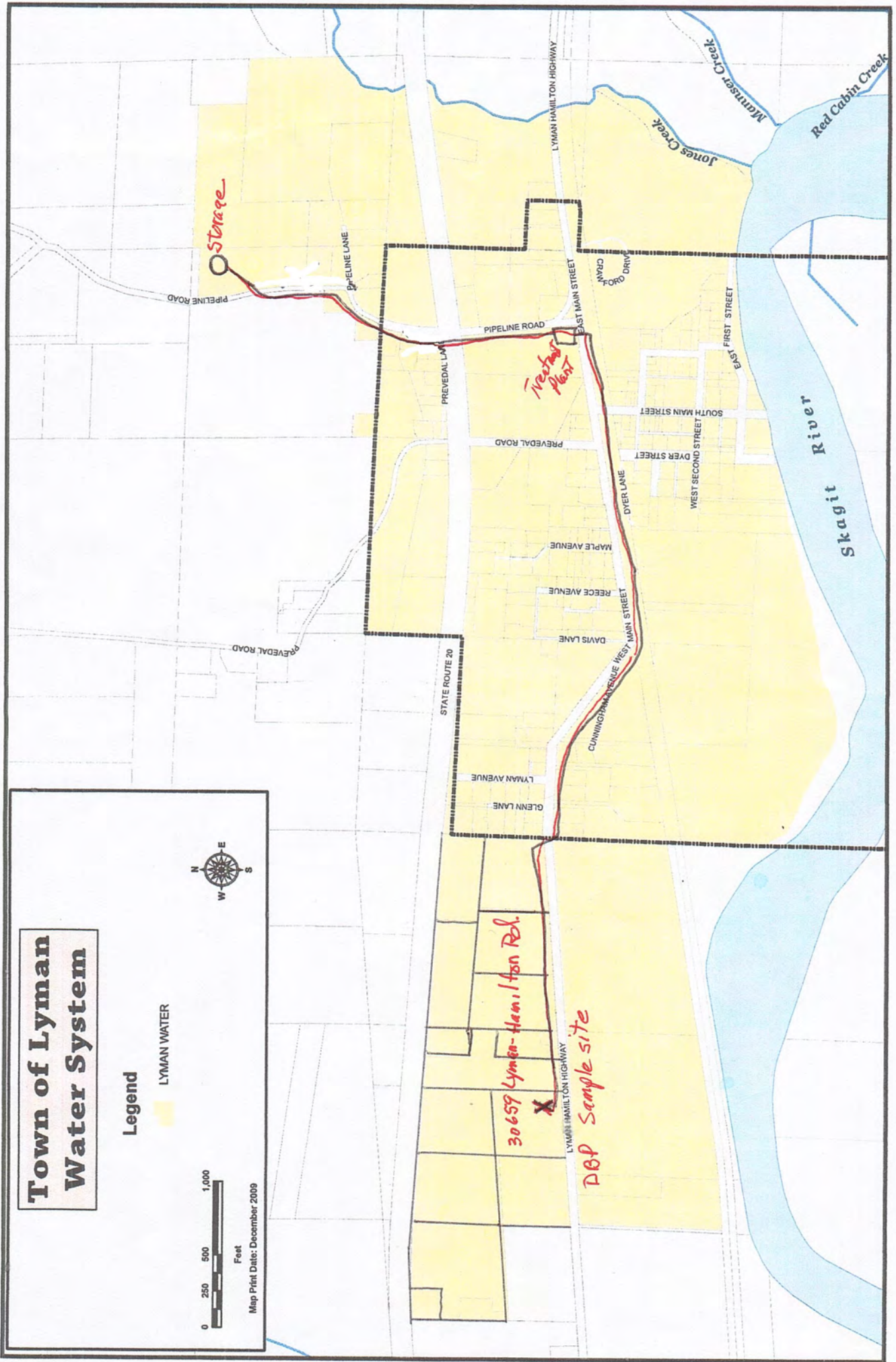
Town of Lyman Water System

Legend

LYMAN WATER



Map Print Date: December 2008



APPENDIX Q

CAPITAL IMPROVEMENT PLAN COST ESTIMATES

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
GENERAL IMPROVEMENT G-1
Purchase Backup Equipment

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Purchase Backup Equipment	LUMP SUM	\$ 3,000	\$ 3,000
TOTAL ESTIMATED PROJECT COST:.....				<u><u>\$ 3,000</u></u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
GENERAL IMPROVEMENT G-2
Update Auto-Read Handheld Meter Reader

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Update Auto-Read Handheld Meter Reader	LUMP SUM	\$ 9,000	\$ 9,000
TOTAL ESTIMATED PROJECT COST:.....				<u><u>\$ 9,000</u></u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
SOURCE IMPROVEMENT SO-1
Well 2 Improvements

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Well 2 Improvements	LUMP SUM	\$ 3,500	\$ 3,500
TOTAL ESTIMATED PROJECT COST:.....				<u><u>\$ 3,500</u></u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
SOURCE IMPROVEMENT SO-2
Well 2 Pump Replacement

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Well 2 Pump Replacement	LUMP SUM	\$ 18,000	\$ 18,000
TOTAL ESTIMATED PROJECT COST:.....				<u><u>\$ 18,000</u></u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
STORAGE IMPROVEMENT ST-1
Clean Reservoir

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Clean Reservoir	LUMP SUM	\$ 4,000	\$ 4,000
TOTAL ESTIMATED PROJECT COST:.....				\$ <u>4,000</u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
STORAGE IMPROVEMENT ST-2
Record Conveyance of Reservoir Land

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Record Conveyance of Reservoir Land	LUMP SUM	\$ 4,000	\$ 4,000
TOTAL ESTIMATED PROJECT COST:.....				\$ <u>4,000</u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
STORAGE IMPROVEMENT ST-3
Repair Leak from Reservoir Sample Tap

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Repair Leak	LUMP SUM	\$ 1,500	\$ 1,500
TOTAL ESTIMATED PROJECT COST:.....				\$ <u><u>1,500</u></u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
STORAGE IMPROVEMENT ST-4
Storage Metering Improvements

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Reservoir Site Meter Vault	LUMP SUM	\$ 20,000	\$ 20,000
	Subtotal.....			\$ 20,000
	Tax rate (8.2%).....			1,600
	TOTAL ESTIMATED PROJECT COST:.....			\$ 21,600
	ENR Construction Cost Index = 9,441 (May 2013)			

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
STORAGE IMPROVEMENT DE-1
New 160,000-Gallon Reservoir

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	\$ 40,000	\$ 40,000
2	Minor Changes	LUMP SUM	\$ 10,000	\$ 10,000
3	Site Earthwork	LUMP SUM	\$ 14,000	\$ 14,000
4	Unsuitable Excavation	150 CY	\$ 15	\$ 2,250
5	Locate Existing Utilities	LUMP SUM	\$ 2,500	\$ 2,500
6	Erosion Control	LUMP SUM	\$ 5,000	\$ 5,000
7	Trench Safety Systems	LUMP SUM	\$ 3,000	\$ 3,000
8	Surface Restoration	LUMP SUM	\$ 1,600	\$ 1,600
9	Fencing	260 LF	\$ 30	\$ 7,800
10	Gravel Borrow	400 TN	\$ 20	\$ 8,000
11	Crushed Surfacing, Base Course	240 TN	\$ 25	\$ 6,000
12	Foundation Gravel	150 TN	\$ 20	\$ 3,000
13	Site Piping	LUMP SUM	\$ 50,000	\$ 50,000
14	Concrete Reservoir	LUMP SUM	\$ 160,000	\$ 160,000
15	Electrical, Telemetry, and Instrumentation	LUMP SUM	\$ 20,000	\$ 20,000
16	Survey	LUMP SUM	\$ 2,500	\$ 2,500
Subtotal.....				\$ 335,650
Tax rate (8.2%).....				<u>27,523</u>
Subtotal:.....				\$ 363,173
Contingency (20%).....				<u>\$ 72,827</u>
TOTAL ESTIMATED CONSTRUCTION COST:.....				\$ 436,000
Administration (5%):.....				\$ 21,800
Engineering (15%):.....				\$ 65,400
Construction Management (10%):.....				<u>\$ 43,600</u>
TOTAL ENGINEERING AND ADMINISTRATIVE COSTS (30%):.....				\$ 131,000
TOTAL ESTIMATED PROJECT COST:.....				<u><u>\$ 567,000</u></u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
DISTRIBUTION SYSTEM IMPROVEMENT D-1
Repair Leak on Myer Avenue

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Repair Leak	LUMP SUM	\$ 280	\$ 280
TOTAL PROJECT COST:.....				\$ <u>280</u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
DISTRIBUTION SYSTEM IMPROVEMENT D-2
Repair Leak on Pipeline Lane

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Repair Leak	LUMP SUM	\$ 3,500	\$ 3,500
TOTAL PROJECT COST:.....				<u><u>\$ 3,500</u></u>
ENR Construction Cost Index = 9,441 (May 2013)				

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
DISTRIBUTION SYSTEM IMPROVEMENT D-3
Dyer Avenue Waterline Replacement

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	\$ 4,000	\$ 4,000
2	8-inch DI Water Pipe, Including Fittings	360 LF	\$ 50	\$ 18,000
3	Locate Existing Utilities	LUMP SUM	\$ 1,000	\$ 1,000
4	Erosion Control	LUMP SUM	\$ 1,000	\$ 1,000
5	Additional Pipe Fittings	200 LB	\$ 3.50	\$ 700
6	Trench Safety Systems	LUMP SUM	\$ 1,000	\$ 1,000
7	8-inch Gate Valves	2 EA	\$ 1,200	\$ 2,400
8	Fire Hydrants	1 EA	\$ 4,000	\$ 4,000
8	Gravel Backfill	180 TN	\$ 15	\$ 2,700
9	Crushed Surfacing, Top Course	70 TN	\$ 25	\$ 1,750
10	Foundation Gravel	20 TN	\$ 35	\$ 700
11	HMA Cl. 1/2 PG 58-22	40 TN	\$ 150	\$ 6,000
12	Sawcutting	720 LF	\$ 3	\$ 2,160
13	Cold Mix Asphalt	20 TN	\$ 150	\$ 3,000
14	Connections to Existing System	1 EA	\$ 3,000	\$ 3,000
15	3/4" Service Connections, complete	8 EA	\$ 500	\$ 4,000
16	Traffic Control	16 HRS	\$ 95	\$ 1,520
	Subtotal.....			\$ 56,930
	Tax rate (8.2%).....			4,668
	Subtotal:.....			\$ 61,598
	Contingency (20%).....			\$ 12,402
	TOTAL ESTIMATED CONSTRUCTION COST:.....			\$ 74,000
	Administration (5%):.....			\$ 3,700
	Engineering (15%):.....			\$ 11,100
	Construction Management (10%):.....			\$ 7,400
	TOTAL ENGINEERING AND ADMINISTRATIVE COSTS (30%):.....			\$ 22,000
	TOTAL ESTIMATED PROJECT COST:.....			\$ 96,000
	ENR Construction Cost Index = 9,441 (May 2013)			

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
DISTRIBUTION SYSTEM IMPROVEMENT D-4
Pipeline Lane Waterline Replacement

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT</u> <u>PRICE</u>	<u>AMOUNT</u>
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	\$ 5,000	\$ 5,000
2	8-inch DI Water Pipe, Including Fittings	420 LF	\$ 50	\$ 21,000
3	Locate Existing Utilities	LUMP SUM	\$ 1,000	\$ 1,000
4	Erosion Control	LUMP SUM	\$ 1,000	\$ 1,000
5	Additional Pipe Fittings	200 LB	\$ 3.50	\$ 700
6	Trench Safety Systems	LUMP SUM	\$ 1,000	\$ 1,000
7	8-inch Gate Valves	2 EA	\$ 1,200	\$ 2,400
8	Fire Hydrants	2 EA	\$ 4,000	\$ 8,000
8	Gravel Backfill	210 TN	\$ 15	\$ 3,150
9	Crushed Surfacing, Top Course	80 TN	\$ 25	\$ 2,000
10	Foundation Gravel	20 TN	\$ 35	\$ 700
11	HMA Cl. 1/2 PG 58-22	50 TN	\$ 150	\$ 7,500
12	Sawcutting	840 LF	\$ 3	\$ 2,520
13	Cold Mix Asphalt	20 TN	\$ 150	\$ 3,000
14	Connections to Existing System	1 EA	\$ 3,000	\$ 3,000
15	3/4" Service Connections, complete	8 EA	\$ 500	\$ 4,000
16	Traffic Control	16 HRS	\$ 95	\$ 1,520
	Subtotal.....			\$ 67,490
	Tax rate (8.2%).....			5,534
	Subtotal:.....			\$ 73,024
	Contingency (20%).....			\$ 14,976
	TOTAL ESTIMATED CONSTRUCTION COST:.....			\$ 88,000
	Administration (5%):.....			\$ 4,400
	Engineering (15%):.....			\$ 13,200
	Construction Management (10%):.....			\$ 8,800
	TOTAL ENGINEERING AND ADMINISTRATIVE COSTS (30%):.....			\$ 26,000
	TOTAL ESTIMATED PROJECT COST:.....			\$ 114,000
	ENR Construction Cost Index = 9,441 (May 2013)			

Town of Lyman
GRAY & OSBORNE PRELIMINARY PROJECT COST ESTIMATE
DISTRIBUTION SYSTEM IMPROVEMENT D-5
Lyman Hamilton Road Waterline Replacement

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT</u> <u>PRICE</u>	<u>AMOUNT</u>
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	\$ 24,000	\$ 24,000
2	8-inch DI Water Pipe, Including Fittings	2,310 LF	\$ 50	\$ 115,500
3	Locate Existing Utilities	LUMP SUM	\$ 6,000	\$ 6,000
4	Erosion Control	LUMP SUM	\$ 6,000	\$ 6,000
5	Additional Pipe Fittings	1,000 LB	\$ 3.50	\$ 3,500
6	Trench Safety Systems	LUMP SUM	\$ 4,600	\$ 4,600
7	8-inch Gate Valves	14 EA	\$ 1,200	\$ 16,800
8	Fire Hydrants	6 EA	\$ 4,000	\$ 24,000
8	Gravel Backfill	1,130 TN	\$ 15	\$ 16,950
9	Crushed Surfacing, Top Course	420 TN	\$ 25	\$ 10,500
10	Foundation Gravel	130 TN	\$ 35	\$ 4,550
11	HMA Cl. 1/2 PG 58-22	280 TN	\$ 150	\$ 42,000
12	Sawcutting	4,620 LF	\$ 3	\$ 13,860
13	Cold Mix Asphalt	110 TN	\$ 150	\$ 16,500
14	Connections to Existing System	1 EA	\$ 3,000	\$ 3,000
15	3/4" Service Connections, complete	10 EA	\$ 500	\$ 5,000
16	Traffic Control	92.0 HRS	\$ 95	\$ 8,740
	Subtotal.....			\$ 321,500
	Tax rate (8.2%).....			26,363
	Subtotal:.....			\$ 347,863
	Contingency (20%).....			\$ 69,137
	TOTAL ESTIMATED CONSTRUCTION COST:.....			\$ 417,000
	Administration (5%):.....			\$ 20,900
	Engineering (15%):.....			\$ 62,600
	Construction Management (10%):.....			\$ 41,700
	TOTAL ENGINEERING AND ADMINISTRATIVE COSTS (30%):.....			\$ 125,000
	TOTAL ESTIMATED PROJECT COST:.....			\$ 542,000
	ENR Construction Cost Index = 9,441 (May 2013)			

APPENDIX R

CORRESPONDENCE AND APPROVALS



June 28, 2013

Ms. Jennifer Kropak
Washington State Department of Health
Drinking Water Program
20435 72nd Avenue South, Suite 200
Kent, Washington 98032

SUBJECT: DRAFT WATER SYSTEM PLAN
TOWN OF LYMAN, SKAGIT COUNTY, WASHINGTON
G&O #12575.00

Dear Ms. Kropak:

Enclosed are three hard copies and one CD copy of the final draft of the Town of Lyman's Water System Plan. The Plan has been reviewed by the Town and is ready for adoption by the Town, subject to receiving comments from DOH and Skagit County. At this time, the Plan has also been submitted to Skagit County and adjacent purveyors for their review.

Please contact me at your convenience at (206) 284-0860 if you have any questions.

Very truly yours,

GRAY & OSBORNE, INC.

Josef Dalaeli, P.E.

JD/hhj
Encl.

cc: Mayor Debra Heinzman, Town of Lyman
Mr. Gary Christensen, A.I.C.P., Skagit County Planning & Development Services
Mayor Joan Cromley, Town of Hamilton
Ms. Lynnette Korfanta, Bacus Road Water System
Mr. Chris Shaff, Planning Engineer, Skagit County Public Utility District



June 28, 2013

Mr. Gary Christensen, A.I.C.P.
Skagit County Planning and Development Services
1800 Continental Place
Mount Vernon, Washington 98273

SUBJECT: DRAFT WATER SYSTEM PLAN
TOWN OF LYMAN, SKAGIT COUNTY, WASHINGTON
G&O #12575.00

Dear Mr. Christensen:

Enclosed are one hard copy and one CD copy of the final draft of the Town of Lyman's Water System Plan. The Plan has been reviewed by the Town and is ready for adoption by the Town, subject to receiving comments by DOH and Skagit County. At this time, the Plan has also been submitted to DOH and adjacent purveyors for their review. The Town will send the Water System Plan review fee directly to you under separate cover.

Please contact me at your convenience at (206) 284-0860 if you have any questions.

Very truly yours,

GRAY & OSBORNE, INC.

Josef Dalaeli, P.E.

JD/hhj
Encl.

cc: Mayor Debra Heinzman, Town of Lyman



June 28, 2013

Mr. Chris Shaff
Planning Engineer
Skagit County Public Utility District
1415 Freeway Drive
Mount Vernon, Washington 98273

SUBJECT: DRAFT WATER SYSTEM PLAN
TOWN OF LYMAN, SKAGIT COUNTY, WASHINGTON
G&O #12575.00

Dear Mr. Shaff:

On behalf of the Town of Lyman, I would like to notify you that the Town of Lyman's 2013 Draft Water System Plan is available for review. Attached is a CD containing the Plan. In accordance with WAC 246-290-100(7), the Town of Lyman is making this Plan available to all adjacent water purveyors so that they can assess consistency with ongoing and adopted planning efforts.

Also attached is a copy of the letter that was sent along with the Plan to the Washington State Department of Health.

We anticipate that the Department of Health will complete its review of the Plan in 90 days, at which point the Plan will be finalized. We would appreciate receiving any comments you might have within that time period, if possible.

Please refer comments and questions regarding this Plan to the undersigned at (206) 284-0860.

Very truly yours,

GRAY & OSBORNE, INC.

Josef Dalaeli, P.E.

JD/hhj
Encl.

cc: Mayor Debra Heinzman, Town of Lyman



June 28, 2013

Ms. Lynnette Korfanta
Bacus Road Water System
P.O. Box 3366
Arlington, Washington 98223

SUBJECT: DRAFT WATER SYSTEM PLAN
TOWN OF LYMAN, SKAGIT COUNTY, WASHINGTON
G&O #12575.00

Dear Ms. Korfanta:

On behalf of the Town of Lyman, I would like to notify you that the Town of Lyman's 2013 Draft Water System Plan is available for review. Attached is a CD containing the Plan. In accordance with WAC 246-290-100(7), the Town of Lyman is making this Plan available to all adjacent water purveyors so that they can assess consistency with ongoing and adopted planning efforts.

Also attached is a copy of the letter that was sent along with the Plan to the Washington State Department of Health.

We anticipate that the Department of Health will complete its review of the Plan in 90 days, at which point the Plan will be finalized. We would appreciate receiving any comments you might have within that time period, if possible.

Please refer comments and questions regarding this Plan to the undersigned at (206) 284-0860.

Very truly yours,

GRAY & OSBORNE, INC.

Josef Dalaeli, P.E.

JD/hhj
Encl.

cc: Mayor Debra Heinzman, Town of Lyman



PLANNING & DEVELOPMENT SERVICES

DALE PERNULA, AICP, DIRECTOR

JACK MOORE, CBCO, BUILDING OFFICIAL

September 19, 2013

Josef Dalaeli, P.E.
Gray & Osborne, Inc.
701 Dexter Avenue N., Suite 200
Seattle, WA 98109

RE: Town of Lyman Water System Plan (June, 2013) local government consistency review

Dear Mr. Dalaeli,

Thank you for the opportunity to review the Town of Lyman Water System Plan (WSP)- dated June, 2013.

Regarding the six-year growth projections, Skagit County has adopted countywide growth forecasts for each municipality and its urban growth area. For your information, the Town of Lyman allocated population forecast for 2025 is 550 residents. See Table 3 of the following referenced report at: [Population & Employment Forecasting & Allocation 2025](#), and [Countywide Planning Policies 1.1](#). That said, the forecasted 2025 Town residents is not significantly different than the Town's WSP forecast of 557 residents in 2023. Also, Skagit County is required to update its comprehensive plan pursuant to the Growth Management Act before July 1, 2016, which will include new 20-year population and employment forecasts to 2036.

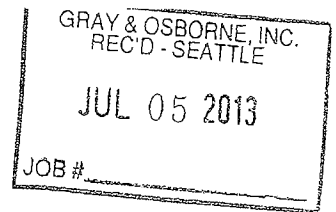
I have reviewed your submitted *Town of Lyman Water System Plan (WSP)- dated June, 2013*. Attached is a signed Local Government Consistency Review Checklist indicating that the water system plan is consistent with: Skagit County land use and zoning, population forecasts, comprehensive plan water service area and capital facility policies, and the Coordinated Water System Plan.

If you have any questions, please contact me at (360) 336-9410, ext. 5624, or garyc@co.skagit.wa.us.

Sincerely,

Gary R. Christensen, AICP
Manager

Attachment



STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent Washington 98032-2388

July 2, 2013

MARK KITCHEN
LYMAN WATER DEPARTMENT
PO BOX 1248
LYMAN WA 98263

RE: LYMAN WATER DEPARTMENT ID# 49050
SKAGIT COUNTY
WATER SYSTEM PLAN
SUBMITTAL #13-0702

Dear Mark Kitchen:

On July 02, 2013 the Department of Health, Office of Drinking Water (ODW) received planning documents submitted for review and approval per WAC 246-290. This submittal has been assigned a unique identification number 13-0702. Please include this number on all future correspondence or additional submittals about this project.

We will review and respond to your Water System Plan (WSP) within 90 days unless a longer period of time is necessary, RCW 70.116.140. If additional time is needed, we will notify you.

Please note: We charge a review fee. Our fee invoice is sent with our review letter or approval letter. This fee will cover the cost of reviewing the initial draft plan plus review of one final draft. Payment of review fees does not guarantee our approval of a submittal. If additional review letters and submittals are required, we will send another invoice with the final approval letter. There is a link to our fee schedule on our website www.doh.wa.gov/ehp/dw under rules, WAC 246-290-990.

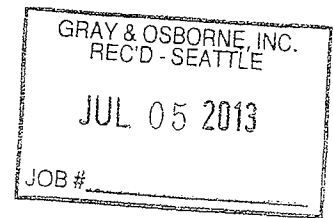
Please call me at (253) 395-6750 if you have any questions about this letter.

Sincerely,

Mary Rucksdashel
Northwest Drinking Water Operations

cc: JOSEF DALAELI, P.E., GRAY & OSBORNE INC





STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent Washington 98032-2388

July 2, 2013

Jacqueline Klug
Department of Ecology – M/S NB-81
3190 160th Ave SE
Bellevue, WA 98008-5452

Subject: Lyman Water Department Water System, ID #49050
Skagit County
Water System Plan
Submittal #13-0702

Dear Jacqueline Klug:

Here is the water system plan for the Lyman Water Department located in Skagit County. Please review and provide comments, as required in the 2007 Memorandum of Understanding. Please focus comments on the elements identified in the *Joint Review Procedures for Planning and Engineering Documents*. Comments on other elements of the document are welcome, but a response from the water system on other elements is not required.

Please provide written comments to the water utility and copy or office within 60 days from the date of this letter. We will forward any changes to the document regarding water rights to you for review.

Please mail comments to:

Jennifer Kropack
Department of Health
20425 – 72nd Ave. S, Suite 310
Kent, WA 98032

If I receive no response by the comment deadline, DOH will determine compliance based on information provided by the water system. If you have any questions, please contact me at 253-395-6769. Thank you for your time and assistance.

Sincerely,

Jennifer Kropack
Regional Planner
NW Drinking Water Operations

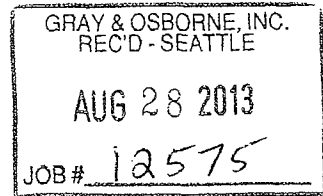
Enclosures – Water System Plan & Submittal Form

cc: Mark Kitchen
Josef Dalaeli, P.E.





STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent, Washington 98032



August 26, 2013

HONORABLE MAYOR DEBRA HEINZMAN & COUNCIL MEMBERS
LYMAN WATER DEPARTMENT
PO BOX 1248
LYMAN, WA 98263

RE: Town of Lyman ID# 49050
Skagit County
Water System Plan
Submittal # 13-0702

Dear Honorable Mayor Debra Heinzman and Town Council:

Thank you for submitting the draft water system plan (WSP) for the Town of Lyman, received in this office on July 2, 2013.

General Observations

We commend all of the Town's progress since the last 2002 plan. Bringing the water system into compliance through leveraging loans and grant monies is a major success. From building a new 158,000 storage reservoir and transmission line, to adding disinfection and corrosion control treatment, to increasing your rates, and beginning your leak detection and repair efforts, we see your positive outcomes. Once your plan is approved, the Town will be in compliance with Municipal Water Law (MWL) and water rights, and you will have identified future priorities. Approved plans also help you secure funding if any is available*(see note at end of letter).

We have reviewed the submittal and offer the following comments. Please address prior to final plan approval.

Planning

1. Have the Town's planner or the Mayor sign the local government consistency form per MWL and provide to us. Also provide a signed consistency statement from Skagit County.

System Analysis

2. Page 3-14. The high distribution system leakage (DSL) average of 39% should be identified as a deficiency in Chapter 3.

Operations & Maintenance

3. Page 7-2. Recommend you add the following to the routine preventive maintenance schedule: ground level checks of the storage tank (daily or weekly) and comprehensive inspection of the storage tank (internal and external) every three to five years.
4. Page 7-4 and Appendix D – Cross Connection Control Program. Describe the total number of backflow prevention devices installed and their testing compliance status. Summarize the implementation status of



the Town's cross connection control plan and identify next steps for full implementation. When will the customer surveys be completed?

5. Appendix N – Emergency Response Plan. Include response to caustic overfeed in caustic soda section. And include notification to the Skagit County Health Department if a situation arises that impacts the quality or quantity of water available, especially when food service or schools are involved.

Water Use Efficiency (WUE) & Water Resources

Pages 5-10 – 5-11 and Appendix J. Your distribution system leakage (DSL) average of 39% (volume equals 116 homes water usage/year) needs your attention within the available resources. And incremental progress is expected over time. Reducing leakage directly benefits the town by lowering pumping and treatment costs and reducing staff time to deal with outages and repairs. Even more important, a tight system with low leakage is less susceptible to contamination, and this benefits the entire community. Your Water Loss Control Action Plan (WLCAP) needs some clarifications:

- a. Explain the most current thinking about real versus apparent leakage. Where are the areas of highest leakage or is finding the apparent losses more the problem now?
- b. Explain how the source meter inaccuracy will be resolved. What will it take to fix the source meter accuracy condition described on page 5-11 and what will it cost?
- c. Recommend changing the text from “elective” to “as soon as we can finance, and we are committed to doing the most cost effective things first, then re-evaluating and prioritizing our next step.”
- d. Per WAC 246-290-820 (5) (d), describe in more detail “any technical concerns or economic concerns, or other system characteristics justifying the higher distribution system leakage.”
- e. Recommend doing a cost-benefit analysis to compare pumping and treatment costs to the costs of fixing the worst leaks or meter inaccuracies sooner rather than later.

Financials

6. Pages 8-2 – 8-4, Table 8-1. It appears the Town is committed to handle the smaller expense projects to reduce water loss within this six-year period. However, for the bigger main replacement costs there appears to be very little commitment in your financial statements to fund infrastructure replacement from your own revenues or borrowing. Instead it appears you hope to rely on grants*(see note at end of letter). What year is the SRF debt expiring? Is the Town willing to commit to taking on new debt for main replacement once the existing debt is retired? What is your proposed financial solution if more frequent breaks begin to occur on the old mains identified in the plan?
7. Chapter 9. The Town's financial position is of concern to DOH. Your customer base is small, your reserves are very low, and you are barely covering annual O & M and debt service expenses. Recommend review of your rate structure to make sure all customer classes are paying their fair share. What percent of your customers have the low income rate? How many ERUs is the school using and paying for? When money is this tight, it pays to look at every angle and potentially restructure your rates.
8. Page 9-1, Table 9-2 and Appendix D. Is the Town willing to commit to the 2% rate increase beyond 2013 if necessary according to Ordinance # 208?

Other

9. Provide a copy of your franchise agreement with Skagit County.
10. Provide documentation of the governing body approval of the WSP.

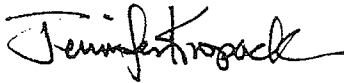
Regulations establishing a schedule for fees for review of planning, engineering and construction documents have been adopted (WAC 246-290-990). The total cost is \$1,507.50. The Office of Drinking Water has used

state and federal funds to pay \$301.50 of this amount. An itemized invoice showing the remaining amount due of **\$1,206.00** is enclosed.

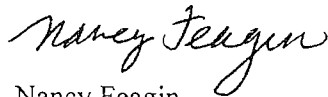
This fee covers our cost for review of the initial submittal, plus the review of one revised document. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: **DOH, Revenue Section, and P.O. Box 1099, Olympia, WA 98507-1099.**

Thank you again for submitting your plan for our review. If you have any comments or questions concerning our review, please contact me on the planning subjects or contact Nancy Feagin about the engineering questions.

Sincerely,



Jennifer Kropack
Regional Planner
(253) 395-6769

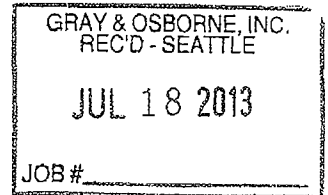


Nancy Feagin
Regional Engineer
(253) 395-6765

Enclosure: Invoice

cc: Cas Hancock, Operator
Josef Dalaeli, PE, Gray & Osborne, Inc.
Jacque Klug, Ecology, NWRO
Lorna Parent, Skagit County Health Department
Gary Christensen, Director, Skagit County Planning & Development Services
Mike Dixel, DOH, Water Use Efficiency Program Manager

*Note: During these hard economic times and government downsizing of programs, there are less and less grant monies to be found. The 2013 DOH SRF loan terms identifies an affordability index of between 2.01 – 3.5% for principal forgiveness of 30% (if available) with a 1% interest rate. Whether you review MHI at the county level (Skagit County is approximately \$55,000/year) or go to information on American FactFinder, US Census 2010, where Lyman's MHI is identified at \$34,688/year, your average water rate of \$47/month would not qualify. The qualifying water rate is closer to \$68.75/month per County MHI or \$58.10/month per Town MHI. It is good to know that the past loan and grants, and the fixes you made in the last decade are really proving to be a good deal for the Town.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

July 16, 2013

Jennifer Kropack
Department of Health
20425 72nd Avenue South, Suite 310
Kent, WA 98032

Re: Lyman Water Department Water System, ID #49050; Skagit County; Water System Plan; Submittal #13-0702.

Dear Mrs. Kropack:

Thank you for the opportunity to review the Town of Lyman Water System Plan (WSP). Consistent with the Memorandum of Understanding between the State of Washington Departments of Ecology and Health, I have reviewed the relevant portions of the WSP and offer the following comments.

Water Right Assessment

The Water Rights Evaluation and Source of Supply Analysis sections included in *Chapter 3: System Analysis* are consistent with Ecology records. However, *Appendix B: Water Right Certificates* contains several elements that are inconsistent with Ecology record and with the water right characterization in Chapter 3. The following comments apply to the Appendix B Water Rights Self Assessment Tables 1 – 3.

- Permit, Certificate, or Claim #: The first entry should only list Ground Water Certificate (GWC) 4041 (i.e., delete the permit reference).
- Source Name/Number: The first entry should list wells #1 and #2.
- Existing Water Rights – Maximum Instantaneous Flow Rate (Q_i): the Q_i on the first entry should be 700 gpm, as listed in GWC 4041.
- Existing Consumption – Maximum Instantaneous Flow Rate (Q_i): the Q_i on the first entry should be 558 gpm, which combines the withdrawals for wells #1 and #2.
- Existing Consumption – Maximum Annual Volume (Q_a): the Q_a on the first entry should reflect the combined withdrawals for wells #1 and #2.



Jennifer Kropact
January 16, 2013
Page 2

- Delete entire second line/entry that currently reads:

2. Permit 5641/GWC 4041	Town of Lyman	1979	Well #2	All supplemental	-	-	279 gpm	0.1 acre-ft	-	-
----------------------------	---------------------	------	------------	---------------------	---	---	------------	----------------	---	---

Thank you again for the opportunity to review the Town of Lyman WSP. Please contact me at (425) 649-7217 or at ria.berns@ecy.wa.gov if you have any questions regarding this review or need additional information.

Sincerely,



Ria Berns
Water Resource Program

cc: Mark Kitchen
Josef Dalaelie, P.E.

Local Government Consistency Review Checklist

Water System Name: Town of Lyman PWS ID: 49050

Planning/Engineering Document Title: Water System Plan Plan Date: June 2013
~~Water System Plan~~ ~~June 2011~~

Local Government with Jurisdiction: Skagit County
~~Skagit County~~

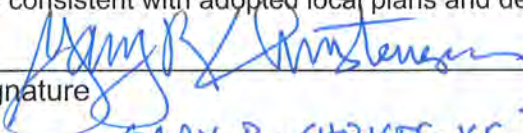
WAC 246-290-108 Consistency with local plans and regulations:

Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b) (ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with **local plans and regulations**. This review must include specific elements of local plans and regulations, as they reasonably relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

Local Government Consistency Statement	Page(s) in Planning Document	Yes – No – Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the applicable service area.	1-3, FIGURE 1-5	YES
b) The <u>six-year growth projection</u> used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	TABLE 2=10 CHAPTER 2	YES
c) Applies to <u>cities and towns that provide water service</u> : All water service area policies of the city or town are consistent with the <u>utility service extension ordinances</u> of the city or town.		NA
d) <u>Service area policies</u> for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area [City(ies), County(ies)].	CHAPTER 1	YES
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable; Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of Comprehensive plans.	CHAPTER 8	YES

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature:  Date: 9/19/13
Printed Name, Title, & Jurisdiction: GARY R. CHRISTENSEN, MANAGER, SKAGIT COUNTY PDS



Local Government Consistency Review Checklist

Water System Name: Town of Lyman PWS ID: 49050

June 2013,

Planning/Engineering Document Title: Water System Plan Plan Date: Rev. Dec. 2013

Local Government with Jurisdiction: Town of Lyman

WAC 246-290-108 Consistency with local plans and regulations:

Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b) (ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with **local plans and regulations**. This review must include specific elements of local plans and regulations, as they reasonably relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

Local Government Consistency Statement	Page(s) in Planning Document	Yes – No – Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the applicable service area.	1-3, Fig. 1-5	Yes
b) The <u>six-year growth projection</u> used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	2-9	Yes
c) Applies to <u>cities and towns that provide water service</u> : All water service area policies of the city or town are consistent with the <u>utility service extension ordinances</u> of the city or town.	1-5 to 1-8	Yes
d) <u>Service area policies</u> for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area [City(ies), County(ies)].	1-5 to 1-8	Yes
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable; Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of Comprehensive plans.	Chapter 8	Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Debra K. Heinzen
Signature

12-13-13
Date

Debra Heinzen Mayor
Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the retail service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place of use. If no water right place of use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place of use (water system plan amendment is required). For non-community water systems, a consistency review is required when requesting a place of use expansion. All engineering documents must be submitted with a service area map per WAC 246-290-110(4)(b)(ii).

A) Documenting Consistency: Municipal water suppliers must document all of the elements in a consistency review per WAC 246-290-108.

- 1 a) Provide a copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that are related to water supply planning.
- 1 b) Include a copy of the **six-year growth projections** that corresponds to the service area. If the local population growth rate projections are not used, provide a detailed explanation on why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- 1 c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. This applies to cities and towns only.
- 1 d) Include all **service area policies** for how new water service will be provided to new customers.
- 1 e) **Other relevant elements** related to water supply planning as determined by the department (DOH). See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and provide direction on how this inconsistency can be resolved.

C) Documenting Lack of Consistency Review by Local Government: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for their review. Please include: name of contact, date, and efforts made (letters, phone calls, and e-mails). In order to self-certify, please contact the DOH Planner.

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

RESOLUTION 2013-7
A RESOLUTION OF THE TOWN OF LYMAN
APPROVING THE 2013-2019
WATER SYSTEM PLAN UPDATE

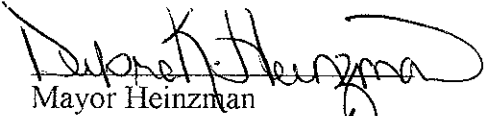
WHEREAS, the Lyman Town Council, in compliance with the Department of Health must submit a Water System Plan Update in 2013; and,

WHEREAS, the Lyman Town Council has retained the services of Gray and Osborn, Inc. to coordinate the Water System Plan Update; and,

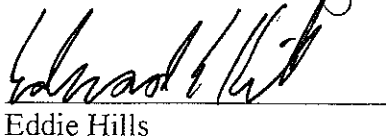
WHEREAS, the Lyman Town Council has reviewed this Water System Plan Update,

THEREFORE BE IT RESOLVED, by the Lyman Town Council that they approve this plan and return it to Gray and Osborn, Inc. for timely submittal to the Department of Health.

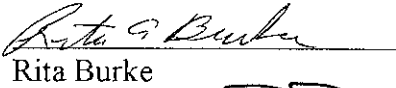
Passed this 10th day of December 2013



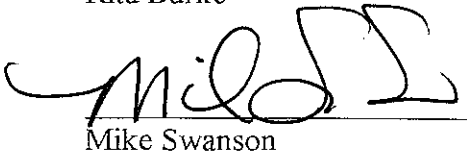
Mayor Heinzman



Eddie Hills



Rita Burke



Mike Swanson



Gail Ganga

Mike Couch