CITY OF ALGONA

KING COUNTY **WASHINGTON**

WATER SYSTEM PLAN

G&O #20619
MAY 2022

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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TABLE OF CONTENTS

CHAPTER 1 – DESCRIPTION OF THE WATER SYSTEM

CHAPTER 2 – BASIC PLANNING DATA

CHAPTER 3 – SYSTEM ANALYSIS

CHAPTER 4 – WATER EFFICIENCY PROGRAM

CHAPTER 5 – OPERATION AND MAINTENANCE PROGRAM

CHAPTER 6 – CAPITAL IMPROVEMENT PROGRAM

CHAPTER 7 – FINANCIAL ANALYSIS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

CHAPTER 1

DESCRIPTION OF THE WATER SYSTEM

WATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Algona (City), incorporated in 1955, is a Code City that operates under Title 35A RCW. The City operates a public water system that serves customers within the City limits. The water system is publicly owned and is governed by an elected Mayor and five-member City Council. Algona's mailing address is:

City of Algona
200 Washington Blvd
Algona, Washington 98001-8505

Algona's Washington State Department of Health (DOH) water system identification number is 01450 V. A copy of Algona's Water Facility Inventory (WFI) form is included in Appendix B. Figure 1-1 provides a regional vicinity map showing the location of the system.

SYSTEM BACKGROUND

HISTORY OF WATER SYSTEM DEVELOPMENT AND GROWTH

The water system that serves the City of Algona was originally constructed in 1960 by King County Water District No. 101. In the early 1960s, a 100,000-gallon steel reservoir was constructed for the water system. This reservoir is located at a site west of West Valley Highway and near the extension of 5th Avenue North. In 1970, the water district was deactivated and the City of Algona assumed the maintenance and operations responsibilities for the system. The original source of supply for the water system was the City of Auburn (Auburn). Water was purchased from Auburn and delivered through a 4-inch master meter located on Boundary Boulevard at Celery Avenue. In August 1975, a well was drilled by the City at its Public Works Yard on 3rd Avenue South. This well had a capacity of 500 gpm and, once brought online in 1978, was capable of servicing the entire City with the exception of the Auburn 400 Industrial Park and the Boeing Welded Duct Facility. An interlocal agreement for emergency water supply was established between Algona and Auburn in 1978.

On May 23, 1996, Algona's well collapsed. On the same day, Auburn began to supply emergency water via the existing Auburn intertie. Due to several factors, including Auburn's supply surplus, the existing infrastructure was able to supply water to Algona, Boeing, and the Auburn 400 Industrial Park. Thus, Algona elected to resume the purchase of water from Auburn. City of Algona Resolution 550-96 established an interlocal agreement for the purchase of water from the City of Auburn on

August 20, 1996. This interlocal agreement was termed the Auburn Intertie Project and the agreement is included in Appendix C. In accordance with this agreement and to ensure adequate water supply and redundancy, four master meter stations were to be constructed in addition to the one serving Boeing. Two master meter stations were constructed in 2001, with one located at Boundary Boulevard and Industry Drive North, and the second at Boundary Boulevard and Milwaukee Avenue. A third master meter was installed in 2002 near West Valley Highway and 10th Avenue North as part of a commercial development. The fourth master meter, located on 1st Avenue, served the Boeing Duct Welding Facility directly and is isolated from the remainder of Algona's water system. An updated interlocal agreement between the City of Auburn and the City of Algona was signed in 2002. This agreement is also included in Appendix C.

The City of Algona's existing water system is shown on Figure 1-2.

PROJECTS COMPLETED SINCE THE 2014 WATER SYSTEM PLAN

Table 1-1 identifies the completion status of Capital Improvement Program (CIP) projects from Algona's previous *2014 Water System Plan*.

TABLE 1-1

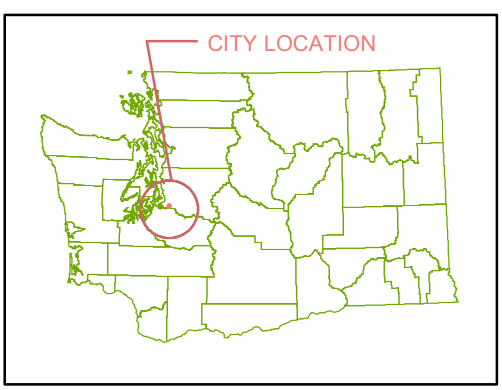
Projects Completed from 2014 Water System Plan CIP

Project No.	Project Description	Status or Year Completed
2014 through 2020 CIP		
ST-1	Financial Participation in Auburn Reservoir	Completed 2016(1)
M-1	Radio Read Meters for Commercial Accounts	Completed 2018
D-1	Water main along Seattle Boulevard South, 5th Avenue South, and Tacoma Boulevard South	Completed 2015

(1) Algona has purchased 180,000 gallons of storage from Auburn and has the option to purchase an additional 120,000 gallons.

ADJACENT PURVEYORS

The City of Algona is surrounded by the City of Auburn, the City of Pacific (Pacific), and the Lakehaven Utility District. The City of Auburn borders Algona to the north and east and is currently the City's sole wholesale water source. The Lakehaven Utility District borders the City of Algona on the west. Pacific borders Algona on the south. The cities of Algona and Pacific have an intertie, which is located at the intersection of Milwaukee Boulevard South and 5th Avenue South. The City of Pacific serves two commercial accounts and approximately 22 residential accounts located inside the Algona City limits on 5th Avenue South and in the southeast portion of the City. The City of Algona's City limits, retail service area, and adjacent purveyors are all shown on Figure 1-3.



N

0 6,000 12,000 Feet

CITY OF ALGONA

WATER SYSTEM PLAN
FIGURE 1-1
LOCATION MAP

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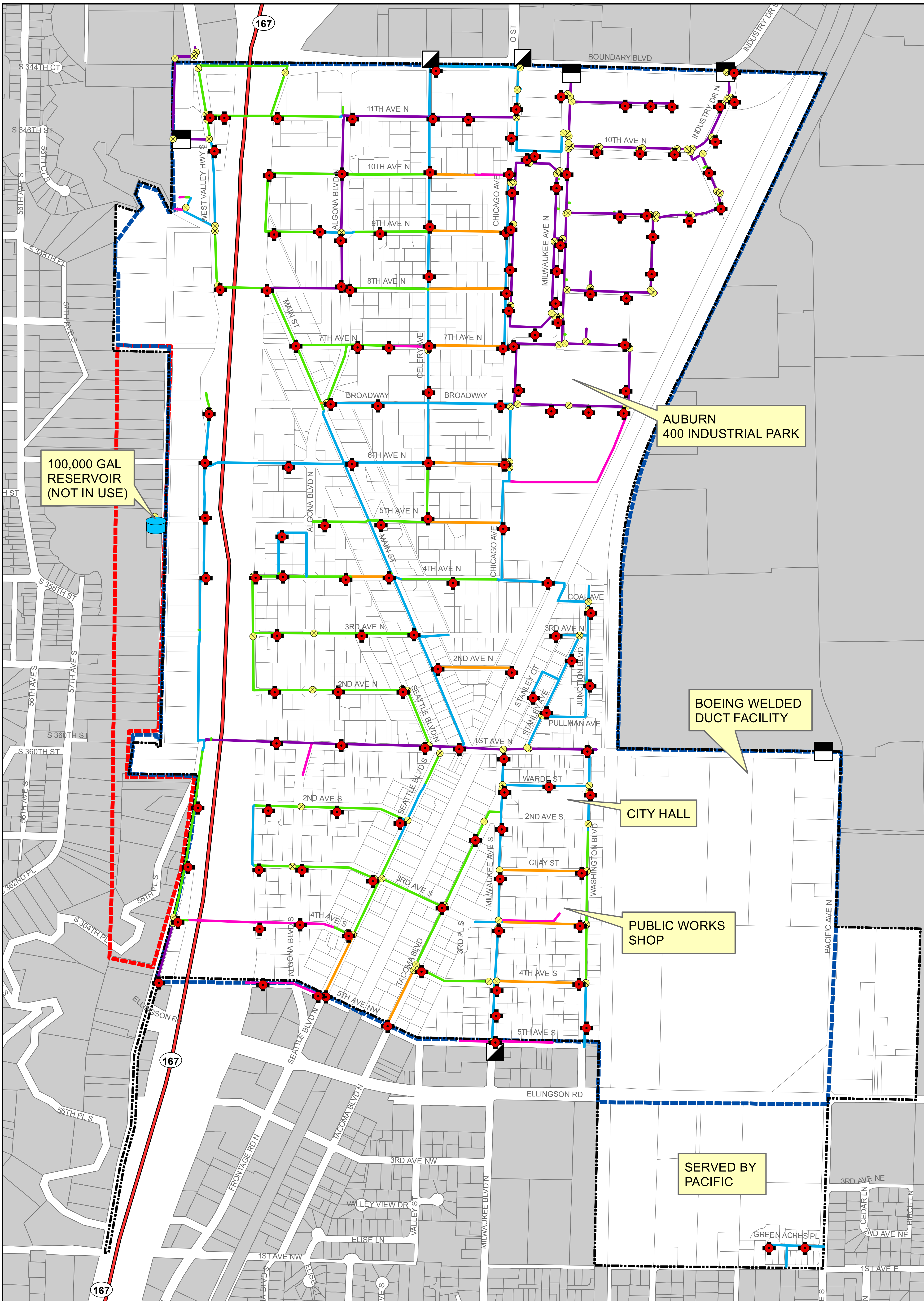
L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 1-1 LOCATION.mxd



LEGEND

Source: City of Algona, King County GIS

WATER MAINS

- 2-INCH
- 4-INCH
- 6-INCH
- 8-INCH
- 12-INCH
- UNKNOWN

- FIRE HYDRANT
- VALVE
- SOURCE INTERTIE
- EMERGENCY INTERTIE
- RETAIL SERVICE AREA
- CITY OF ALGONA
- POTENTIAL ANNEXATION SERVICE AREA

N

0 250 500 1,000 Feet

CITY OF ALGONA
WATER SYSTEM PLAN
FIGURE 1-2
WATER SYSTEM FACILITIES

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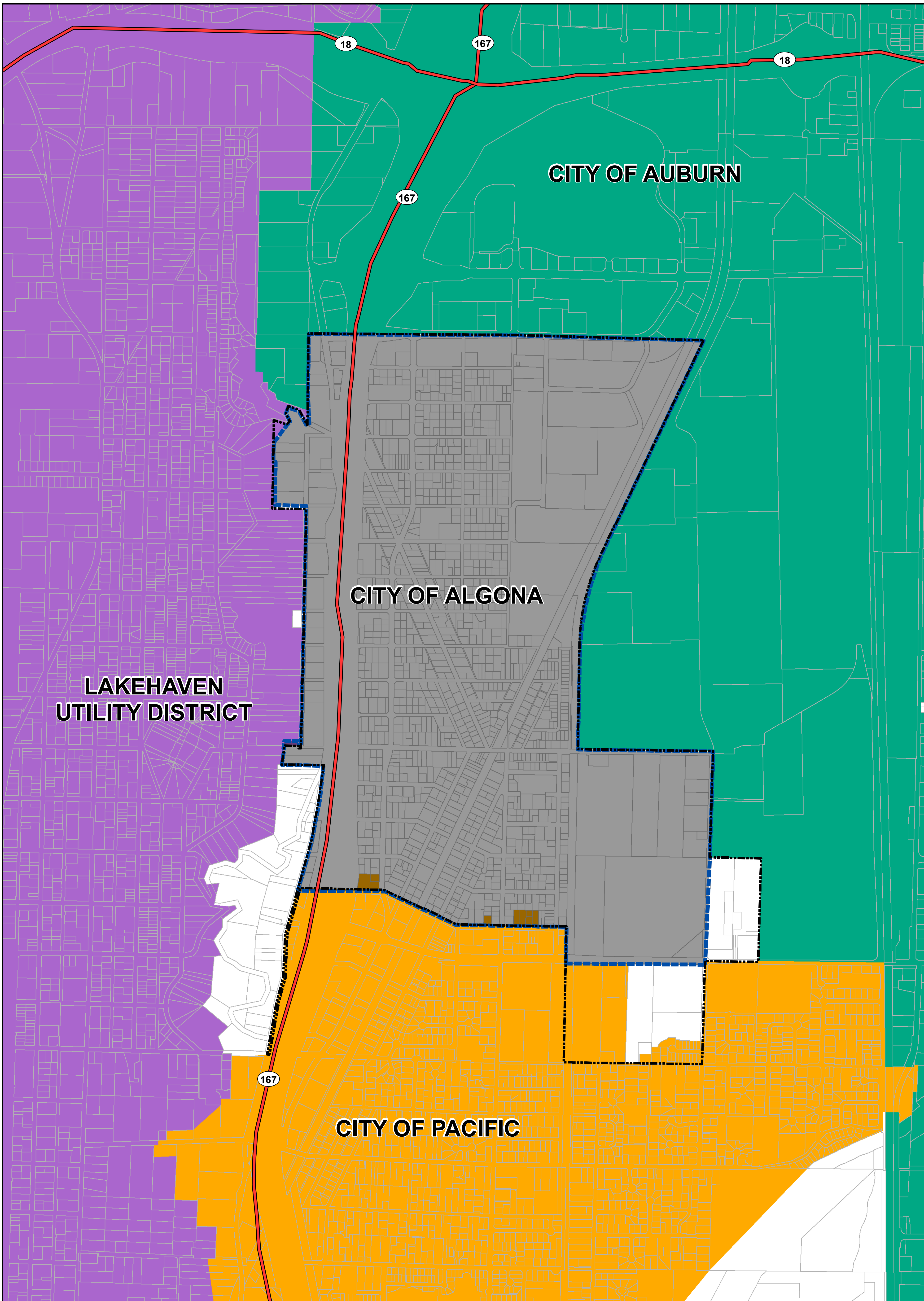
L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 1-2 WATER SYSTEM.mxd



Legend

Source: King County GIS

ALGONA CITY LIMITS
RETAIL SERVICE

Adjacent Purveyor

CITY OF
CITY OF PACIFIC
LAKEHAVEN WATER AND SEWER DISTRICT

N

0 550 1,100 2,200 Feet

CITY OF ALGONA
WATER SYSTEM PLAN
FIGURE 1-3
SERVICE AREAS AND ADJACENT PURVEYORS

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L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 1-3 PURVEYORS.mxd

GEOGRAPHY

The City of Algona is situated in the White River Valley. Algona's elevation ranges between 65 feet and 85 feet above sea level. The higher elevations within Algona all lie west of the West Valley Highway and include some steep slopes. A watershed divide runs through the City at approximately 4th Avenue North. The North basin flows to Mill Creek before eventually joining the Green/Duwamish River. The South basin flows into Government Canal and into the White River. The White River flows into the Puyallup River and eventually discharges into Commencement Bay when it reaches the City of Tacoma (Tacoma). Local topography is shown in Figure 1-4.

SITE SENSITIVE AREAS

Site sensitive areas in the vicinity near Algona include steep slope and erosion hazard areas, flood hazard areas, and water bodies. The site sensitive areas within the City are shown in Figures 1-4.

Steep Slope and Erosion Hazard Areas

These areas are prone to unstable behavior due to steep slopes, lack of vegetation, or unconsolidated soils. Erosion Hazard Areas are especially subject to erosion, if disturbed, and may not be well suited for high-density developments or intensive land uses.

Flood Hazard Areas

Flood hazard areas are areas adjacent to lakes, rivers, and streams that are prone to flooding during peak runoff periods. Flood hazard areas deserve special attention due to the sensitive nature of their ecosystems as well as the potential for damage to structures located in the floodplain.

Water Bodies

Lakes, streams, and creeks are classified as sensitive areas due to the wide variety of plants and animals that they support. It should be noted that a majority of the regulations for water bodies are designed to protect natural water bodies and their associated ecosystems.

INVENTORY OF EXISTING FACILITIES

SOURCE OF SUPPLY

The City of Auburn has been the sole source of water to the Algona water system since May 23, 1996 when Algona's sole potable well collapsed. Both cities have ratified agreements in 1996 and 2002.

The City of Auburn operates multiple sources including two springs, ten wells, and a wholesale intertie with Tacoma. Algona's wholesale water comes primarily from Wells 6 and 7 and is stored in Reservoir 6 in Lakeland Hills.

TREATMENT

Auburn's water treatment includes chlorination, corrosion control, and metals removal. Wells 6 and 7 are the primary sources of wholesale water delivered to Algona. Water from Wells 6 and 7 is pumped, treated, and chlorinated at the Fulmer Field CCT Facility.

According to Auburn's 2015 *Water System Plan*, the Fulmer Field CCT Facility was constructed in 2004 and is located adjacent to the Fulmer Field City Park as well as Well 2 and Well 6. Chlorine is introduced into the system prior to the air-stripping towers at a dose of approximately 0.95 mg/L. The chlorine is adjusted based on measured chlorine residual at the station analyzer. The treated water is then stored in the clearwell before being boosted into the distribution system.

STORAGE

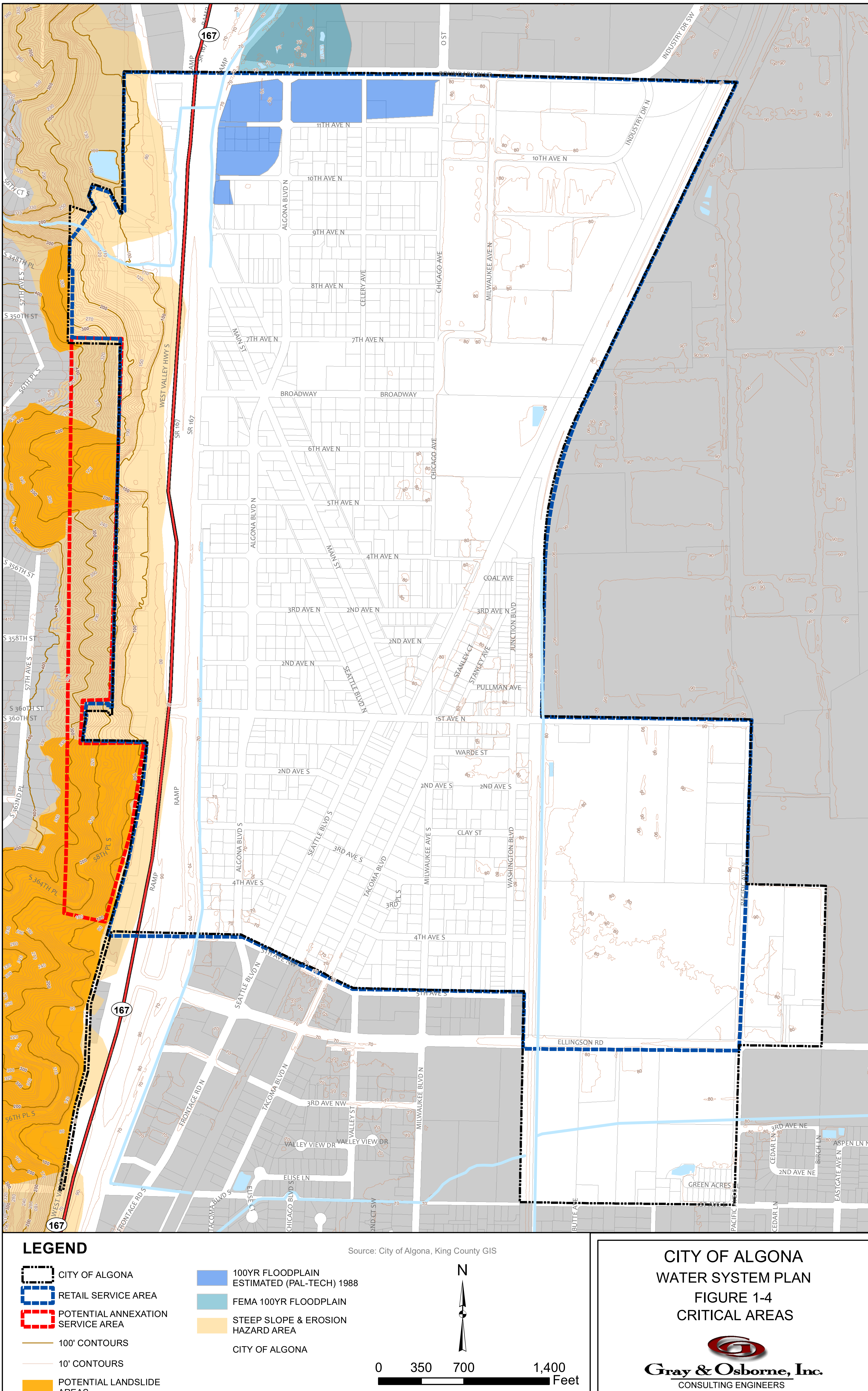
At present, Algona purchases 280,000 gallons of storage from the City of Auburn.

Per the terms of the 1996 and 2002 Agreements with Auburn, the City of Algona agreed to financially participate in the construction of a new Auburn reservoir, and receive a storage allotment of 180,000 gallons. In 2010, the City of Auburn built a new 1.0 MG reservoir in the Lakeland Hills portion of Auburn's service area. Algona was allotted 180,000 gallons of this reservoir.

The 2002 Agreement also states "Algona's minimum financial participation shall provide for construction of storage volume capacity of 180,000 gallons, inclusive of standby, equalization, and fire protection volume storage. Such 180,000-gallon capacity is in addition to Algona's existing 100,000-gallon reservoir storage in its westerly service area." Per the agreement, Algona must do one of the following:

- Maintain at least 100,000 gallons of storage in its service area;
- Increase participation in the future Auburn reservoir by 100,000 gallons; or
- Obtain 100,000 gallons of storage from another source.

Algona ceased using its 100,000-gallon steel reservoir located west of the West Valley Highway in 1996. The City plans to demolish and remove the reservoir before it becomes a safety hazard. However, without this 100,000-gallon reservoir, the City would



CITY OF ALGONA
WATER SYSTEM PLAN
FIGURE 1-4
CRITICAL AREAS

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L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 1-4 CRITICAL AREAS.mxd not have been in compliance with the 2002 Agreement. As a result, Algona purchased an additional 100,000 gallons of capacity in the Lakeland Hills Reservoir 6 in 2016, bringing the total allotted storage volume in the City of Auburn's Lakeland Hills Reservoir to 280,000 gallons.

Algona is still short approximately 20,000 gallons of storage in order to meet its fire suppression storage requirements. There have been ongoing discussions between Algona and Auburn for an additional 20,000 gallons of storage, though at this time, a formal agreement has not been reached. A more extensive storage capacity analysis can be found in Chapter 3.

INTERTIES

Algona has six interties with the City of Auburn and one with the City of Pacific. These are shown on Figure 1-2.

Five of the Auburn interties are metered and connected to Auburn's 242 Zone. These interties make up the wholesale source of supply for Algona's water system. Three feed the distribution system while the intertie at 1st Avenue North serves the Boeing Duct Welding Facility directly and is isolated from the rest of the distribution system. A fifth Auburn intertie is unmetered and designed as an emergency source of supply. Finally, the sixth Auburn intertie is a normally closed valve, is inactive, and has not been used in the last 10 years. It is unknown if the intertie is still equipped with a master meter. As specified in the 2002 Agreement, the City of Auburn is responsible for operation and maintenance of the interties and calibration of the master meters.

Algona also has an emergency intertie with the City of Pacific, which is located at the intersection of Milwaukee Avenue South and 5th Avenue South. This 8-inch intertie is currently unmetered and is for emergency use only. No written agreement exists between Algona and Pacific for use of this intertie at this time. Table 1-2 provides an inventory and description of each intertie.

TABLE 1-2

Intertie Inventory and Characteristics

Auburn/Algona Intertie Locations	Connected Water System	Meter Size, in.	Status	Maximum Flow Rate
Intersection of Milwaukee Avenue North and Boundary Boulevard	City of Auburn	8-inch	Active/ Permanent	3,500 gpm (each)
Intersection of Industry Drive North and Boundary Boulevard	City of Auburn	8-inch	Active/ Permanent	
West Valley Highway, at Approx. 10th Avenue North	City of Auburn	8-inch	Active/ Permanent	
1st Avenue North – Boeing Facility	City of Auburn	8-inch	Active/ Permanent	
Boundary Boulevard and Celery Avenue (Emergency Intertie-Normally Closed)(1)	City of Auburn	8-inch	Inactive	N/A
Boundary Boulevard and O Street SW(2)	City of Auburn	Unmetered	Emergency	N/A
Milwaukee Avenue South and 5th Avenue South(2)	City of Pacific	Unmetered	Emergency	N/A

(1) The City of Auburn does not read this meter and it may be removed.
(2) This intertie is unmetered. No current agreement exists between Pacific and Algona for this intertie.

There are no restrictions on flow at any of the interties feeding Algona. However, since the City does not produce any water, the flow direction under typical operating conditions will be into Algona. The flow rate is dependent upon the hydraulic gradient and demand at each of the intertie locations. All metered interties are equipped with 8-inch meters.

The Pacific intertie is an 8-inch pipe connecting the two systems with a closed valve. The hydraulic grade line in Pacific is approximately 10 feet higher than in Algona, so flow would be towards Algona under normal circumstances. The valve is normally closed and must be manually opened. The valve could be opened on an “as needed” basis based upon mutual agreement of both cities at the time of need. This intertie has not been used in many years yet the valve was most recently exercised by City of Pacific staff. As previously mentioned, there is currently no formal written agreement between the two cities governing the use of this intertie. It is recommended that the two cities develop an interlocal agreement.

TRANSMISSION AND DISTRIBUTION

The City of Algona water system includes about 18 miles of piping, ranging in size from 4-inch to 12-inch, as presented in Table 1-3. The pipe material is estimated to be roughly 85 percent asbestos cement (AC) installed in the 1960s, 13 percent Ductile Iron (DI), and 2 percent PVC. The distribution system includes five crossings of SR 167.

TABLE 1-3

Distribution System Pipe Inventory

Diameter	Length (Feet)	Percentage
Unknown	1,333	1.4%
2-inch	388	0.4%
4-inch	7,118	7.7%
6-inch	28,595	30.9%
8-inch	32,667	35.3%
12-inch	22,553	24.3%
TOTAL	**92,654**	**100%**

In addition to the pipes listed above, the water system includes approximately 155 fire hydrants. Many of the fire hydrants installed in the 1960s are the older two or three port, 4-3/4-inch valve type. These should be replaced with modern 5-1/4-inch valve type hydrants. All hydrants are well maintained and functional, though some are connected to undersized 4-inch water mains.

PRESSURE ZONES

Water service to the City is provided by a single pressure zone, with typical service pressures ranging between approximately 60 to 75 psi. Since the 100,000-gallon reservoir was taken out of service, the hydraulic grade line (HGL) of the water system has been established by the City of Auburn's Valley Zone, which has an HGL of approximately 242 feet.

SERVICE AREAS

In accordance with the Washington State Municipal Water Law (MWL), the City is required to designate a retail service area (RSA) within which it has a duty to serve all customers. If appropriate, the City must also designate a future service area and a wholesale service area. A map which includes both the City's retail and future areas can be found on Figure 1-2.

RETAIL SERVICE AREA

Duty to Serve

The City acknowledges that it has a duty to serve all new connections within its designated RSA. The retail service area is required to include the existing service area and areas where new service will be provided. The City defines the extent of its RSA as the area it currently serves within the City Limits, as shown on Figure 1-2.

While the City has a duty to serve new connections within the retail service area, there are four threshold factors that must be met prior to providing service. These are:

1. The City has sufficient water rights to provide service.

2. The City has sufficient capacity to serve water in a safe and reliable manner.

3. The service request is consistent with adopted local plans and development regulations.

4. Service can be provided in a timely and reasonable manner.

For threshold factor one to be met, there must be sufficient water available according to terms of the wholesale agreement with the City of Auburn. Auburn has a portion of their water rights allocated for use by the City of Algona, but Algona may not serve new connections if the allocated water rights are exceeded.

Applications for new water service must meet the requirements of the Algona Municipal Code (AMC) Chapter 13.02. An application for new water service must be made in writing to the Office of the City Clerk on the City's form. Applications must state the purpose for which the water will be used and must be made by the property owner or authorized representative. The applications are reviewed per the four threshold criteria presented outlined above. The City determines whether to accept or reject the application within 30 days. If an application is rejected, the applicant can appeal the decision to the City Council.

Existing Retail Service Area

The City currently serves the majority of customers within its city limits, with two exceptions – the Boeing Welded Duct Facility and the southwestern area served by the City of Pacific. These areas are shown in Figure 1-2.

Future Service Area

The City has established a potential annexation area which extends slightly beyond the city limits to the west as shown in Figure 1-2. The City's future water service area may expand into this region. Expansion is restricted to the north and east by the City of Auburn, to the south by the City of Pacific, and beyond the potential annexation area to the west by steep and unstable terrain which is unlikely to be developed. Future growth within the City will be the result of infilling and redevelopment of existing developed areas.

ZONING AND LAND USE

The City adopted an updated zoning map as part of their 2015 Comprehensive Plan. The majority of the City east of the West Valley Highway is zoned single-family residential. Commercial and/or industrial areas are west of the West Valley Highway and in the Auburn 400 and Boeing areas. Community commercial zoning is located primarily along 1st Avenue, with some additional commercial areas in the northwest and south portions of the City. Figure 1-5 displays the current zoning for the City of Algona.

SERVICE AREA AGREEMENTS

The City of Algona has had an emergency interlocal service agreement with the City of Auburn since 1978. In 1996, the Algona Intertie Project Agreement was signed to govern the purchase of wholesale water from Auburn after the failure of Algona's well. The 1996 Algona Intertie Project Agreement was later superseded by the 2002 Algona/Auburn Intertie Agreement No. 3A (Appendix C) which is currently in effect.

The 2002 agreement specified that Algona's well and all associated water rights be conveyed to the City of Auburn by Bill of Sale. Algona agreed to participate in the construction of a new Auburn reservoir and purchase 180,000 gallons of the reservoir's storage. The agreement also required Algona to coordinate its water use efficiency goals with Auburn's water conservation program, and either maintain the existing 100,000 gallons of storage, or elect to increase their purchased storage from Auburn. As previously discussed, Algona opted for the purchase of additional storage. The agreement also covered a number of additional requirements relating to master meters, easements, service areas, Algona's projected water demands, and project costs. Agreement No. 3A presented water supply projections only through 2014. Should Algona require more water than what is guaranteed under the agreement, an amendment to the 2002 agreement would be required. The City's forecasted water demand is discussed at the end of Chapter 2 and the capacity analysis of water provided by the wholesale water agreement can be found in Chapter 3.

No written agreement with the City of Pacific intertie currently exists for use of the emergency intertie.

SERVICE AREA POLICIES AND CONDITIONS OF SERVICE

Service area policies are discussed in Table 1-4.

TABLE 1-4

Service Area Policies(1)

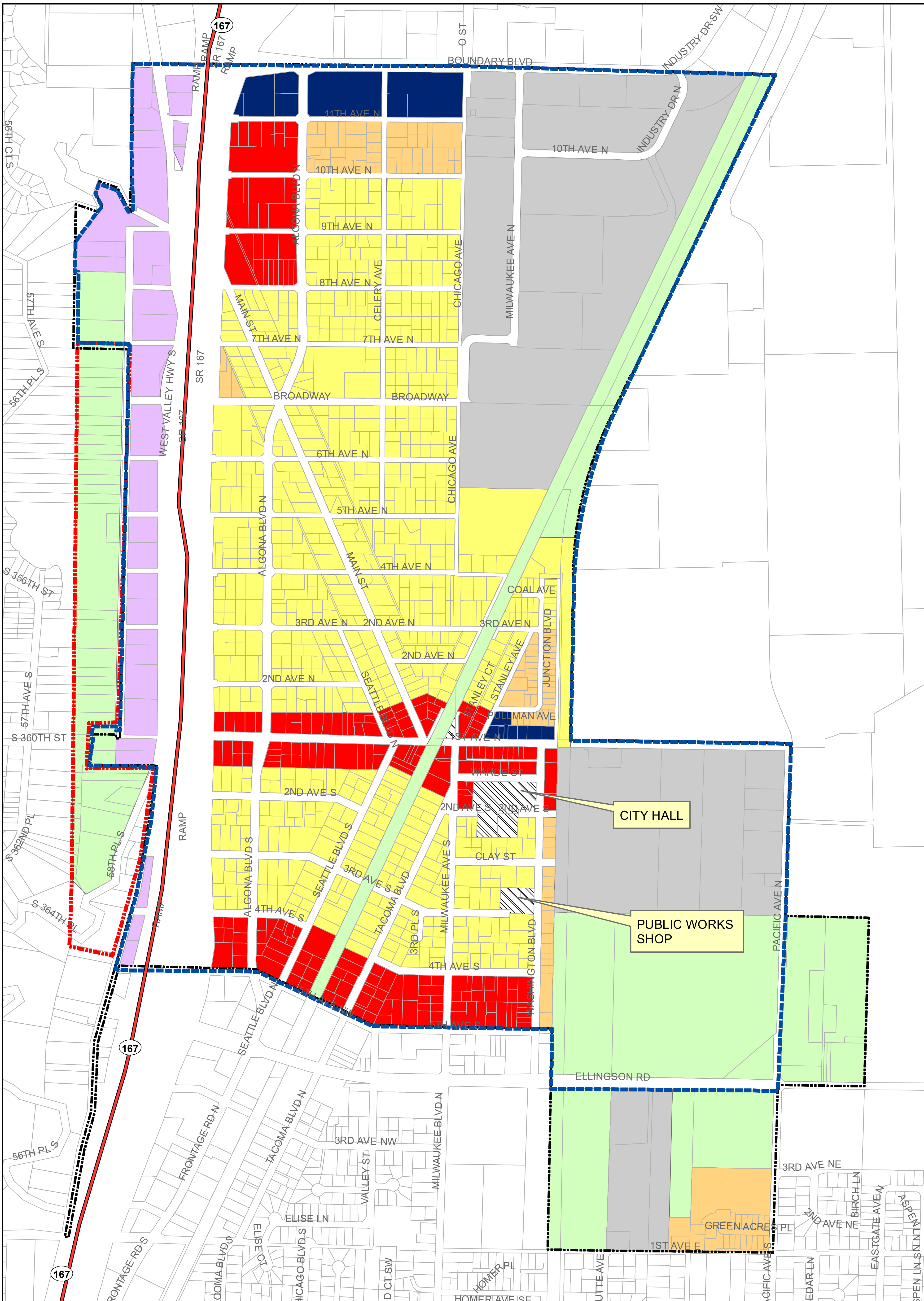
Policy Description	Reference
The City will provide water service within its retail service area when requested and when service can be provided complying with the four threshold factors.	Established by adoption of this Water System Plan AMC 13.02.030
The design of all improvements to the City's system or improvements to be connected to the City's system shall meet or exceed the standards adopted by the City.	City of Algona Public Works Standards (Updated August 2021)
Latecomer agreements will be considered by the City Council on a case by case basis if requested by a developer. The maximum term of latecomer agreements will be 5 years.	AMC 13.02.260
Satellite systems. The City does not currently wish to provide service to satellite systems.	Established by adoption of this Water System Plan
Public Works Construction Standards	Updated by adoption of this Water System Plan
Prohibits cross connections and establishes responsibility of water system customers to maintain backflow prevention assemblies.	AMC 13.02.160
The City of Algona requires each new water service to be metered.	AMC 13.02.100
The City of Algona requires extensions to the water system to be made in accordance with the plans submitted by the City Engineer and approved by the Council.	AMC 13.02.230
Service rate and connection charge policies.	AMC 2.50

(1) The City does not have direct connection or annexation policies.

RELATED PLANNING DOCUMENTS

CITY OF ALGONA 2014 WATER SYSTEM PLAN

The last water system planning document prepared for the City of Algona was completed by Gray & Osborne in 2014. This document was used as the framework for the current Plan. The 2014 Plan presented historical water use, projected water use, and developed a capital improvement plan for the City to implement. Since the previous Plan was published, the City has completed a water main extension along Seattle Boulevard South, 5th Avenue, and Tacoma Boulevard South.



Legend

- RETAIL SERVICE AREA
- CITY OF ALGONA
- POTENTIAL ANNEXATION AREAS (PAA)
- LOW DENSITY RESIDENTIAL (R-L)
- MEDIUM DENSITY RESIDENTIAL (R-M)
- MIXED USE COMMERCIAL
- GENERAL COMMERCIAL (C-2)
- HEAVY COMMERCIAL (C-3)
- LIGHT INDUSTRIAL (M-1)
- PUBLIC LAND
- OPEN SPACE/CRITICAL AREAS (ALGONA)

Source: City of Algona, King County GIS

N

0 250 500 1,000 Feet

CITY OF ALGONA
WATER SYSTEM PLAN
FIGURE 1-5
ZONING

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CONSULTING ENGINEERS

L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 1-5 ZONING.mxd

CITY OF ALGONA 2015 COMPREHENSIVE PLAN

The City of Algona last updated its comprehensive plan in 2015. This plan is required for Growth Management Act compliance and includes goals, objectives, and policies that will in some cases have an impact on the formation of the Water System Plan. The Plan contains population growth projections, defines the City's Urban Growth Area (UGA), and contains a land use plan that is the model for existing City of Algona zoning. The current projected growth rate in the City is 0.84 percent per year.

CITY OF AUBURN 2015 WATER SYSTEM PLAN

The City of Auburn contracted with Carollo Engineers to complete the City of Auburn 2015 Water Comprehensive Plan. This plan provides a description of the Auburn water system and future planning for the system . This document is relevant to Algona's water system since Auburn supplies water to Algona. Algona has agreed to purchase capacity in Auburn's reservoirs to meet storage requirements, thus the storage analysis for Auburn's plan will be referenced in this Plan.

1989 SOUTH KING COUNTY COORDINATED WATER SYSTEM PLAN

The Coordinated Water System Plan (CWSP) for South King County (Economic and Engineering Services, Inc., October, 1989) contains an interlocal agreement for establishing water utility service area boundaries.

CHAPTER 2

BASIC PLANNING DATA

OBJECTIVE

The objective of this chapter is to present basic planning data and derive characteristic water parameters for the City of Algona's water system. These characteristic parameters will then be used for forecasting the City's future water demand. This chapter provides existing and projected future water demand, population, service connections, and Equivalent Residential Units (ERU). The chapter also includes projected land use and water demands for the 10- and 20-year planning periods. These forecasted demands will later inform the system capacity analysis in Chapter 3.

HISTORIC POPULATION AND WATER USE DATA

RESIDENTIAL POPULATION

Table 2-1 presents historical population data for the City of Algona (City). The average annual population growth rate between the 2012 and 2020 was 0.6 percent based on estimates published by the Washington State Office of Financial Management (OFM).

TABLE 2-1

Historical Population Growth for Algona

Year	Population(1)
2012	3,070
2013	3,075
2014	3,090
2015	3,105
2016	3,175
2017	3,180
2018	3,180
2019	3,207
2019	3,190
2020	3,217

(1) Source: Washington State Office of Financial Management 2020

SERVICE CONNECTIONS

In 2020 the City of Algona served 1,035 residential units, including 990 single-family residential connections and 45 multi-family units. Multi-family customers are billed per unit, rather than per metered connection, and are not tracked separately from single-family residential customers within the billing system, though the City maintains a separate count of multi-family units. Table 2-2 summarizes historical water service connection data, including single-family residential, multi-family residential, commercial/industrial, total active connections and total inactive connections for 2016 through 2020.

TABLE 2-2

2016-2020 Water Service Connections

Year	Single-Family Residential	Multi-Family Unit(1)	Commercial/ Industrial	Total Active Connections	Total Inactive Connections	Total Connections
2016	972	45	53	1,070	19	1,089
2017	972	45	53	1,070	21	1,091
2018	977	45	54	1,076	19	1,095
2019	986	45	55	1,086	13	1,099
2020	990	45	55	1,090	14	1,104

(1) Number of individual units, not meters.

The City of Algona's customer connections are fully metered. The majority of system meters are 3/4-inch. There are currently only three connections with meters larger than 2 inches (two 3-inch meters and one 6-inch meter).

HISTORICAL WATER USE

PURCHASED WATER AND AVERAGE DAY DEMAND

The City of Algona purchases water from the City of Auburn via four metered interties which are read monthly. Three of the interties (West Valley Highway, Milwaukee Avenue North, Industry Drive) serve the City's distribution system while the fourth intertie (1st Ave North) serves the Boeing Duct Facility directly. Table 2-3 provides a summary of the historical annual purchased water at each of the four interties along with the corresponding average day demand (ADD) for 2016 through 2020. ADD was determined by dividing purchased water by the number of days in a given year. Data for water production was provided by the City of Auburn.

TABLE 2-3

Annual and Average Daily Production

Year	West Valley Highway at 10th Avenue North		Milwaukee Avenue North and Boundary Boulevard		Industry Drive North and Boundary Boulevard		1st Avenue North - Boeing Facility		Total	
	Annual Water Purchased (MG/year)	Average Day Demand (gpd)	Annual Water Purchased (MG/year)	Average Day Demand (gpd)	Annual Water Purchased (MG/year)	Average Day Demand (gpd)	Annual Water Purchased (MG/year)	Average Day Demand (gpd)	Annual Water Purchased (MG/year)	Average Day Demand (gpd)
2016	11.9	32,715	41.7	114,229	39.5	108,157	24.7	67,703	117.8	322,804
2017	6.4	17,528	46.7	127,922	45.7	125,260	24.7	67,541	123.5	338,252
2018	9.4	25,758	54.8	150,008	47.9	131,263	24.7	67,552	136.7	374,580
2019	7.4	20,260	52.6	144,053	45.7	125,119	23.9	65,502	129.6	354,933
2020	7.3	19,868	50.6	138,593	44.7	122,330	28.5	78,200	131.0	358,991
Average	**8.5**	**23,226**	**49.3**	**134,961**	**44.7**	**122,426**	**25.3**	**69,300**	**127.7**	**349,912**

Data Source: City of Auburn Records

Between 2016 and 2020, the City purchased an average of 127.7 MG of water each year and had an average annual ADD of 0.35 mgd. Over the same period, 39 percent of purchased water entered the City's water system via the Milwaukee Avenue North intertie, while 35 percent came through the Industry Drive North Intertie and 7 percent came through the West Valley Highway intertie. Approximately 20 percent of purchased water went to the Boeing Duct Facility directly via the 1st Avenue intertie.

HISTORIC WATER CONSUMPTION

Table 2-4 summarizes the water consumption by customer class for the City of Algona between 2016 and 2020. Since the Boeing Duct facility is metered via its own meter and intertie with the City of Auburn, the facility's consumption is quantified separately. Water consumption data was provided by the City of Algona billing records. It is worth noting that consumption totals are always less than production totals with DSL and other authorized uses like flushing and firefighting efforts comprising the difference.

TABLE 2-4

Annual Water Consumption by Customer Class

Year	Residential (gpd)	Boeing Duct Facility (gpd)	Commercial/Industrial (without Boeing) (gpd)	Total (gpd)
2016	161,103	66,539	78,837	306,479
2017	174,278	68,181	64,031	306,489
2018	169,175	75,007	61,621	305,803
2019	166,720	68,902	69,587	305,209
2020	151,617	81,471	64,705	297,792
Average	**164,578**	**72,020**	**67,756**	**304,354**

DISTRIBUTION SYSTEM LEAKAGE

Distribution System Leakage (DSL) is defined as the difference between total metered source production and authorized consumption. DSL includes any water loss due to leaks, unauthorized uses, or water leaving the system for unmetered usage. Unauthorized uses may include illegal service connections, accounting errors, and inaccurate source or customer meters. If a system does not keep records of flushing, fire flows, and other unmetered but credibly estimated uses, these can be included in the total for authorized consumption. As a result, the authorized consumption of a given year in Table 2-5 may be larger than the total consumption shown in Table 2-4. A summary of the City's historic DSL analysis can be found in Table 2-5.

TABLE 2-5

Distribution System Leakage

Year	Total Production (gpd)	Authorized Consumption (gpd)[1]	Distribution System Leakage (gpd)	Distribution System Leakage %	3-year Rolling Average
2016	322,804	307,325	15,479	4.8%	4.7%
2017	338,252	306,678	31,574	9.3%	7.0%
2018[2]	374,580	306,227	68,353	18.2%	10.8%
2019	354,933	305,498	49,436	13.9%	13.8%
2020[3]	358,991	298,608	60,383	16.8%	16.3%
Average				**12.6%**	**-**

(1) Includes total consumption and credibly quantifiable flushing, fire flows, and large water main breaks.
(2) In 2018, a large leak lasting multiple weeks occurred resulted in higher DSL.
(3) In 2020, a prolonged leak at a fire hydrant resulted in higher DSL.

As can be seen in Table 2-5, the City's average DSL from 2016 through 2021 is 12.6 percent while the 3-year rolling average, which is used for water use efficiency (WUE) compliance was 16.3 percent in 2020. The Department of Health (DOH) requires that systems maintain a DSL rate of 10 percent or less. As a result, the City must develop a Water Loss Control Action Plan. DSL, water use efficiency requirements, and the Water Loss Control Action Plan are all discussed further in Chapter 4.

EQUIVALENT RESIDENTIAL UNIT

The concept of Equivalent Residential Units (ERUs) is used as a means to express water use by non-residential customers as an equivalent number of residential customers. Typical ERU consumption is calculated by dividing the total volume of water utilized in the single-family residential (SFR) customer class by the total number of active SFR connections. This number defines the average consumption per ERU, which can be referred to as ERU_{ADD}. The volume of water used by any other customer class can then be divided by ERU_{ADD} in order to determine the number of ERUs for a given customer class.

As previously discussed, the City of Algona does not track multi-family residential water use separately from single-family residential water use. The number of residential connections and the total residential water usage includes both single-family and multi-family residential. The City does, however, bill their multi-family residential customers according to unit, rather than by meter. Multi-family customers within Algona are primarily four-unit complexes or smaller. Between 2016 and 2020, the City has consistently had 45 multi-family units. For this analysis, the ERU_{ADD} will be calculated using total residential water use and total residential units, which includes multi-family use.

Table 2-6 summarizes the City's ERU_{ADD} value for 2016 through 2020, yielding an average ERU_{ADD} of 161 gpd/ERU.

TABLE 2-6

ERU_{ADD} for 2016 through 2020

Year	Number of Residential Connections	Residential Consumption[(1)] (gpd)	ERU_{ADD}
2016	1,017	161,103	158
2017	1,017	174,278	171
2018	1,022	169,175	166
2019	1,031	166,720	162
2020	1,035	151,617	146
Average			**161**

(1) Based on consumption in Table 2-4.

As shown in Table 2-6, the City's ERU_{ADD} has trended downwards over the last 4 years, reflecting the regional trend of a reduction in water use per ERU. The average 161 gpd/ERU will be used to project future water use later in this Chapter.

PEAKING FACTORS

In order to estimate future maximum day and peak hour demands for the City, maximum day and peak hour peaking factors have been calculated from historical production data as detailed below.

Maximum Day Peaking Factor

The City does not have adequate daily demand data to determine the maximum day peaking factor directly. As a result, maximum day peaking factors for this plan will be estimated using the method outlined in Section 3.4.1 of the DOH 2020 *Water System Design Manual*. This method first determines the maximum month average day demand (MMADD) peaking factor by dividing the MMADD by the ADD. Then an additional factor of 1.35 is applied to the MMADD to find the estimated MDD and to derive a maximum day peaking factor.

Table 2-7 summarizes both the MMADD and maximum day peaking factor for 2016 through 2020. All data was sourced from the City of Auburn's monthly master meter readings.

TABLE 2-7

2016-2020 Maximum Month Average Day Factor

Year	Average Day Customer Demand (gpd)	Maximum Month	Maximum Month Average Day Demand (gpd)	MMADD Peaking Factor(1)	Estimated MDD(2) (gpd)	Max Day Peaking Factor(3)
2016	306,479	August	400,083	1.31	540,112	1.76
2017	306,489	August	448,993	1.46	606,141	1.98
2018	305,803	August	433,768	1.42	585,587	1.91
2019	305,209	July	411,569	1.35	555,618	1.82
2020	297,792	July	441,175	1.48	595,586	2.00
Average				**1.40**	**-**	**1.90**

(1) Ratio of MMADD/ADD.
(2) Estimated Maximum Day Demand calculated by multiplying MMADD by peaking factor of 1.35 (where MDD:MMADD = 1.35).
(3) Maximum Day Peaking Factor = ADD/Estimated MDD.

The average Max Day Peaking Factor was determined to be 1.90. This peaking factor will be used in projected water demand forecasting which is summarized in Table 2-10.

Peak Hour Peaking Factor

The City's peak hour peaking factor is based on the guidelines set forth in DOH's June 2020 *Water System Design Manual* Equation 3-1, and is calculated as described below:

$$PHD = \frac{ERU_{MDD}}{1440}(C * N + F) + 18$$

Where:

PHD = Peak hourly demand (gpm)
C = Coefficient associated with Ranges of ERUs per DOH Manual (C = 1.6)
N = Number of system ERUs (from Table 2-9)
ERU_{MDD} = Max day demand per ERU
F = Factor associated with ranges of ERU's per DOH Manual (F = 225)

The total number of system ERUs was determined by dividing a year's ADD in Table 2-3 by the respective ERU_{ADD} from Table 2-6. The ERU_{MDD} for a given year was determined by multiplying the respective year's ERU_{ADD} by the max day peaking factor in Table 2-7. Table 2-8 summarizes the peak hour peaking factor starting from 2016 through 2020. The peak hour peaking factor is computed by dividing the computed peak hour demand by the estimated MDD from Table 2-7.

TABLE 2-8

2016-2020 Peak Hour Peaking Factor

Year	Number of System ERUs(1)	ERU_{ADD} (gpd)(2)	ERU_{MDD} (gpd)(3)	Peak Hour Demand (gpm)	Estimated MDD (gpm)(4)	Peaking Hour Peaking Factor(5)
2016	2,032	158	279	692	375	1.85
2017	1,973	171	339	814	421	1.93
2018	2,260	166	317	864	407	2.12
2019	2,193	162	294	781	386	2.03
2020	2,445	146	293	860	414	2.08
Average	-	**161**	**304**	-	-	**2.00**

(1) Number of System ERUs = Average Day Demand (from Table 2-3)/ERU_{ADD}.
(2) From Table 2-6.
(3) ERU_{MDD} = Max Day Peaking Factor of 1.90 * ERU_{ADD}.
(4) From Table 2-7.
(5) Peak Hour Peaking Factor = Peak Hour Demand/Estimated MDD.

The average peak hour peaking factor of 2.0 will be used to calculate the projections.

LARGE WATER COMSUMERS

The 10 largest water consumers for 2020 are listed in Table 2-9, along with their 2020 average day metered consumption and number of ERUs.

TABLE 2-9

Largest Water Consumers in 2020

Top 10 users	Averaged Day Metered Consumption (gpd)	Number of ERUs	Percent of Total Production
The Boeing Company	81,525	557	22.8%
Tim's Cascade Snacks	12,230	83	3.4%
Terra Dynamics	11,232	77	3.1%
SCS LL LLC	10,979	75	3.1%
Primus International	6,880	47	1.9%
Algona View Investment (Laundromat)	5,075	35	1.4%
Packing Corporation of America	4,524	31	1.3%
Seoul Trading	3,429	23	1.0%
KC Solid Waste	2,758	19	0.8%
City of Algona	2,631	18	0.7%
Prologis	1,858	13	0.5%
Total			**40.0%**

WATER DEMAND PROJECTIONS

PROJECTED GROWTH

Growth within the City of Algona is anticipated to be modest given that the majority of property within the City has already been developed. The City of Algona's *2015 Comprehensive Plan* estimates a 0.84 percent growth rate. This growth rate will be applied to the City's population as well as the residential and commercial/industrial consumption for the water demand forecasting which is summarized in Table 2-10.

WATER DEMAND FORECASTING

Water demand projections are calculated by using the 5 year average (2016 through 2020) consumption and DSL as a baseline. Growth in residential and commercial/industrial consumption is then estimated to match the projected population growth of 0.84 percent. The consumption at the Boeing Duct Facility will be held constant at a conservative 80,000 gpd given that the average over the last 6 years was 72,020 gpd but there was an uptick to 81,471 in 2020 (as shown in Table 2-4).

A given year's ADD is the sum of the total consumption and the DSL. The number of ERUs is the ADD divided by the systems characteristic average ERU_{ADD} of 161 gpd/ERU. The MDD was determined by multiplying a given year's ADD by the 1.90 peaking factor and the peak hour demand was determined by multiplying the MDD by the peak hour demand peaking factor of 2.0 as determined in the peaking factor section of this chapter. Projections for these parameters are summarized in Table 2-10 for every year in the 10-year planning horizon (2022 through 2031) as well as the final year of the 20-year planning horizon (2041).

TABLE 2-10

Forecasted Water Demands

Year	Projected Population[(1)]	Residential Consumption (gpd)[(1)]	Boeing Duct Facility (gpd)[(2)]	Commercial/ Industrial Consumption (gpd)[(1)]	Total Consumption	DSL (gpd)[(3)]	Number of ERUs[(4)]	Average Day Demand (gpd)[(5)]	Max Day Demand (gpd)[(6)]	Peak Hour Demand (gpm)[(7)]
2022	3,271	167,355	80,000	68,899	316,254	45,000	2,248	361,254	684,604	951
2023	3,290	168,761	80,000	69,478	318,239	45,000	2,260	363,239	688,365	957
2024	3,309	170,178	80,000	70,062	320,240	45,000	2,273	365,240	692,157	962
2025	3,328	171,608	80,000	70,650	322,258	45,000	2,285	367,258	695,981	967
2026	3,348	173,049	80,000	71,244	324,293	45,000	2,298	369,293	699,838	973
2027	3,367	174,503	80,000	71,842	326,345	45,000	2,311	371,345	703,727	978
2028	3,386	175,969	80,000	72,445	328,414	45,000	2,324	373,414	707,648	983
2029	3,406	177,447	80,000	73,054	330,501	45,000	2,337	375,501	711,603	989
2030	3,426	178,937	80,000	73,668	332,605	45,000	2,350	377,605	715,590	994
2031	3,446	180,441	80,000	74,286	334,727	45,000	2,363	379,727	719,611	1,000
2032	3,466	181,956	80,000	74,910	336,867	45,000	2,376	381,867	723,666	1,006
2033	3,486	183,485	80,000	75,540	339,024	45,000	2,390	384,024	727,755	1,011
2034	3,506	185,026	80,000	76,174	341,200	45,000	2,403	386,200	731,879	1,017
2035	3,526	186,580	80,000	76,814	343,394	45,000	2,417	388,394	736,036	1,023
2036	3,547	188,147	80,000	77,459	345,607	45,000	2,431	390,607	740,229	1,029
2037	3,567	189,728	80,000	78,110	347,838	45,000	2,445	392,838	744,457	1,035
2038	3,588	191,322	80,000	78,766	350,088	45,000	2,459	395,088	748,721	1,040
2039	3,609	192,929	80,000	79,428	352,356	45,000	2,473	397,356	753,020	1,046
2040	3,630	194,549	80,000	80,095	354,644	45,000	2,487	399,644	757,356	1,052
2041	3,651	196,184	80,000	80,768	356,951	45,000	2,501	401,951	761,728	1,059
2042	3,672	197,831	80,000	81,446	359,278	45,000	2,516	404,278	766,137	1,065

(1) Based on a 0.84 percent growth rate.
(2) Boeing Duct Facility consumption held constant at 80,000 gpd.
(3) DSL held constant at 48,800 gpd, the average DSL per day between 2016 and 2020.
(4) Number of ERUs = (Total Consumption + DSL) / ERU_{ADD} where ERU_{ADD}= 161 gpd/ERU.
(5) Average Day Demand (ADD) = Average Day Production = Total Consumption + DSL.
(6) Maximum Day Demand (MDD) = ADD * Max Day Peaking Factor; where Max Day Peaking Factor = 1.90 (From Table 2-7).
(7) Peak Hour Demand = MDD*Peak Hour Peaking Factor / 1440; where Peak Hour Peaking Factor = 2.0 (From Table 2-8).

CHAPTER 3

SYSTEM ANALYSIS

INTRODUCTION

Water system planning is based on a careful analysis of a water utility's ability to meet level of service standards for existing and future customers. The water system's ability to meet current and future demands is an important consideration in water system planning. In addition to demand considerations, water quality plays a major role in determining the adequacy and compliance of a water system. The four components analyzed in this chapter's system analysis include:

1. System Design and Design Standards
2. Water Quality Monitoring and Compliance
3. Capacity Analysis of System Components
4. Summary of System Deficiencies

SYSTEM DESIGN STANDARDS

BASIS OF DESIGN STANDARDS

State Standards

The Washington State Department of Health (DOH) relies on various publications of standards, agencies, and the utility itself to establish design criteria. The following is a brief description of three of the most widely recognized performance and design standards.

- ***WAC 246-290, Group A Public Water Systems*, Washington State Board of Health (Nov 2021)**

  This is the primary drinking water regulation used by the Washington State Department of Health (DOH) to assess capacity, water quality, and overall compliance with drinking water standards.

- ***Water System Design Manual,* Washington State Department of Health (June 2020)**

  These standards serve as guidance for the preparation of plans and specifications for Group A public water systems in compliance with WAC 246-290.

- ***Water System Planning Guidebook,* Washington State Department of Health (August 2020).**

  The Water System Planning Guidebook outlines planning requirements as well as a process framework for water systems to create a WSP that best fits their size and needs. Significant revisions to the former Water System Guidebook were adopted in August 2020.

City Standards

DOH relies on the City itself to establish design criteria. The following gives a brief description of the referenced City design standards:

- ***Public Works Standards,* City of Algona (August 2021).**

  These standards may also be referred to as Construction Standards and are adopted and approved by the City for construction of new public facilities, including water works. These standards, including developer extension guidelines, are provided in Appendix D.

GENERAL FACILITY DESIGN STANDARDS

Design criteria typically address the sizing and reliability requirements for source, storage, distribution, fire flow, and water quality. Construction standards set forth the materials and construction methods that contractors, developers, and the City must follow when constructing water system facility improvements. General facility design standards are summarized in Table 3-1 and cover the following categories:

- Average and Peak Day Demand
- Peak Hour Demand
- Storage Requirements
- Fire Flow Rate and Duration
- Minimum System Pressure
- Minimum Pipe Sizes
- Reliability Recommendations
- Valve and Hydrant Spacing
- Other System Policies

TABLE 3-1

General Facility Requirements

<table>
<tr><th>Standard</th><th>DOH Water System Design Manual
(June 2020)</th><th>City of Algona Standard</th></tr>
<tr><td>Average Day and Maximum Day Demand</td><td>Average day demand should be determined from previous actual water use data. Maximum day demand is estimated at 1.35 to 1.65 times the maximum month's average day demand if daily metered data is not available.</td><td>Average day demand was determined using five years of historical data. Maximum day demand is estimated at 1.90 times the average day demand. Because daily demand data for this planning period were not available, maximum daily demands were estimated using maximum month average day demand method outlined in Chapter 3 Section 4.1 of the DOH design manual (see Table 2-7)</td></tr>
<tr><td>Peak Hour Demand</td><td>Peak hour demand is determined using the following equation:
$PHD = (ERU_{MDD}/1440)[(C)(N) + F] + 18$
ERU_{MDD} = Daily demand per ERU, calculated using peak day single-family housing unit demand (gpd)
C = Coefficient from DOH Design Manual Table 3-1.
N = Number of connections, ERUs using max day demand and ERU_{MDD}
F = Factor of range from DOH Design Manual Table 3-1.</td><td>Peak hour demand was estimated at 2.0 using the DOH formula. Because daily demand data for this planning period were not available, maximum daily demands were estimated using the max day peaking factor identified in Table 2-7.</td></tr>
<tr><td>Storage</td><td>Water systems must account for and provide storage equal to the sum of:
* Operational Storage
* Equalizing Storage
* Standby Storage*
* Fire Suppression Storage*
* Dead Storage
*Standby storage and fire suppression storage may be nested if permitted by the local fire authority.</td><td>Algona's storage is provided by the City of Auburn. Equalizing storage, standby storage and fire suppression storage are calculated per the DOH Manual, noting that Algona is a consecutive water system.</td></tr>
<tr><td>Fire Flow Standard (Rate & Duration)</td><td>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).</td><td>The following fire flow requirements are used for planning purposes:
<u>Single Family Residential:</u> 1,500 gpm for 2 hours
<u>Commercial/Industrial/Multi-Family Residential:</u> 2,500 gpm for 3 hours</td></tr>
<tr><td>Minimum System Pressure</td><td>The system should be designed to maintain a minimum of 30 psi in the distribution system under peak hour demand when all operational and equalizing storage is depleted and 20 psi under fire flow plus maximum day demand conditions when all fire suppression storage is depleted.</td><td>Maintain pressure above 60 psi as currently provided by Auburn during peak hour demand and pressure above 20 psi during fire flow events coinciding with maximum day demand.</td></tr>
</table>

TABLE 3-1 – (continued)

General Facility Requirements

Standard	DOH Water System Design Manual (June 2020)	City of Algona Standard
Minimum Pipe Sizes	The diameter of a transmission line shall be determined by hydraulic analysis. The minimum size distribution system line shall not be less than 6 inches in diameter unless a hydraulic analysis justifies another size.	The minimum distribution line size shall be 8-inches. Pipes may be resized after hydraulic model review.
Reliability Recommendations	1. Sources should be capable of replenishing fire suppression storage within a 72-hour period while concurrently supplying MDD. 2. Sources capable of supplying MDD within a 20-hour period. 3. Sources must meet ADD with largest source out of service. 4. Source reliability sufficient to limit system-imposed water use restrictions to once every 50 years, on average. 5. In-place, auto-transfer auxiliary power equipment for pump stations and/or two independent primary public power sources and/or adequate gravity standby storage. 6. Standby storage equivalent to MDD, unless lack of source redundancy justifies higher SB volume or good source redundancy justifies lower SB volume. 7. Looping of distribution mains when feasible. 8. Pipeline velocities <8 ft/s at PHD. 9. Flushing velocities of a minimum of 3 fps for all pipelines.	1. The City of Auburn provides both storage and source water as part of the wholesale water agreement. Auburn's 2015 Water System Plan indicates that Auburn does meet this reliability recommendation. 2. Requirement for sources capable of supplying MDD within a 20-hour period is not applicable because source is controlled by Auburn. 3. Requirement for or sources capable of supplying ADD with largest source out of service is not applicable because source is controlled by Auburn. 4. Source reliability sufficient to limit system-imposed water use restrictions to once every 50 years, on average. 5. Requirement for standby power at water system facilities does not apply since the City does not own any pumps and the master meters belong to Auburn. 6. Algona has purchased sufficient water from Auburn to ensure standby storage equivalent to system MDD. 7. The Distribution system is looped where feasible. 8. Pipeline velocities are not to exceed 8 ft/s during PHD. 9. Flushing must be 3 fps minimum for all pipelines.
Valve and Hydrant Spacing	Sufficient valves should be spaced to keep the minimum number 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.	Hydrants are required every 600 feet in residential areas and at every 300 feet in commercial areas. The maximum valve spacing is 1,000 feet or at tees.

WATER QUALITY STANDARDS

APPLICABLE DRINKING WATER QUALITY REGULATIONS

Water quality monitoring is an important part of both regulatory compliance and water system oversight. Table 3-2 lists the existing drinking water regulations and action taken by the City. Some regulations are not included, as they do not apply to the City's water system. For example, filter Backwash Water Rule is not listed nor is it applicable or discussed. Certain regulations are the responsibility of Algona's wholesale water supplier, the City of Auburn. These regulations are still discussed and clearly identified as the City of Auburns responsibility.

Existing state law regulates bacteriological contaminants, inorganic chemicals and inorganic physical parameters (IOCs); volatile organic chemicals (VOCs); synthetic organic chemicals (SOCs); radionuclides; disinfection byproducts (DBPs) including total trihalomethanes (TTHMs), haloacetic acids (HAA5s), bromate, and chlorite; and disinfectant residuals. Upcoming water quality regulations include the revised lead and copper rule as well as per- and polyfluoralkyl substances (PFAS) monitoring. Together all these regulations define treated water quality standards and establish treated and/or source water quality monitoring schedules. Auburn performs all source monitoring while the City is responsible monitoring within its distribution system.

Minimum standards for water quality are specified in terms of Maximum Contaminant Levels (MCLs). Primary MCLs are based on chronic and/or acute human health effects. Secondary MCLs are based on factors other than health effects, including aesthetics. MCLs are specified in WAC 246-290 and described in the following pages and tables in this chapter.

TABLE 3-2

Drinking Water Regulation Summary

Drinking Water Regulation(1)	Contaminants Affected(2)	City Action
Arsenic Rule	Arsenic	Responsibility of City of Auburn
Asbestos	Asbestos	Monitoring
Consumer Confidence Report	None, reporting only	Reporting
Disinfectants/Disinfection Byproducts Rule (D/DBPR) (Stage 1 & 2)	TTHMs, HAA5, Chlorite, Bromate	Monitoring
Inorganic Chemicals and Physical Parameters	IOCs	Responsibility of City of Auburn
Lead and Copper Rule	Lead, Copper	Monitoring

TABLE 3-2 – (continued)

Drinking Water Regulation Summary

Drinking Water Regulation[1]	Contaminants Affected[2]	City Action
Revised Lead and Copper Rule	Lead, Copper	Future Monitoring: Monitoring requirements change October, 2024
Per- and Polyfluoroalkyl Substances	PFAS	Responsibility of City of Auburn
Radionuclides Rule	Radionuclides	Responsibility of City of Auburn
Residual Disinfectant	Total Free Chlorine	Monitoring
Revised Total Coliform Rule	Coliform	Monitoring
Unregulated Contaminant Monitoring Rule	IOCs, VOCs, SOCs	Responsibility of City of Auburn

(1) Drinking water regulations as of March 2022.

(2) TTHM = Total Trihalomethanes; HAA5 = Five Haloacetic Acids; IOCs = Inorganic Chemical and Physical Characteristics; VOCs = Volatile Organic Chemicals; SOCs = Synthetic Organic Compounds.

Many of the regulations shown in Table 3-2 define water quality standards and establish water quality monitoring schedules. A copy of Algona's most recent Water Quality Monitoring Schedule, a guidance document prepared by DOH, is included in Appendix E. The City's monitoring schedule is summarized below in Table 3-3. This schedule is current as of December 2021. The schedules for both future and existing regulations are subject to revision and the City should continue to stay informed regarding regulatory deadlines – particularly when it comes to upcoming lead and copper as well as PFAS monitoring.

TABLE 3-3

City of Algona Water Quality Monitoring Schedule(1)

Parameter	Sample Location	Frequency	Notes
Arsenic	Distribution System	Not Required	Responsibility of City of Auburn
Asbestos	Distribution System	One sample every 9 years	Last Sampled April 2021
Consumer Confidence	N/A	Yearly	-
Disinfectants/Disinfection Byproducts Rule (D/DBPR) (Stage 1 & 2)	Distribution System	Annually	Last Sampled August 2021
Inorganic Chemicals and Physical Parameters (Inorganics, Nitrite, Nitrate)	Source	Not Required	Responsibility of City of Auburn
Lead and Copper	Distribution System	Ten samples every 3 years	Last Sampled September 2019
Radionuclides Rule	Source	Not Required	Responsibility of City of Auburn
Residual Disinfectant	Distribution System	Daily	Also tested during monthly coliform monitoring
Coliform Bacteria	Distribution	Three samples monthly	-
Unregulated Contaminants (IOCs, VOCs, SOCs)	Source	Not Required	Responsibility of City of Auburn

(1) Drinking schedule current as of March 2022.

WATER QUALITY ANALYSIS

Arsenic Rule

Long-term exposure to low concentrations of arsenic in drinking water can lead to skin, bladder, lung, or prostate cancer. Non-cancer effects of ingesting arsenic at low levels include cardiovascular disease, diabetes, and anemia, as well as reproductive, developmental, immunological, and neurological effects. The EPA's Arsenic MCL is 0.01 mg/L.

<u>Monitoring Requirements and Analysis</u>

The Arsenic Rule makes monitoring requirements consistent with monitoring for other IOCs. Groundwater sampling for arsenic is required once every 3 years. Any system that has a sampling point monitoring result which exceeds the MCL must increase the frequency of monitoring at that sampling point to quarterly sampling. Compliance with the MCL is based on the running annual average of the samples. Systems triggered into increased monitoring are not be considered in violation of the MCL until they have completed 1 year of quarterly sampling. However, if any sample results cause the running annual average to exceed the MCL at any point, the system is out of compliance with the MCL immediately.

As indicated in Tables 3-2 and 3-3, Algona is not responsible to source testing. This responsibility is taken by the City of Auburn which last reported Arsenic sample results in 2019. These results indicated an arsenic concentration at or below the 0.001 mg/L detection limit, well below the MCL of 0.01mg/L

Asbestos

Asbestos is the name for a group of naturally occurring, hydrated silicate minerals with fibrous morphology. Included in this group are chrysotile, corcidolite, amosite, and the fibrous varieties of anthophyllite, tremolit, and actinolite. Most commercially mined asbestos is chrysotile. Asbestos' flexibility, strength, and chemical and heat resistance properties have made it a useful material for building insulation, brake linings, and water pipes.

There is concern with the health risks associated with asbestos. Several studies have documented hazards to internal organs as a result of inhalation of asbestos fibers. Data is limited on the effects of ingestion of asbestos fibers or on the effects of inhalation exposure from drinking water. Ingestion studies have not caused cancer in laboratory animals, though studies of asbestos workers have shown increased rates of gastrointestinal cancer.

<u>Monitoring Requirements and Analysis</u>

The City of Algona's distribution system contains asbestos cement (AC) water mains; therefore, it is required to monitor for asbestos. For utilities with asbestos pipe in the distribution system, one sample in an area with AC pipe is required every 9 years in accordance with Part 40 Code of Federal Regulations 141,23 (b). The MCL for asbestos is 7 million fibers/liter. Asbestos analysis was carried out in April of 2021 and a concentration of 0.1640 million fibers/liter was detected, which is well below the MCL.

Customer Confidence Report

The Consumer Confidence Report Rule requires community water system purveyors to prepare and distribute an annual report of water quality analyses to their customers. The City is required to submit the Consumer Confidence Report (CCR) to its customers before the 1st of July each year. A copy of the City of Algona's 2021 CCR is included in Appendix E.

Disinfectants and Disinfection Byproducts Rule

WAC 246-290-300(6) requires purveyors of public systems that provide water treated with chemical disinfectants to monitor for disinfectants and disinfection byproducts. The

Disinfectants and Disinfection Byproducts (D/DBP Rule) establishes residual disinfectant concentrations and MCLs for disinfection byproducts.

Trihalomethanes (THMs) and haloacetic acids (HAA5) are a group of organic compounds that can be formed as a result of drinking water disinfection by chlorine and are, therefore, often referred to as disinfection byproducts. Total THMs include the sum of the concentrations of four disinfection byproducts: chloroform, bromoform, bromodichloromethane, and dibromochloromethane.

<u>Monitoring Requirements and Analysis</u>

Stage 1 of the D/DBP Rule became effective in 2000 and established the MCLs for TTHM and HAA5 is 80 micrograms per liter (µg/L) and 60 µg/L, respectively. Stage 2 of the D/DBP Rule began on October 1, 2013 and maintained the same MCLs but based compliance on the locational running annual average (LRAA) of each individual sample site instead of the running annual average of all sample sites combined. This means that the annual average at each site must be below the MCL. The number of samples taken is dependent on the population served. Systems serving between 500 and 9,999 people must collect two samples per year.

The City's Stage 2 sampling locations were selected in the 2008 Initial Distribution System Evaluation (IDSE) Report. The City chose to implement the Standard Monitoring Plan approach developed by the EPA for the completion of their ISDE requirements. This process involves one year of increased monitoring for TTHM and HAA5 in addition to the data being collected under Stage 1. The City performed monitoring for Stage 2 by collecting one sample at a single site per year.

Results of Stage 2 monitoring for 2017 through 2021 are presented in Table 3-4. In all cases the test results were well below the MCLs for TTHM and HAA5.

TABLE 3-4

Stage 2 D/BPR Initial Monitoring Results (µg/L)

Location	Parameter	MCL	12/22/2017	8/21/2018	8/28/2019	8/11/2020	8/12/02021
Site: Washington Boulevard South	TTHM	80	2.4	4.2	5.56	3.64	3.68
	HAA5	60	1.2	6	ND	1.66	1.84

Inorganic Chemicals and Physical Parameters

WAC 246-290-310 specifies primary and secondary MCLs for inorganic physical and chemical characteristics. Primary MCLs are based on health effects, and secondary MCLs are based on factors other than health effects, such as aesthetics. Three chemicals, lead, copper, and sodium do not have primary or secondary MCLs, but are required to be monitored along with other IOCs. Lead and copper are regulated under the Lead and

Copper Rule, described in detail later in this chapter. Primary and secondary MCLs for inorganic chemical and physical characteristics are summarized in Tables 3-4 and 3-5, respectively.

Primary and secondary MCLs for inorganic physical and chemical characteristics are summarized in Tables 3-5 and 3-6. Sampling and compliance for these constituents is performed by the City of Auburn at each of its sources of supply.

TABLE 3-5

Primary Water Quality Standards Inorganic Chemical Characteristics

Chemical	Primary MCL
Antimony (Sb)	0.006 mg/L
Arsenic (As)	0.01 mg/L
Asbestos	7 million fibers/liter (length > 10 microns)
Barium (Ba)	2.0 mg/L
Beryllium (Be)	0.004 mg/L
Cadmium (Cd)	0.005 mg/L
Chromium (Cr)	0.1 mg/L
Copper (Cu)	1.3 mg/L (Action Level, EPA)
Cyanide (HCN)	0.2 mg/L
Fluoride (F)	4.0 mg/L
Lead (Pb)	0.015 mg/L (Action Level, EPA)
Mercury (Hg)	0.002 mg/L
Nickel (Ni)	0.1 mg/L
Nitrate (as N)	10.0 mg/L
Nitrite (as N)	1.0 mg/L
Selenium (Se)	0.05 mg/L
Sodium (Na)	20 mg/L (EPA recommendation)
Thallium (Tl)	0.002 mg/L

Source: WAC 246-290-310.

TABLE 3-6

Secondary Water Quality Standards Inorganic Chemical and Physical Characteristics

Chemical/Characteristic	Secondary MCL
Chloride (Cl)	250.0 mg/L
Fluoride (F)	2.0 mg/L
Iron (Fe)	0.3 mg/L
Manganese (Mn)	0.05 mg/L
Silver (Ag)	0.1 mg/L
Sulfate (SO4)	250.0 mg/L
Zinc (Zn)	5.0 mg/L
Color	15 Color Units
Specific Conductivity	700 umhos/cm
Total Dissolved Solids (TDS)	500 mg/L

Source: WAC 246-290-310.

<u>Monitoring Requirements and Analysis</u>

Groundwater sources must be sampled for inorganics once every 3 years, unless a monitoring waiver is granted by DOH. Nitrate samples are required annually and nitrite samples are required once every 3 years. Because nitrates and nitrites are included in Inorganic Chemical (IOC) sampling, additional individual samples are not required in years when an IOC is taken from the source.

As indicated in Tables 3-2 and 3-3, Algona is not responsible for source testing. The City of Auburn is responsible for all inorganic parameters and physical parameters sampling.

Lead and Copper Rule

In 1991, the EPA promulgated the Federal Lead and Copper Rule. The State of Washington adopted this rule in 1995, with minimal changes. The Lead and Copper Rule is intended to reduce the tap water concentrations of lead and copper that can occur when corrosive source water causes lead and copper to leach from water meters and other plumbing fixtures.

<u>Monitoring Requirements and Analysis</u>

Based on the requirements of the EPA Lead and Copper Rule (40 CFR 141), lead and copper monitoring had to be completed for two consecutive 6-month monitoring periods initially. If lead and copper action levels were not exceeded, then the number of samples could be reduced to one-half the original number for three consecutive annual periods. If compliance with the action level was maintained, reduced sampling continued once every 3 years thereafter.

Ninety percent of the distribution system lead samples collected according to the procedures outlined in WAC 246-290 must have concentrations below the "Action Level" of 0.015 mg/L. Similarly, 90 percent of the copper samples must have concentrations less than 1.3 mg/L. Systems exceeding the action levels are required to provide public notification and implement a program for reducing lead and copper levels.

In 2016 and 2019, the City of Algona took ten lead and copper samples throughout the City's distribution. Table 3-7 provides the results of the City's lead and copper testing. The City's distribution system is below the Action Level for both analytes and is thus, in compliance with the Lead and Copper Rule.

TABLE 3-7

Lead and Copper Testing

		2016		2019	
	Action Level (mg/L)	Maximum Concentration (mg/L)	90th Percentile Concentration (mg/L)	Maximum Concentration (mg/L)	90th Percentile Concentration (mg/L)
Lead	0.015	0.003	0.003	0.0134	0.01176
Copper	1.3	0.76	0.757	0.194	0.1797

Revised Lead and Copper Rule

The Revised Lead and Copper Rule (RLCR) will focus on replacing 100 percent of lead service lines and establishing a "trigger level" for each containment. The EPA has also signaled its intent emphasize testing for lead and copper in schools and child care facilities. Water systems will be required to identify and make public the locations of lead service pipes. These revised regulations will take effect in October of 2024.

Per- and Polyfluoroalkyl Substances

Per- and polyfluoroalkyl substances (PFAS) have become an increased concern for ground water contamination in recent years. The substances are used to manufacture heat-, grease-, oil-, stain-, and water-resistant materials. They are also resistant to heat and chemical degradation. PFAS are commonly found in consumer goods such has clothing, nonstick cookware, and food packaging as well as fire retardants and surfactants. PFAS are typically found in groundwater near military bases, airports, and local fire departments.

The EPA established non-regulatory lifetime health advisory levels for two specific PFAS, erfluorooctanoicacid (PFOA) and perfluorooctanesulfonic acid (PFOS) at 70 parts per trillion combined. As of 2022, the EPA is still in the process of establishing federal drinking water standards for PFAS.

Monitoring Requirements and Analysis

In Washington State, DOH's PFAS rule took effect in January 2022 and establishes state action levels (SAL) for five PFAS commonly found in drinking water. The rule will require water systems to monitor all active, permanent, and seasonal sources beginning in 2023 and no later than 2025. Monitoring rwill be the responsibility of the City of Auburn with requirements set by WAC 246-290-300 (10) and sampling will be required a minimum of once every 3 years. In the event PFAS is detected, follow up measures and monitoring will be required. The SALs for the five PFAS are summarized in Table 3-8.

TABLE 3-8

PFAS SALs

Chemical	State Action Level(1)
PFOA	10 µg/L
PFOS	15 µg/L
PFHxS	65 µg/L
PFNA	9 µg/L
PFBS	345 µg/L

(1) All action levels set by WAC 246-290-315 (4).

Radionuclides

Radionuclides include radioactive substances occurring naturally in subsurface waters. Regulated substances include radium-226, radium-228, uranium, and gross alpha and beta particles. Table 3-9 summarizes radionuclide MCLs as defined by EPA's Radionuclide Rule, WAC 246-290-310(7), and 40 CFR 141.66.

TABLE 3-9

Radionuclide MCLs

Parameter	MCL
Combined Radium-226 and Radium-228	5 pCi/L
Uranium	30 µg/L
Gross alpha particle activity, excluding uranium	15 pCi/L
Beta particle and photon radioactivity from man-made radionuclides	4 millirem

Monitoring Requirements and Analysis

WAC 246-290-300(10) and 40 CFR 141.26 require radionuclide samples at a frequency determined by initial sampling. A gross alpha particle activity measurement may be substituted for the required radium-226 and radium-228 analysis provided that the measured gross alpha particle activity does not exceed 5 pCi/L at a confidence level of 95 percent.

As indicated in Tables 3-2 and 3-3, Algona is not responsible for source testing. The City of Auburn is responsible for monitoring radionuclide and radon level and is required to do so at least every 6 years. Samples were collected in 2016 and 2017 at all sources with results all below their respective MCLs.

Residual Disinfectant

According to WAC 246-290-300, systems providing surface water disinfection treatment or receiving water that has been disinfected, shall measure residual disinfectant concentration within the distribution system daily. A disinfectant residual must be maintained throughout the distribution system.

Monitoring Requirements and Analysis

Water in the distribution system must maintain a residual disinfectant concentration of at least 0.2 mg/L. City staff report a consistent chlorine residual of 0.3 to 0.4 mg/L.

Revised Total Coliform Rule

Coliform bacteria describe a broad category of organisms routinely monitored in potable water supplies. Though not all coliform bacteria are pathogenic in nature, they are relatively easy to identify in laboratory analysis and they represent an indicator organism. If coliform bacteria are detected, then pathogenic organisms may also be present. Bacterial contamination in a water supply can cause a number of waterborne diseases, so these tests are strictly monitored and regulated by the DOH.

WAC 246-290 establishes bacteriological testing requirements for public water systems. Compliance with this rule is based on the presence/absence of total coliforms. The number of routine samples required depends on the system size.

The Revised Total Coliform Monitoring Rule specifies each total coliform positive routine sample must be tested for the presence of E. coli.; if any total coliform positive sample is also E. coli. positive, then the sample must be reported to the state by the end of the day. If a routine sample is positive for total coliform, repeat samples are required.

Within 24 hours of learning of the total coliform positive sample result, at least three repeat samples must be collected and analyzed for total coliform. One repeat sample must be collected from the same tap as the original sample, one repeat sample must be collected within five service connections upstream, and one repeat sample must be collected within five service connections downstream. If one or more repeat sample is positive for total coliform, the sample must be analyzed for E. coli. If the total coliform positive sample is positive for E. coli, the sample must be reported to the state. Another set of repeat samples must then be collected unless an assessment has been triggered and the state has been notified.

Monitoring Requirements and Analysis

The City of Auburn monitors for bacteriological contaminants as part of the Regional Monitoring Plan, but the City of Algona is responsible for taking any repeat samples and notifying customers in the event of a violation. The City of Algona's Coliform Monitoring Plan provides details on sampling stations, methods, and schedule and can be found in Appendix E. Three routine samples are collected each month as part of the Regional Sampling Program coordinated by the City of Auburn. The City of Algona has been in compliance with WAC regulations for sampling and follow-up actions since the City's last water system plan was published in November 2014. The City had one sample that was positive for coliform and E. coli in September 2016; however, repeat samples were negative for both coliform and E. coli.

Unregulated Contaminant Monitoring Rule (Volatile Organic and Synthetic Organic Compounds)

There are currently 21 regulated VOCs and 30 regulated SOCs. A list of these compounds and their MCLs is included in Table 3-10.

TABLE 3-10

Regulated VOCs and SOCs

Organic Chemical	Primary MCL (mg/L)(1)	Organic Chemical	Primary MCL (mg/L)(1)
Vinyl Chloride	0.002	Chlordane	0.002
Benzene	0.005	Dibromochloro-propane	0.0002
Carbon Tetrachloride	0.005	2,4-D	0.07
1,2-Dichloroethane	0.005	Ethylene dibromide	0.00005
Trichloroethylene	0.005	Heptachlor	0.0004
Para-Dichlorobenzene	0.075	Heptachlor epoxide	0.0002
1,1-dichloroethylene	0.007	Lindane	0.0002
1,1,1-Trichloroethane	0.2	Methoxychlor	0.04
cis-1,2-Dichloroethylene	0.07	Polychlorinated biphenyls (PCBs)	0.0005
1,2-Dichloropropane	0.005	Pentachlorophenol	0.001
Ethylbenzene	0.7	Toxaphene	0.003
Monochlorobenzene	0.1	2,4,5-TP	0.05
Ortho-Dichlorobenzene	0.6	Benzo(a)pyrene	0.0002
Styrene	0.1	Dalapon	0.2
Tetrachloroethylene	0.005	Di(2-ethylhexyl) adipate	0.4
Toluene	1	Di(2-ethylhexyl) phthalate	0.006
Trans-1,2-Dichloroethylene	0.1	Dinoseb	0.007

TABLE 3-10 – (continued)

Regulated VOCs and SOCs

Organic Chemical	Primary MCL (mg/L)(1)	Organic Chemical	Primary MCL (mg/L)(1)
Xylenes (total)	10	Diquat	0.02
Dichloromethane	0.005	Endothal	0.1
1,2,4-Trichloro-benzene	0.07	Endrin	0.002
1,1,2-Thrichloro-ethane	0.005	Glyphosate	0.7
Arochlor	0.002	Hexachlorobenzene	0.001
Aldicarb	0.003	Hexachlorocyclopentadiene	0.05
Aldicarb sulfone	0.002	Oxamyl (vydate)	0.2
Aldicarb sulfoxide	0.004	Picloram	0.5
Atrazine	0.003	Simazine	0.004
Carbofuran	0.04	2,3,7,8-TCDD (dioxin)	$3x10^{-8}$

Monitoring Requirements and Analysis

As indicated in Tables 3-2 and 3-3, Algona is not responsible for source testing. Sampling and compliance for these constituents is performed by the City of Auburn at each source.

FACILITY ANALYSIS

SOURCE OF SUPPLY

The 2002 Agreement with Auburn established that Auburn will provide wholesale water to Algona, typically via three of five available interties. The agreement outlined both average day demand and maximum day demand limits which effectively act as Algona's source capacity.

The Agreement only projected water demands for Algona through 2014, and states that "Additional water supply may be available as mutually agreed to in writing by the Auburn City Council and the Algona City Council." The City of Auburn has indicated these quantities could potentially be increased as part of the analysis for Auburn's 2022 WSP.

For this analysis, projected demands from Chapter 2 will be compared to the 2014 limits in the 2002 Agreement. The Agreement gives an average day limit of 525,000 gpd and a maximum day limit of 1,114,000 gpd. Tables 3-11 and 3-12 compare the projected average and maximum day demands to the 2014 limits while also summarizing the surplus/deficit in terms of volume and equivalent residential units (ERUs).

TABLE 3-11

ADD Supply Capacity Analysis

Year	Projected ADD (gpd)(1)	Agreement ADD Supply Limit (gpd)(2)	Surplus/ (Deficit) (gpd)	Surplus/ (Deficit) in ERUs(3)
2022	361,254	525,000	163,746	1,019
2032	381,867		143,133	891
2042	404,278		120,722	751

(1) From Table 2-10.
(2) From 2002 Wholesale Agreement.
(3) Based on Surplus/ (Deficit) divided by ERU_{ADD} , where ERU_{ADD} = 161 gal/ERU.

TABLE 3-12

MDD Supply Capacity Analysis

Year	Projected MDD (gpd)(1)	Agreement MDD Supply Limit (gpd)(2)	Surplus/ (Deficit) (gpd)	Surplus/ (Deficit) in ERUs(3)
2022	684,604	1,114,000	429,396	1,410
2032	723,666		390,334	1,282
2042	766,137		347,863	1,142

(1) From Table 2-10.
(2) From 2002 Wholesale Agreement.
(3) Based on Surplus/ (Deficit) divided by ERU_{MDD} , where ERU_{MDD} = 304 gal/ERU.

As shown in Tables 3-10 and 3-11, under the current wholesale water agreement the City has adequate source capacity to meet average and maximum day demands through the 20-year planning period.

STORAGE

As detailed in Chapter 1, Algona does not operate its own functional storage facility but instead purchases 280,000 gallons of dedicated storage in the City of Auburn's Lakeland Hills Reservoir 6. There have been also been ongoing discussions between Algona and Auburn for an additional 20,000 gallons of storage, though a formal agreement has not been reached.

Since Algona purchases all of it water from Auburn, and since all of its storage is provided by Auburn, Algona is considered a "consecutive" water system. With the exception of operational and dead storage, Algona's storage needs must be satisfied independently of Auburn's own storage.

Storage requirements for the City of Algona will be determined by applying the criteria outlined in the DOH June 2020 *Water System Design Manual*. The storage recommended according to this guidance document is based on the sum of the following:

- Dead Storage
- Operational Storage
- Equalizing Storage
- Standby Storage
- Fire Suppression Storage

As Algona purchases dedicated storage from Auburn, dead and operational storage need not be quantified. Equalizing, standby, and fire suppression storage requirements are calculated below.

Equalizing Storage

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 hour 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 (V_{ES}) is calculated using the following equation from the DOH *2020 Water System Design Manual* (Eq 7-1):

V_{ES} = (PHD-Qs)*150 minutes (but not less than zero)

Where:

PHD = Peak Hour demand
Qs = Sum of all installed and active supply source capacities, except emergency supply.

Each master meter between Auburn and Algona may be considered a source. Algona receives water from Auburn through three 8-inch master meters. The master meters are turbine meters, each rated for a “high normal flow rate” of 1,600 gpm and a “maximum flow rate” of 3,500 gpm. Assuming all three meters can be used, a maximum Qs can be assumed to be 10,500 gpm This Qs is larger than any of the projected PHD values within the 10 and 20-year planning horizons summarized in Table 2-10. As a result, equalizing storage is not needed. The full storage requirements and storage capacity analysis are summarized in Table 3-14.

Standby Storage

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 a break in a major transmission line. The amount of emergency storage should 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 and fire suppression may be nested, meaning only the larger of the two is required. Algona's standby and fire suppression storage are nested.

Standby storage (V_{SB}) is calculated using the following equation from the DOH *2020 Water System Design Manual* (Eq 7-2):

$$V_{SB} = N*SB_i*T_d$$

Where:

N = Number of system ERUs
SB_i = Locally adopted unit SB volume in gallons per day per ERU; in Algona's case 200 gpd per ERU
Td = Number of days selected to meet water system demand reliability standard; in Algona's case 1 day

Since Algona's storage needs are entirely met through the wholesale water contract with the City of Auburn, Algona's standby storage is based on a 200 gpd/ERU of storage.

Standby storage requirements for the present, 10 year, and 20 year planning periods are summarized in Table 3-13 below. The Boeing Welded Duct facility has been served directly from the Auburn via the 1st Avenue North Intertie system since it was constructed. Water supplied to the Boeing Welded Duct facility does not pass through the master meters that serve the rest of the City of Algona. As a result, the ERUs associated with this facility are excluded from the storage calculations.

TABLE 3-13

Standby Storage Requirements

Year	Standby Storage (gallons)
2022	342,998
2032	368,652
2042	396,543

Fire Suppression Storage

Fire suppression storage is provided to ensure that the volume of water required for fighting fires is available when necessary. The amount of water required for firefighting purposes is specified in terms of rate of flow in gallons per minute (gpm) and an associated duration. Fire flow must be provided at a residual water system pressure of at least 20 pounds per square inch (psi).

As previously mentioned, standby storage and fire suppression may be nested, meaning only the larger of the two is required.

Fire suppression storage (V_{FSS}) is calculated using the following equation from the DOH *2020 Water System Design Manual* (Eq 7-3):

$$V_{FSS} = (FF)*(T)$$

Where:

V_{FSS} = Fire suppression storage volume, gallons
FF = Maximum fire flow flowrate requirement
T = Duration of fire flow needed, minutes

The City's largest first flow requirement is 2,500 gpm of fire flow for 3 hours for commercial, industrial, and multi-family residential areas. This requirement controls and result in a total of 450,000 gallons of fire suppression storage.

Storage Summary

A summary of Algona's storage requirements and a capacity analysis are presented in Table 3-14 below. Algona has chosen to nest its fire suppression and standby storage. As a result, the larger of the two, fire suppression storage, must be met. The storage requirements are compared to the 280,000 gallons of dedicated storage secured by the agreement with Auburn.

TABLE 3-14

Storage Capacity Analysis

Year	Equalizing Storage (gal)	Standby Storage (gal)(1)	Fire Suppression Storage(1) (gal)	Total Storage Required(1) (gal)	Available Storage (gal)	Surplus/ (Deficit) (gal)
2022	0	342,998	450,000	450,000	280,000	(170,000)
2032	0	368,652		450,000	280,000	(170,000)
2042	0	396,543		450,000	280,000	(170,000)

(1) Fire Suppression Storage and Standby are nested, only the larger of the two storage requirements must be met.

The City of Algona finds itself with a 170,000 gallon storage deficit through the 20-year planning period. This deficit is largely the result of the updated fire flow requirements outlined in the city's 2021 Public Works Standards. These storage deficiencies will be further discussed in the system deficiencies section at the conclusion of this chapter.

DISTRIBUTION SYSTEM HYDRAULIC MODELING

The operation of a municipal water system involves dynamic interactions between various water system components, including source, storage, transmission, and distribution system facilities. These interactions and their effect on the level of service provided to the City's customers are dependent on the distribution and magnitude of water demands within the system as well as the performance characteristics of the water system facilities. In addition, infrequent high water demand events, such as firefighting and other emergencies, can significantly alter the normal flow patterns and pressures in the municipal water system and its components. These factors must be considered in analyzing the ability of a water system to provide for future demands, while maintaining an adequate level of water service to customers.

The development of a computer hydraulic model, which can accurately and realistically simulate the performance of a water system in response to a variety of conditions and scenarios, has become an increasingly important element in the planning, design, and analysis of municipal water systems. The Washington State Department of Health's WAC 246-290 requires hydraulic modeling as a component of water system plans.

HYDRAULIC MODELING SOFTWARE

The City's water system was analyzed using Innovyze's InfoWater hydraulic modeling software, which operates in an ArcMap GIS environment. The InfoWater model was created from an existing H2Onet hydraulic model developed during the completion of the City's 2014 Water System Comprehensive Plan. The model was modified to include new transmission mains constructed since the last Plan.

The InfoWater model is configured with a graphical user interface. Each water system element, including pipes, valves, sources, and reservoirs, is assigned a unique graphical representation within the model. Each element is assigned a number of attributes specific to its function in the actual water system. Typical element attributes include spatial coordinates, elevation, water demand, pipe lengths and diameters, and critical water levels for reservoirs. With attributes of each system element as the model input, the InfoWater software produces the model output in the form of flows and pressures throughout the simulated water system.

DEVELOPMENT AND CALIBRATION OF HYDRAULIC MODEL

The calibration of a hydraulic model provides a measure of assurance that the model is an accurate and realistic representation of the actual system. The hydraulic model of the City's water system was calibrated using data obtained from fire hydrant tests at various locations throughout the water system.

Four fire hydrant tests were conducted, with the assistance of City personnel, in June 2021. A hydrant test uses two hydrants, one outfitted with a pressure gauge and one with a diffuser nozzle. The diffuser nozzle is equipped with a device called a pitot tube which is used to measure flow.

Testing procedures were as follows: the hydrant with the pressure gauge was opened and static pressure was read before the second hydrant with the diffuser nozzle was opened and flow was measured with the pitot tube; meanwhile, a residual pressure was recorded at the first hydrant. Field results were used to calibrate the hydraulic model through verification and adjustment of pipe type, sizes, roughness coefficients, and elevations. Locations for hydrant flow tests are presented in Table 3-15 and are shown in Figure 3-1.

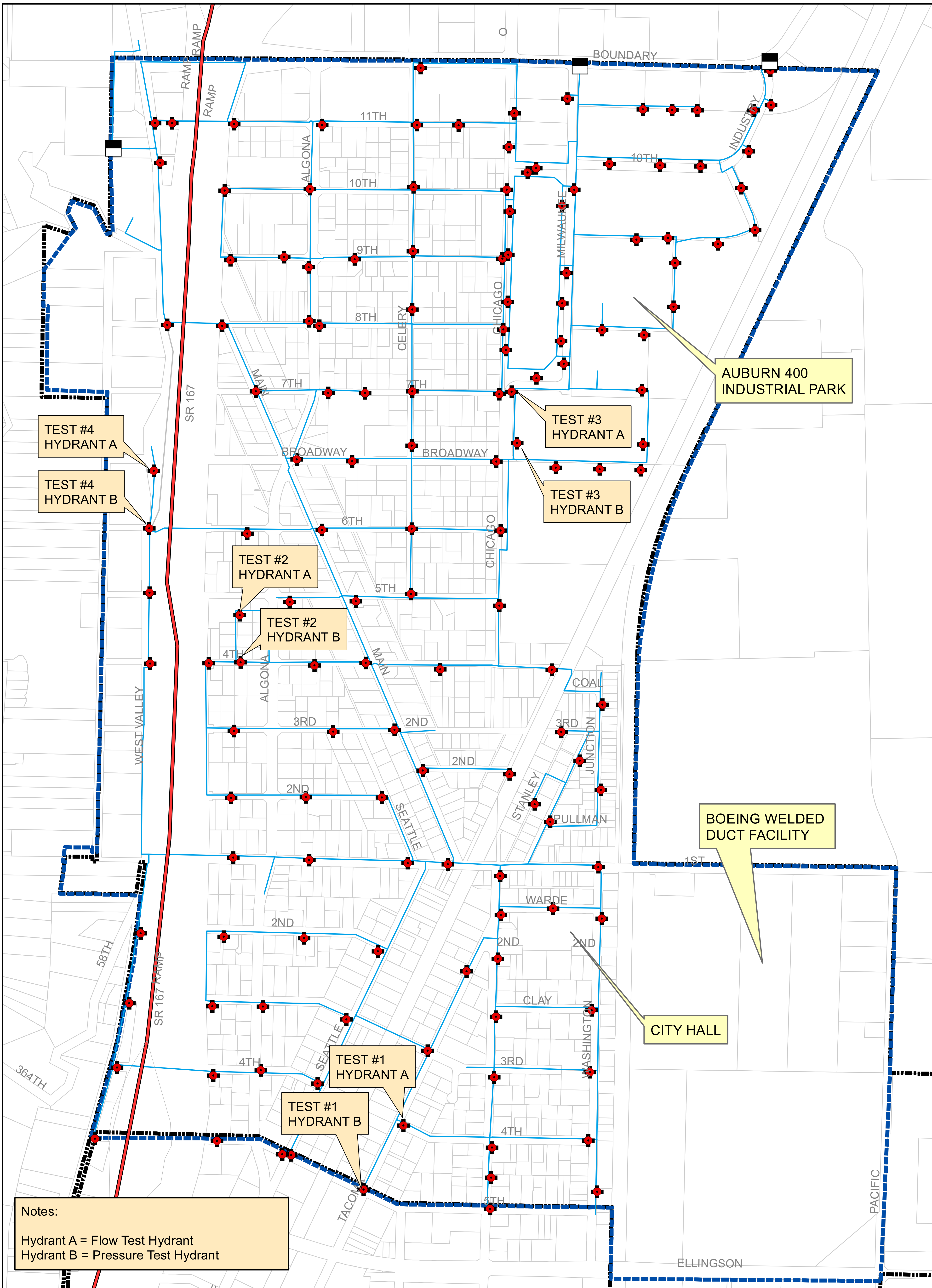
TABLE 3-15

2021 Hydrant Field Testing Locations

Test Number	Pressure Testing Location		Flow Testing Location	
	Intersection	Node	Intersection	Node
1	5th Avenue NW and Tacoma Boulevard	J-153	4th Avenue South and Tacoma Boulevard	J70
2	139 4th Avenue North and private road	J72	125 4th Avenue North in private cul-de-sac	J68
3	650 Milwaukee Avenue North (south location)	J74	650 Milwaukee Avenue North (north location)	J252
4	Inside Transfer Station	J-121	35315 West Valley Highway South	J-50

The system conditions during each hydrant test were noted for an accurate model. The City does not have any reservoirs, sources, or booster stations within the retail service area (RSA) so these parameters were not accounted for in the model. The three active interties with Auburn, which supply the City of Algona's distribution system and were detailed earlier in Chapters 1 and 3, were modeled as fixed head reservoirs with a head of 242 feet. The intertie supplying the Boeing Duct facility was not included in the model as it is completely isolated from the City's distribution system.

Static pressure results were generated by running the model with only domestic demands. The domestic demands used for the calibration were assumed to be the average day demand for 2020, excluding the Boeing Duct facility demand. Residual pressure results



Notes:

Hydrant A = Flow Test Hydrant
Hydrant B = Pressure Test Hydrant

LEGEND:

- Intertie
- Fire Hydrant
- Retail Service Area
- City Limits
- Parcels

N

0 250 500 1,000 Feet

CITY OF ALGONA

WATER SYSTEM PLAN
FIGURE 3-1
HYDRANT FIELD TESTING
LOCATIONS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 3-1 HYDRANT FIELD TEST.mxd were generated by placing an additional demand, at the location of the hydrant test, equal to the measured flow rate.

The system pressure and pipe flow rates determined in the calibration process are highly dependent on the friction loss characteristics established for each pipe. The friction losses occurring in lengths of pipe, fittings, and isolation valves were accounted for in the hydraulic model through the use of frictional factors. The friction factors for the model pipes are adjusted throughout the calibration process until the model output best approximates the measured values. Hazen-Williams C-factors between 115 and 150 were used throughout the City's system. These friction factors are typical for most pipe types and are generally conservative. A majority of the pipes were assigned C-factors of 120 and 130 based on the amount of aging asbestos-cement pipe in the system.

The model output has been produced for two data comparisons: static pressure and residual pressure. Table 3-16 provides the flow rates, measured static and residual pressures, and modeled static and residual pressures.

TABLE 3-16

Model Calibration

Test	Node (pressure/flow)	Field Flow (gpm)	Field Pressures (psi)			Model Pressure (psi)			Model vs Field Δ (psi)
			Static	Residual	ΔP	Static	Residual	ΔP	
1	J-153/J70	1,186	75	58	17	74.5	57.4	17.1	-0.1
2	J72/J68	1,061	75	46	29	71.4	47.7	23.7	5.3
3	J74/J252	1,353	72	69	3	70.2	69.0	1.2	1.8
4	J-121/J50	1,300	70	59	10	67.1	56.0	11.1	-0.1

Calibration of the hydraulic model produced results that were within 3 psi of static pressure and 5 psi of residual pressure, with the exception of a single case for the static pressure. This exception occurred at test number 2 which is located in a private cul-de-sac in the western portion of the City. The static pressure model result for this site was more conservative than the field measurements and given the location and configuration of the water system, it is believed that this discrepancy would have little effect on the rest of the system.

The DOH Water System Design Manual does not require any set standard for hydraulic model calibration. However, static pressure results within 2 psi and residual pressure results within 5 psi are generally considered acceptable. The calibration produced results within an acceptable range.

PEAK HOUR DEMAND MODELING RESULTS

Water systems must maintain a minimum pressure of 30 psi in the distribution system under peak hour demand conditions in accordance with WAC 246-290-230(5). The City's existing distribution system has been modeled under 2021, 2031, and 2041 peak hour demand conditions. Table 3-17 provides the system conditions used for the peak hour analyses.

TABLE 3-17

System Conditions During Peak Hour Analyses

Condition	2021	2031	2041
Peak Hour Demands	735 gpm	789 gpm	848 gpm
Auburn's Valley Zone Supply to Interties	242 ft HGL	242 ft HGL	242 ft HGL

The hydraulic model is used to evaluate the system's ability to provide adequate service pressure. Table 3-18 provides the range of system pressures during peak hour with the model node and corresponding location. Figure 3-2 identifies the peak hour pressures throughout the water system at the end of the 20-year planning period. Complete model output results are included in Appendix F.

TABLE 3-18

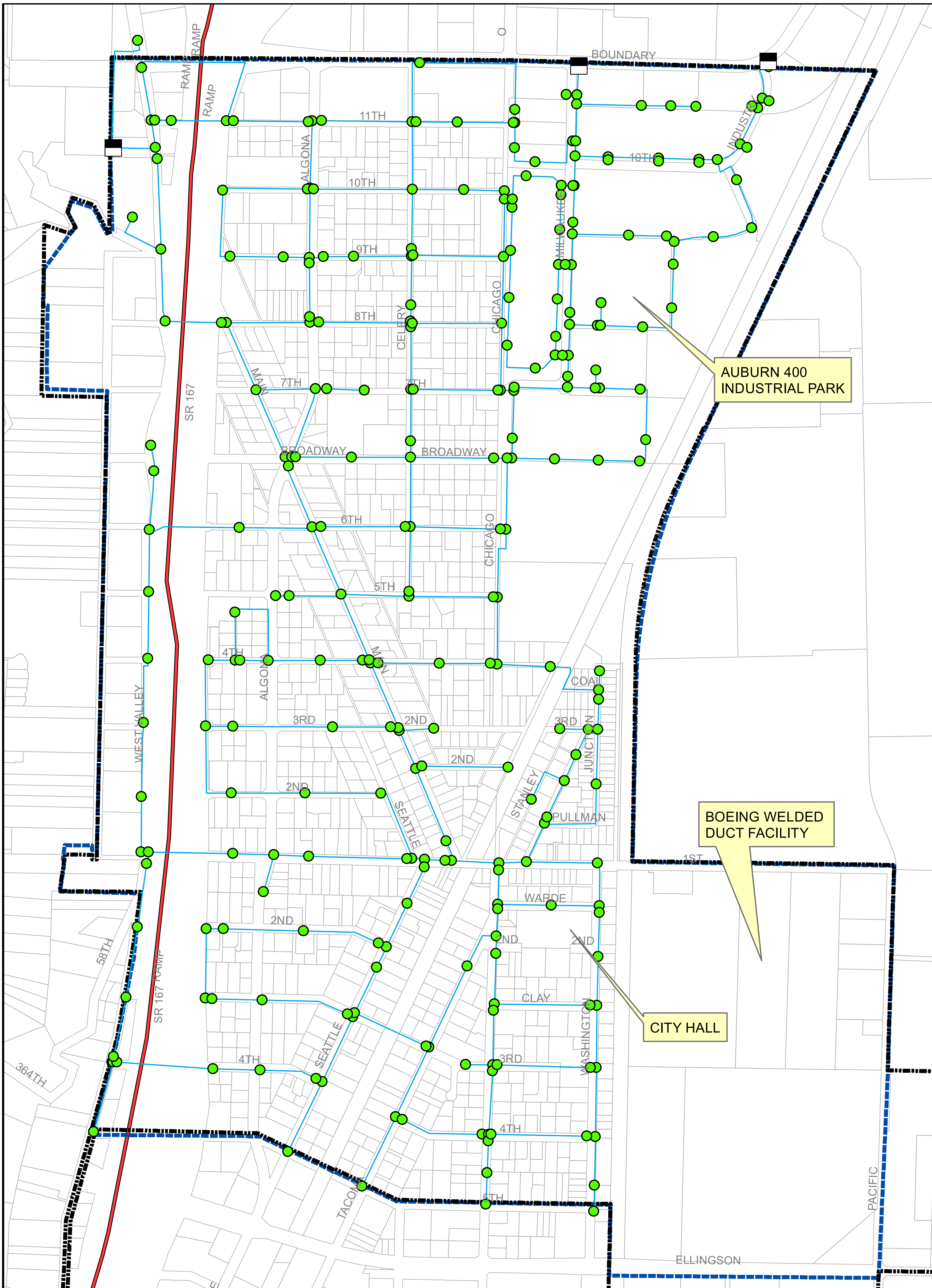
Pressures During Peak Hour Analyses

Pressure Range	Node	Location	2021-2041
Minimum	J-224	34721 West Valley Highway South	64.1 psi
Maximum	J-196	Between 11th Avenue North and I-5	74.4 psi

The results of the Peak Hour Analyses indicate that sufficient pressures are available throughout the system at peak hour demands throughout the 20-year planning period.

FIRE FLOW MODELING RESULTS

The hydraulic model was used to assess the availability of fire flows throughout the water system. WAC 246-290-230 (6) requires systems providing fire flow to be designed to provide maximum day demands plus the required fire flow, while maintaining system-wide pressure of 20 psi. Typically, fire flow analyses also incorporate the depletion of operational, equalizing, and fire suppression storage. Since the City does not have any storage within the RSA and receives all of its water via the three active interties, this aspect was not evaluated in the model or analyses.



LEGEND:

Peak Hour Pressure (psi)

- < 30
- 30 - 40
- 40 - 60
- 60 - 80
- > 80

- Intertie
- City Limits
- Retail Service Area
- Parcels

N

0 250 500 1,000 Feet

CITY OF ALGONA

WATER SYSTEM PLAN
FIGURE 3-2
2041 PHD MODELING RESULTS

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L:\ALGONA\20619 Water System Plan\Data\Modeling\GIS\MXDs\FIG 3-2.mxd

Fire flow standards were established by the adoption of the City of the Uniform Fire Code (UFC), the 1989 *Coordinated Water System Plan* and the City of Algona Public Works Standards (updated August 2021). The City's Public Works Standards contain the more stringent of the fire flow standards, with minimums of 1,500 gpm for single-family residences and 2,500 gpm for multi-family residences, commercial buildings, and industrial buildings. Commercial and industrial areas are primarily along the West Valley Highway and in the Auburn 400 area.

The City's distribution system was modeled with the fire flow conditions provided in Table 3-19.

TABLE 3-19

System Conditions During Fire Flow Analyses

Condition	2021	2031	2041
Maximum Day Demands	367 gpm	394 gpm	424 gpm
Required Fire Flow			
Single-Family	1,500 gpm	1,500 gpm	1,500 gpm
Commercial/Industrial/Multi-Family	2,500 gpm	2,500 gpm	2,500 gpm
Auburn's Valley Zone Supply to Interties	242 ft HGL	242 ft HGL	242 ft HGL

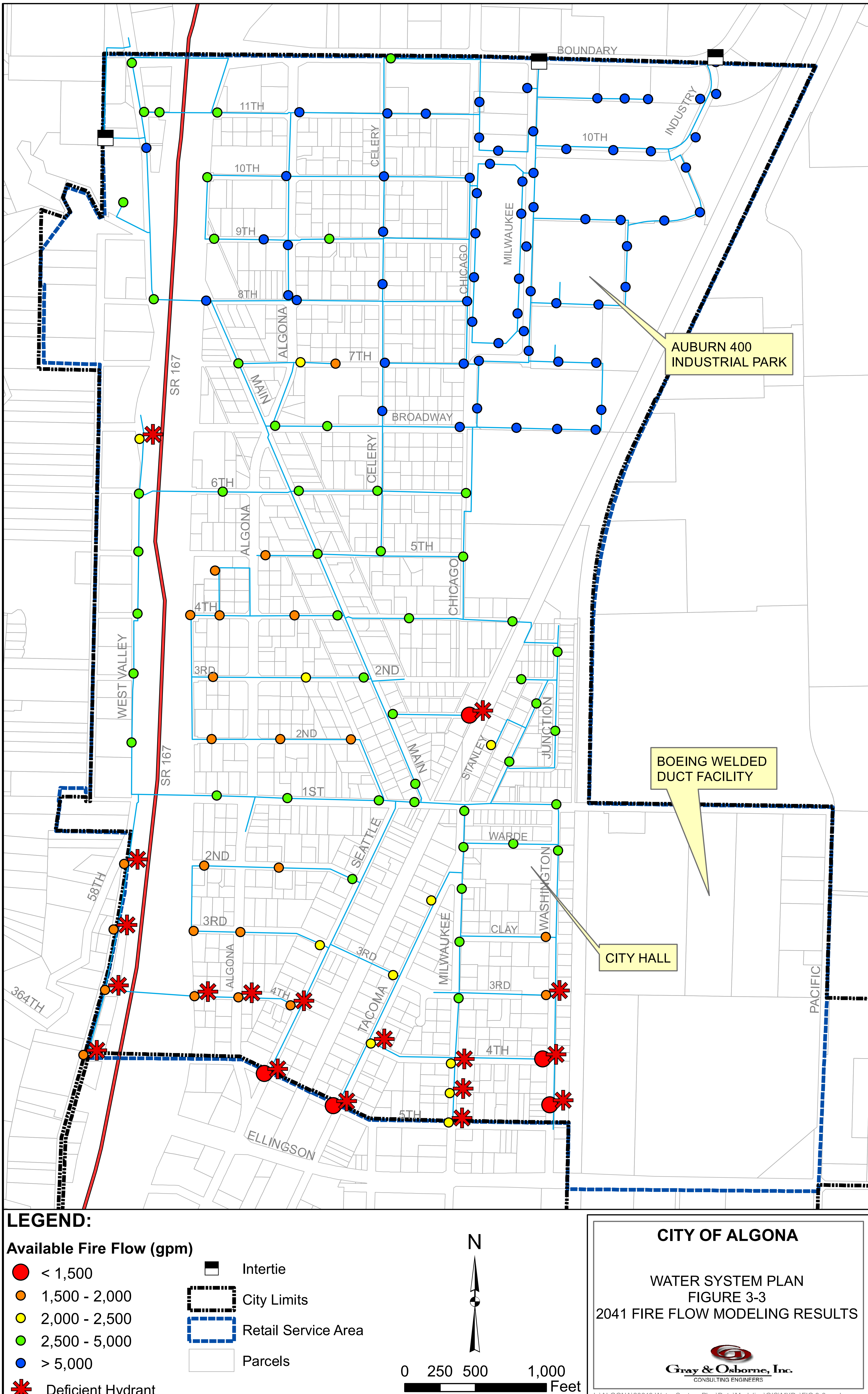
Figure 3-3 illustrates the existing available fire flows throughout the water system based on the system conditions above. Table 3-20 summarizes the hydrant locations where the required fire flow demand cannot be provided through the 20-year planning period. Corresponding Capital Improvement Program (CIP) projects for each deficiency are included in Table 3-20 with the available fire flows after the implementation of the projects. CIP projects are described in detail in Chapter 6. Due to minimal change in fire flow values in 2031, results are not included in Table 3-20. The results from 2031 are included in the comprehensive list of the available fire flow at all relevant system nodes in Appendix F.

TABLE 3-20

Fire Flow Model Deficiency Results

Node	Location	Required Fire Flow (gpm)	2021 Design Fire Flow (gpm)(1)	2041 Design Fire Flow (gpm)(1)	2041 Design Fire Flow w/CIPs (gpm)	Reason for Deficiency	CIP Project
J-137	2nd Avenue North Dead End	1,500	578	577	2,575	Dead end 4-inch pipe	D-6
J-147	Seattle Boulevard South Dead End	2,500	602	601	2,739	Dead end 4-inch pipe	D-1
J-153	Tacoma Boulevard South Dead End	2,500	619	617	2,779	Dead end 4-inch pipe	D-2
J102	4th Avenue South and Washington Boulevard South	2,500	1,437	1,431	3,159	4-inch pipe	D-8
J358	Washington Boulevard South near 5th Avenue South	2,500	1,501	1,495	2,622	4-inch and 6-inch pipe upstream	D-9
J-145	West Valley Highway South Southern Dead End	2,500	1,580	1,573	3,362	Dead end, 6-inch and 8-inch pipe upstream	D-5
J16	West Valley Highway South at 4th Avenue South	2,500	1,599	1,592	3,444	6-inch and 8-inch pipe	D-5
J120	4th Avenue South near SR 167	2,500	1,676	1,669	3,090	6-inch pipe	D-9
J58	West Valley Highway South at 3rd Avenue South	2,500	1,676	1,668	3,586	6-inch and 8-inch pipe	D-5
J104	Washington Boulevard South at the Public Works Shop	2,500	1,692	1,684	3,329	4-inch pipe	D-7
J30	4th Avenue South and Algona Boulevard South	2,500	1,738	1,730	3,275	6-inch pipe	D-2
J150	4th Avenue South and Seattle Boulevard South	2,500	1,906	1,896	3,711	6-inch pipe	D-1
J60	West Valley Highway South at 2nd Avenue South	2,500	1,917	1,907	3,644	6-inch and 8-inch pipe	D-5
J-154	Milwaukee Boulevard South and 5th Avenue South	2,500	2,071	2,060	2,594	High demand, 6-inch pipe upstream	D-4
J70	4th Avenue South and Tacoma Boulevard South	2,500	2,134	2,131	3,693	6-inch pipe	D-2
J-292	Milwaukee Boulevard South between 5th Avenue South and 4th Avenue South	2,500	2,225	2,212	2,902	High demand, 6-inch pipe upstream	D-2
J50	West Valley Highway South Northern Dead End	2,500	2,295	2,286	3,358	6-inch and 8-inch pipe	D-3
J100	Milwaukee Boulevard South and 4th Avenue South	2,500	2,408	2,393	3,338	High demand, 6-inch pipe upstream	D-3

(1) The Available Fire Flows shown are the flows available at a minimum pressure of 20 psi anywhere within the system. Available Fire Flows do not include CIP improvements.



CITY OF ALGONA

WATER SYSTEM PLAN
FIGURE 3-3
2041 FIRE FLOW MODELING RESULTS

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CONSULTING ENGINEERS

L:\ALGONA\20619 Water System Plan\Data\Modeling\GIS\MXDs\FIG 3-3.mxd

As can be seen in Table 3-19 and Figure 3-3, isolated areas throughout the distribution system cannot meet the fire flow requirements. Areas deficient in fire flow are primarily on the south end of the distribution system on 4-inch and 6-inch water mains, as well as areas along the West Valley Highway. Figure 3-4 presents the available fire flows following the completion of CIP projects D-1 through D-9. The CIP projects listed would be sufficient to allow the entire distribution system to meet fire flow requirements.

SYSTEM DEFICIENCIES

WATER QUALITY

The City of Algona water system is currently in compliance with all water quality regulations. The City should continue to track water quality test results as they are received to identify potential trends. Should the City see a sudden or abnormal rise in any monitored water quality parameters, the City of Auburn should be contacted immediately.

Algona should also stay up to date on upcoming changes to water quality monitoring including the Revised Lead and Copper Rule, both of which are discussed earlier in this Chapter.

SOURCE CAPACITY

The 2002 Agreement designates an average and maximum day supply through 2014. The Agreement states that additional water may be available if mutually agreed to. As shown in Tables 3-11 and 3-12, the City's projected average and maximum day demands through 2041 can be met by the supply designated in the 2002 Agreement with Auburn. No additional interties with the City of Auburn are planned at this time.

STORAGE CAPACITY

At present, Algona is in compliance with its 2002 Agreement with Auburn. Algona financially contributed towards the construction of 180,000 gallons of storage in Auburn's new Lakeland Hills Reservoir 6 as well as replaced its own storage with 100,000 gallons of additional purchased storage from Auburn. The results in a total storage capacity of 280,000 gallons.

The storage analysis presented earlier in this chapter concluded that Algona maintains a 170,000 gallon storage deficit throughout the 20-year planning period. This deficit is due to fire suppression storage requirements which were increased after the adoption of the updated 2021 Public Works Standards. It is recommended that Algona pursue purchasing additional storage from the City of Auburn. The City of Auburn was made aware of Algona's storage capacity deficit while updating their Water System Plan in 2022.

It is also recommended that the City demolish the abandoned 100,000-gallon reservoir before it becomes a safety hazard.

DISTRIBUTION SYSTEM

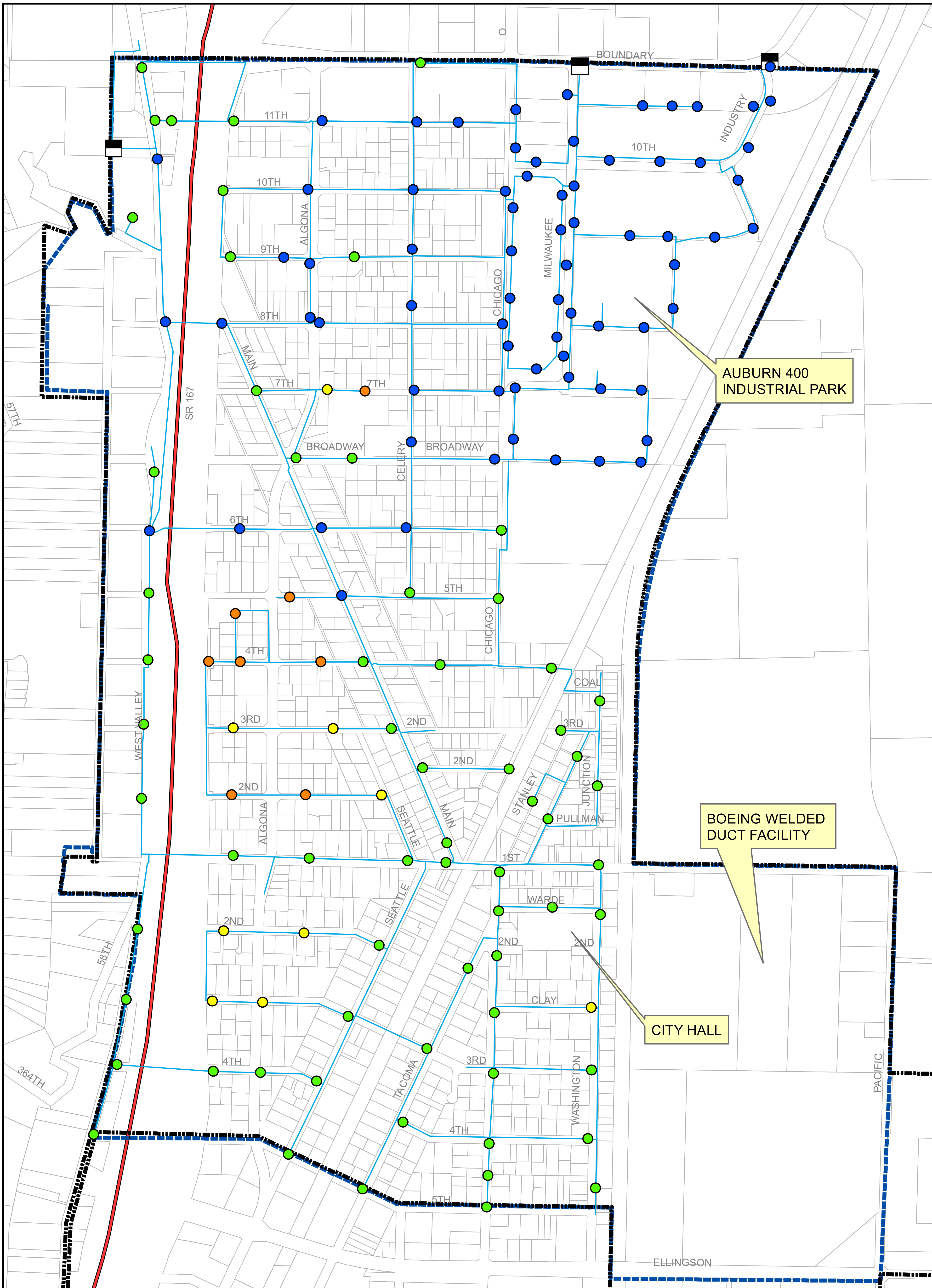
As shown in Figure 3-3, isolated areas throughout Algona's distribution system cannot meet the minimum fire flow requirements specified by the UFC or the fire flow goals set by the City. These areas are primarily along the West Valley Highway and in the southern portion of the distribution system. CIP projects have been identified to correct these deficiencies. These projects include installing new water mains to create loops and upsizing water mains. CIP project descriptions and costs are provided in Chapter 6.

Emergency Intertie Agreement with City of Pacific

The Cities of Algona and Pacific have an emergency intertie in the form of a closed valve near the intersection of 5th Avenue South and Milwaukee Avenue South. The Cities should work together to develop an agreement that defines the conditions under which the intertie can be used, the amount of water available, the standard procedures for operating the intertie, O&M responsibilities for the intertie, and the cost of water.

Replacement Schedule for AC pipe and Asbestos Monitoring

A significant portion of the City's distribution system is made up of Asbestos Cement (AC) pipes. These pipes were installed mainly in the 1960s and make up the majority of the City's 4-inch and 6-inch pipes. In many places, including the City of Algona, AC pipe has proved to have a limited life span and is a potential source of failure due to its brittle nature. DOH has recommended the City develop an AC pipe replacement program that will work to eliminate AC pipe within a reasonable time frame. A proposed AC pipe replacement schedule is included in Chapter 6.



LEGEND:

Available Fire Flow (gpm)

- < 1,500
- 1,500 - 2,000
- 2,000 - 2,500
- 2,500 - 5,000
- > 5,000

- Intertie
- City Limits
- Retail Service Area
- Parcels

N

0 250 500 1,000
Feet

CITY OF ALGONA

WATER SYSTEM PLAN
FIGURE 3-4
2041 FIRE FLOW MODELING RESULTS
WITH IMPROVEMENTS

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L:\ALGONA\20619 Water System Plan\Data\Modeling\GIS\MXDs\FIG 3-4.mxd

CHAPTER 4

WATER USE EFFICIENCY PROGRAM

OBJECTIVE

A viable water use efficiency program is a requirement of water system planning. This chapter identifies conservation and water use efficiency requirements and outlines the City of Algona's (City) Water Use Efficiency (WUE) Program for the next 10 years.

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 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 (WUE) Rule, which was adopted in October 2006. The WUE Rule is outlined in the *Water Use Efficiency Guidebook* (Third Edition), which was most recently revised in January 2017.

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 the Washington State Department of Ecology (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 City to develop an active and beneficial conservation plan.

The third and most recent edition of the WUE Guidebook was released in January 2017. The WUE Rule sets stringent requirements for public water purveyors. The WUE Rule is comprised of the following six sections:

1. WUE Requirements
2. Water Metering

3. Data Collection
4. Distribution System Leakage (DSL)
5. Demand Forecasting
6. WUE Goals
7. WUE Measures

WATER USE EFFICIENCY REQUIREMENTS

The WUE Guidebook establishes varying implementation and evaluation requirements for municipal water suppliers (MWS). The requirements focus on the importance of measuring water usage and evaluating the effectiveness of the WUE program. The Rule outlies three fundamental elements which include planning, DSL standards, and goal setting and performance reporting.

Table 4-1 provides a summary of the WUE Rule requirements applicable to the City.

TABLE 4-1

Summary of WUE Requirements

Requirement	City Compliance
Include WUE Program in Planning Documents	✓
Set WUE Goals	✓
Submit Service Meter Installation Schedule	✓
Submit First Annual Performance Report	✓
Meet DSL Standard (based on 3-year rolling average)	Not in Compliance
Complete Installation of All Service Meters	✓

The City has met all WUE requirements outlined above in Table 4-1, with the exception of the DSL standard. City's DSL will be discussed later in this chapter.

WATER METERING

The WUE Rule requires all sources and customer service connections be metered by 2017. The City currently meters all sources (master meters) and customers and is, therefore, in full compliance with this requirement. All new sources and customers will also continue to be metered.

DATA COLLECTION AND REPORTING

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

- Calculating leakage;

- Forecasting demand for future water needs;
- Identifying areas for more efficient water use;
- Evaluating the success of your WUE program;
- Describing water supply characteristics;
- Aiding in decision-making about water management.

Table 4-2 summarizes the water use data collection requirements.

TABLE 4-2

Summary of Water Use Data Collection

Required Data Type	Unit of Measure	Collection Frequency	Comments
Water Service Connections	Connections	Monthly	From customer billing records
Source of Supply Meter Readings	Cubic Feet	Monthly	Master meters at interties are read monthly by the City of Auburn
Wholesale Water Purchased	Cubic Feet	Monthly	Purchased from Auburn, ensure value matches master meter readings
Peak Month	Cubic Feet	Annually	Peak month is tabulated monthly based on master meter readings
Distribution System Leakage	Gallons and Percent	Annually	Based on the annual difference of water purchased and consumed. Reported to DOH annually
Unmetered, Unbilled Authorized Uses	Gallons	Annually	Calculated from City records of flushing, testing, and construction uses
Single-Family Service Meter Readings	Cubic Feet	Every 2 Months	—
Multi-family Service Meter Readings	Cubic Feet	Every 2 Months	
Industrial/Commercial Service Meter Readings	Cubic Feet	Monthly	

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

DISTRIBUTION SYSTEM LEAKAGE

The WUE Rule requires that water distribution systems maintain a DSL rate less than 10 percent of finished water production based on a 3-year rolling average. DSL is defined as the difference between the total water production and authorized consumption. Authorized consumption includes metered water consumption by customers and known or credibly estimated uses that were unbilled or unmetered. Unmetered uses typically include cleaning reservoirs, flushing mains, and fire flows. DSL is typically attributed to water loss due to leaks or unauthorized uses such as illegal service connections, accounting errors, inaccurate source and customer meters, and water leaving the system for any unmetered use.

In recent years the City has had two water main breaks, which occurred in 2018 and 2020. Both were small enough to remain undetected for a long period of time and complicated any effort to accurately estimate the volume of water lost.

DSL for 2016 through 2020 is summarized in Table 4-3. The City's 3-year rolling average DSL is currently 16.3 percent which is above the WUE Rule's 10 percent maximum allowable leakage requirement. As a result, a Water Loss Control Action Plan must be implemented and will be discussed later in this chapter.

TABLE 4-3

Distribution System Leakage

Year	Total Production (gpd)	Authorized Consumption (gpd)(1)	Distribution System Leakage (gpd)	Distribution System Leakage %	3-year Rolling Average
2016	322,804	307,325	15,479	4.8%	4.7%
2017	338,252	306,678	31,574	9.3%	7.0%
2018(2)	374,580	306,227	68,353	18.2%	10.8%
2019	354,933	305,498	49,436	13.9%	13.8%
2020(3)	358,991	298,608	60,383	16.8%	16.3%
Average				**12.6%**	-

(1) Includes total consumption and credibly quantifiable flushing, fire flows, and large water main breaks.
(2) In 2018, a large leak lasting multiple weeks occurred resulted in higher DSL.
(3) In 2020, a prolonged leak at a fire hydrant resulted in higher DSL.

WATER DEMAND FORECAST

The water demand forecast is presented in Table 2-15 and is based on historic water use data and anticipated population growth. A detailed discussion of demand forecast assumptions and parameters can be found in Chapter 2. These forecasted values will be compared to a similar forecast in which the City enacts and meets new conservation goals as summarized in Table 4-4.

WATER USE EFFICIENCY GOALS AND PROGRAM

This section summarized the City's WUE goals and program measures. According to the 2002 Auburn/Algona Intertie Agreement 3A (2002 Agreement), Algona is required to implement a conservation program that is, at a minimum, consistent with Auburn's conservation program. The City is committed to meeting the terms of the agreement and the updated conservation program will continue to include field testing for spot leak detection, repair of leaks, and public information actions equal to Auburn's public information actions. The City will also do its part in contributing the Auburn's qualitative goals.

City of Auburn's Water Use Efficiency Program

The City of Auburn's WUE program was last updated as part of the 2015 Water System Plan. The City of Auburn has five program goals, which are outlined as follows:

1. Decrease planning ERU value (gpd/ERU) one percent annually;
2. Decrease planning peaking factor from the current 1.85 to one less than 1.72;
3. Maintain 3-year average DSL under 10 percent;
4. Provide customer service and support for customers to conserve water; and
5. Support and participate in applicable regional plans to maintain supply.

City of Algona Water Use Efficiency Goals and Measures

Previous Goals

Past WUE goals were established by the City's 2014 Water System Plan. These included specific consumption and supply goals. These goals will be evaluated for the years 2015 through 2020 by comparing target values from the 2014 WSP to the historic values which actually occurred. The two goals are described below.

1. Consumption Goal: Reduce the consumption per ERU (ERU_{ADD}) by one percent per year for the duration of the planning period.

TABLE 4-4

Consumption Goal Evaluation

Year	Goal ERU_{ADD} (gpd)(1)	Historic ERU_{ADD} (gpd)
2016	176	158
2017	175	171
2018	173	166
2019	171	162
2020	169	146

(1) Based on an ERU Value of 180 gpd/ERU beginning in 2014 WSP.

The City met and exceed the target consumption goal for each of the last 5 years. The ERU values shown in Table 4-4 also illustrate an overall downward trend in consumption per ERU for the City of Algona.

2. Supply Goal: Maintain a DSL rate below 10 percent as measured by the 3-year rolling average.

   The City's historical DSL was previously summarized in Table 4-3. The City met its supply goal in 2016 and 2017 but failed to do so in 2018, 2019, and 2020.

Updated Goals

Under the WUE Rule, the City must outline new water use efficiency goals as part of the WSP update, adopt these goals through a public process, and measure progress towards these goals each year. These goals must include a measurable outcome, address water supply and/or water demand characteristics, and include an implementation schedule. The City's three new goals are designed to be consistent with the City of Auburn's quantitative goals and include two goals targeted at consumption and one targeted at supply.

1. Goal 1 (Consumption) – Maintain a maximum day peaking factor below 1.72. As illustrated in Table 2-7, the City's average peaking factor for 2016 through 2020 was 1.90. This will be addressed by leaning on existing measures like customer education.

2. Goal 2 (Consumption) – Reduce the average day consumption per ERU (ERU_{ADD}) by one percent per year for the next 10 years. Table 4-4 shows the impact of meeting the reduced consumption goal.

3. Goal 3 (Supply) – Decrease the projected DSL volume by 6.5 percent per year over the ten-year planning period in order to bring the DSL rate below 10 percent to be in compliance with the WUE rule, below 7 percent by the end of the 10-year planning period, and consistent with the City of Auburn's conservation goals. Water savings from Goals 2 and 3 are combined in Table 4-5 below.

TABLE 4-5

Water Savings with Consumption Goal

Year	Projected ERUs (Excluding DSL)[1]	No Conservation		Conservation		Annual Water Savings (MG/Y)
		ERU_{ADD}	Average Daily Consumption (MG/Y)	ERU_{ADD}	Average Daily Consumption (MG/Y)	
2023	1,956	161	314,286	158	308,032	2.3
2024	1,968	161	316,254	156	306,861	3.4
2025	1,980	161	318,239	154	305,699	4.6
2026	1,993	161	320,240	153	304,545	5.7
2027	2,005	161	322,258	151	303,399	6.9
2028	2,018	161	324,293	150	302,262	8.1
2029	2,031	161	326,345	148	301,133	9.2
2030	2,044	161	328,414	147	300,012	10.4
2031	2,057	161	330,501	145	298,899	11.5
2032	2,070	161	332,605	144	297,794	12.7
Total						**74.8**

(1) From Table 2-10.

TABLE 4-6

Total Water Savings – Consumption and Supply Goals

Year	Average Day Consumption w/o WUE Goals (gpd)(1)	Average Day Consumption w/WUE Goals (gpd)(1)	DSL w/o WUE Goals (gpd)(2)	DSL w/WUE Goal (gpd)	DSL w/WUE Goal (%)(3)	Total Water Purchased w/o WUE Goals (gpd)	Total Water Purchased w/WUE Goals (gpd)	Annual Water Savings (MG/Y)
2023	314,286	308,032	45,000	40,392	11.6%	359,286	348,424	4.0
2024	316,254	306,861	45,000	37,767	11.0%	361,254	344,628	6.1
2025	318,239	305,699	45,000	35,312	10.4%	363,239	341,011	8.1
2026	320,240	304,545	45,000	33,016	9.8%	365,240	337,561	10.1
2027	322,258	303,399	45,000	30,870	9.2%	367,258	334,270	12.0
2028	324,293	302,262	45,000	28,864	8.7%	369,293	331,126	13.9
2029	326,345	301,133	45,000	26,988	8.2%	371,345	328,121	15.8
2030	328,414	300,012	45,000	25,233	7.8%	373,414	325,246	17.6
2031	330,501	298,899	45,000	23,593	7.3%	375,501	322,492	19.3
2032	332,605	297,794	45,000	22,060	6.9%	377,605	319,854	21.1
Average								**128.0**

(1) From Table 4-4.
(2) From Table 2-15.
(3) DSL % = 100*(DLS w/WUE Goals) / (Total Water Purchased w/WUE Goals).

As shown in Table 4-6, by enacting the three WUE goals, the City would save an estimate 112.2MG of purchased water over the 10-year planning period and would reach a DSL rate below 10 percent by 2029, bringing the City in compliance with the WUE Rule.

WATER USE EFFICIENCY MEASURES

The WUE Rule requires the evaluation or implementation of different water use efficiency measures to help meet the WUE goals. The WUE Guidebook gives a list of mandatory measures that must be implemented or evaluated as well as a list of supplemental measures that can be counted toward the WUE Program. WAC 246-290-810 identifies the minimum number of water use efficiency measures that must be evaluated based on system size. As the City of Algona serves between 1,000 and 2,499 customers, the City's WUE Program must evaluate and/or implement a minimum of five water use efficiency measures.

The following sections describe both the mandatory and supplementary water use efficiency measures adopted and/or evaluated by the City, and indicate which have been or will be implemented.

Mandatory Measures

<u>Implement Source and Service Meters and Calibration</u>

The WUE Rule requires all sources and customer service connection be metered by 2017. The City currently meters all source interties and customers and is, therefore, in full compliance with this requirement.

Source interties for wholesale water from the City of Auburn are fully metered at four master meter stations. Two master meter stations were constructed in 2001 and are located at Boundary Boulevard and Industry Drive North, and Boundary Boulevard and Milwaukee Avenue. The third master meter was installed in 2002 near the West Valley Highway and 10th Avenue North as part of a commercial development. A fourth intertie is located at 1st Avenue North and serves the Boeing Duct Welding Facility directly. Source meters are owned and operated by the City of Auburn which is responsible for the testing and repair of the meters, as necessary.

Service connections are metered using an automatic meter reading (AMR) system which collects customer meter readings wirelessly. During the development of the AMR system, older customer meters were also replaced with new units. The City performs testing and calibration of service meters as requested by customers or when needed to resolve billing irregularities.

All new sources and customers will also continue to be metered.

<u>Evaluated DSL and Implement Water Loss Action Control Plan 10 Percent is Exceeded</u>

If a system's distribution system leakage exceeds 10 percent, the WUE Program must also implement a Water Loss Control Action Plan (WLCAP). The WLCAP includes assessing data accuracy and collection methods, leak detection and repair, and other measures to reduce DSL. Finding and repairing leaks is an essential method for controlling DSL as well as maintaining the integrity of the water distribution system. Determining the amount and location of DSL can greatly improve water conservation efforts. A regular and systematic program of finding and repairing leaks in transmission and distribution system mains should be conducted. Field testing for leak detection, followed by leak repair is required by the 2002 Agreement with Auburn.

The City's DSL is above 10 percent based on the 3-year rolling average. A WLCAP required and is included at the end of Chapter 4. The City's capital improvement plan includes $2,500 for leak detection every 3 to 5 years. Any discovered leaks have been repaired.

Steps to reduce DSL include the following:

1. Ensure service meters are new or properly calibrated.
2. Ensure all services are metered including non-billed connections, such as City offices and parks.
3. Ensure that all construction water use is metered.
4. Perform annual spot leak detection surveys.
5. Improve monitoring of source and service meter data to assess monthly DSL.

Implement Customer Education

The WUE Program requires education and promotion of water use efficiency once a year. Educational efforts may include distribution of DOH brochures, bill inserts, or notifications included with the annual consumer confidence report.

The City periodically includes conservation tips in the water bills sent to customers. Conservation brochures are available at the public utilities counter and the City's website includes water saving information for indoor and outdoor water use.

Evaluate Conservation Rate Structure

The City previously evaluated and has implemented a conservation rate structure. Rates are evaluated to ensure customers are encouraged to use less water while also providing funding for the WUE program and maintaining revenue. The City's intent with its water rate structure is to encourage conservation by incrementally increasing the overage volume charge and evaluating the amount of water included in the base rate.

The City includes 400 cubic feet of water in its base rate. Water use above that amount follows an inclining block structure and has an additional charge with rates based on consumption between predetermined volumes of water. Table 4-7 provides the water rates from Algona Municipal Code, passed in December 2021.

TABLE 4-7

2022 Water Rate Schedule

Size of Service	Quantity Allowed Per Month	Monthly Service Charge	Excess Use Rates
3/4-inch metered residential	4 CCF	$34.79	4.01-10 CCF: $3.32 / CCF 10.01-15 CCF: $3.6776 CCF 15.01^{+} CCF:$4.20 / CCF
Multiple residential units (apartments, duplexes, etc.)	4 CCF	$34.79 per unit	
Residential units where water has been disconnected per Section 13.02.200 of Algona Municipal Code	0 CCF	$20.56	
Metered bulk rate	—	$63.24	$3.32 / CCF
Commercial/industrial < 1-inch meter	4 CCF	$36.10	$4.10 / CCF
Commercial/industrial 1-inch meter	4 CCF	$40.57	
Commercial/industrial 2-inch meter	4 CCF	$45.31	
Commercial/industrial 3-inch meter	4 CCF	$49.34	
Commercial/industrial 4-inch meter	4 CCF	$52.77	

Evaluate Water Reclamation Evaluation

Reclaimed water may be used for landscaping or other non-potable uses, and may become more common as water resources become limited. The City owns and operates the sewer system within the city limits. Ultimately, the sewer is conveyed to King County's sewer system in Renton where the sewage is treated. At this time, the City does not have plans to implement water reclamation. Neither King County nor the City of Auburn have indicated plans for reclaimed water uses within the City of Algona. Typical uses for reclaimed water, such as golf courses and parks, are limited within the City's service area. There is no source or distribution system for reclaimed water in the vicinity of the City.

Under the 2002 Agreement with Auburn, evaluations of reclaimed water use savings will be conducted and conservation measures for reclaimed water usage will be implemented if a specific opportunity arises. Auburn's WUE program identifies the irrigation customer class as the most likely user for reclaimed water, with the potential large users to seek participation as well. The City of Algona will cooperate with King County and the City of Auburn if future development of a reclaimed water system occurs.

Supplemental Measures

Bills Showing Consumption History

Water utility bills that show consumption history can help customers monitor their water consumption trends. These bills give feedback to customers on their own attempts to conserve and give a reference that helps in identifying leaks or changes in water usage that customers might otherwise not be aware of.

The City currently presents a graph of past usage on all bills that go to customers for all customer classes.

Implementation of Conservation Rate Structure

As previously mentioned, the City has both evaluated and implemented water rates to encourage water conservation. The implementation of water rates based on the evaluation is considered a supplemental WUE measure. As mentioned previously, the City follows an inclining block rate structure with a flat fee for volume usage of 0 to 400 cubic feet of water.

Additional Customer Education

Providing education to customers more than once a year qualifies as a supplemental WUE measure. The City distributes DOH conservation literature several times per year, in addition to providing water conservation tips on the City's website year-round. The City also assists customers as needed at the utilities counter or during calls for information. These forms of education are provided for all customer classes.

Notifying Customers of Leaks

Potential leaks are investigated through water meters upon request of the customers.

Water Efficient Fixture Giveaways and Rebates

The City will continue to provide rebates to customers that replace old toilets with new high-efficiency toilets through their EPA WaterSense Toilet Rebate program. The City gives away free low-flow shower heads at the Utility Billing Counter.

Evaluation of Existing Measures

Many of the measures selected for continued implementation require little additional funding, such as including consumption history in bills and including information in inserts and online. The City will track the finances associated with each measure and compare it to water saved to evaluate the effectiveness of each measure. If measures do not provide enough savings to meet goals, additional measures will be considered.\

PERFORMANCE REPORTING

The City must submit a performance report to DOH by July 1 each year. This annual report must include:

- Total source production and customer consumption;
- Distribution system leakage in percentage and volume; and
- Description of current WUE goals, schedule and progress towards meeting goals.

DOH has developed an online reporting form that must be used by water systems to file their annual report. Previous year's WUE annual performance reports are also available on the DOH website.

The City has been in compliance with this reporting.

WATER LOSS CONTROL ACTION PLAN

In 2020, the City's DSL was 16.8 percent with a 3-year rolling average DSL of 13.7 percent. Both DSL values are above the distribution system leakage standard of 10 percent. As a result, the City must implement a Water Loss Control Action Plan (WLCAP). The following elements are included in the WLCAP:

- The water loss control methods include pipe replacement to reduce leakage and replacing faulty water meters. It is worth noting that the City's water meters are between 11 and 5 years old. A replacement program will begin in 2029, when 150 to 200 meters will be replaced per year over the next 7 years.

- The City will work to reach the 10 percent yearly standard by 2029 and the 10 percent 3-year rolling DSL standard by 2030. A more detailed schedule for reaching the 10 percent DSL standard is presented in Table 4-5.

- Leak detection has already been part of the Water Fund operating budget included in Repair and Maintenance. These efforts will increase in frequency and be outlined as a separate line item in the financial projections in Chapter 7 in Table 7-8.

- The City's Capital Improvement Program (CIP), which is detailed in Chapter 6, outlines future continued meter replacement program as well as the continued replacement projects for asbestos concrete (AC) which are often at increased risk of leaking. Water meter replacement and upgrades will continue to keep the maximum meter age to 15 to 20 years. If meters show signs of faulty readings they will be replaced sooner. Water Main replacement project will prioritize leaking and AC main. Water main replacement projects are included in the financial projections in Table 7-9 under Capital Projects Fund (Fund 404).

- There are no anticipated technical or financial concerns that could prevent the City from complying with the standard. The City's financial information can be found in Chapter 7.

ASSESSING DATA ACCURACY AND COLLECTION METHODS

The City has taken and will continue to take measures to ensure the accuracy of its water production and consumption data. The City will continue to work with the City of Auburn to ensure the master meters are accurately recording the water sold to the City.

The City will continue to replace service meters regularly as stated above in an effort to ensure that consumption readings are accurate.

FIELD ACTIVITIES TO REDUCE LEAKAGE

The City will complete leak detection every three years, when there is a large increase in DSL, or when master meter readings from the City of Auburn abnormally increase. The City will prioritize identify and prioritize the replacement of aging water mains with frequent leaks or breaks.

WATER LOSS CONTROL METHODS

The City plans to employ several aggressive water loss control methods to reduce leakage and eliminate water accounting inaccuracies described below.

The City will increase the frequency of its existing leak detection program. To reduce the potential of meter reading inaccuracies, the City will implement a meter calibration program and schedule. The City's CIP includes a pipe replacement program for aging pipes, especially those with a history of leakage and/or are made of Asbestos Cement.

CHAPTER 5

OPERATION AND MAINTENANCE PROGRAM

WATER SYSTEM MANAGEMENT AND PERSONNEL

The City of Algona is governed by a mayor and five-member City Council. Water system staff includes a Public Works Director, Public Works Director and two utility workers. The current Public Works Director position is vacant, with the Mayor acting as the Interim Public Works Director. The City should actively pursue filling this vacancy. The certification status of City water utility staff is shown below:

Vacant	Public Works Director Certification: N/A Operator Number: N/A
Matt Bailey	Water Operator Certification: WDM-2, CCS Operator Number: 014393

OPERATION CERTIFICATION

State law requires Group A public water systems to retain operators certified as competent to operate and manage the system. WAC 246-292 describes the requirements for cities and for operators. The City serves a population between 1,501 and 15,000 and is classified as a Group 2 water system per WAC 246-292-040. The City is required to employ at least one water district manager (WDM) with a certification level at or above the City's group classification. The City has one operator with suitable certification.

PROFESSIONAL GROWTH REQUIREMENTS

In order to promote and maintain expertise for the various grades of operator certification, Washington State requires that all certified operators complete no less than three Continuing Education Units (CEU) within each 3-year period. Programs sponsored by both Washington Environmental Training Resources Center (WETRC) and the American Water Works Association (AWWA) Pacific Northwest Subsection are the most popular sources of CEUs for certified operators in Washington State. The City's operators have been able to consistently meet their required number of CEUs.

Operator training is an important component in maintaining a safe and reliable water system. At a minimum, all personnel performing water system related duties should receive training in the following areas:

- Confined Space

- Trenching and Shoring
- Traffic Flagging
- Asbestos Cement Pipe Safety
- Cross-Connection Control

The City's water system operators typically complete more than the required CEUs within a given period. All utility workers are certified in asbestos cement pipe safety, CPR and first aid, and all are certified in traffic flagging. Other utility staff have expressed interest in and are encouraged to become certified as WDM-1 and CCCS. Each year, the City allocates funds for water system operator training.

SYSTEM OPERATION AND CONTROL

MAJOR SYSTEM COMPONENTS

Algona receives source water and storage capacity from the City of Auburn. Flow to Algona is recorded through a series of master meters at the four interties but is not otherwise controlled.

PREVENTIVE MAINTENANCE PROGRAM

The most cost-effective method for maintaining a water system is to provide a planned preventive maintenance (PM) program. A planned PM program can provide the optimum level of maintenance activities for the least total maintenance cost. The routine maintenance procedures for each system component are described in the following sections.

Distribution System Valve and Hydrant Maintenance

The City staff exercises hydrants in the system on an annual basis, at a minimum.

The City exercises and cleans out valve cans once a year. Valves that do not close tight should be removed, repaired or replaced. An important aspect of distribution system valve maintenance is to ensure distribution valves are completely open. A partially closed valve can significantly reduce peak day operation and fire flow supply. Sample maintenance reporting forms are included in Appendix G.

Dead-End Waterlines

Dead-end waterlines are susceptible to water quality problems. These lines should be flushed at least semiannually, or more frequently if water quality complaints should occur, in order to remove stagnant water and debris which may have been deposited. The City flushes dead end mains every 6 months, at a minimum.

Meters

Accurate water metering is essential to the financial and conservation components of the water system infrastructure. Substantial revenue may be lost through inaccurate metering of residential, commercial, and industrial accounts. Without accurate master or service meter readings, the City cannot properly determine distribution system leakage volumes and comply with the Water Use Efficiency Rule and the conservation requirements of the 2002 Agreement with Auburn and this updated WSP.

The maintenance and calibration of the Auburn Intertie master meters are the responsibility of the City of Auburn. Service meters, including all Algona residential and commercial customer meters, are calibrated and/or replaced according to the following schedule:

- 3/4-inch and 1-inch meters will be tested every 10 years and replaced, if necessary. Replacement is recommended if it is cheaper than to test, trouble shoot and repair meters.
- 2-inch through 4-inch meters will be tested and calibrated every 3 to 5 years.
- 4-inch and larger meters will be tested and calibrated every 1 to 3 years.

The City implemented a radio based automatic meter reading system throughout the distribution system, beginning in 2010. Meters are read using a mobile radio receiver which uses Sensus Flexnet Technology. This system replaced the touch read system the City had been using previously. As a part of this project, the City replaced approximately 600 older incompatible meters and installed new registers and meter transmitter units on all customer meters. Most commercial meters were replaced in 2018. These new meters are anticipated to have a 20-year lifespan, governed by the battery life of the transmitters. At present the service meters range in age from 5 to 11 years old.

Inventory of Materials

The City has established and maintains an inventory of parts and supplies on-hand including the appurtenances needed to make emergency repairs. The City keeps adequate inventory of the materials necessary to repair leaks for pipes sized 8-inch and smaller.

Recommended Preventative Maintenance Schedule

Table 5-1 summarizes the recommended schedule of normal maintenance and operations activities. The frequency listed is a minimum and the actual frequency will be adjusted as necessary to meet system requirements.

TABLE 5-1

Preventive Maintenance Schedule

Maintenance Activity	Frequency
Check distribution system and note any suspected leaks	Daily(1)
Check and record master meter readings	Twice per Week(2)
Collect routine coliform samples	Monthly
Read commercial meters	Monthly
Read residential meters	Monthly
Flush dead-end lines	Semi-Annually
Exercise hydrants	Annually
Exercise valves	Annually
Visit and inspect Out of Service City Reservoir	Annually

(1) City crews generally drive every City street at least once per week as part of routine utility maintenance.

(2) Daily readings are recommended in July and August to establish peak day use.

EMERGENCY RESPONSE PROGRAM

Water utilities have the responsibility to provide an adequate and reliable quantity and quality of water at all times. To meet this requirement, utilities must reduce or eliminate the effects of natural disasters, accidents, and intentional acts. Although it is not possible to anticipate all potential disasters affecting the City's system, formulating procedures to manage and remedy common emergencies is appropriate.

The Public Works Director or the designated assistant will be in charge. The telephone number for the Public Works Office is (253) 833-2741. After hours or weekend calls will be directed to the Algona Police Department. The Police Department will then contact the staff member on after-hours duty.

In the event of a major disaster which damages the water system and where telephone service is interrupted, all City staff need to report to the City Hall office as quickly as they can safely do so. City field personnel will conduct surveys to determine the extent of damage to City facilities. Given the size of the City's RSA and the small amount of staff members, it is expected that a major disaster may require outside help from other agencies.

Table 5-2 lists water system emergency contacts. For most emergencies, the City will coordinate response efforts with the City of Auburn.

TABLE 5-2

Emergency Phone List

Agency/Group	Contact	Phone Number
Fire/Police	--	911
City of Algona Public Works	Vacant	----
City of Auburn	Public Works – Water	1-253-931-3048
Chemical Supplies	Jones Chemical Inc.	1-253-572-9034
Chemical Supplies	Univar	1-713-644-3171
Pipe/Fitting Suppliers	Pacific Water Works Supply	1-253-761-0828
Pipe/Fitting Suppliers	H.D. Fowler	1-253-863-8300
Testing Lab	King County Health Dept.	1-206-339-5270
Testing Lab	Water Management Laboratory	1-253-531-3121
Washington State Dept. of Health	N.W. Regional Office, Richard Rodriguez	1-253-395-6771
City of Pacific	City Hall	1-253-833-8486
King County	Emergency Management	1-206-296-3830
King County	24 Hour Number	1-206-296-8100
Puget Sound Energy	Main Number	1-888-225-5773
Lumen	Main Number	1-800-573-1311
Comcast	Main Number	1-800-Comcast
State Wide One-Call	Utility Locates	1-800-424-5555
Gray & Osborne, Inc.	Consulting Engineer	1-206-284-0860

EMERGENCY PROCEDURES

Power Failure

Various types of weather can cause a loss of power, including wind, lightning, freezing rain, or freezing snowstorm. Additionally, power can be lost through traffic accidents. The City of Algona does not have any water system components that use electricity and, therefore, does not have an emergency procedure for power failure.

Severe Earthquake

A severe earthquake would result in water line breaks and damage to the City's distribution system. Table 5-3 provides procedures to follow in the event of a severe earthquake.

TABLE 5-3

Severe Earthquake Response

System Component	Proposed Actions
Distribution System	• Inspect system for leakage or breaks • Close valves to isolate breaks • Notify customers of emergency and request water conservation • Repair break • Disinfect isolated section • Take bacteriological samples • Return to service up return of satisfactory test

Severe Snowstorm

Heavy snowfall may bring motor vehicle traffic to a standstill. Employees may not be able to reach a problem area. In order to minimize the effect of a snowstorm on the water system, streets should be plowed to maintain access to all facilities. Snow gear and chains should be ready for maintenance equipment and vehicles. If extremely cold, customers should be reminded to leave faucets dripping to help keep pipes from freezing.

High Water and Flooding

Heavy snow melt and/or rains can cause the water level to rise and reach a flood level. A majority of the City's distribution system is above flood level, but the City should communicate with the City of Auburn regarding flooding elsewhere in Auburn's system. The City of Algona should also monitor chlorine residuals throughout the distribution system.

Contamination of Water Supply

Contamination of the water supply may occur due to main breaks, pollution from an isolated source, or from a deliberate act of vandalism or terrorism. The DOH and customers should be notified as required. Table 5-4 provides emergency response procedures to follow in the event of water supply contamination.

TABLE 5-4

Water Supply Contamination Response

System Component	Proposed Actions
Distribution System	• Notify customers of emergency and issue a water shut-off notice • Identify the source of contamination • Close valves to isolate the contamination • Remove contamination and flush previously contaminated section • Take samples and return to service when results are within compliance • Notify customers when service has been restored

The City also maintains a current coliform monitoring plan and sampling schedule, both of which can be found in Appendix E.

SAFETY PROCEDURES

The work place hazards for the Algona water system are limited due to the nature of the water system. The City does not have its own sources or storage and therefore does not have to deal with chemicals for treatment. Staff are trained in confined space entry, asbestos-cement pipe handling, and to follow the guidelines outlined in the City's Safety Manual.

CROSS-CONNECTION CONTROL PROGRAM

Per the requirements of WAC 246-290-100, the City of Algona is required to develop a Cross-Connection Control Program (CCCP) which protects the public water supply from contamination due to backflow of non-potable liquid, solid, or gas from connected customer systems. The City's CCCP is based upon the requirements of WAC 246-290-490 and available in Appendix H.

PROGRAM SCHEDULING AND PERSONNEL REQUIREMENTS

Section 13.02.160 of the Algona Municipal Code contains the City's cross connection control ordinance. This ordinance states that "any such cross-connection now existing or hereafter installed is hereby declared subject to immediate termination of water service and any such cross-connection shall be abated immediately." The code, included in Appendix H, states the conditions where cross-connection control devices are required.

The City is in the process of updating their list of cross-connection control devices. The City has one water operator certified as a cross-connection control specialist.

NEW AND EXISTING CROSS-CONNECTION DEVICES

New service applications are evaluated by the cross-connection control specialist to determine what type of backflow prevention device is needed, if any. Backflow prevention devices are required on all new cross connections. A condition for new services will be an evaluation by the cross-connection control certified City staff to determine what type of backflow device is needed.

It is the responsibility of the customer to ensure proper testing of the devices on an annual basis. The City must test its own cross-connection control devices annually as well.

CROSS-CONNECTION CONTROL PROGRAM RECORD KEEPING

A critical program element of a cross-connection control program is the maintenance of accurate records. The City has a file for each service with a cross-connection device. Information kept includes address of device, type, size, date of last test, and date of next test. Annual testing results for the devices care then recorded in each respective file. Annual summary reports are prepared and sent to DOH. The percent compliance for cross-connection device testing was 30 percent in 2020 and 45 percent in 2021.

The City will commit to making a concerted and renewed effort to issue notifications of for test reminders and non-compliance.

CHAPTER 6

CAPITAL IMPROVEMENT PROGRAM

INTRODUCTION

Chapter 6 presents the Capital Improvement Plan (CIP) for the 10- and 20-year planning periods. Preliminary project cost estimates for the projects described in this chapter are provided in Appendix J. Figure 6-1 shows the locations of proposed distribution, storage and source improvements.

This chapter also presents the proposed schedule for the City's 10-year water system capital improvements are scheduled and prioritized on the basis of water quality concerns, growth, regulatory requirements, component reliability, system benefit, and financial priority. When the Water System Plan is updated after 10 years, the projects presented for the 20-year planning period should be reevaluated and scheduled for the subsequent 10-year planning period, as necessary

In the future, other projects may arise that are not identified as part of the City'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 within the City's water system. Due to budgetary constraints, the completion of these projects may require that the proposed completion date for projects in the CIP be rescheduled. The City retains the authority to reschedule proposed projects and to expand or reduce the scope of proposed projects, as best determined by the City Council. As the proposed completion date for the project approaches, each capital improvement project should be re-evaluated to consider the most recent planning efforts.

CAPITAL IMPROVEMENT PROGRAM

Table 6-1 summarizes the proposed capital improvement projects for the 10-year and 20-year planning periods. Project locations can be seen in Figure 6-1. All costs discussed in this Chapter are in November 2021 dollars, which corresponds to an Engineering News Record (ENR) Construction Cost Index (CCI) of 13,596 for the Seattle metropolitan area. Detailed cost estimates for the capital improvement projects are included in Appendix J. All distribution system project costs contain a 20 percent contingency and a 30 percent engineering and administration cost.

The CIP projects are categorized as follows:

- Storage Projects (ST);
- Distribution System Projects (D); and
- General Projects (G).

PROJECT ST-1: PURCHASE ADDITIONAL STORAGE FROM AUBURN

The storage capacity analysis in Chapter 3 identified an existing storage deficit of approximately 170,000 gallons that will remain constant throughout the 20-year planning period if not addressed. The simplest solution would be to increase the storage the City of Algona purchases from the City of Auburn from 280,000 gallons to 450,000 gallons. However, as of early 2022 Auburn is in the middle of updating its own Water System Plan and can only guarantee 20,000 additional gallons. Algona has shared its capacity analysis with Auburn in hopes that these numbers can be incorporated with Auburn's updated Plan. For the purposes of this CIP, it is assumed that Algona will be able to purchase the full 170,000 additional gallons from Auburn by 2023 at the same price per gallon ($2.56/gallon) as the previously agreed to but not executed 20,000-gallon increase. After applying a 10 percent sales tax, this would result in an estimated total cost of $480,000.

Total Project Cost: $480,000

PROJECT ST-2: DEMOLITION OF ABANDONED RESERVOIR

The City should demolish its abandoned 100,000-gallon reservoir prior to it becoming a safety hazard. The City may be able to have the reservoir removed for little cost if the Contractor can salvage the metal and sell it for scrap. With a 40 percent contingency and 10 percent sales tax applied, the project is estimated to cost $46,000.

Total Project Cost: $46,000

PROJECT D-1: WATER MAIN ALONG SEATTLE BOULEVARD SOUTH, 3RD AVENUE SOUTH TO 5TH AVENUE NW

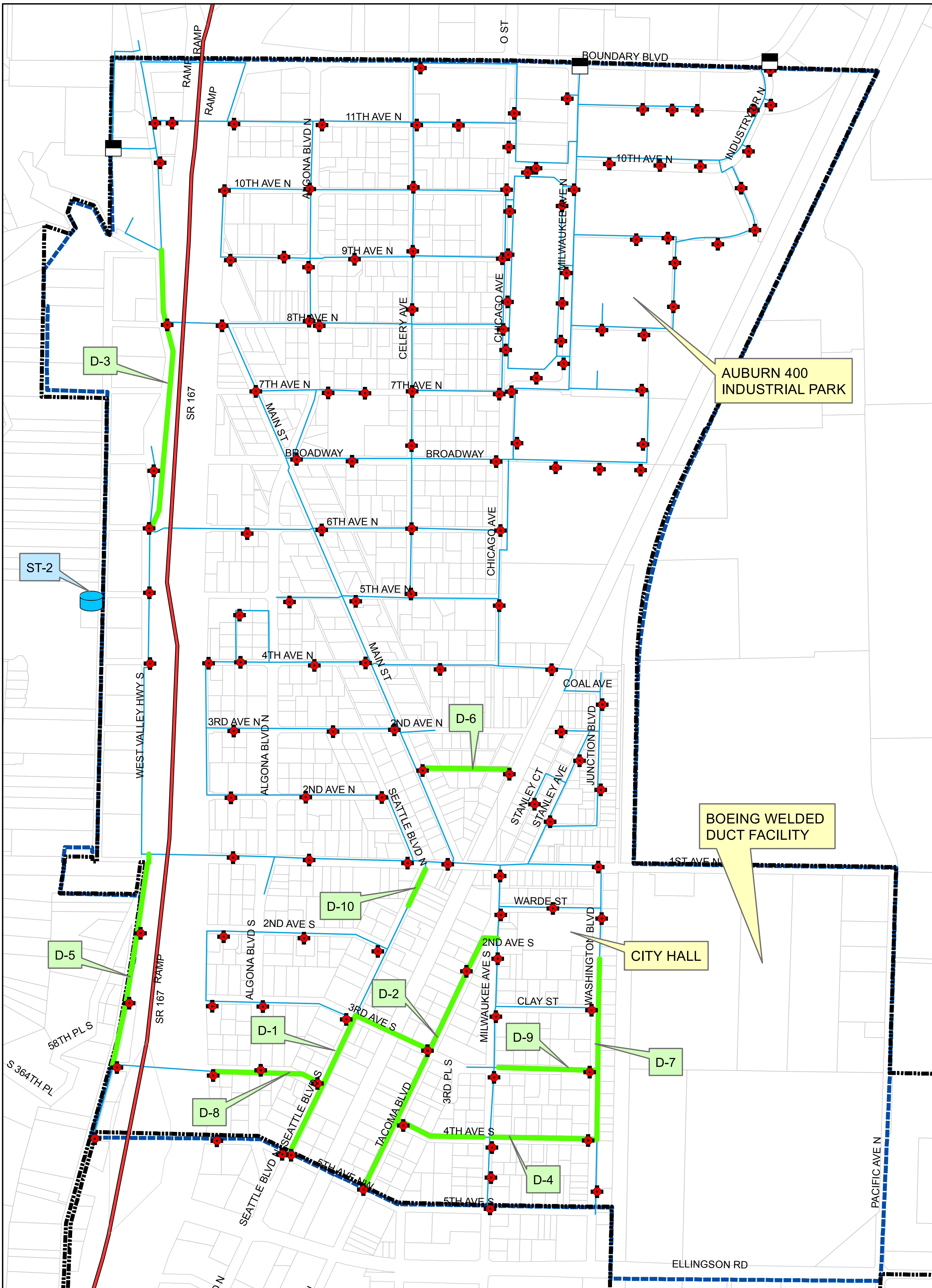
Construction of approximately 1,025 LF of 8-inch and 12-inch water main along Seattle Boulevard South from 3rd Avenue South to 5th Avenue NW. This project replaces undersized 4-inch and 6-inch AC water mains and improves available fire flow. Existing infrastructure at this location does not meet fire flow requirements of the current zoning.

Total Project Cost: $564,000

PROJECT D-2: WATER MAIN ALONG TACOMA BOULEVARD AND 3RD AVENUE SOUTH

Construction of approximately 2,500 LF of 8-inch and 12-inch water main along Tacoma Boulevard from 2nd Avenue South to 5th Avenue NW as well as 3rd Avenue South between Seattle Boulevard South and Tacoma Boulevard. This project provides improved capacity and replaces undersized 4-inch and 6-inch AC pipe.

Total Project Cost: $1,446,000



LEGEND:

- Proposed Dist. System CIP Project
- Intertie
- Fire Hydrant
- City Limits
- Retail Service Area
- Parcels

N

0 250 500 1,000 Feet

CITY OF ALGONA

WATER SYSTEM PLAN
FIGURE 6-1
PROPOSED CAPITAL IMPROVEMENT PROJECTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 6-1 PROPOSED CIP.mxd

PROJECT D-3: WATER MAIN ALONG WEST VALLEY HIGHWAY, 9TH AVENUE NORTH TO BROADWAY STREET

Construction of approximately 2,000 LF of 12-inch water main along West Valley Highway, between 9th Avenue North and Broadway Street. This project improves fire flows along West Valley Highway, provides looping, and increases redundancy for the City's crossings of SR 167. Existing infrastructure at this location does not meet fire flow requirements of the current zoning.

Total Project Cost: $1,137,000

PROJECT D-4: WATER MAIN ALONG 4TH AVENUE SOUTH, TACOMA BOULEVARD TO WASHINGTON BOULEVARD

Construction of approximately 1,300 LF of 8-inch water main along 4th Avenue South, between Tacoma Boulevard and Washington Boulevard. This project replaces undersized 4-inch and 6-inch AC water main and improves available fire flow. Existing infrastructure at this location does not meet fire flow requirements of the current zoning.

Total Project Cost: $637,000

PROJECT D-5: WATER MAIN ALONG WEST VALLEY HIGHWAY, 1ST AVENUE NORTH TO 4TH AVENUE SOUTH

Construction of approximately 1,410 LF of 12-inch water main along West Valley Highway, between 1st Avenue and 4th Avenue South. This project replaces an undersized 6-inch and 8-inch AC water main and improves available fire flow along West Valley Highway. Existing infrastructure at this location does not meet fire flow requirements of the current zoning.

Total Project Cost: $876,000

PROJECT D-6: WATER MAIN ALONG 2ND AVENUE NORTH, EAST OF MAIN STREET

Construction of approximately 575 LF of 8-inch water main along 2nd Avenue North, east of Main Street. This project replaces an undersized 4-inch AC water main and improves available fire flow at a location with a fire flow deficiency.

Total Project Cost: $299,000

PROJECT D-7: WATER MAIN ALONG WASHINGTON BOULEVARD, CITY HALL TO 4TH AVENUE SOUTH

Construction of approximately 2,000 LF of 8-inch water main along Washington Boulevard, between City Hall and 4th Avenue South. This project replaces an undersized 6-inch AC water main and improves available fire flow at a location with a fire flow deficiency.

Total Project Cost: $899,000

PROJECT D-8: WATER MAIN ALONG 4TH AVENUE SOUTH, STATE ROUTE 167 TO SEATTLE BOULEVARD SOUTH

Construction of approximately 740 LF of 8-inch water main along 4th Avenue South, between State Route 167 and Seattle Boulevard South. This project replaces an undersized 6-inch AC water main and improves available fire flow at a location with a fire flow deficiency.

Total Project Cost: $392,000

PROJECT D-9: WATER MAIN ALONG 3RD AVENUE SOUTH, MILWAUKEE BOULEVARD SOUTH TO WASHINGTON BOULEVARD

Construction of approximately 650 LF of 8-inch water main along 3rd Avenue South, between Milwaukee Boulevard South and Washington Boulevard. This project replaces an undersized 4-inch AC water main and improves available fire flow at a location with a fire flow deficiency.

Total Project Cost: $307,000

PROJECT D-10: WATER MAIN ALONG SEATTLE BOULEVARD SOUTH, 1ST AVENUE NORTH TO 2ND AVENUE SOUTH

Construction of approximately 265 LF of 12-inch water main along Seattle Boulevard South, between 1st Avenue North and 2nd Avenue South from approximately address number 116 to 130. This project replaces an undersized 6-inch AC water main and improves available fire flow at a location with a fire flow deficiency.

Total Project Cost: $174,000

PROJECT D-11: REPLACEMENT OF AC WATER MAINS

The City will continue to replace existing AC water mains throughout the distribution system. These water mains were installed in the 1960s and are reaching the end of their service life. Whenever possible, replacement projects will occur concurrently with road improvement and developer projects to reduce costs of road restoration. Priority will be placed on replacing 4-inch AC lines, which will be upsized to at least 8-inch. The City currently has approximately 32,000 LF of 4-inch and 6-inch AC pipe that is not scheduled for replacement by an individual CIP project. Replacement of the City's entire stock of AC pipe within the 20-year planning period would require the replacement of approximately 1,600 LF of AC pipe per year. As a goal the City will replace one city block or approximately 700 LF of AC water main per year on a biennial basis.

Annual Project Cost: $337,000

PROJECT G-1: SERVICE METER REPLACEMENT PROGRAM

The City's residential service meters will near the end of their useful life as they approach 20 years of use. The City will begin replacing 200 meters a year in 2029. This replacement schedule will last through 2035.

Annual Project Cost: $66,000

CIP PRIORITIZATION AND SCHEDULE

The City intends to prioritize scheduling capital improvement projects based on the following criteria:

1. Improve present and future level of service, maintain overall system capacity to adequately support projected growth, and address fire flow deficiencies identified in Chapters 3;

2. Replace or refurbish aging pipe that is at or near the end of its useful life in an effort to reduce distribution system leakage; and

3. Coordinate with other City capital projects for sewer, overlay, and roadway improvements to incorporate water system improvements and take advantage of opportunities for potential cost savings/sharing.

Table 6-1 provides a summary of the capital improvements and a timetable for their completion. All construction costs are presented in November 2021 dollars.

TABLE 6-1

Capital Improvement Projects

Project	Project Name	Estimated Project Cost 2021 Dollars(1)	Projected Date
ST-1	Purchase Additional Storage	$480,000	2023
ST-2	Demolish Abandoned Reservoir	$46,000	2030
D-1	Water Main Along Seattle Boulevard South (Southern Portion)	$564,000	2031
D-2	Water Main Along Tacoma Boulevard and 3rd Avenue South	$1,446,000	After 2032
D-3	Water Main Along West Valley Highway, 9th Avenue North to Broadway Street	$1,137,000	2025
D-4	Water Main Along 4th Avenue South, Tacoma to Washington Boulevard	$637,000	After 2032
D-5	Water Main Along West Valley Highway, 1st Avenue North to 4th Avenue South	$876,000	2027
D-6	Water Main Along 2nd Avenue North, East of Main Street	$299,000	After 2032
D-7	Water Main Along Washington Boulevard, City Hall to 4th Avenue South	$899,000	After 2032
D-8	Water Main Along 4th Avenue South, State Route 167 to Seattle Boulevard South	$392,000	2029
D-9	Water Main Along 3rd Avenue South, Milwaukee Boulevard South to Washington Boulevard	$307,000	After 2032
D-10	Water Main Along Seattle Boulevard South, 1st Avenue North To 2nd Avenue South	$174,000	2028
D-11	Replace AC Water Mains	$337,000 per year	Every 2 Years, Starting in 2024
G-1	Service Meter Replacement Program	$66,000 per year	2029-2035

(1) Capital project cost estimates are tied to the November 2021 Seattle Engineering News Record (ENR) Construction Cost Index (CCI) of 13,596.

CHAPTER 7

FINANCIAL ANALYSIS

INTRODUCTION

This chapter outlines the City’s financial plan for implementing the recommended Capital Improvement Plan, paying operation and maintenance (O&M) expenses, and meeting debt service. This chapter also reviews the City’s past and present financial status, available revenue sources, allocation of revenue sources, as well as the fiscal impact of the recommended capital improvements and rates.

FINANCIAL STATUS OF EXISTING WATER UTILITY

CURRENT WATER RATES

Water rates and charges for the City of Algona were last updated by Ordinance 1197 Section 21 in December 2021. The City charges for water service on a monthly basis. Water service rates consist of a monthly base charge that is dependent on the meter size. The base charge also includes a base quantity of water use permitted per month. Customers consuming more than the amount of water included in the base fee are charged for water consumption per 100 cubic feet (CCF). These charges are based on meter readings every 2 months. Table 7-1 lists the City’s past and current schedule of rates and charges.

TABLE 7-1

2022 Water Rate Schedule

<table>
<tr><th>Size of Service</th><th>Quantity Allowed Per Month</th><th>Monthly Service Charge</th><th colspan="3">Excess Use Rates (per CCF)</th></tr>
<tr><td>3/4-inch Single-Family Residential</td><td>4 CCF</td><td>$34.79</td><td rowspan="3">4.01-10 CCF:
$3.32</td><td rowspan="3">10.01-15 CCF:
$3.6776</td><td rowspan="3">15.01^{+} CCF:
$4.20</td></tr>
<tr><td>Multiple -Family Residential</td><td>4 CCF</td><td>$34.79 per unit</td></tr>
<tr><td>Disconnected Residential Units (Section 13.02.200 of Algona Municipal Code)</td><td>0 CCF</td><td>$20.56</td></tr>
<tr><td>Metered Bulk Rate</td><td>—</td><td>$63.24</td><td colspan="3">$3.32</td></tr>
<tr><td>Commercial/Industrial < 1-inch meter</td><td>4 CCF</td><td>$36.10</td><td colspan="3" rowspan="5">$4.10</td></tr>
<tr><td>Commercial/Industrial 1-inch meter</td><td>4 CCF</td><td>$40.57</td></tr>
<tr><td>Commercial/Industrial 2-inch meter</td><td>4 CCF</td><td>$45.31</td></tr>
<tr><td>Commercial/Industrial 3-inch meter</td><td>4 CCF</td><td>$49.34</td></tr>
<tr><td>Commercial/Industrial 4-inch meter</td><td>4 CCF</td><td>$52.77</td></tr>
</table>

CURRENT SYSTEM DEVELOPMENT FEES

The City's system development fees (also known as connection charges or GFCs) are specified in Ordinance No. 1141 Section 17. These charges are applicable only to new customers connecting to the system and are intended to repay existing customers for facilities already installed as well as provide funds for constructing new facilities. In addition to the system development fee, a new customer is charged an installation fee to cover the cost of installing the service connection and meter. Table 7-2 lists system development fees and Table 7-3 lists the installation fees.

TABLE 7-2

Water System Development Fees(1)

Customer Type	System Development Fees
Single Family Residential and Mobile Homes	$3,000
Multiple Dwelling Units	$545 per living unit
All other properties except City properties; the rate shall be based upon the total daily use divided by 800 gallons per ERU	$940 per ERU

(1) City of Algona Ordinance No. 1141 Section 17.

TABLE 7-3

Water System Installation Fees

Meter Size	Installation Fees
3/4-inch meter	$1,000
1-inch and over meter	Actual cost plus 15%, not less than $1,000
3/4-inch meter installation only, with water service installed by the developer, as approved by the City Engineer	$200
1-inch and over meter installation only, with water service installed by the developer, as approved by the City Engineer	Actual cost plus 15%, in no case less than $200

HISTORICAL REVENUE AND EXPENSES

The City operates two separate funds, No. 402 and 404, for water utility operations, maintenance, and capital improvements.

Fund No. 402 is the Water Operations Fund. It draws revenue from water bills and pays the water utility's operations and maintenance expenses. Historically, the 402 Fund has also contributed to capital projects. Table 7-4 provides the historical operating revenue and expenses for the years 2016 through 2021 for Fund 402.

The Water Capital Improvement Fund (No. 404) generates the majority of its revenue from the system development charges and is used to itemize capital expenses of the water utility. Table 7-5 lists the historical water capital improvement fund revenue and expenses for the years 2016 through 2021.

TABLE 7-4

Historical Water Operating Revenue and Expenses (Fund No. 402)

	2016	2017	2018	2019	2020	2021
Operating Revenue (Fund No. 402)						
Water Services	$678,714	$689,459	$767,839	$764,848	$779,536	$812,351
Interest and Miscellaneous	$373,397	$143,894	$153,147	$183,506	$172,334	$138,545
O&M Revenue	**$1,052,111**	**$833,353**	**$920,985**	**$948,354**	**$951,870**	**$950,896**
Operating Expenses (Fund No. 402)						
Salaries and Benefits	$142,716	$159,311	$159,588	$172,538	$173,270	$158,769
Utilities	$4,085	$5,993	$4,309	$3,067	$2,838	$3,104
Repair and Maintenance	$1,724	$280	$20,716	$25,321	$16,777	$2,670
Supplies	$33,335	$32,174	$10,140	$9,313	$5,585	$12,524
Rentals	$3,343	$3,368	$3,756	$3,708	$2,603	$330
Insurance	$6,713	$6,966	$6,908	$7,448	$8,426	$8,785
Taxes	$31,881	$35,135	$35,238	$37,247	$33,912	$47,716
Professional Services	$15,719	$7,169	$8,873	$9,970	$9,432	$54,655
Wholesale Water Purchase	$404,615	$412,531	$420,399	$383,229	$392,017	$389,764
Inter-Fund Transfer						
Miscellaneous	$11,218	$11,337	$11,208	$10,755	$11,168	$11,756
Total O&M Expenses	**$655,349**	**$674,266**	**$681,135**	**$662,597**	**$656,028**	**$690,073**
Starting/Year End Balance (Fund No. 402)						
Starting Balance	**$680,212**	**$1,076,975**	**$1,236,062**	**$1,475,912**	**$1,761,670**	**$2,057,512**
Year End Balance	**$1,076,975**	**$1,236,062**	**$1,475,912**	**$1,761,670**	**$2,057,512**	**$2,318,335**

TABLE 7-5

Historical Water Capital Revenue and Expenses (Fund No. 404)

	2016	2017	2018	2019	2020	2021
Operating Revenue (Fund No. 404)						
Water System Development	$60,383	$69,760	$71,347	$85,441	$83,110	$68,262
Investment Interest	$308	$1,179	$4,217	$5,303	$2,047	-
Inter-fund Transfer	$250,000[(1)]	-	-	-	-	-
Total Capital Revenue	**$310,690**	**$70,939**	**$75,564**	**$90,744**	**$85,157**	**$68,262**
Operating Expenses (Fund No. 404)						
Capital Improvement Projects	$256,228	$0	$0	$0	$0	$0
Starting/Year End Balance (Fund No. 404)						
Starting Balance	$67,477	$121,939	$192,878	$268,442	$359,186	$444,343
End Balance	$121,939	$192,878	$268,442	$359,186	$444,343	$512,605

(1) Fund transfer occurred to help finance the purchase of extra storage from the City of Auburn.

FORECASTED FINANCIAL ANALYSIS

FORECAST FACTORS

Various projection factors are used to estimate future expenses and revenues as shown in Table 7-6. Wholesale water purchased from Auburn for resale by Algona is based upon Auburn's adopted fee schedule in the Auburn Municipal Code 13.06.360 which gives rates from 2019 through 2022. Each year wholesale water costs increased 2.8 and 3.2 percent. A conservative 3.5 percent is given in Table 7-6.

TABLE 7-6

Summary of Projection Development Factors

Factors	Annual Percentage Increase
Salary and Benefits	4.00%
Inflation	4.00%
State Water Excise Tax	5.03%
City Growth Rate	0.84%
General Rate Increase	4.25%
Wholesale Water Cost	3.50%

PROJECTED REVENUES AND EXPENDITURES

Revenue

Future revenues have been projected based on a review of the historical financial data provided by the City, in conjunction with the forecast factors summarized in Table 7-6.

Water sales, the largest revenue stream for the 402 Operations Fund, are expected to increase by 0.84 percent annually as a result of the ERU growth rate. Water sales will also be influenced by the rate increases outlined in Table 7-6. The general rate increase will occur at 4.25 percent to assure adequate funding for the Capital Improvement Plan and maintain a positive year-end balance. Projected revenue for the 402 Fund is summarized, along with expenditures and year end balances in Table 7-8.

Water development charges and inter-fund transfers form the bulk of the revenue sources for the 404 Fund. System development charges are anticipated to increase at the same rate as the City's general rate increase (4.25 percent) to provide sufficient funding for capital improvement projects. In addition, a $600,000 inter-fund transfer from the Water Operations Fund (402) to the Water Capital Improvement Fund (404) will occur each year to fund the Capital Improvement Program (CIP). Projected revenue for the 404 Fund is summarized, along with expenditures and year end balances in Table 7-9.

Expenditures

Future expenses have been projected based on a review of the historical financial data provided by the City, in conjunction with the forecast factors given in Table 7-6.

When forecasting the 402 Fund expenditures, salaries and benefits, utility expenses, repair and maintenance, supplies, rentals, insurance, and professional services are all projected to increase by 4.0 percent to match inflation. The state excise tax is forecasted to remain at a 5.03 percent increase per year. Projected expenditures for the 402 Fund are summarized in Table 7-8.

Expenditures for the 404 Fund are summarized in Table 7-7 below and reflect the CIP project schedule detailed in Chapter 6. Estimated project costs are adjusted by applying a 4.0 percent per year inflation factor. Projected expenditures for the 404 Fund are summarized in Table 7-9.

TABLE 7-7

Capital Improvement Fund 404 Schedule of Expenses(1)(2)

Projects	Project Description	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
D-1	Seattle Boulevard South (Southern Portion)									$802,700	
D-3	West Valley Highway, 9th Avenue North to Broadway Street			$1,279,000							
D-5	West Valley Highway, 1st Avenue North to 4th Avenue South					$1,065,800					
D-8	4th Avenue South, State Route 167 to Seattle Boulevard South							$515,800			
D-10	Seattle Boulevard South (Northern Portion)						$220,200				
D-11	Replace AC Water Mains		$364,500		$394,200		$426,400		$461,200		$498,800
G-1	Water Meter Replacement Program							$86,900	$90,300	$93,900	$97,700
ST-1	Purchase Additional Storage	$499,200						$60,500			
ST-2	Demolish Abandoned Reservoir								$63,000		
Total		**$499,200**	**$364,500**	**$1,279,000**	**$394,200**	**$1,065,800**	**$646,600**	**$663,200**	**$614,500**	**$896,600**	**$596,500**

(1) Reflect project schedule established in Table 6-1.

(2) 4.0 percent annual inflation applied to costs summarized in Table 6-1.

TABLE 7-8

Forecasted Water Operations Fund (No. 402) Revenue and Expenses

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Operating Revenue (Fund No. 402)											
Water Services(1)	$854,000	$897,800	$943,800	$992,200	$1,043,100	$1,096,600	$1,152,800	$1,211,900	$1,274,000	$1,339,300	$1,407,900
Interest and Miscellaneous(2)	$158,300	$164,600	$171,200	$178,000	$185,100	$192,500	$200,200	$208,200	$216,500	$225,200	$234,200
O&M Revenue	**$1,012,300**	**$1,062,400**	**$1,115,000**	**$1,170,200**	**$1,228,200**	**$1,289,100**	**$1,353,000**	**$1,420,100**	**$1,490,500**	**$1,564,500**	**$1,642,100**
Operating Expenses (Fund No. 402)											
Salaries and Benefits(3)	$164,700	$171,300	$178,200	$185,300	$192,700	$200,400	$208,400	$216,700	$225,400	$234,400	$243,800
Utilities(2)	$3,900	$4,100	$4,300	$4,500	$4,700	$4,900	$5,100	$5,300	$5,500	$5,700	$5,900
Repair and Maintenance(2)	$13,200	$13,700	$14,200	$14,800	$15,400	$16,000	$16,600	$17,300	$18,000	$18,700	$19,400
Supplies(2)	$13,900	$14,500	$15,100	$15,700	$16,300	$17,000	$17,700	$18,400	$19,100	$19,900	$20,700
Rentals(2)	$2,800	$2,900	$3,000	$3,100	$3,200	$3,300	$3,400	$3,500	$3,600	$3,700	$3,800
Insurance(2)	$8,785	$9,100	$9,500	$9,900	$10,300	$10,700	$11,100	$11,500	$12,000	$12,500	$13,000
Taxes(4)	$37,850	$39,800	$41,800	$43,900	$46,100	$48,400	$50,800	$53,400	$56,100	$58,900	$61,900
Professional Services(4)	$18,020	$18,700	$19,400	$20,200	$21,000	$21,800	$22,700	$23,600	$24,500	$25,500	$26,500
Wholesale Water Purchase(5)	$399,600	$417,100	$435,300	$454,300	$474,200	$494,900	$516,500	$539,100	$562,700	$587,300	$613,000
WLCAP(6)	$30,000	$31,200	$32,400	$33,700	$35,000	$36,400	$37,900	$39,400	$41,000	$42,600	$44,300
Inter-Fund Transfer	0	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Miscellaneous(4)	$11,245	$11,700	$12,200	$12,700	$13,200	$13,700	$14,200	$14,800	$15,400	$16,000	$16,600
Total O&M Expenses	**$703,999**	**$1,334,100**	**$1,365,400**	**$1,398,100**	**$1,432,100**	**$1,467,500**	**$1,504,400**	**$1,543,000**	**$1,583,300**	**$1,625,200**	**$1,668,900**
Starting/Year End Balance (Fund No. 402)											
Starting Balance	**$2,318,335**	**$2,626,635**	**$2,354,935**	**$2,104,535**	**$1,876,635**	**$1,672,735**	**$1,494,335**	**$1,342,935**	**$1,220,035**	**$1,127,235**	**$1,066,535**
Year End Balance	**$2,626,635**	**$2,354,935**	**$2,104,535**	**$1,876,635**	**$1,672,735**	**$1,494,335**	**$1,342,935**	**$1,220,035**	**$1,127,235**	**$1,066,535**	**$1,039,735**

(1) Increases by a 0.84 percent population growth rate and a 4.25 percent per year rate increase estimated in Table 7-6.
(2) Increases at the 4 percent general inflation rate per estimated in Table 7-6.
(3) Increases at the 4 percent estimated COLA per estimated in Table 7-6.
(4) Increases at the 5.03 percent state water excise tax increase per Table 7-6.
(5) Increases at the 3.5 percent wholesale water rate increase estimated in Table 7-6.
(6) Water Loss Control Action Plan: Increases at the 5.03 percent state water excise tax increase per Table 7-6.

TABLE 7-9

Forecasted Capital Improvement Fund (No 404) Revenue and Expenses

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Operating Revenue (Fund No. 404)											
Water System Development	$73,100	$76,200	$79,400	$82,800	$86,300	$90,000	$93,800	$97,800	$102,000	$106,300	$110,800
Investment Interest	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200
Inter-Fund Transfer	-	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Total Capital Revenue	**$75,300**	**$678,400**	**$681,600**	**$685,000**	**$688,500**	**$692,200**	**$696,000**	**$700,000**	**$704,200**	**$708,500**	**$713,000**
Operating Expenses (Fund No. 404)											
Capital Improvement Projects	$0	$499,200	$364,500	$1,279,000	$394,200	$1,065,800	$646,600	$663,200	$614,500	$896,600	$596,500
Starting/Year End Balance (Fund No. 404)											
Starting Balance	**$512,605**	**$587,905**	**$767,105**	**$1,084,205**	**$490,205**	**$784,505**	**$410,905**	**$460,305**	**$497,105**	**$586,805**	**$398,705**
End Balance	**$587,905**	**$767,105**	**$1,084,205**	**$490,205**	**$784,505**	**$410,905**	**$460,305**	**$497,105**	**$586,805**	**$398,705**	**$515,205**

Both the Water Operations Fund (402 Fund) and the Water Capital Improvement Fund (404 Fund) are forecasted to end every year in the 10-year planning period with positive balances. The 402 Fund's projected end year balances range between $1,039,735 and $2,626,635, finishing with $1,039,735 in 2032. Meanwhile, the 404 Fund's projected end year balances range between $398,705 and $1,084,205, finishing with $515,205 in 2032.

RECOMMENDATIONS

It is recommended that the City continue separating the Water and Sewer Utility Funds and monitor the reserve balances in the Water Capital Improvement Fund (Fund No. 404). As a result of the projected 4.25 percent per year increase for the general rate and system development charges, the City should be capable of maintaining sufficient fund balances and completing the modest capital improvement program outlined in Chapter 6. The City should consider applying for public grants and loans as a means to finance larger capital projects. Coordinating water system improvements with other utility capital projects may prove beneficial to the City through potential cost savings or cost burden sharing. Additionally, projects may be funded by developers if water system extensions to properties within new plats are required. A further discussion of available funding sources is provided in Appendix K.

APPENDIX A

WASHINGTON STATE DOH PROJECT APPROVAL APPLICATION AND SUBMITTAL FORMS

Drinking Water

Project Approval Application (PAA) Form

331-149 F • Revised 1/10/2022

Please complete all appropriate sections of this application form and include it with your project.

WATER SYSTEM Information

Water System Name: City of Algona
PWS ID #: 01450V
Submittal Description: Water System Plan
County: King
Classification: A-Community
# of Service Connections: 1,000 - 9,000

OWNER Information

Name: Matt Bailey
Owner ID #: Enter text
E-mail address: bmathewb@algonawa.gov
Phone: 253-833-2897
Mailing address: 200 Washington Blvd S
City: Algona
State: Wa
Zip: 98001

PROJECT CONTACT Information

Name/Position: Stacey Clear / Consulting Engineer
E-mail address: edelfel@g-o.com
Phone: 206-284-0860
Mailing address: 3710 168th Street, Bldg "B", Suite 210
City: Arlington
State: WA
Zip: 98223

CONSULTING/DESIGN ENGINEER Information

Name/Firm: Stacey Clear/ Consulting Engineer
Enter text
E-mail address: edelfel@g-o.com
Phone: 206-284-0860
Mailing address: 3710 168th Street, Bldg "B", Suite 210
City: Arlington
State: Wa
Zip: 98223

SMA Information

Name/SMA: Enter text
SMA #: Enter text
E-mail address: Enter text
Phone: Enter text
Mailing address: Enter text
City: Enter text
State:
Zip:

BILLING Information*

Name: Matt Bailey
E-mail address: bmathewb@algonawa.gov
Phone: 253-833-2897
Mailing address: 200 Washington Blvd S
City: Algona
State: WA
Zip: 98011

GENERAL Submittal Information

☐ Check here if you need a Box.com folder set up for transferring your project to us electronically. (You will receive an invite by email after we have received the PAA form.)

Do you have projects currently under review by us? ☒ Yes ☐ No

☐ This is a new water system (if so, include a completed Water Facilities Inventory Report Form with your project).

☐ DWSRF Loan
Application # ____
Loan # ____

☐ Enforcement
Docket # ____
Type ____

☒ Water System Plan (complete Planning Information)

☐ Small Water System Management Program (complete Planning Information)

☐ Engineering (complete Engineering Information)

☐ Group B (complete Engineering Information)

☐ Satellite Management Agency Plan (complete SMA Information)

ENGINEERING Information

Project Report Type: ____
Special Report or Plans: ____
Predesign Study: ____
Existing System Approval: ____
Construction Documents: ____
Waiver: ____
Other: ____

PLANNING Information

How many connections does system currently have?	1,152
If system is private-for-profit, is it regulated by UTC?	☐ Yes ☒ No
Is system expanding?	☐ Yes ☒ No
Expanding service area?	☐ Yes ☒ No
Increasing number of approved connections?	☐ Yes ☒ No
If the number of connections is expected to increase, how many *new* connections are proposed in the next ten (10) years?	115
Is your system pursuing additional water rights from Department of Ecology in the next 20 Years?	☐ Yes ☒ No
Is a new intertie proposed?	☐ Yes ☒ No
Is the system located in a Critical Water Supply Service Area (is there a Coordinated Water System Plan)?	☒ Yes ☐ No
If yes, have you sent a copy of the plan to the county or responsible agency for the CWSP?	☐ Yes ☒ No
Are you requesting distribution main project report and construction document submittal exception?	☒ Yes ☐ No
If so, does the WSP contain standard construction specifications for distribution mains?	☒ Yes ☐ No
The water system/purveyor is responsible for sending a copy of the plan to:	☒ Yes ☐ No
• Adjacent utilities for review or a letter notifying them that a copy is available for their review and where it is located	☒ Yes ☐ No
• All local governments within the service area	☒ Yes ☐ No
• County and city planning departments, one or both if applicable, adjacent water systems, etc..	
List who have you sent the WSP to for review other than ODW?	Auburn, Lakehaven W&SD, Pacific
Are you proposing a change in the place of use of your water right?	☐ Yes ☒ No
If "yes," the purveyor must send a copy of the WSP or SWSMP to all local governments within the service area (county and city planning departments) for a local consistency determination. Has this been completed?	☐ Yes ☐ No
What are the years of the requested plan approval period (for example 2022 to 2032)?	2023-2032
Does your plan follow your preplan checklist?	☒ Yes ☐ No

SMA Information

☐ Ownership only ☐ Management and Operations only ☐ Ownership, Management & Operations

Where can we find the [SMA Notice of Intent 331-590](), in your plan: ______

Please submit all documents electronically. We request one paper copy of planning documents be submitted to the address for your regional office below.

☐ **Eastern Regional Office**	☒ **Northwest Regional Office**	☐ **Southwest Regional Office**
Department of Health	Department of Health	Department of Health
16201 E Indiana Ave, Suite 1500	20425 72nd Ave S, Suite 310	PO Box 47823
Spokane Valley, WA 99216	Kent, WA 98032-2388	Olympia, WA 98504-7823
eroadmin@doh.wa.gov	dw.nwro.wsprojects@doh.wa.gov	swro.admin@doh.wa.gov
Phone: 509-329-2100	Phone: 253-395-6750	Phone: 360-236-3030
Fax: 509-329-2104	Fax: 253-395-6760	Fax: 360-664-8058

Washington State Department of Health

To request this document in another format, call 1-800-525-0127. Deaf or hard of hearing customers, please call 711 (Washington Relay) or email civil.rights@doh.wa.gov.

APPENDIX B

WATER FACILITIES INVENTORY (WFI) FORM

WATER FACILITIES INVENTORY (WFI) FORM

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

ONE FORM PER SYSTEM

Quarter: 1
Updated: 11/05/2020

Printed: 6/21/2022
WFI Printed For: On-Demand
Submission Reason: Pop/Connect Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822 or email wfi@doh.wa.gov

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
01450 V	ALGONA WATER DEPT	KING	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

Mathew Bailey
200 WA BLVD
ALGONA, WA 98001

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS

ALGONA, CITY OF MAYOR
DAVID HILL
200 WA BLVD
ALGONA, WA 98001

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION

Primary Contact Daytime Phone:	(253) 833-2741
Primary Contact Mobile/Cell Phone:	(2530 261-5471
Primary Contact Evening Phone:	(253) 833-2741
Fax: (253) 939-3366	E-mail: mathewb@algonawa.gov

10. OWNER CONTACT INFORMATION

Owner Daytime Phone:	(253) 833-2897
Owner Mobile/Cell Phone:	(253) 261-1372
Owner Evening Phone:	(253) 261-1580
Fax: (253) 939-3366	E-mail: mayor@cityofalgona.com

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

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: ____________ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [x] Agricultural
- [x] Commercial / Business
- [x] Day Care
- [x] Food Service/Food Permit
- [ ] 1,000 or more person event for 2 or more days per year
- [ ] Hospital/Clinic
- [x] Industrial
- [x] Licensed Residential Facility
- [ ] Lodging
- [ ] Recreational / RV Park
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.):

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [x] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [ ] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

100,000

15 Source Number	16 SOURCE NAME: LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456. IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	17 INTERTIE: INTERTIE SYSTEM ID NUMBER	18 SOURCE CATEGORY: WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	19 USE: PERMANENT	SEASONAL	EMERGENCY	20 SOURCE METERED	21 TREATMENT: NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	22 DEPTH: DEPTH TO FIRST OPEN INTERVAL IN FEET	23 CAPACITY (GALLONS PER MINUTE)	24 SOURCE LOCATION: 1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S02	AUBURN (4)	03350 V											X			Y	X							770			00N	00E
S03	PACIFIC	65300 W													X	N	X							900			00N	00E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
01450 V	ALGONA WATER DEPT	KING	A	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?)		1106	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	1031		
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	22		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	75		
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	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	46	46	
28. TOTAL SERVICE CONNECTIONS		1152	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 3180

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 that are NOT already included in the residential population?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	3	3	3	3	3	3	3	3	3	3	3	3

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

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: Mathew Bailey DATE: 6/24/2022

PRINT NAME: Mathew Bailey TITLE: Public Works Supervisor

WS ID	WS Name
01450	ALGONA WATER DEPT

Total WFI Printed: 1

Washington State Department of
Health
Division of Environmental Health
Office of Drinking Water

Water Facilities Inventory (WFI)

Report Create Date:	6/21/2022		
Water System Id(s):	01450		
Print Data on Distribution Page:	Yes		
Print Copies For:	DOH Copy		
Water System Name:	ALL		
County:	-- Any --		
Region:	ALL		
Group:	ALL		
Type:	ALL		
Permit Renewal Quarter:	ALL		
Water System Is New:	ALL		
Water System Status:	Act		
Water Status Date From:	ALL	**To**	ALL
Water System Update Date	ALL	**To**	ALL
Owner Number:	ALL		
SMA Number:	ALL		
SMA Name:	ALL		
Active Connection Count From:	ALL	**To:**	ALL
Approved Connection Count	ALL	**To:**	ALL
Full-Time Population From:	ALL	**To:**	ALL
Water System Expanding	ALL		
Source Type:	ALL		
Source Use:	ALL		
WFI Printed For:	On-Demand		

APPENDIX C

AUBURN-ALGONA AGREEMENTS

RESOLUTION NO. 689-02

A RESOLUTION OF THE CITY OF ALGONA, WASHINGTON AUTHORIZING THE MAYOR TO EXECUTE INTER-LOCAL AGREEMENT NO. 3A MODIFYING THE WATER SYSTEM INTERTIE PROJECT AGREEMENT BETWEEN THE CITY OF ALGONA AND THE CITY OF AUBURN.

WHEREAS, the City of Algona adopted Resolution No. 550-96 establishing inter-local agreement No. 3 with the City of Auburn on August 20, 1996; and

WHEREAS, estimated project costs in Inter-local Agreement No. 3 were underestimated; and

WHEREAS, it is the desire of Algona and Auburn to finalize Inter-local Agreement No. 3 with respect to facilities constructed and agree on a method of payment for constructed and proposed facilities

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ALGONA AS FOLLOWS:

The Algona City Council hereby authorizes the Mayor of the City of Algona to execute Water System Intertie Agreement No. 3A with the City of Auburn, attached hereto as exhibit "A."

Passed this 6TH day of November, 2002, and signed in authentication of its passage this 6TH day of November.

ATTEST:

Danielle M. Stafford, City Clerk

Glenn Wilson, Mayor

WATER SYSTEM INTERTIE AGREEMENT
Algona/Auburn Intertie Agreement No. 3A

THIS AGREEMENT made and entered into by and between the City of Auburn, hereinafter referred to as "Auburn", and, the City of Algona, hereinafter referred to as "Algona", for the purposes of modifying Interlocal Agreement 3 between Algona and Auburn and establishing a payment schedule for the system intertie between the respective parties,

WITNESSETH:

WHEREAS, both Cities have executed Interlocal Agreement 3 (IA#3) for the Algona Intertie Project dated August 19, 1996; and

WHEREAS, both Cities agreed that the following facilities were to be built and funded in part or in whole by Algona as a part of IA#3:

1. Five (5) Meter Stations
2. A Future Reservoir in Lakeland Hills
3. Wells 6 and 7; and

WHEREAS, this agreement identifies one time capital facilities charges for the above referenced projects that serve to increase the capacity of service to the City of Algona; and

WHEREAS, Algona agreed to deed over its primary Water Right(s) (instantaneous flow rate (Qi) of 500 gpm, annual flow rate (Qa) of 175 acre feet per year), well facilities and well property protection zone easement to Auburn in exchange for Auburn providing a portion of the Algona long term water supply; and

WHEREAS, the Cities agreed to terminate a number of preexisting agreements; and

WHEREAS, Algona agreed to implement a water conservation program consistent with Auburn's conservation program; and

WHEREAS, Algona agreed to maintain its 100,000 gallons of system storage, participate in an additional 100,000 gallons of storage in the Auburn system or provide for the storage otherwise; and

WHEREAS, Algona granted Auburn permission to construct, own, operate, maintain, repair and replace Auburn water facilities within Algona right of way at Auburn expense; and

WHEREAS, the Boeing Company "Welded Duct Facility" was transferred to Algona as a direct service customer and the existing meter was converted to a master meter; and

WHEREAS, a 180,000 gallon share of the IA#3 proposed 1.7 million gallon Lakeland Hills Reservoir was to be financed by Algona in accordance with the Algona January 1997 Water

System Plan and with Auburn storage criteria in accordance with the schedule contained in Exhibit D of IA#3; and

WHEREAS, Auburn agreed to provide Algona up to 525,000 gallons of average day demand (ADD) and 1,114,000 gallons of maximum day demand (MDD) through 2014; and

WHEREAS, the estimated project costs were shown in Exhibit D of IA#3 and those estimated costs were understated; and

WHEREAS, the Algona City well and associated water rights were not completely conveyed by Algona to Auburn as intended under IA#3, and

WHEREAS, it is the desire of Algona and Auburn to finalize the IA#3 agreement with respect to facilities constructed and agree on a method of payment for constructed and proposed facilities

NOW, THEREFORE, IT IS MUTUALLY AGREED as follows:

In order to provide for the construction and operation of water supply facilities, piping and meters for a water supply intertie, and reservoir capacity, all between Auburn and Algona, the Participants mutually agree:

1. Interlocal Agreement 3 (IA#3) for the Algona Intertie Project between the City of Algona and the City of Auburn, dated August 19, 1996 and adopted by City of Auburn Resolution No. 2770 is hereby superceded by this Agreement.

2. Algona shall convey to Auburn Algona's City well and any and all associated water rights by Bill of Sale, included as Exhibit F. The well location is depicted on Exhibit A. In addition, Algona shall convey a Well Site Easement included as Exhibit G, and Access Easement included as Exhibit H for the aforementioned well. All costs for said conveyances will be included within the costs of projects planned under this Agreement. In event of future well abandonment by Auburn, any and all related easements shall be vacated by Auburn, and Algona and others shall no longer be bound thereby.

3. Algona shall have and implement a conservation program. The conservation program shall, at a minimum, be consistent with Auburn's conservation program and include field testing for leak detection, repair of leaks and public information actions equal to Auburn's public information actions. Algona's water conservation plan shall be included in the 2002 Algona Water System Plan.

4. So long as it continues to purchase wholesale water from Auburn, Algona shall continue to maintain and provide no less than the existing storage in its 100,000 gallon reservoir in its westerly service area. Alternately, Algona may elect to increase participation by 100,000 gallons within the future Auburn reservoir per Exhibit B herein, or acquire storage otherwise (such as

·aven Utility District) and terminate the continued operation of the existing reservoir ..ty service area.

5. Algona hereby grants Auburn the right to construct, own, operate, maintain, repair, and replace Auburn's municipal water system including pipes, fire hydrants, valves, meters, and other appurtenances located within Algona right-of-way as shown on Exhibit A, in perpetuity per the terms and conditions herein.

5.1. Auburn shall provide to Algona copies of available record drawings showing the location of Auburn's water system within Algona right-of-way.

5.2. Except for the normal operation of Auburn's water system, Auburn shall notify Algona prior to any major waterline improvements or replacements which may interfere with or disrupt any other utilities and/or passage of traffic within Algona. Algona shall notify Auburn prior to any street or other utility improvement which may interfere or disrupt Auburn's water system.

5.3. Auburn shall be responsible to pay for costs associated with improvements to Auburn's water system including necessary street patches. In the event that Algona constructs any street improvements on those rights-of-way containing Auburn's water system, Auburn shall be responsible to adjust all water system appurtenances to finish grade, including lowering or raising said pipelines at conflict with Algona improvements.

6. Algona agrees to financially participate in the supplemental supply development of a portion of Auburn's Well # 6 and Well # 7, in accordance with Exhibit D.

7. This Agreement shall include construction and operation of up to five individual master meter stations. Three master meter stations, including the one currently serving the Boeing "Welded Duct Facility", and two installed under IA#3 are as shown on Exhibit A. The remaining two meter stations will be located and constructed at the discretion of Algona. For adequate water distribution to be obtained, it may also be necessary for Algona to construct additional piping and connections, at its own expense.

8. Algona agrees to transfer title to Auburn for any water lines between existing master meter stations and the existing Auburn mains. Any piping between future master meter stations and Auburn mains will be similarly transferred by Algona to Auburn. Title will be transferred with a bill of sale and the water pipe will be regulated under Paragraphs 5 and 13 of this Agreement.

9. This Agreement shall include future construction of a reservoir by Auburn within the Lakeland Hills development area within Pierce County, Washington. The volume of the new reservoir is presently estimated to be approximately 2.65 million gallons, and this capacity is to be shared with Algona. Financial participation is to be based on a capacity percentage basis by any and all municipalities sharing in the capacity, whether the actual storage volume usage for

any such municipality is directly derived from the reservoir or not. Algona's capacity shall be 180,000 gallons, exclusive of the provision of Paragraph 4 of this Agreement.

10. Algona projects the need for supply source in the following quantities:

Year	Average Daily Demand (mgd)	Maximum Daily Demand (mgd)
2004	0.457	0.945
2009	0.491	1.029
2014	0.525	1.114

11. Additional water supply may be available as mutually agreed to in writing by the Auburn City Council and the Algona City Council.

12. Respective facility ownership, capacity rights, and responsibility for operation, maintenance, and renewal and/or replacement (r/r) are as specifically described in Exhibit B. Operational parameters shall be as specifically defined in Exhibit C.

13. Distribution water pipelines within the city limits of a Participant shall be owned and the responsibility of that Participant, with the exception of Auburn facilities specifically identified on Exhibit A, and permitted by Paragraph 5.

14. Retail customers whose property lies within the city limits of a Participant shall be the retail customers of that Participant.

15. For Auburn facilities within Algona, as specifically identified on Exhibit A, Algona hereby grants a franchise to Auburn.

16. Auburn shall design, construct and maintain its facilities constructed under this Agreement in accordance with the design standards described in the 2001 Auburn Comprehensive Water Plan, and the updates thereto.

17. Both Participants shall exercise good faith and use best efforts in estimating project costs. However, the foregoing notwithstanding, each Participant shall be responsible for and shall pay for one hundred percent (100%) of its actual, proportionate share of the project costs, regardless of the estimate. The project costs are estimated as shown in Exhibit D. The Participants shall maintain individual cost records of their expenses for the project. Auburn will maintain overall coordinated project cost records. Algona has the right to review the design of each project in Exhibit D, prior to the project being bid. Auburn shall allow sufficient time in the project schedule for this review. Should potential cost savings to the design be identified that are not in conflict with accepted industry design standards, Algona and Auburn shall work in good faith and cooperatively to incorporate the potential cost savings into the final design.

18. The Participants shall fully finance and pay for their proportionate share of cost as shown in Exhibit D. Algona shall deposit funds with Auburn to perform the project work for the proposed facilities in accordance with the schedule shown in Exhibit E. As future actual costs of projects in Exhibit D are determined, Auburn will notify Algona of such updates and the authorized representatives will execute an update to Exhibit D which will supercede all prior dated versions of Exhibit D.

19. Auburn has prepared a cost of service study to determine the cost of service to its customers. A customer classification for "wholesale-Algona" has been created, and rates for service charges are based on a rate study for this customer classification. Auburn will regularly update the cost of service analysis. Wholesale water rates to Algona will be based on costs of providing the service.

20. For purposes of this Agreement, each Participant identifies its authorized representative as the "Mayor" of Algona and as the "City Engineer" of Auburn.

21. The Participants shall meet as needed for project coordination.

22. The Participants shall be responsible for design, construction management, and commissioning of all facilities to be constructed in accordance with ownership of the facility. Responsibilities may be assigned otherwise by agreement of the Participants' authorized representatives.

23. It is acknowledged and agreed that in the event Auburn experiences any system failure or decreased capacity for any reason, the supply to Algona may be curtailed to an equal percentage of use as Auburn's curtailment is implemented. Such curtailment shall be imposed by Algona on Algona retail customers immediately and simultaneously as such curtailment is imposed by Auburn on Auburn retail customers.

24. It is the intent of Auburn to provide the water described in Paragraph 10 whenever it is available subject to the limitations described in Paragraph 23. Auburn shall use reasonable diligence and best efforts to provide immediate notice in the event it becomes aware that it may not be able to fulfill the requirements of Paragraph 10 for any reason.

25. Auburn possesses the short-term (approximately five (5) years) capacity to meet the storage requirements for Algona. Long-term storage requirements for Algona shall be met by Algona financial participation within the next increment of storage to be constructed by Auburn. Algona's minimum financial participation shall provide for construction of storage volume capacity of 180,000 gallons, inclusive of standby, equalization, and fire protection volume storage. Such 180,000 gallon capacity is in addition to Algona's existing 100,000 gallon reservoir storage in its westerly service area.

26. Algona's water supply needs above the 0.525 mgd average daily demand, and the 1.114 mgd maximum daily demand, both identified in Paragraph 10 will be dependent upon negotiation of an amendment to this Agreement.

27. This Agreement shall remain in full force unless terminated by mutual agreement of the Participants.

28. This Agreement may be amended only in writing by approval signed by the Participants.

29. The authorized representatives shall have authority to update Exhibits attached hereto. The Exhibits shall be updated and/or revised only upon written agreement signed by the Participants' authorized representatives. Updates must be ratified by each Participant's City Council.

30. Algona agrees to indemnify, defend and hold harmless Auburn, its officers, directors, employees and agents, and their successors and assigns, from any and all costs or claims arising out of or in any way resulting from Algona's default, failure of performance, or negligent conduct associated with this Agreement. It is further agreed that Auburn shall provide water to Algona consistent with its provision of water to all of its retail water customers, and the failure of the Auburn water system to deliver flow to Algona, in whole or in part, as described in this Agreement, so long as Auburn is providing water to Algona consistent with its provision of water to the rest of its retail water customers, and consistent herewith, shall not give rise to an action against Auburn, and Algona agrees to indemnify, defend and hold harmless Auburn, its officers, directors, employees and agents, and their successors and assigns, from any and all costs or claims arising out of or in any way resulting from any such failure of the Auburn water system to deliver flow to Algona, in whole or in part. This indemnification provision shall include, but is not limited to, all claims against Auburn by an employee or former employee of Algona or their contractors and, as to such claims, Algona expressly waives all immunity and limitation of liability under Title 51 RCW.

Auburn agrees to indemnify, defend and hold harmless Algona, their officers, directors, employees and agents, and their successors and assigns, from any and all costs or claims arising out of or in any way resulting from Auburn's default, or negligent conduct associated with this Agreement. This indemnification provision shall include, but is not limited to, all claims against Algona by an employee or former employee of Auburn or its contractors and, as to such claims, Auburn expressly waives all immunity and limitation of liability under Title 51 RCW.

31. The parties shall make good faith efforts to resolve by informal discussion any dispute arising under or in connection with this Agreement. If at any time either party to this Agreement determines that such informal discussions will not result in a resolution of the dispute, such party may request formal discussion by both parties. If formal discussion by the parties does not resolve the dispute, a settlement conference shall be held within thirty (30) days of the unsuccessful resolution meeting. The settlement conference will be held at the Seattle office of Judicial Arbitration and Mediation Services, Inc. ("JAMS"). The complaining party must contact JAMS to schedule the conference. The parties may agree on a retired judge from the JAMS panel. If they are unable to agree, JAMS will provide a list of three available judges and each party may strike one. The remaining judge will serve as the mediator at the settlement conference.

32. If any provision of this Agreement is invalid or unenforceable the remaining provisions shall remain in force and effect.

IN WITNESS WHEREOF, the Participants hereto have caused this Agreement to be executed by their proper Officers on the date shown below.

City of Auburn

By: ______________________

Its: Mayor

Date: 10/21/02

Attest by: ______________________

Approved as to Form by: ______________________

City of Algona

By: Glenn Dickson

Its: Mayor

Date: 11-6-02

Attest by: ______________________

Approved as to Form by: ______________________

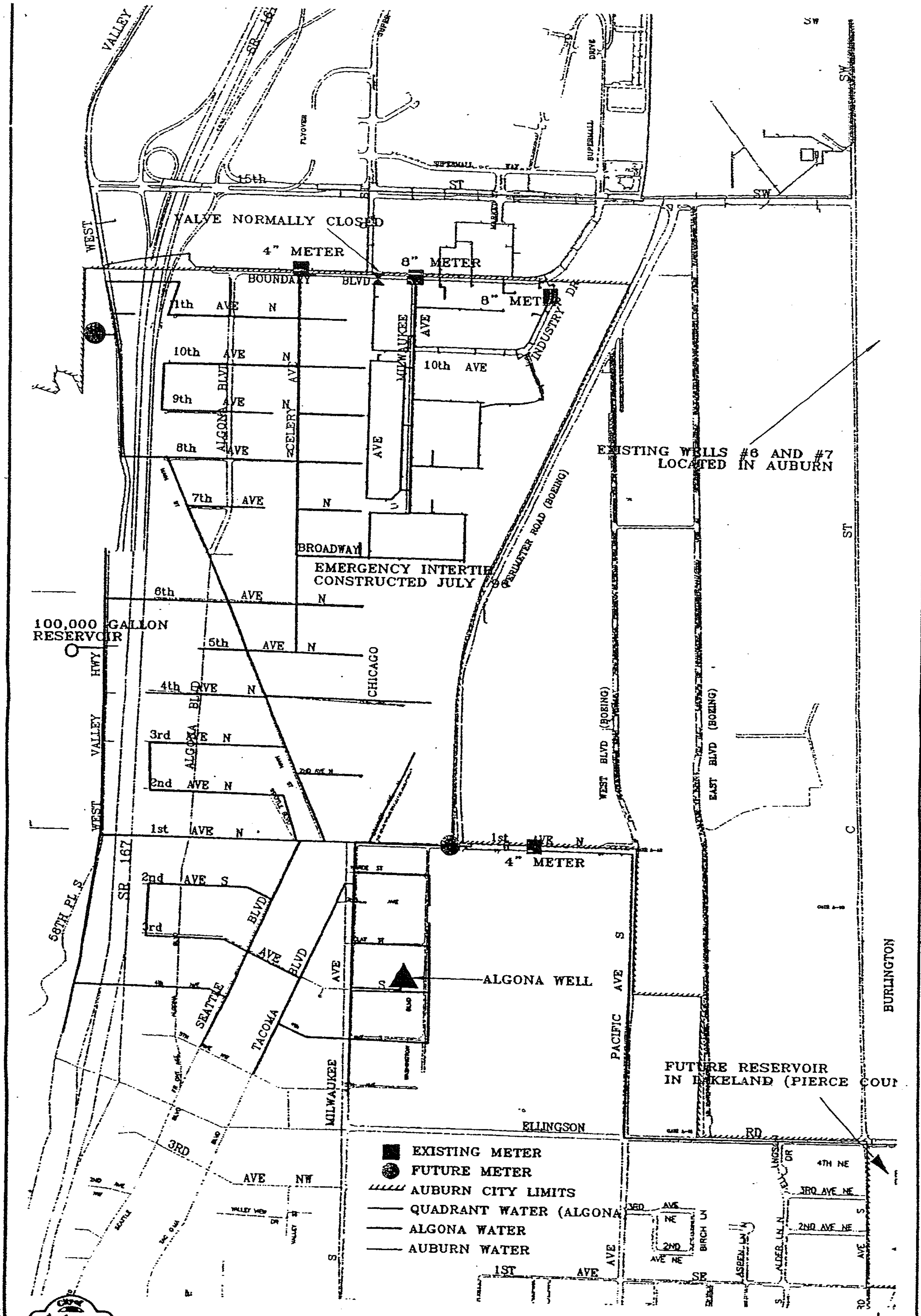


EXHIBIT A – FACILITIES LAYOUT PLAN
IA #3A
ALGONA INTERTIE PROJECT

SCALE: 1"=800'

Exhibit A
Facilities Layout Plan

WATER SYSTEM INTERTIE AGREEMENT
Algona/Auburn Intertie Agreement No. 3A
(continued)

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

3. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit B
Facility Ownership, Capacity Rights, Operation, Maintenance, and Renewal and Replacement Responsibilities
to
WATER SYSTEM INTERTIE AGREEMENT
Algona/Auburn Intertie Agreement No. 3A

Facility	Location	Facility Ownership	Capacity Rights	Operation, Maintenance, & Renewal/Replacement Responsibility
Meter Station 1, existing for Boeing	200' easterly of the Intersection of 1st Avenue North and Perimeter Road	Auburn	100% Algona	Auburn
Meter Station 2, existing	Intersection of Milwaukee Avenue and Boundary Boulevard	Auburn	100% Algona	Auburn
Meter Station 3, existing	Intersection of Industry Drive North and Boundary Boulevard	Auburn	100% Algona	Auburn
Meter Station 4 future	Presently unknown, but probably near intersection of West Valley Highway and Boundary Boulevard extended	Auburn	100% Algona	Auburn
Meter Station 5 future	Presently unknown, but probably near intersection of UP RR and 1st Avenue North	Auburn	100% Algona	Auburn
Algona Well, existing	+/-150' northwesterly of intersection of Washington Boulevard and 3rd Ave South	Auburn	100% Auburn	Auburn
Lakeland Hills Reservoir, future	Lakeland Hills, Pierce County	Auburn	180,000 gallons Algona; remainder Auburn	Auburn
Supply (Qi) existing supplemental water rights	Well #6, Fulmer Field Well #7, City Park	Auburn	1,114,000 gpd Algona; remainder Auburn	Auburn

Exhibit B
Facility Ownership, Capacity Rights, Operation, Maintenance, and Renewal and Replacement Responsibilities
to
WATER SYSTEM INTERTIE AGREEMENT
Algona/Auburn Intertie Agreement No. 3A
(continued)

Update Approval

1. Auburn: ______________________________, Dated: ________________

   Algona: ______________________________, Dated: ________________

2. Auburn: ______________________________, Dated: ________________

   Algona: ______________________________, Dated: ________________

Exhibit C
Project Criteria
to
WATER SYSTEM INTERTIE AGREEMENT
Algona/Auburn Intertie Agreement No. 3A

Project Criteria:

- Meter Stations to be sized on flow volume criteria as opposed to line size.
- Maximum (Qi) daily demand flow is 1.114 million gallons per day for total of all meter stations supply to Algona, except in case of fire or emergency.
- Maximum annual (Qa) average daily demand flow is 0.525 million gallons per day for total of all meter stations supply to Algona.
- Each meter station shall be calibrated annually for the first three years of operations, and thereafter at the discretion of Auburn.
- Reservoir capacity for Algona is 180,000 gallons of the estimated 2.65 mg total capacity in the proposed Lakeland Hills Reservoir.
- Total of all meter stations supply to Algona necessary for peak hourly flow and fire flow shall be determined by Algona, and such data provided to Auburn for meter station design and/or station design review.

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit D
Project Cost Estimate
to
WATER SYSTEM INTERTIE AGREEMENT
Algona/Auburn Intertie Agreement No. 3A

	IA#3		Incurred Costs To Date	
Description	Estimated Cost	Expenditures to Date	Auburn	Algona
METER STATIONS	(includes allied costs)			
2-inch @ Boeing	N/A	N/A	N/A	N/A
8-inch @ Industry Drive	$25,740	$76,723	$31,757	$44,966
8-inch @ Milwaukee	$25,740	$76,723	$31,757	$44,966
8-inch (Future)	$28,600	N/A	0%	100%
8-inch (Future)	$31,460	N/A	0%	100%
Subtotal Meter Stations	**$111,540**	**$153,446**	**$63,514**	**$89,932**
SUPPLY FACILITIES				
Well #6		$1,057,507	$990,514	$66,993
Well #7		$2,387,050	$2,235,829	$151,221
Subtotal Supply Facilities	**$1,787,500**	**$3,444,557**	**$3,226,343**	**$218,214**
PRELIMINARY COSTS				
Algona Well/Water Rights Conveyance	$5,000	$5,000	$5,000	$0
Algona Water Rights	N/A	N/A	$30,000	($30,000)
Well Easements	$2,000	$2,000	$2,000	$0
SKCRWA JOA Development	$5,800	$5,800	$0	$5,800
COS/Rate Study	$1,627	$1,627	$0	$1,627
Subtotal Preliminary Costs	**$14,427**	**$14,427**	**$37,000**	**($22,573)**
COSTS TO DATE	N/A	$3,612,430	**$3,326,857**	**$285,573**
PAYMENTS TO DATE	**N/A**	**N/A**	**($3,326,857)**	**($85,300)**
BALANCE OWING	**N/A**	**N/A**	**$0**	**$200,273**
STORAGE FACILITIES				
Lakeland Hills Res.	$2,700,000	N/A	$2,520,000	$180,000
Subtotal Storage Facilities	**$2,700,000**	N/A	**$2,520,000**	**$180,000**
Estimated Total PROJECT COST	**$4,613,467**	$6,312,430	**$5,846,857**	**$465,573**

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit E - Project Schedule

to

WATER SYSTEM INTERTIE AGREEMENT

Algona/Auburn Intertie Agreement No. 3A

Activity	Date
Execute Interlocal Agreement #3	Completed
Complete master meter stations design for initial two stations	Completed
Algona to provide well, water rights and easements conveyance to Auburn	November 2002
Award master meter stations construction contract	Completed
Complete construction of master meter stations #2 and #3	Completed
Final master meter stations and conveyance project cost accounting	Completed
Interim payment of $85,300 from Algona	Completed
Final Auburn Wells 6 and 7 cost accounting	Completed
Execute Interlocal Agreement #3A	November 2002
Future construction of master meter stations #4 and #5	To be determined
Algona to provide $200,273 to Auburn for partial payment of cost incurred to date	31 March 2003
Algona to provide $180,000 to Auburn for partial payment for future Reservoir	Due at Construction Contract Award
Final project cost accounting	31 March 2008
Final IA #3A balancing payment from Algona	30 April 2008

Exhibit E - Project Schedule
to
WATER SYSTEM INTERTIE AGREEMENT
Algona/Auburn Intertie Agreement No. 3A

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit F – Bill of Sale for Algona's Well

to

WATER SYSTEM INTERTIE AGREEMENT

Algona/Auburn Intertie Agreement No. 3A

(follows)

Return Address
City of Auburn
City Clerk
25 West Main
Auburn, WA 98001

20030113000704
PACIFIC NW TIT BS 25.00
PAGE 001 OF 007
01/13/2003 09:44
KING COUNTY, WA

Above this line reserved for recording information

BILL OF SALE

Reference # (if applicable)	N/A	Additional on page	____
Grantor/Borrower	1) City of Algona	2)	
		Additional on page	____
Grantee/Assignee/Beneficiary:	City of Auburn		
Legal Description/STR	NW, SW1/4, 25-21-4E	Additional on page	6
Assessor's Tax Parcel ID#	954300-0570		

7/25 PNWT W4881-12

KNOW ALL MEN BY THESE PRESENTS that for and in consideration of the sum of ONE DOLLAR ($1 00), and for the consideration of incorporating the facilities into the City system, and other good and sufficient consideration, receipt whereof is hereby acknowledged, the undersigned Grantor City of Algona, a Municipal Corporation in King County, Washington, do by these presents hereby convey, setover, assign, transfer and warrant to the City of Auburn, a Municipal Corporation in King County, Washington, a well and waterworks supplying water for public use, the associated ground water right (EXHIBIT 'A', Certificate Number GI-22769C), and all appurtenances or any other associated public facility generally consisting of a ten (10) inch casing to approximately 65 feet below ground surface Situated within the following described real property

See EXHIBITS 'B' AND 'C' ATTACHED HERETO AND BY THIS REFERENCE MADE A PART HEREOF.

and the said Grantor(s) hereby warrant(s) that they are the sole owner(s) of all the property above conveyed, that they have full power to convey the same and that they will defend the title of the said Grantee against any and all persons lawfully making claim thereto, and indemnify the City of Auburn for any costs, including Attorney fees in defending title.

IN WITNESS WHEREOF the Grantor(s) has/have executed these presents this 6th day of November, 2002

City of Algona, GRANTOR

GLENN WILSON, MAYOR

STATE OF WASHINGTON)
)ss
County of King)

I certify that I know or have satisfactory evidence that Glenn Wilson is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that he/she was authorized to execute the instrument and acknowledged it as the Mayor of The City of Algona, a Municipal Corporation, to be the free and voluntary act of such party for the uses and purposes mentioned in this instrument.

Dated 11-6-02

Danielle M Stafford

Notary Public in and for the State of Washington
residing at Pierce County
My appointment expires 11-30-04

DANIELLE M. STAFFORD
NOTARY PUBLIC
COMMISSION EXPIRES 11-30-04
STATE OF WASHINGTON

File: 4.1
REF H \FORMS\FC089 (R 4/01)

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

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

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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
December 10, 1976	G1-22769	G1-22769P	G1-22769C

NAME
CITY OF ALGONA

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
402 Warde Street	Algona	Washington	98002

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

PUBLIC WATER TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	500	175.0

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

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
400 feet east and 1200 feet south from west quarter corner of Sec 25

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼SW¼	25	21	4 E	10	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
28	4	Woods Algona Add. Div 1

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Algona

PROVISIONS

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90 03 380, 90 03 390, and 90 44 020

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90 14 180

Given under my hand and the seal of this office at Redmond Washington, this 15th day of November, 19 78.

Department of Ecology

by Robert K. McCormick

ROBERT K McCORMICK, Regional Manager

ENGINEERING DATA

OK

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

[illegible]

GI - 22760P

CITY OF ALGONA

402 Warde Street   Algona   WA   98002

[illegible]

Municipal Water Supply

April 4?, 1977

[x] YES [ ] NO

?11

5?? gal per minute

Average 11,?64 GP per day

[ ] GPM
[ ] CFS

[x] YES [ ] NO

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

Well site   Block 4, Lots 23-30, Woods Algona Division No. 1 as recorded in book of Plats, Vol 10 Page 35, records of King County Washington

Water used in City of Algona, Washington

Description of City Limits   All that portion of Sections 23, 24, 25, 26 and 35 and 36 Township 21 North Range 4 East, W.M. described as follows

BEGINNING at the northwest corner of the southeast one-quarter of Section 23, Township 21 North, Range 4 East W.M. and running thence easterly along the North line of said southeast one-quarter to the northeast corner thereof; thence easterly along the north line of the southwest one-quarter of Section 24, Township 21 North, Range 4 East, W.M. to a point on the easterly margin of the joint C.M. & St. P. & O.W.R.R. Railway's right-of-way thence southwesterly along said easterly margin to an intersection with the northerly margin of the right-of-way of South 350th Street thence easterly along said northerly margin of South 350th Street to an intersection with the easterly margin of the right-of-way of 76th Avenue South thence southerly along said easterly margin of 76th Avenue South to an intersection with the northerly line of the Southwest one-quarter of the Southeast one-quarter of Section 25, Township 21

STATE OF WASHINGTON
County of King } ss

OK FEES
ISSUE CERTIFICATE
PER PERMIT
10-2?-78
USE LEGAL ON PERMIT

I   John E. Matchett   being first duly sworn depose and say that I have read the above and foregoing proof of appropriation that I know the contents thereof and that the facts therein stated are true

IN WITNESS WHEREOF I have hereunto set my hand this 10th day of October 1978

John E. Matchett
Permittee's Signature

Subscribed and sworn to before me this 10th day of October 1978

Margaret ? ?
Notary Public

ECY 040-1-76

EXHIBIT "B"

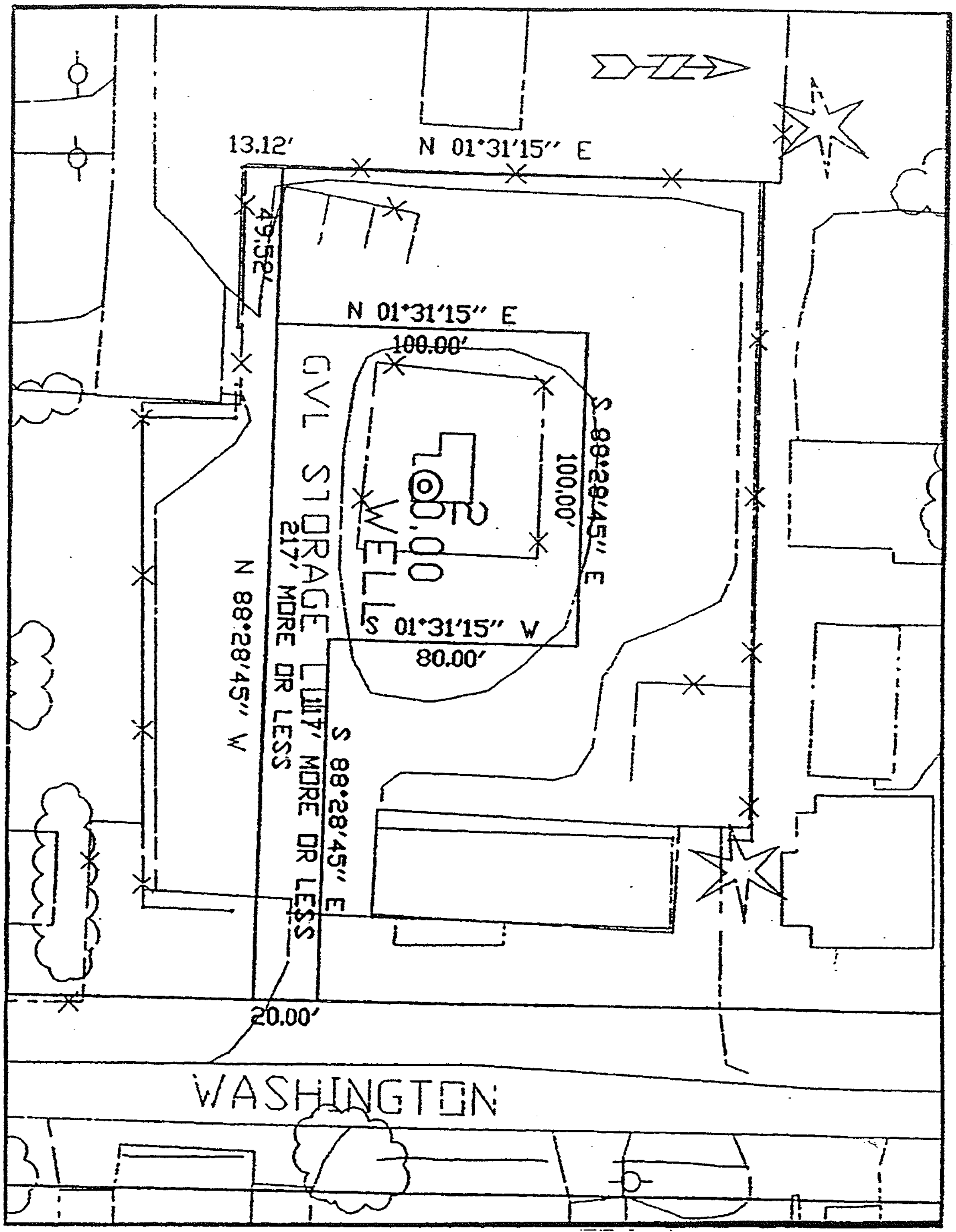
ALGONA WATER WELL EASEMENT
3RD AVENUE SOUTH AND WASHINGTON BOULEVARD

THAT PORTION OF LOTS 23 AND 24 AND 25 AND 26 AND 27 AND 28 AND 29 AND 30, ALL IN BLOCK 4 OF WOOD'S ALGONA ADDITION, DIVISION NUMBER 1 TO THE CITY OF SEATTLE AS RECORDED IN VOLUME 19 OF PLATS, PAGE 36, RECORDS OF KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS

BEGINNING AT THE SOUTHWEST CORNER OF SAID LOT 30, THENCE NORTH 01°31'15" EAST ALONG THE WEST BOUNDARY OF SAID LOT 30, A DISTANCE OF 13 12 FEET, THENCE SOUTH 88°28'45" EAST, 49 52 FEET TO THE TRUE POINT OF BEGINNING, THENCE NORTH 01°31'15" EAST, 100 00 FEET, THENCE SOUTH 88°28'45" EAST, 100 00 FEET, THENCE SOUTH 01°31'15" WEST, 80 00 FEET, THENCE SOUTH 88°28'45" EAST, 117 FEET MORE OR LESS TO THE WEST MARGIN OF WASHINGTON BOULEVARD, THENCE SOUTHERLY 20 00 FEET MORE OR LESS ALONG SAID WEST MARGIN OF WASHINGTON BOULEVARD TO A POINT WHICH BEARS SOUTH 88°28'45" EAST FROM SAID TRUE POINT OF BEGINNING; THENCE NORTH 88°28'45" WEST, 217 FEET MORE OR LESS TO SAID TRUE POINT OF BEGINNING

SITUATE IN THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 25, TOWNSHIP 21 NORTH, RANGE 4 EAST, W M

EXHIBIT "C"



13.12'
N 01°31'15" E
49.52'
N 01°31'15" E
100.00'
S 88°28'45" E
100.00'
GVL STORAGE LOT
217' MORE OR LESS
N 88°28'45" W
2.00
WELL
S 01°31'15" W
80.00'
217' MORE OR LESS
S 88°28'45" E
20.00'
WASHINGTON

20021230001158.001

20021230001158
PACIFIC NW TIT EAS 22.00
PAGE 001 OF 004
12/30/2002 09:50
KING COUNTY, WA

Return Address
City of Auburn
City Clerk
25 West Main
Auburn, WA 98001

Above this line reserved for recording information

4/22 PNWT
W4865-12

EASEMENT

Well Site Easement

Reference # (if applicable)	N/A	Additional on page	___
Grantor/Borrower	1) City of Algona	2)	
		Additional on page	___
Grantee/Assignee/Beneficiary:	**City of Auburn**		
Legal Description/STR	NW, SW1/4, 25-21-4E	Additional on page	3
Assessor's Tax Parcel ID#	954300-0570		

For and in consideration of the sum of one dollar ($1 00) and other good and valuable consideration in hand paid, receipt of which is hereby acknowledged, and for benefits to be derived by the Grantor herein, Grantor, City of Algona, a municipal corporation of King County, Washington, hereby conveys and warrants to the City of Auburn, Grantee herein, a municipal corporation of King County, Washington, its successors and assigns, a perpetual Nonexclusive Easement under, over, through and across the following described real property for the purpose of operating, maintaining, installing and decommissioning a well and waterworks supplying water for public use AND APPURTENANCES THEREOF, said real property being described as follows

SEE EXHIBITS "A" AND "B" ATTACHED HERETO AND BY THIS REFERENCE MADE A PART HEREOF

This easement is given under the threat of and in lieu of Eminent Domain

Said Grantee shall have the absolute right, at times as may be necessary, for immediate entry upon said Easement for the purpose of maintenance, inspection, construction, repair, reconstruction or decommissioning of the above improvements without incurring any legal obligation or liability therefore

Said Grantee shall have the absolute right to place any type of driving surface within said Easement deemed necessary by the Grantee

Said Grantor shall not in any way block, restrict or impede access and egress to or from said Easement, and/or in any way block, restrict or impede full use of the real property within the above-described Easement by said Grantee for the above-described purposes Said Grantor may fence across said Easement and/or along the boundaries of said Easement provided that a gate is constructed in said fence Said gate shall be of sufficient length and location to allow the Grantee full use of, and access and egress to and from the real property within the above-described Easement If said gate is to be locked, keys shall be provided to the Grantee

This Easement shall be a covenant running with the above-described real property and burden said real estate, and shall be binding on the successors, heirs and assigns of all parties hereto

Dated this 6th day of November, 2002

City of Algona, GRANTOR

Glenn Wilson

GLENN WILSON, MAYOR

STATE OF WASHINGTON)
)ss
County of King)

I certify that I know or have satisfactory evidence that Glenn Wilson and ______

is/are the person(s) who appeared before me, and said **individual(s)** acknowledged that he/she/they signed this instrument and acknowledged it to be his/her/their free and voluntary act for the uses and purposes mentioned in this instrument

Dated 11-30-04

DANIELLE M. STAFFORD COMMISSION EXPIRES NOTARY PUBLIC 11-30-04 STATE OF WASHINGTON

Danielle M Stafford

Notary Public in and for the State of Washington
residing at Pierce County
My appointment expires 11-30-04

REF H \FORMS\FC087 (4/98)

EXHIBIT "A"

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3RD AVENUE SOUTH AND WASHINGTON BOULEVARD

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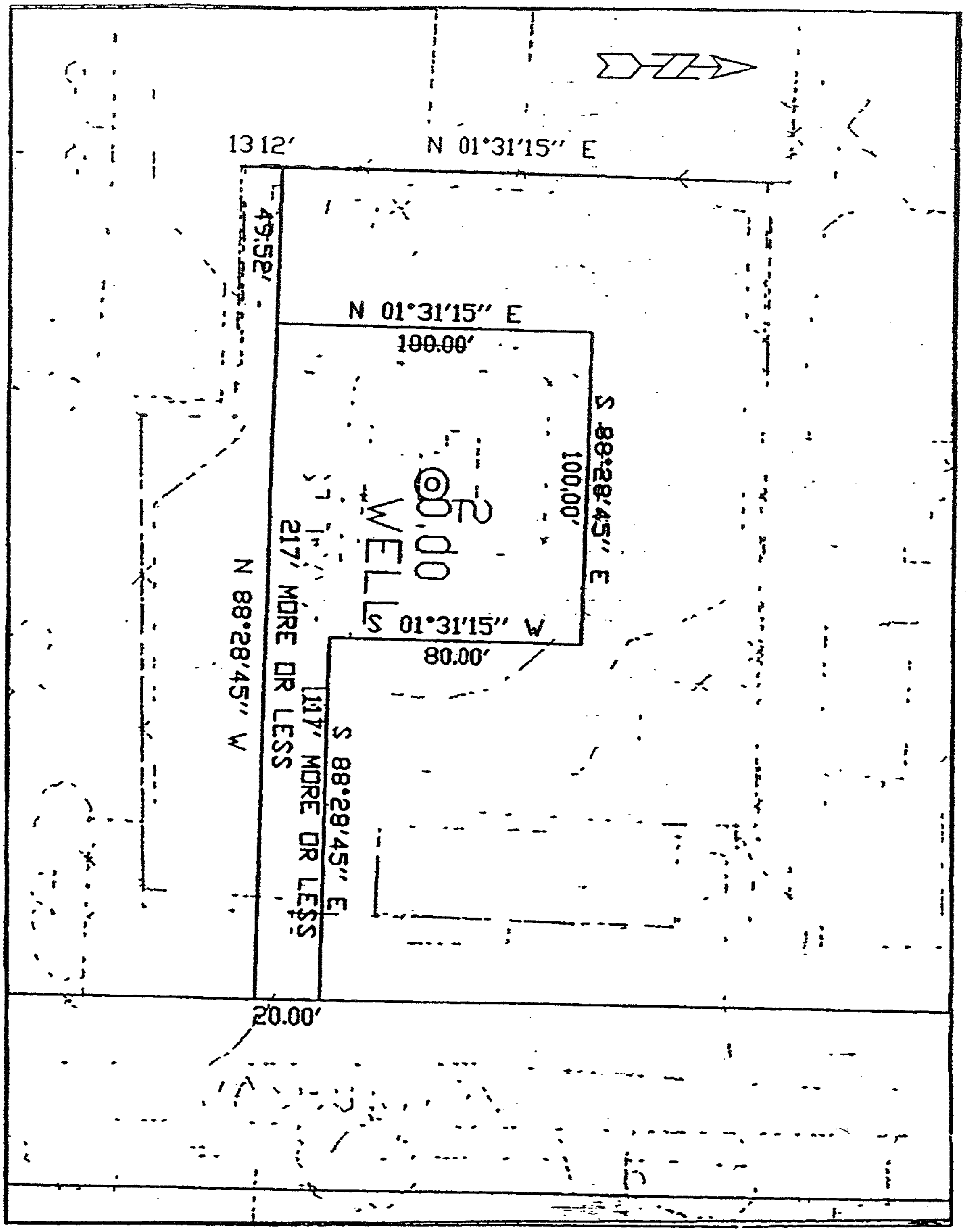
SITUATE IN THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 25, TOWNSHIP 21 NORTH, RANGE 4 EAST, W M

EXHIBIT "B"


13.12'
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217' MORE OR LESS
117' MORE OR LESS
S 88°28'45" E
20.00'

20021230001157.001

20021230001157
PACIFIC NW TIT EAS 22.00
PAGE 001 OF 004
12/30/2002 09:58
KING COUNTY, WA

Return Address
City of Auburn
City Clerk
25 West Main
Auburn, WA 98001

This document is filed for record by Pacific Northwest Title as accommodation only. It has not been examined as to proper execution or as to its effect upon title

Above this line reserved for recording information

4/22 PNWT
W48605-12

EASEMENT

Access Easement

Reference # (if applicable)	N/A	Additional on page	____
Grantor/Borrower	1) City of Algona	2)	
		Additional on page	____
Grantee/Assignee/Beneficiary:	**City of Auburn**		
Legal Description/STR	NW, SW1/4, 25-21-4E	Additional on page	3
Assessor's Tax Parcel ID#	954300-0570		

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Dated this 6th day of November, 2002

City of Algona, GRANTOR

Glenn Wilson

GLENN WILSON, MAYOR

STATE OF WASHINGTON)
)ss
County of King)

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and
is/are the person(s) who appeared before me, and said individual(s) acknowledged that he/she/they signed this instrument and acknowledged it to be his/her/their free and voluntary act for the uses and purposes mentioned in this instrument

Dated 11-6-02

DANIELLE M. STAFFORD
COMMISSION EXPIRES
NOTARY
PUBLIC
11-30-04
STATE OF WASHINGTON

Danielle M Stafford
Notary Public in and for the State of Washington
residing at Pierce County
My appointment expires 11-30-04

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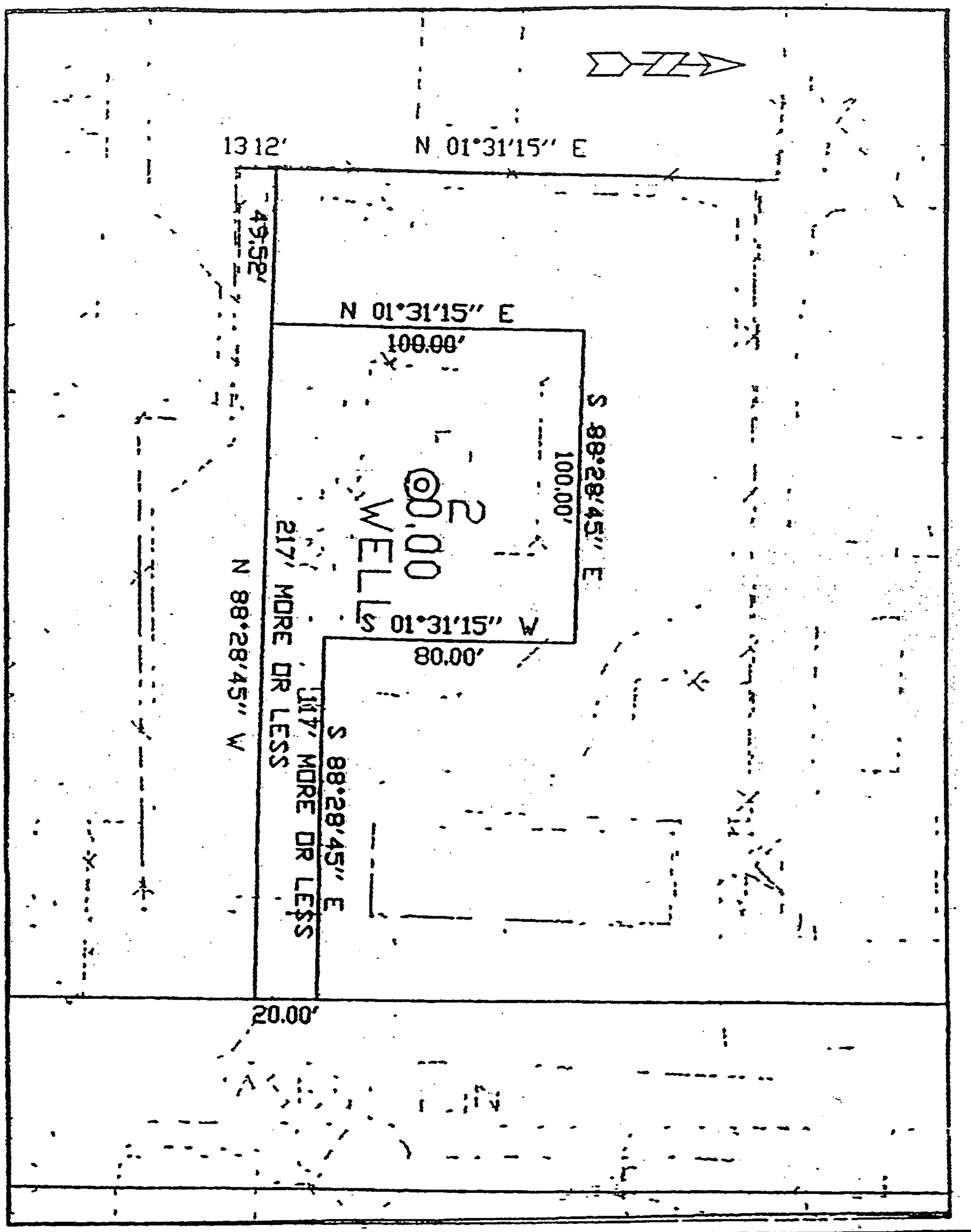
SITUATE IN THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 25, TOWNSHIP 21 NORTH, RANGE 4 EAST, W M

EXHIBIT "B"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2
@0.00
WELL
S 01°31'15" W
80.00'
N 88°28'45" W
217' MORE OR LESS
117' MORE OR LESS
S 88°28'45" E
20.00'

ORIGINAL

INTERLOCAL AGREEMENT 3
FOR THE
ALGONA INTERTIE PROJECT
BETWEEN THE
CITY OF ALGONA
AND THE
CITY OF AUBURN

I. PROJECT TITLE AND SCOPE

This project shall be known as the Algona Intertie Project. The project scope shall include construction and operation of water supply facilities, piping and meters for a water supply intertie between the City of Auburn ("Auburn" herein) and the City of Algona ("Algona" herein), jointly termed the Participants. The project also includes Algona's commitment to financially participate in a future reservoir to be constructed by Auburn. The proposed project facilities are identified on Exhibit A.

The contents of all Exhibits attached hereto are incorporated herein by this reference as though fully set forth herein. The Exhibits attached hereto are:

1. Exhibit A - FACILITIES LAYOUT PLAN
2. Exhibit B - FACILITY OWNERSHIP, CAPACITY RIGHTS, OPERATION, MAINTENANCE, AND RENEWAL AND REPLACEMENT RESPONSIBILITIES
3. Exhibit C - PROJECT CRITERIA
4. Exhibit D - PROJECT COST ESTIMATE
5. Exhibit E - PROJECT SCHEDULE
6. Exhibit F - ALGONA WELL FACILITY AND WATER RIGHT CONVEYANCE
7. Exhibit G - WELL AND INGRESS \ EGRESS EASEMENT

II. RECITALS

WHEREAS, this Interlocal Agreement 3 ("IA3" herein) is consistent with the Joint Operating Agreement ("JOA" herein) of the South King County Regional Water Association ("SKCRWA" herein) dated July 26, 1995; and

WHEREAS, it is the intent of Algona to obtain a portion of its long-term water supply needs from Auburn and it is the intent of Auburn to provide Algona with a portion of its long-term water supply needs; and

WHEREAS, Auburn has the necessary water system capacity to meet a portion of Algona's long-term public water supply needs; and

WHEREAS, pursuant to Section 4. C. of the JOA, for wholesale or emergency water supply purposes, the following interties exist or are expected to exist in the near future for the Participants to this IA3 which is consistent therewith:

1. Algona

   - City of Auburn,
   - Lakehaven Utility District (future), and
   - City of Pacific

2. Auburn

- City of Algona,
- City of Bonney Lake,
- Covington Water District,
- City of Kent (emergency only),
- Lakehaven Utility District (future),
- Muckleshoot Indian Tribe (future),
- City of Pacific, and
- King County Water District #111; and

WHEREAS, pursuant to Chapter 35 RCW, municipalities are authorized to enter into interlocal agreements for services;

NOW, THEREFORE, in order to provide for the construction and operation of water supply facilities, piping and meters for a water supply intertie, and reservoir capacity, all between Auburn and Algona, the Participants mutually agree:

III. CONDITIONS OF SERVICE

A. Estimated project costs as shown in Exhibit D are hereby reviewed and approved by Algona and Auburn.

B. As a condition precedent to Auburn providing a portion of the long-term water supply to Algona as described in paragraph V. C., Algona shall convey to Auburn Algona's City well as shown on Exhibit A, along with a well property protection zone easement as shown on Exhibit A, and any and all associated water rights. The cost of such conveyances will be included within the Project Costs. In the event of future well abandonment by Auburn, any and all related easements, such as for a wellhead protection zone, shall be vacated by Auburn, and Algona and others shall no longer be bound thereby.

C. The Participants hereby concurrently terminate, with the execution of this IA3, pre-existing agreements and those associated with the following documents:

1. "Water Service Agreement," dated April 21, 1981, between Algona and Auburn, executed for purposes of serving the Quadrant Corporation plat called Auburn 400 Corporate Park;

2. Letter correspondence from Pat Nevins, Director of Public Works for Auburn, to Mayor August Schuman for Algona, dated August 30, 1984, setting forth billing conditions and rates pertaining to Algona's purchases of water from Auburn;

3. "Interlocal Agreement Between the City of Auburn and the City of Algona for the Sale of Water," dated September 8, 1992, executed for purposes of serving The Boeing Company welded duct facility.

4. "Interlocal Agreement Between the City of Auburn and the City of Algona for the Use of Certain Streets Located Within the City of Algona Designated as Ellingson Road, Pacific Avenue South and First Avenue South by the City of Auburn for a Water Distribution System," dated September 8, 1992, executed for purposes of serving the Boeing Company welded duct facility.

D. Algona shall develop and implement a conservation program within 180 days of the execution of this IA3. The conservation program shall include field testing for leak detection and repair. The leak detection field investigation and repairs shall be planned to complete field testing and repair of Algona's complete water system within three years of the execution of this IA3. The conservation program shall, at a minimum, be consistent with Auburn's conservation program and include public information actions equal to Auburn's public information actions.

E. So long as it continues to purchase wholesale water from Auburn, Algona shall continue to maintain and provide no less than the existing storage in its 100,000 gallon reservoir in its westerly service area. Alternately, Algona may elect to increase participation by 100,000 gallons within the future Auburn reservoir per Exhibit B herein, or acquire storage otherwise (such as from Lakehaven Utility District) and terminate the continued operation of the existing reservoir in its westerly service area.

F. Algona hereby grants Auburn the right to construct, own, operate, maintain, repair, and replace Auburn's municipal water system including pipes, fire hydrants, valves, meters, and other appurtenances located within Algona right-of-way as shown on Exhibit A, in perpetuity per the terms and conditions herein.

Auburn shall provide to Algona copies of available record drawings showing the location of Auburn's water system within Algona right-of-way.

Except for the normal operation of Auburn's water system, Auburn shall notify Algona prior to any major waterline improvements or replacements which may interfere with or disrupt any other utilities and/or passage of traffic within Algona. Algona shall notify Auburn prior to any street or other utility improvement which may interfere or disrupt Auburn's water system.

Auburn shall be responsible to pay for costs associated with improvements to Auburn's water system including necessary street patches. In the event that Algona constructs any street improvements on those rights-of-way containing Auburn's water system, Auburn shall be responsible to adjust all water system appurtenances to finish grade, including lowering or raising said pipelines at conflict with Algona improvements.

IV. FIRST IN TIME FIRST IN RIGHT

It is the intent of Auburn to create a first in time, first in service approach to wholesale of water within the limitations of Auburn's water rights and/or supply capacity. Auburn agrees that future interlocal agreements or interlocal agreement amendments pertaining to the supply of wholesale water to Algona or other purveyors by Auburn shall be subject to the terms and conditions of this IA3.

V. PROJECT DESCRIPTION

A. The Project contemplates use of master meter stations and flow control facilities as necessary to measure peaking factors and the volume of water supplied.

B. The project shall include supply development as a portion of Auburn's well # 6 and well # 7. Currently Auburn is developing the two wells with a planned Qi of 10 mgd, with construction completion scheduled for 1998, and primary water rights acquisition scheduled for 1999.

C. The Project shall include five individual master meter stations. One master meter station, the one currently serving the Boeing welded duct facility, currently exists. At such time as conditions precedent to this IA3 have been met, construction will be commenced upon two additional master meter stations. The first to be constructed will be located on Industry Drive North, immediately south of Boundary Boulevard. The second to be constructed will be located on Milwaukee Avenue, immediately south of Boundary Boulevard. The remaining two meter stations will be located and constructed at the discretion of Algona.

For adequate water distribution to be obtained, it shall also be necessary for Algona to construct additional piping and connections, at its own expense, such as to the Quadrant system,

D. The Project shall include a reservoir, to be constructed in the future by Auburn, and presently expected to be located within the Lakeland Hills development area within Pierce County, Washington. The present reservoir construction schedule expects the construction to occur during the late 1990's. The volume of the new reservoir is presently estimated to be approximately 1.7 million gallons, and this capacity is to be shared with multiple municipalities, including Auburn and Algona. Financial participation is to be based on a capacity percentage basis by any and all municipalities sharing in the capacity, whether the actual storage volume usage for any such municipality is directly derived from the reservoir or not. Algona's capacity shall be 180,000 gallons, exclusive of the provision of Paragraph III. E.

E. Algona projects the need for supply source in the following quantities:

Year	Average Daily Demand (mgd)	Maximum Daily Demand (mgd)
1996	0.415	0.846
1998	0.423	0.863
2000	0.427	0.871
2004	0.457	0.945
2009	0.491	1.029
2014	0.525	1.114

F. Additional water supply may be available as mutually agreed to by the Auburn City Council and the Algona City Council.

G. Respective facility ownership, capacity rights, and responsibility for operation, maintenance, and renewal and/or replacement (r/r) are as specifically described in Exhibit B. Operational parameters shall be as specifically defined in Exhibit C.

H. Distribution water pipelines within the city limits of a Participant shall be owned and the responsibility of that Participant, with the exception of Auburn facilities specifically identified on Exhibit A, and permitted by Paragraph III. F.

I. Retail customers whose property lies within the city limits of a Participant shall be the retail customers of that Participant.

J. For Auburn facilities within Algona, as specifically identified on Exhibit A, Algona hereby grants a franchise to Auburn.

K. Auburn shall design, construct and maintain its facilities constructed under IA3 in accordance with the design standards described in the 1995 Auburn Comprehensive Water Plan.

VI. PROJECT COSTS

Both Participants shall exercise good faith and use best efforts in estimating project costs. However, the foregoing notwithstanding, each Participant shall be responsible for and shall pay for one hundred percent (100%) of its actual, proportionate share of the project costs, regardless of the estimate. The project costs are estimated as shown in Exhibit D. The Participants shall maintain individual cost records of their expenses for the project. Auburn will maintain overall coordinated project cost records.

VII. PROJECT FINANCING

A. The Participants shall fully finance and pay for their proportionate share of cost as shown in Exhibit D. Algona shall deposit funds with Auburn to perform the project work for the proposed facilities in accordance with the schedule shown in Exhibit E.

B. Auburn shall fund two master meters to be immediately installed and include in future monthly service charges an additional amount of $1,000 each month to Algona for recovery of Auburn's funding of purchase and installation of the two master meters. Such additional charges shall continue until Algona has paid the principal in full and has paid interest on the outstanding principal at the rate of 5.5% simple annual.

VIII. SERVICE CHARGES

Auburn has prepared a cost of service study to determine the cost of service to its customers. A customer classification for "wholesale" has been created, and rates for service charges shall be based on a rate study for the wholesale customer classification. Auburn will regularly update the cost of service analysis. Wholesale water rates will be based on costs of providing the service. Cost of developing the initial Cost of Service Study and Rate Study will be included within the project costs.

IX. ADJUSTMENTS TO THE SERVICE CHARGES

Adjustments to the service charges will be made in accordance with Section 4. H. of the JOA.

X. PROJECT COORDINATION

A. For purposes of this IA3, each Participant identifies its authorized representative as the "Mayor" of Algona and as the "City Engineer" of Auburn.

B. The Participants shall meet as needed for project coordination.

C. The Participants shall be responsible for design, construction management, and commissioning of all facilities to be constructed in accordance with ownership of the facility. Responsibilities may be assigned otherwise by agreement of the Participants' authorized representatives.

XI. LIMITATIONS ON AUBURN'S CAPACITY

A. It is acknowledged and agreed that in the event Auburn experiences any system failure or decreased capacity for any reason, the supply to Algona may be curtailed to an equal percentage of use as Auburn's curtailment is implemented. Such curtailment shall be imposed by Algona on Algona retail customers immediately and simultaneously as such curtailment is imposed by Auburn on Auburn retail customers.

B. It is the intent of Auburn to provide the water described in Paragraph V. E. whenever it is available subject to the limitations described in paragraph XI. A. Auburn shall use reasonable diligence and best efforts to provide immediate notice in the event it becomes aware that it may not be able to fulfill the requirements of paragraph V. E. for any reason.

C. Auburn possesses the short-term (approximately three (3) years) capacity to meet the storage requirements for Algona. Long-term storage requirements for Algona shall be met by Algona financial participation within the next increment of storage to be constructed by Auburn. Algona's minimum financial participation shall provide for construction of storage volume capacity of 180,000 gallons, inclusive of standby, equalization, and fire protection volume storage. Such 180,000 gallon capacity is in addition to Algona's existing 100,000 gallon reservoir storage in its westerly service area.

D. Algona's water supply needs above the 0.525 mgd average daily demand, and the 1.114 mgd maximum daily demand, both identified in paragraph V. E. will be dependent upon negotiation of an amendment to this IA3.

XII. TERM OF DURATION OF AGREEMENT

This IA3 shall remain in full force unless terminated by mutual agreement of the Participants.

XIII. AMENDMENTS

A. This IA3 may be amended only in writing by approval signed by the Participants.

B. The authorized representatives shall have authority to update Exhibits attached hereto. The Exhibits shall be updated and/or revised only upon written agreement signed by the Participants' authorized representatives. Updates must be ratified by each Participant's City Council.

XIV. DISPUTE RESOLUTION

A. Should a dispute arise between the Participants regarding the technical aspects of the planning, design, construction, funding, or operation of the facilities contemplated under IA3, the authorized representatives of the Participants, as defined in paragraph X. A. herein, shall meet and select one person who, along with the authorized representatives of the Participants, will form a dispute resolution panel to resolve the dispute. Should the dispute resolution panel not be able to reach a mutually satisfactory resolution, the dispute will be resolved as described below.

B. Legal disputes between the Participants to IA3 not resolved in accordance with paragraph XIV. A., shall be resolved through the use of mediation by a mediator mutually acceptable to the Participants with each Participant agreeing to equally share the cost of the mediator. Should the Participants not be able to satisfactorily resolve the dispute through mediation, the forum for resolution shall be King County Superior Court. The substantially prevailing party will be entitled to attorney fees and costs.

XV. HOLD HARMLESS

Each Participant agrees to indemnify and hold harmless the other Participant from and against any loss, cost, damage, or expense of any kind and nature arising out of injury to person or damage to property in any manner caused by the negligent act or omission of the indemnified individual Participant in the performance of its work pursuant to or in connection with this IA3.

XVI. SEVERABILITY

If any provision of this IA3 is invalid or unenforceable the remaining provisions shall remain in force and effect.

IN WITNESS WHEREOF, the Participants hereto have caused this IA3 to be executed by their proper Officers on the date shown below.

City of Auburn

By: Charles A. Booth

Its: Mayor

Date: 8/19/96

Attest by: Robin Wohlhueter

Approved as to Form by: ______________________

City of Algona

By: Glen Dickson

Its: mayor

Date: 8/20/96

Attest by: ______________________

Approved as to Form by: ______________________

Exhibit A
Facilities Layout Plan
to
Interlocal Agreement 3
for
Algona Intertie Project
(continued)

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

3. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit B
Facility Ownership, Capacity Rights, Operation, Maintenance, and Renewal and Replacement Responsibilities
to
Interlocal Agreement 3
for
Algona Intertie Project

Facility	Location	Facility Ownership	Capacity Rights	Operation, Maintenance, & Renewal/Replacement Responsibility
Meter Station 1, existing for Boeing	200' easterly of the Intersection of 1st Avenue North and Perimeter Road	Auburn	100% Algona	Auburn
Meter Station 2, immediate installation	Intersection of Milwaukee Avenue and Boundary Boulevard	Auburn	100% Algona	Auburn
Meter Station 3, immediate installation	Intersection of Industry Drive North and Boundary Boulevard	Auburn	100% Algona	Auburn
Meter Station 4 future installation	Presently unknown, but probably near intersection of West Valley Highway and Boundary Boulevard extended	Auburn	100% Algona	Auburn
Meter Station 5 future installation	Presently unknown, but probably near intersection of UP RR and 1st Avenue North	Auburn	100% Algona	Auburn
Algona Well, existing	+/-150' northwesterly of intersection of Washington Boulevard and 3rd Ave South	Auburn	100% Auburn	Auburn
Future Lakeland Hills Reservoir #2	Lakeland Hills, Pierce County	Auburn	10.5% Algona; remainder Auburn	Auburn
Supply (Qi)	Well #6, City Park Well #7, Unknown	Auburn	11.14% Algona; remainder Auburn	Auburn

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit C
Project Criteria
to
Interlocal Agreement 3
for
Algona Intertie Project

Project Criteria:

- Meter Stations to be sized on flow volume criteria as opposed to line size.
- Maximum (Qi) daily demand flow is 1.114 million gallons per day for total of all meter stations supply to Algona, except in case of fire or emergency.
- Maximum annual (Qa) average daily demand flow is 0.525 million gallons per day for total of all meter stations supply to Algona.
- Each meter station shall be calibrated annually for the first three years of operations, and thereafter at the discretion of Auburn.
- Reservoir capacity for Algona is 180,000 gallons of the estimated 1.7 mg total capacity in the proposed Lakeland Hills Reservoir 2.
- Total of all meter stations supply to Algona necessary for peak hourly flow and fire flow shall be determined by Algona, and such data provided to Auburn for meter station design.

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit D
Project Cost Estimate
to
Interlocal Agreement #3
for
Algona Intertie Project

Description	Total Est. Cost	Auburn Cost Percent	Auburn Cost Cost	Algona Cost Percent	Algona Cost Cost	Algona Cost by Year 1996	1997	1998	1999	Future
METER STATION										
2-Inch Meter Station at Boeing	Existing		N/A		N/A					
8-Inch Turbine Meter Station at Industry Drive	$18,000	0.0%	$0	100%	$18,000	$18,000				
8-Inch Turbine Meter Station at Miwaukee	$18,000	0.0%	$0	100%	$18,000	$18,000				
8-Inch Turbine Meter Station (Future)	$20,000	0.0%	$0	100%	$20,000			$20,000		
8-Inch Turbine Meter Station (Future)	$22,000	0.0%	$0	100%	$22,000					$22,000
PUMP STATIONS SUBTOTAL	$78,000		$0		$78,000	$36,000	$0	$20,000	$0	$22,000
STORAGE FACILITY										
Lakeland Hills Rerservoir #2 (Note 1) (equalization storage)	$1,020,000	89.5%	$912,900	10.5%	$107,100			$107,100		
Fire storage of 480,000 gallons is existing within valley reservoirs	$0.00	100.0%	$0	0.0%	$0			$0		
Standby storage is not required in valley zone (multiple sources)	$0.00	100.0%	$0	0.0%	$0			$0		
STORAGE FACILITY SUBTOTAL	$1,020,000		$912,900		$107,100	$0	$0	$107,100	$0	$0
SUPPLY FACILITY										
Portion of Well #6 and Well #7 (Note 2)	$1,250,000	93.7%	$1,170,812	6.3%	$79,188		$79,188			
SUPPLY FACILITY SUBTOTAL	$1,250,000		$1,170,812		$79,188	$0	$79,188	$0	$0	$0
TOTAL ESTIMATED CONSTRUCTION COST	$2,348,000	88.7%	$2,083,712	11.3%	$264,288	$36,000	$79,188	$127,100	$0	$22,000
PRELIMINARY PROJECT COSTS										
Algona Well and Water Rights Conveyance	$5,000	100.0%	$5,000	0.0%	$0	$0				
Algona Water Rights Value	in cost transfer	100.0%	$30,000	-100.0%	($30,000)	($30,000)				
Wellhead protection zone easement	$2,000	100.0%	$2,000	0.0%	$0	$0				
Development of Joint Operating Agreement - SKCRWA	$5,800	0.0%	$0	100.0%	$5,800	$5,800				
Cost of Service Study / Rate Study	$1,627	0.0%	$0	100.0%	$1,627	$1,627				
PRELIMINARY PROJECT COSTS SUBTOTAL	$14,427		$37,000		($22,573)	($22,573)	$0	$0	$0	$0
ALLIED COST										
Contingency (10.0%)	$234,800	88.7%	$208,371	11.3%	$26,429	$3,600	$7,919	$12,710		$2,200
State Sales Tax (8.2%)	$192,536	88.7%	$170,864	11.3%	$21,672	$2,952	$6,493	$10,422		$1,804
Engineering Design (6.5%)	$152,620	88.7%	$135,441	11.3%	$17,179	$2,340	$5,147	$8,262		$1,430
Construction Engineering (7.5%)	$176,100	88.7%	$156,278	11.3%	$19,822	$2,700	$5,939	$9,533		$1,650
Legal (1.0%)	$23,480	88.7%	$20,837	11.3%	$2,643	$360	$792	$1,271		$220
Fiscal (1.0%)	$23,480	88.7%	$20,837	11.3%	$2,643	$360	$792	$1,271		$220
Administration (2.0%)	$46,960	88.7%	$41,674	11.3%	$5,286	$720	$1,584	$2,542		$440
Permits, Agency Approvals (2.0%)	$46,960	88.7%	$41,674	11.3%	$5,286	$720	$1,584	$2,542		$440
Engineering Surveys (2.5%)	$58,700	88.7%	$52,093	11.3%	$6,607	$900	$1,980	$3,178		$550
Land/ROW (2.3%)	$54,004	88.7%	$47,925	11.3%	$6,079	$828	$1,821	$2,923		$506
TOTAL ALLIED COST (43.0%)	$1,009,640		$895,996		$113,644	$15,480	$34,051	$54,653	$0	$9,460
TOTAL PROJECT COST	$3,372,067		$3,016,708		$355,359	$28,907	$113,239	$181,753	$0	$31,460

Note 1: Algona will share in Lakeland Hill Reservoir #2 for 178,500 gallons of the estimated total of 1.7 mg.

Note 2: Algona will share in Well #6 & 7 development for 633,504 gallons of the estimated total of 10.0 mgd.

Exhibit "A" - Resolution No. 2770
City of Auburn - August 19, 1996

EXDDAL.XLS

8/13/96

Exhibit D
Project Cost Estimate
to
Interlocal Agreement 3
for
Algona Intertie Project
(continued)

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

3. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

Exhibit E - Project Schedule
to
Interlocal Agreement 3
for
Algona Intertie Project

Activity	Date
Execute Interlocal Agreement	19 August 1996
Complete Meter Stations design for initial two stations	15 September 1996
Algona to provide wellhead protection zone easement, well conveyance, water rights conveyance, all to Auburn	30 September 1996
Award construction contract	10 October 1996
Complete construction of Master Meter Stations	15 November 1996
Conveyance formal completion of well, easement, and water rights	31 October 1996
Final Master Meter Stations and Conveyance project cost accounting	15 December 1996
Balancing Payment of immediate actions	31 January 1997
Algona to provide $100,000 deposit to Auburn	30 June 1997
Algona to provide $150,000 deposit to Auburn	30 September 1998
Final Project cost accounting	1 November 1999
Final Balancing Payment of IA3	31 December 1999

Update Approval

1. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

2. Auburn: ______________________________, Dated: ______________

   Algona: ______________________________, Dated: ______________

EXHIBIT F. **Algona Well Facility and Water Right Conveyance**

WARRANTY DEED

The GRANTOR, THE CITY OF ALGONA, on this __ day of ___________, 1996, for and in consideration of the sum of $1.00, receipt of which is hereby acknowledged, and for benefits to be derived by the GRANTOR herein, hereby conveys and warrants to the CITY OF AUBURN, GRANTEE, the following well facility and any and all water right(s) (i.e., permit(s) and/or certificate(s)) situated in the County of King, State of Washington:

Well Facility. The well, piping, and appurtenances generally consist of 10 inch casing to approximately 65 feet below ground surface.

Ground Water Right(s) (i.e., permit(s) and/or certificate(s)). The Ground Water Right is to provide water on a continuous basis for municipal purposes pursuant to RCW 90.03.290. Further, this water right is to provide an instantaneous rate of withdrawal (Qi) of 500 gpm, and an annual quantity/rate of withdrawal (Qa) of 175 acre feet per year. As a water right applied to municipal purposes, the instantaneous (Qi) and annual (Qa) amounts authorized for withdrawal within the right(s) is not subject to relinquishment pursuant to RCW 90.14.140(2)(d).

Dated this ___day of ___________, 1996.

____
GRANTOR - CITY OF ALGONA

STATE OF WASHINGTON)
) ss
COUNTY OF KING)

On this _____day of ___________, 1996, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Glenn Wilson, to me known as the Mayor, for the City of Algona, the municipal jurisdiction that executed the above and foregoing instrument and acknowledged that he signed the same as the legally authorized representative of the City of Algona as his free and voluntary act and deed, for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal on the date hereinabove set forth.

____
NOTARY PUBLIC in and for the STATE of WASHINGTON, residing at ________
My Commission expires ________.

AFTER RECORDING, RETURN TO:

City of Auburn
25 West Main Street
Auburn, WA 98001-4998
ATTN: City Clerk

EXHIBIT G

Well and Ingress / Egress Easement

For and in consideration of the sum of one dollar ($1.00) and other good and valuable consideration, receipt of which is hereby acknowledged, and for benefits to be derived by the Grantor herein, Grantor, City of Algona, a Municipal Corporation of the State of Washington, hereby conveys and warrants to the City of Auburn, Grantee herein, a Municipal Corporation of the State of Washington, its successors and assigns, a perpetual Nonexclusive Easement under, over, through and across the following described real property for the purpose of laying, maintaining, and/or installing groundwater well facilities and appurtenances thereof, said real property being described as follows:

> Well and Protection Zone. A circle of land consisting of a 100 foot radius, centered on and surrounding the existing well facilities located on Lots 25-30 inclusive, Block 4, Woods Algona Addition, Division 1, according to the Plat thereof, as recorded in Volume 19 of Plats, page 36, in the records of King County, Washington.

Said Grantee shall have the absolute right, at times as may be necessary, for immediate ingress / egress over the regularly traveled portion of said Lots 25-30 inclusive, Block 4, for the purpose of maintenance, inspection, construction, operation, repair or reconstruction of the well facilities without incurring any legal obligation or liability therefore.

Said Grantor shall not in any way block, restrict or impede access and ingress / egress to or from said Easement, and/or in any way block, restrict or impede full use of the real property within the above-described Easement by said Grantee for the above-described purposes. Said Grantor may fence across said Easement and/or along the boundaries of said Easement provided that a gate is constructed in said fence. Said gate shall be of sufficient length and location to allow the Grantee full use of, and access and ingress / egress to and from the real property within the above-described Easement. If said gate is to be locked, keys shall be provided to the Grantee.

This Easement shall be a covenant running with the above-described real property and burden said real estate, and shall be binding on the successors, heirs and assigns of all parties hereto.

IN WITNESS WHEREOF, said corporation has caused this instrument to be executed by its property officers this _____ day of ____________________, 1996.

____
GRANTOR

BY____________________________________
GLENN WILSON, MAYOR

BY____________________________________
, CITY CLERK

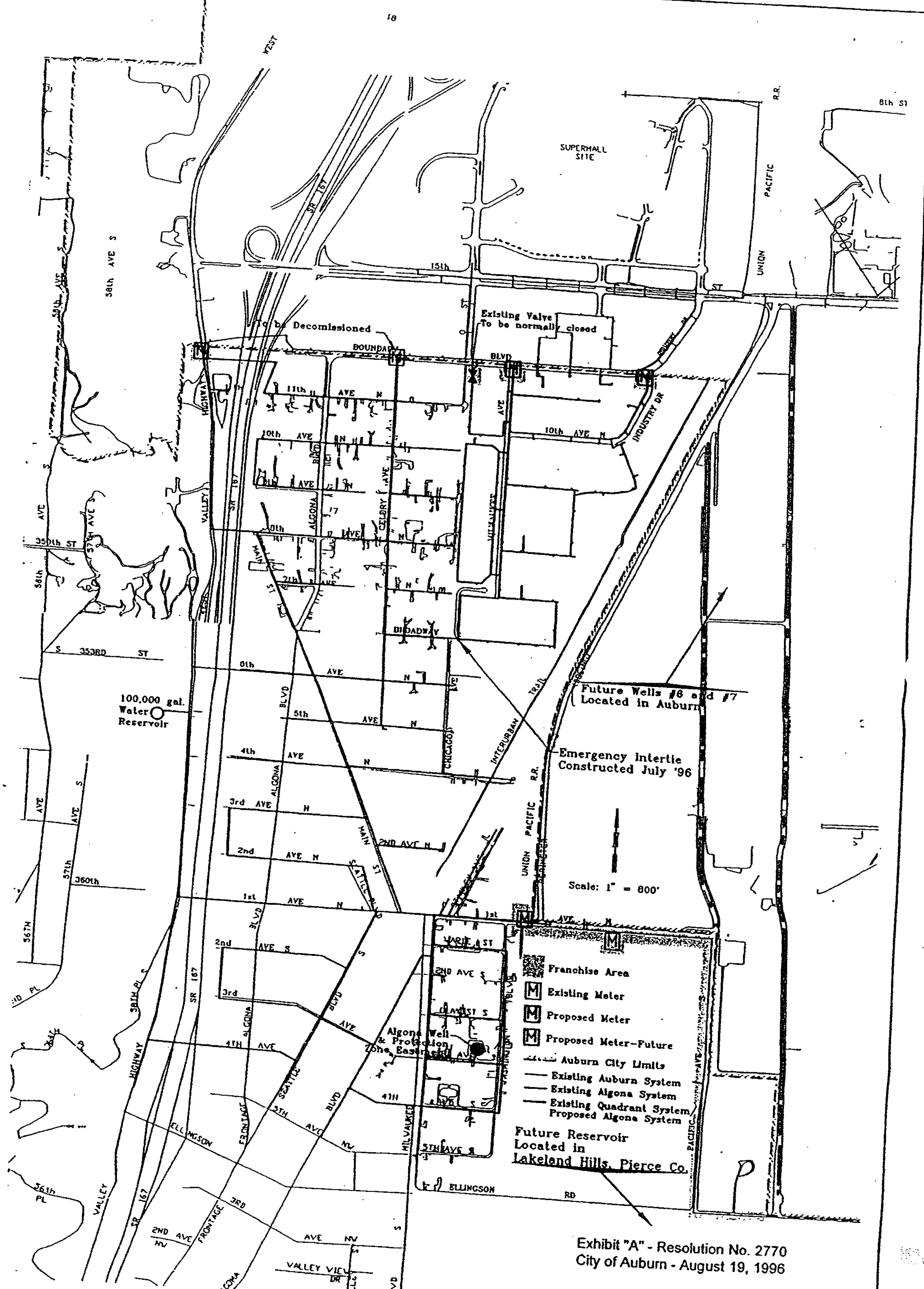


Exhibit "A" - Resolution No. 2770
City of Auburn - August 19, 1996

EXHIBIT A – FACILITIES LAYOUT PLAN
IA #3
ALGONA INTERTIE PROJECT

APPENDIX D

CONSTRUCTION STANDARDS

CHAPTER 8

WATER SYSTEM STANDARDS

8.1 GENERAL

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 City due to localized conditions. Extensions, connections or modifications to the existing system shall be in compliance with the State Department of Health.

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 City Engineer to mitigate impacts caused by the development.

8.2 DESIGN STANDARDS

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 City Standards as set forth herein.

A. Detailed plans shall be submitted for the City's review which provide the locations, size, and type of the proposed water system and points of connection.

B. Project plans shall conform to the requirements of the Plan Checklist.

C. Computations and other data used for design of the water system shall be submitted to the City for approval.

D. 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.

E. 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.

F. Unless otherwise approved or required by the City Engineer, the water main shall be ductile iron pipe class as shown below. The minimum nominal size for water mains shall be 8 inches, unless otherwise approved/required by City Engineer.

TABLE 8-1

Water Main Thickness

Class	Pipe Diameter
Class 52	4" through 14"
16" and larger	Class 50

EXCEPTION: 6-inch hydrant spools and pipelines located beneath rock or retaining walls shall be Class 53.

G. All fittings shall be cement-lined ductile iron.

H. 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 City. A street is normally not considered dedicated until the plat which created it has been officially filed with the County Auditor.

I. All water main distribution pipeline construction shall have a minimum 36-inch cover from finished grade and 42-inch cover over transmission mains. Mains shall generally be located parallel to and 6 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 City’s current Water Comprehensive Plan.

J. 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 the International Building Code and the International Residential Code.

K. 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.

L. Valves shall be installed at not more than 1,000-foot spacing. Valves shall be installed on all legs of all tees and crosses except fire hydrant tees.

M. Pipes connecting hydrants to mains shall be at least 6 inch in diameter and be less than 50 feet in length. If the service line is over 50 feet in length the service line shall be 8 inches in diameter.

- Fire hydrants shall stand plumb, be set to meet manufacturer's specification for ground bury line, and have a clear, level area around the hydrant with a radius of no less than 60 inches.

- Fire hydrants shall be located no closer than 50 feet to the surrounding structures (plus or minus 25 percent), or at a distance as determined by the Fire Marshal and approved by the City Engineer. Fire hydrants shall be located such that no portion of the fire hydrant is within 5 feet of any portion of a driveway (including throat, apron, and wings).

N. Dead end lines are not permitted except where the Developer can demonstrate to the City'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 offsite to create a hydraulic loop, or, as minimum, have a 4-inch blowoff assembly installed at the termination point.

O. Bends shall be included in the design as needed to maintain proper depth and spacing from other utilities. Bends shall be utilized so as not to exceed allowable deflection at pipe joints in accordance with pipe manufacturer's recommendations.

P. Provide thrust blocking and/or restrained joints at all fittings and bends in accordance with the City standards and conditions.

Q. Provide anchor blocking at all up-thrust vertical bends in accordance with these standards. Blocking to be designed by Developer's Engineer.

R. Residential water service pipe shall be a minimum one-inch diameter high density "Poly" pipe, meeting or exceed ASTM D2239, 200 psi with copper tracer wire. The pipe shall be one continuous run from the water main corp stop to the meter setter, no joints are allowed. Larger service lines may be needed if otherwise required by the Uniform Plumbing Code in accordance with fixture units.

8.3 CONSTRUCTION REQUIREMENTS

A. 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.

B. Prior to final inspection, all pipelines shall be tested and disinfected.

C. Prior to construction, the Contractor shall notify the City for a preconstruction meeting.

D. Work shall be performed only by contractors experienced in laying public water mains.

E. Prior to any work being performed, the Contractor shall contact the Mayor to set forth his proposed work schedule.

F. Contractor shall obtain approval of materials to be used from Mayor prior to ordering of materials.

G. During water main installation calcium hypochlorite granules shall be added to each section of new water main in the proportions indicated in the table below. The resulting chlorine concentration within the water main shall not be less than 50 mg/L (see Standard Specifications, Section 7-09.3(24)D).

TABLE 8-2

Calcium Hypochlorite (65% chlorine) Addition Per 100 Feet of Pipe

Pipe Diam. (Inches)	Quantity	
	Grams	Ounces
4	0.67	0.02
6	1.52	0.05
8	2.70	0.09
10	4.22	0.15
12	6.07	0.21

H. All closure fittings shall be swabbed with a 5 percent chlorine solution of chlorine immediately prior to installation per AWWA Standard C651.

I. Specific requirements regarding pressure testing and bacteriological testing are presented below in the Water Pipe Testing & Disinfection Section.

J. All materials shall be new and undamaged.

K. 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.

L. 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. Service inlet shall be centered at inlet end of box and faced toward outlet end of box parallel with long sides.

M. Meter setters shall be Mueller with top entry dual check valve.

N. All water services shall end within road right-of-way or easements.

O. All meters shall be installed by the City; the Developer shall pay the current meter installation charge.

P. Contractor shall furnish and install one water sample station for development in size of 1 to 10 lots. One additional station is required for each additional 50 lots or portions thereof.

Q. All new construction shall comply with the current Cross-Connection Control requirements.

R. Cut in connections shall <u>not</u> be made on Fridays, holidays or weekends. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains.

S. The pipe and fittings shall be inspected for defects before installation. 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.

T. 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.

U. 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 cement lining, and so as to leave a smooth end at right angles to the axis of the pipe. When pipe lengths are cut, the outer edge shall be beveled to prevent damage to the gasket during jointing of pipes.

V. Pipe shall be laid with bell ends facing in the direction of the laying, unless directed otherwise by the City. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations.

W. 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.

X. For connection of push-on 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.

Y. Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner per manufacturer's recommendations. All dead ends on new mains shall be closed with dead end M.J. caps.

Z. Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall. Timber blocking will not be permitted. 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.

AA. 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-hour notice shall be given the City in advance of the planned "cut-ins." All sleeves shall be ductile iron.

BB. Contractor shall notify the Public Works Director and obtain approval from him prior to any water shut-off or turn-on, affecting the water system, a minimum of 48 hours in advance.

CC. Road restoration shall be per these standards. Developer and Contractor shall become familiar with all City conditions of required permits, and shall adhere to all conditions and requirements.

DD. Before acceptance of the water system by the City, 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.

8.4 MATERIALS

A. Water Mains and Fittings

1. Water mains to be installed unless otherwise approved (or required) in writing by the City Engineer shall be ductile iron pipe for all sizes. The minimum size shall be 8 inches unless a smaller size is specifically approved in writing by the Mayor.

2. The ductile iron pipe shall conform to ANSI/AWWA C151/A21.51-91 Standards, and current amendments thereto, except the ductile iron pipe shall have thickness as given in the De Class 52 for 4-inch through 14-inch-diameter pipe and Class 50 for 16" and larger. Grade of iron shall be a minimum of 60-42-10. The exterior of the pipe 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.

3. Type of joint 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.

4. Restrained joint pipe, where shown on the Plans shall be push-on joint pipe with "Field Lok" gaskets as furnished by U.S. Pipe, "Fast Tight" gaskets as manufactured by American Cast Iron Pipe or equal for 12-inch diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for 16-inch and 24-inch-diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.

5. All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer's recommendations.

6. 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.

7. All fittings shall be short-bodied, ductile iron complying 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 cement lined and either mechanical joint or flanged, as indicated on the Plans.

8. 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 EBAA Iron, Inc., MEGALUG, Star Pipe Products, or approved equal.

9. All couplings shall be ductile iron mechanical joint sleeves.

B. Valves

All valves 14 inch and larger shall generally be furnished and installed as butterfly valves. All valves 12 inch and smaller shall generally be furnished and installed as resilient seat gate valves.

1. Resilient-Seated Gate Valves

The gate valves shall be <u>ductile iron body</u> valves, iron disk completely encapsulated with polyurethane rubber and bronze, non-rising stem with "O" ring seals conforming to AWWA C509 or C515. 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.

For applications with working pressure above 175 psi, a valve rated as 250 psi or higher shall be used.

Valves shall be Mueller A-2360 Series, or approved equal.

2. Butterfly Valves

Butterfly valves shall be <u>ductile iron body</u> 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.

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 90 degrees from the full open position to the tight shut position.

Valves shall be Henry Pratt Company "*Groundhog,*" or Mueller "*Lineseal III.*"

3. Tapping Sleeves and Tapping Valves

The tapping sleeves shall be rated for a working pressure of 250 psi minimum and furnished complete with joint accessories. Tapping sleeves shall be constructed in two sections for ease of installation and shall be assembled around the main without interrupting service.

Mechanical joint style sleeves shall be ductile iron and comply with AWWA C110. Mechanical joint sleeves shall be cast by Clow, Dresser, Mueller, Tyler, U.S. Pipe or approved equal.

Tapping valves shall be provided with a standard mechanical joint outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to operation and materials.

The tapping sleeve and valve shall be tested to 100 psi (air) prior to tapping the main.

The installation contractor for the tapping sleeves and valves shall be approved by the City.

4. All Valves

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.

All valves with operating nuts located more than 4'-0" below finished grade shall be equipped with extension stems to bring the operating nut to within 18 inches of the finished grade.

At the top of the extension stem, there shall be a 2-inch standard operating nut, complete with a centering flange that closely fits the 5-inch pipe encasement of the extension stem. The valve box shall be set in a telescoping fashion around the 5-inch pipe cut to the correct length to allow future adjustment up or down.

Each valve shall be provided with an adjustable two-piece cast iron valve box of 5-inches minimum inside diameter. Valve boxes shall have a top section with an 18-inch minimum length. The valve boxes and covers shall be Olympic Foundry No. 940 or equal.

Valves located in easements or outside of paved areas shall have concrete collars with a minimum size of 2'-0" diameter by 4-inches thick.

5. Pressure Reducing and Relief Valves

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 on the service side of the water meter to reduce the pressure to 80 psi or lower, except where the water service pipe supplies water directly to a water-pressure boost system, an elevated water gravity tank, or to pumps provided in connection with a hydropneumatic or elevated gravity water-supply tank system. Pressure at any fixture shall be limited to no more than 80 psi under no-flow conditions.

C. Fire Hydrants

Fire hydrant assemblies shall conform to the standard details listed above.

Fire hydrant service lines shall be installed at right angles to 8-inch minimum diameter supply mains.

Fire hydrants shall stand plumb, be set to meet manufacturer's specification for ground bury line, and have a clear, level area around the hydrant with a radius of no less than 60 inches.

Fire hydrants shall be located no closer than 50 feet to the surrounding structures(plus or minus 25 percent), or at a distance as determined by the Fire Marshal and approved by the City Engineer. Fire hydrants shall be located such that no portion of the fire hydrant is within 5 feet of any portion of a driveway (including throat, apron, and wings).

Fire hydrants shall be provided with two 2-1/2-inch National Standard Thread (NST) hose ports and one 4-1/2-inch NST by 5-inch hose port with a Storz adapter and cap.

The pumper port shall face the street or fire access road and be readily accessible to any fire vehicle for firefighting and pumping operations. There shall be at least 18 inches clear from the face of the pumper port to the edge of pedestrian or traveled ways.

The service line from the supply main to the fire hydrant shall be 6 inches in diameter unless the service line extends over 50 feet in length, in which case the service line shall be 8 inches in diameter.

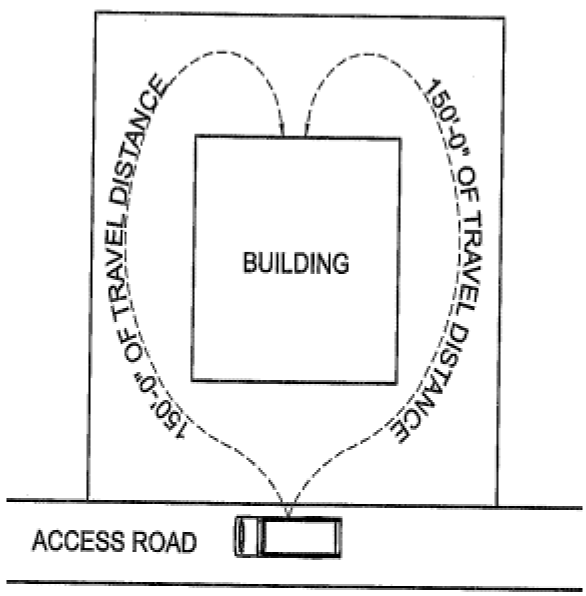
Fire hydrants shall be installed with a maximum spacing of 600 feet along streets in single-family zones and 300 feet in all other zones.

The maximum distance allowed from any part of a single-family residential structure to the closest fire hydrant is 450 feet.

Buildings, other than single-family residences, shall require fire hydrant assemblies when any of the following apply:

- Portions of the building are more than 150 feet in vehicular travel from a fire hydrant assembly
- Buildings more than 10,000 square feet
- Building with a fire flow greater than or equal to 2,500GPM
- Buildings with a portion of the building over 30 feet

These hydrants shall be served by a public water main that loops around the building or complex of buildings and reconnects back to the distribution supply main.



Small Buildings

The fire hydrants shall be M&H "Reliant" No. 929, Waterous Pacer, or Mueller Super Centurion. A blue pavement marker shall be furnished and installed in the pavement in front of each hydrant.

The holding spools between the gate valve and fire hydrant shall be made from Class 53 ductile iron pipe, 0.34-inch wall thickness. The hydrant and gate valve shall be anchored in place using holding spools and mechanical joint restraint device. Holding spools with length in excess of 17 feet shall be supplied with an M. J. sleeve and mechanical joint restraint device.

The fire hydrants shall be painted per local fire marshal requirements with two coats of Preservative Brand caterpillar or international yellow paint. After installation, they shall be wire brushed and field painted with two additional coats of similar yellow enamel paint. Distance to the hydrant valve shall be clearly stenciled in black numerals 2 inches in height on the fire hydrant below the pumper port.

<u>Between the time that the fire hydrant is installed and the completed facility is placed in operation, the fire hydrant shall at all times be wrapped in burlap, or covered in some other suitable manner to clearly indicate that the fire hydrant is not in service.</u>

D. Fire Sprinkler Systems

Any contractor offering to design, install, test, and/or provide maintenance of fire sprinkler systems in Washington must be licensed with the State Fire Marshal's Office, Licensing Section.

Fire sprinkler systems shall be required in commercial/industrial and multifamily buildings according to the adopted fire code regulations. Sprinkler systems may be required in single-family residences when determined by the City and the Fire Authority.

Fire sprinkler supply lines for commercial buildings, unless designed by a Fire Protection Engineer, shall be the same diameter as the supplying water main.

Fire sprinkler supply lines for non-single-family buildings shall be connected to a looped water main.

Fire sprinkler supply lines shall be separated from the public water main by a valve located at the point of connection. Unless the fire sprinkler supply line is installed with a wet tap, the cut-in tee shall have three valves installed.

The design of fire sprinkler supply lines for single-family/duplex shall be designed for 13D or P2904 systems.

A Washington State Certified Level "U" contractor shall install underground fire sprinkler supply lines in accordance with WAC 212-80-010. Prior to installation, three sets of underground fire sprinkler supply line plans shall be submitted to the City for approval by the Fire Marshal. Both a State Certified Level "U" contractor and a Fire Protection Engineer shall stamp these plans. A letter from a state certified sprinkler system designer stating "FOR DESIGN PURPOSES ONLY" may be attached in lieu of a stamp from the Fire Protection Engineer.

A post indicator valve (PIV) shall be installed on the fire sprinkler supply line between the public water main and the building. PIV's shall be located in such a manner as to be easily visible to Fire Department personnel. A wall-mounted PIV may be installed when the exterior wall of the building is of non-combustible construction. A detail containing this information shall be included with the submitted plans.

Fire Department Connections (FDC's) shall be placed within 50 feet of a fire hydrant or as directed by the Fire Marshal. FDC's must be identified and approved by the Fire Marshal.

New water mains shall be constructed with valves on each side of fire line taps.

NFPA 13 and NFPA 13R fire sprinkler systems shall have backflow prevention.

Fire sprinkler service lines shall not be connected to fire hydrant service lines.

Flow-through fire sprinkler systems may be installed for single family residential only. Design shall be according to NFPA 13D. Backflow prevention is not required for flow-through systems.

E. Fire Flows

New developments, redevelopment of existing sites, or changes in land use are required to meet the minimum City fire flow requirements listed below. The developer shall provide information to the City to define the building specific fire flow requirements as listed in IFC Appendix B. If the building specific fire flow requirements are greater than the minimums listed below, facilities shall be designed to meet the greater requirement.

Minimum fire flow requirements within the Algona Water Service areas are:

1. Single-Family Residential: 1,500 gpm @ 2 Hours

2. Commercial/Multi-Family: 2,500 gpm @ 3 Hours

3. Fire flow may be required per IFC Appendix B.

Minimum fire flows outside Algona Water Service areas shall be determined by the water service provider and the Fire Marshal.

If off-site water system improvements are necessary to meet these requirements, the Developer shall be responsible for said improvements.

F. Fire Authority and Hydrant Access

Fire Authority and hydrant access shall meet the following requirements:

Access shall be a minimum of 20-feet wide with a minimum vertical clearance of 13-1/2 feet and capable of supporting 75,000 lbs gross vehicle weight.

For 20 feet wide roadways, turns in the access shall be designed using a minimum inside radius of 28 feet and a minimum outside radius of 48 feet. The VRFA can provide a turning template for any situation beyond this.

Single-family residential driveways greater than 150 feet in length from the face of curb or the edge of the existing asphalt to a location where a single-family home has all portions of the building no more than 150 feet, as measured by an unobstructed route around the exterior of the building, shall have an 18-foot-wide driveway apron and a minimum 20-foot-wide paved surface.

Except as noted otherwise in these standards, access that exceeds 150 feet in length from the face of curb or edge of the existing asphalt of the public road and does not return to a public road shall provide a turnaround within 150 feet of the dead-end. If a hammerhead configuration is utilized for the turnaround, it shall be designed per Figure D103.1 and Table D103.4 in Appendix D of the International Fire Code. If a cul-de-sac is utilized for the turnaround, it shall be designed per the City of Algona Design Standards.

A blue pavement marker shall be furnished and installed in the pavement in front of each hydrant.

G. Blowoffs and Air Relief Assemblies

Two-inch or 4-inch blowoff assemblies shall be installed at the terminus of all dead end water mains. 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.

Two-inch air and vacuum release valves shall be installed at principal high points in the system. See detail.

The installation of these items shall include connection piping, gate valve, valve box, and all accessories.

8.5 WATER PIPE TESTING AND DISINFECTING

All pipelines shall be tested and disinfected prior to acceptance of work. 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. 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.

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.

As soon as the pipe is secured against movement under pressure, it may be filled with water. New water mains are only filled using an approved backflow prevention assembly. The water main is filled from the lower elevation end, so that as the water main is filled the chlorine is contacted and dissolved and the chlorine is spread relatively uniformly through the length of the new water main.

The chlorinated water is allowed to remain in contact with the new system for a minimum of 24-hours. After 24-hours, water may be added to the water main for the purposes of pressure testing. Pressure testing must also include testing against valves.

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 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.

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 1 hour. The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{S*D*\sqrt{P}}{266,400}$$

in which

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

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 rerun at the Contractor's expense until a satisfactory test is obtained.

If the pressure tests fails and retesting of the water main is required the Contractor shall flush the water main with a water chlorine bleach solution (1 gallon of 5 percent bleach to 1,000 gallons of water). The volume of new water pumped into and through the water main is three times the pipe volume.

After successful pressure testing, and additional chlorine contact if necessary, the water main is thoroughly flushed to remove all super chlorinated water from the new water main. A minimum of 5 pipe volumes is flushed out of the water main. After flushing, samples are collected for bacteriological analysis.

After receipt of a satisfactory bacteriological test the system is flushed at a flow rate sufficient to develop a water velocity in the pipe of 2.5 ft/sec for a minimum of five pipe volumes. Pressure tests and bacteriological tests are completed and must be passed before any new water main is physically connected to the system. **No new water main is connected to the system until a satisfactory bacteriological analysis is obtained.**

All closure fittings shall be swabbed with a 5 percent chlorine solution of chlorine immediately prior to installation per AWWA Standard C651. Additional samples for bacteriological analysis shall be collected and analyzed after the final connections are made.

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.

City forces only will be allowed to operate existing and new tie-in valves. The Contractor's forces are expressly forbidden to operate any valve on any section of line, which has been accepted by the City.

8.6 BACKFLOW PREVENTION AND SPRINKLER SYSTEMS

1. All connections to the public water system shall have backflow prevention as required by WAC 248-54-285.

2. All fire sprinkler systems as mandated/proposed/or required by the local fire marshal and/or City Ordinance that have a fire department connection shall have backflow prevention as required by WAC 248-54-285.

3. Building sprinkler systems may be required based on Building Codes/Fire Marshall requirements.

    - Fire sprinkler supply lines for commercial buildings, unless designed by a Fire Protection Engineer, shall be the same diameter as the supplying water main.

    - Fire sprinkler supply lines for non-single-family buildings shall be connected to a looped water main.

    - Fire sprinkler supply lines shall be separated from the public water main by a valve located at the point of connection. Unless the fire sprinkler supply line is installed with a wet tap, the cut-in tee shall have three valves installed.

    - The design of fire sprinkler supply lines for single-family/duplex shall be designed for 13D or P2904 systems.

    - A Washington State Certified Level "U" contractor shall install underground fire sprinkler supply lines in accordance with WAC 212-80-010. Prior to installation, 3 sets of underground fire sprinkler supply line plans shall be submitted to the City for approval by the Fire Marshal. Both a State Certified Level "U" contractor and a Fire Protection Engineer shall stamp these plans. A letter from a state certified sprinkler system designer stating "FOR DESIGN PURPOSES ONLY" may be attached in lieu of a stamp from the Fire Protection Engineer.

    - A post indicator valve (PIV) shall be installed on the fire sprinkler supply line between the public water main and the building. PIV's shall be located in such a manner as to be easily visible to Fire Department personnel. A wall-mounted PIV may be installed when the exterior wall of the building is of non-combustible construction. A detail containing this information shall be included with the submitted plans.

- Fire Department Connections (FDCs) shall be placed within 50 feet of a fire hydrant or as directed by the Fire Marshal. FDCs must be identified and approved by the Fire Marshal.

- New water mains shall be constructed with valves on each side of fire line taps.

- NFPA 13 and NFPA 13R fire sprinkler systems shall have backflow prevention

- Fire sprinkler service lines shall not be connected to fire hydrant service lines.

- Flow-through fire sprinkler systems may be installed for single family residential only. Design shall be according to NFPA 13D. Backflow prevention is not required for flow-through systems.

8.7 SERVICE CONNECTIONS

Individual services to each property shall be installed and connected to the new water mains. New services from existing mains will be installed by the City. The Developer shall be responsible for permitting, traffic control, excavation to expose main, shoring to protect City employees, backfilling trench, and completion of all restoration.

Upon completion of the installation of the water main (before testing and disinfection) services shall be installed by connecting to the water main and extending the service line to the meter setter.

All single family residential shall be provided with a meter setter including a check valve. All other services shall be completed with Washington State-approved backflow prevention located immediately behind and on the property side of the water service box. Irrigation, residential single-family fire meters, duplex, and multi-family residential connections shall require double check valve assemblies (DCVA). All other connections shall require reduced pressure backflow assemblies (RPBA). Commercial fire sprinkler system, if unmetered shall require reduced pressure detector assemblies (RPDA).

All irrigation using chemical feed, or water features, including decorative ponds, pools and fountains requiring make-up water shall be protected from backflow into the public water supply by a **minimum** of an approved air-gap to be located at the fill point of the pond or water feature. This "air-gap" shall be inspected by the City prior to filling. In all instances, the water supply used for filling purposes shall be protected by a double check valve assembly (DCVA) installed behind the meter for new construction or retrofitted as close as practical on modified systems.

Corporation stops and the single meter shut-off valves shall be Mueller or A.Y. McDonald with the type and style noted on the Standard Details or approved equal. Included as a part of the service connection shall be the furnishing and installation of the meter box complete with lid, set flush with the proposed finished grade of the lot in the designated location near the property line, all as shown on the Standard Details. The angle type of shut-off valve and angle type dual check valve shall be set inside the meter box in a proper position for installation of a future meter by the City.

Service lines between the main and the property line shall be placed at a trench depth sufficient to maintain a 3'-0" cover over the top of the service line for its full length, taking into consideration the final finished grade of the proposed street and the final finished grade of any storm ditches.

Upon completion of each service line as indicated herein, the Developer shall flush the service line to remove the debris that may interfere with the future meter installation, and further verify that the service line has full pressure and flow to the meter box.

8.8 1-1/2 INCH AND LARGER METERS

If extensions require water meters 1-1/2 inches or larger, then such entire meter installation, including valves, piping, vaults or meter boxes, drain lines and meters shall be furnished and installed by the Developer conforming to City standards. Activation of meter is subject to conformance with City requirements and payment of connection fees.

8.9 STATE HIGHWAY CROSSINGS

See Section 7.7.

8.10 STREET PATCHING AND RESTORATION

See Sections 5.17, 5.18 and 5.19 for requirements regarding street patching and trench restoration.

APPENDIX E

WATER QUALITY MONITORING SCHEDULE, CUSTOMER CONFIDENCE REPORT AND COLIFORM MONITORING PLAN

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Water Quality Monitoring Schedule

System: ALGONA WATER DEPT
Contact: James M Griess

PWS ID: 01450 V
Group: A - Comm

Region: NORTHWEST
County: KING

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023
Coliform Monitoring Population	3180	3180	3180	3180	3180	3180	3180	3180	3180	3180	3180	3180
Number of Routine Samples Required	3	3	3	3	3	3	3	3	3	3	3	3

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Lead and Copper	10	Jan 2020 - Dec 2022	standard - 3 year	09/11/2019	***Aug 2022***	
Asbestos	1	Jan 2020 - Dec 2028	standard - 9 year	04/12/2021		
Total Trihalomethane (THM)	1	Jan 2022 - Dec 2022	reduced - 1 year	08/12/2021	***Aug 2022***	
Halo-Acetic Acids (HAA5)	1	Jan 2022 - Dec 2022	reduced - 1 year	08/12/2021	***Aug 2022***	

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2022
Submit CCR certification form to ODW (Community systems only):	10/01/2022
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2022
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Northwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding DBPs:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Brandon Katz: (253) 395-6775 or Brandon.Katz@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

CITY OF ALGONA
COLIFORM MONITORING PLAN

In the event of detection of coliform DOH & Auburn must be notified as soon as possible and in no less than 24-hours. **Main Numbers** — **After Hours** DOH 253-395-6750 — DOH 877-481-4901 Auburn 253-931-3048 — Auburn: 253-931-3048

A. System Information

Plan Date: October 2022

Water System Name City of Algona	**County** King	**System I.D. Number** 01450V
Name of Plan Preparer Mathew Bailey	**Position** Public Works Supervisor	**Daytime Phone** **253-833-2897**
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	**Auburn Wells, Tacoma Intertie with Auburn**	
Storage: List and Describe	**Provided by Auburn**	
Treatment: Source Number & Process	Chlorination, pH control (Auburn)	
Pressure Zones: Number and name	Single pressure zone (242 HGL)	
Population by Pressure Zone	3,200	
Number of Routine Samples Required Monthly by Regulation:	3	
Number of Sample Sites Needed to Represent the Distribution System:	12	
***Request DOH Approval of Triggered Source Monitoring Plan?**	**Yes** ☐ **No** ☒	

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name Washington management laboratories Inc.	**Office Phone 253-531-3121** **After Hours Phone** - -
Address 1515 80th Street E., Tacoma, WA 98404	**Cell Phone** - - **Email** ______
Hours of Operation Mon-Fri 8 am – 5 pm, Saturday 9 am – 12 pm, Sunday Closed	

Contact Name ______	
Emergency Laboratory Name ______	Office Phone - - After Hours Phone - -
Address ______	Cell Phone - - Email ______
Hours of Operation ______	

C. Routine, Repeat, and Triggered Source Sample Locations* Routine and Repeat Sample Locations

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites
X1. 405 4th Avenue South	**1-1. Same**
	1-2. 401 4th Avenue South
	1-3. 415 4th Avenue South
	1-4.
X2. 112 3rd Avenue South	**2-1. Same**
	2-2. 104 3rd Avenue South
	2-3. 116 3rd Avenue South
	2-4.
X3. 402 Warde Street	**3-1. Same**
	3-2. 407 Warde Street
	3-3. 415 Warde Street
	3-4.

B. - Continued

Location/Address for Routine Sample Sites	Location/Address for Repeat Sample Sites
X4. 113 1st Avenue	1-1. Same 1-2. 111 1st Avenue 1-3. 115 1st Avenue 1-4.
X5. 121 3rd Avenue North	2-1. Same 2-2. 150 3rd Avenue North 2-3. 201 3rd Avenue North 2-4.
X6. 229 5th Avenue North	3-1. Same 3-2. 296 5th Avenue North 3-3. 225 5th Avenue North 3-4.
X7. 313 8th Avenue North	3-1. Same 3-2. 309 8th Avenue North 3-3. 315 8th Avenue North 3-4.
X8. 914 Celery Street	3-1. Same 3-2. 1032 Celery Street 3-3. 901 Celery Street 3-4.

B. Continued

Location/Address for Routine Sample Sites	Location/Address for Repeat Sample Sites
X9. 315 2nd Avenue North	**2-1. Same**
	2-2. 321 2nd Avenue North
	2-3. 309 2nd Avenue North
	2-4.
X10. 205 Stanley Court	**3-1. Same**
	3-2. 201 Stanley Court
	3-3. 209 Stanley Court
	3-4.
X11. 36042 West Valley Highway	**3-1. Same**
	3-2. 36102 West Valley Highway
	3-3. 36031 West Valley Highway
	3-4.
X12. 405 Seattle Boulevard South	**3-1. Same**
	3-2. 329 Seattle Boulevard South
	3-3. 407 Seattle Boulevard South
	3-4.

If a routine sample is total coliform positive, the City will collect repeat samples as shown, three samples within 24 hours. One sample will be from the location that tested positive, one within 5 services downstream and one from within five services upstream. If one of the repeat samples is positive then an additional set of repeat samples must be collected. This process will continue until no coliforms are detected.

Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	7, 8, 9	July	1, 2, 3
February	10, 11, 12	August	4, 5, 6
March	1, 2, 3	September	7, 8, 9
April	4, 5, 6	October	10, 11, 12
May	7, 8, 9	November	1, 2, 3
June	10, 11, 12	December	4, 5, 6

C. Sampling Procedure

Coliform water samples are collected the 1st Tuesday of every month. All samples are collected from sampling stations. Prior to sampling the hose bibb is sprayed down with 50/50 mix of water and 5% chlorine solution. The hose bibb is turned on for about a minute while washing it off.

Chlorine residual concentration is tested using HACH PCII colorimetric device, then recorded, and then the coliform sample is collected into bottles prepared at the laboratory. When finished the samples are put in the refrigerator at City Hall for same day pick up by Water Management Laboratory.

D. Level 1 and Level 2 Assessment Contact Information

Name **Mathew Bailey**	**Office Phone 253-833-2897** **After Hours Phone 253-261-5471**
Address **200 Washington Blvd S** **Algona, WA 98001**	**Email mathewb@algonawa.gov**

E. *E. coli*-Present Sample Response Plan

Distribution System *E. coli* Response Plan
If we have *E. coli* in our distribution system we will immediately: 1. Call DOH. 2. Call the City of Auburn 3. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary. 4. Coordinate with Auburn to determine if there are coliform hits in their distribution system 5. Interview staff to determine whether anything unusual was happening in the water system service area, especially since the previous month's sample(s). 6. Review new construction activities, water main breaks, and pressure outages that may have occurred during the previous month. 7. Review Cross-Connection Control Program status. 8. Discuss whether a Health Advisory is warranted based on the findings of steps 3-6. 9. 9. Increase chlorine dose at both treatment plants to 1.0 mg/L. 10. Flush affected portions of the distribution system. 11. Prepare draft news release and website changes. 12. Collect investigative samples every 10 to 12 hours until repeat results are known. 13. Issue news release and make website changes if repeats are coliform or E. coli present.

F. Response Checklists

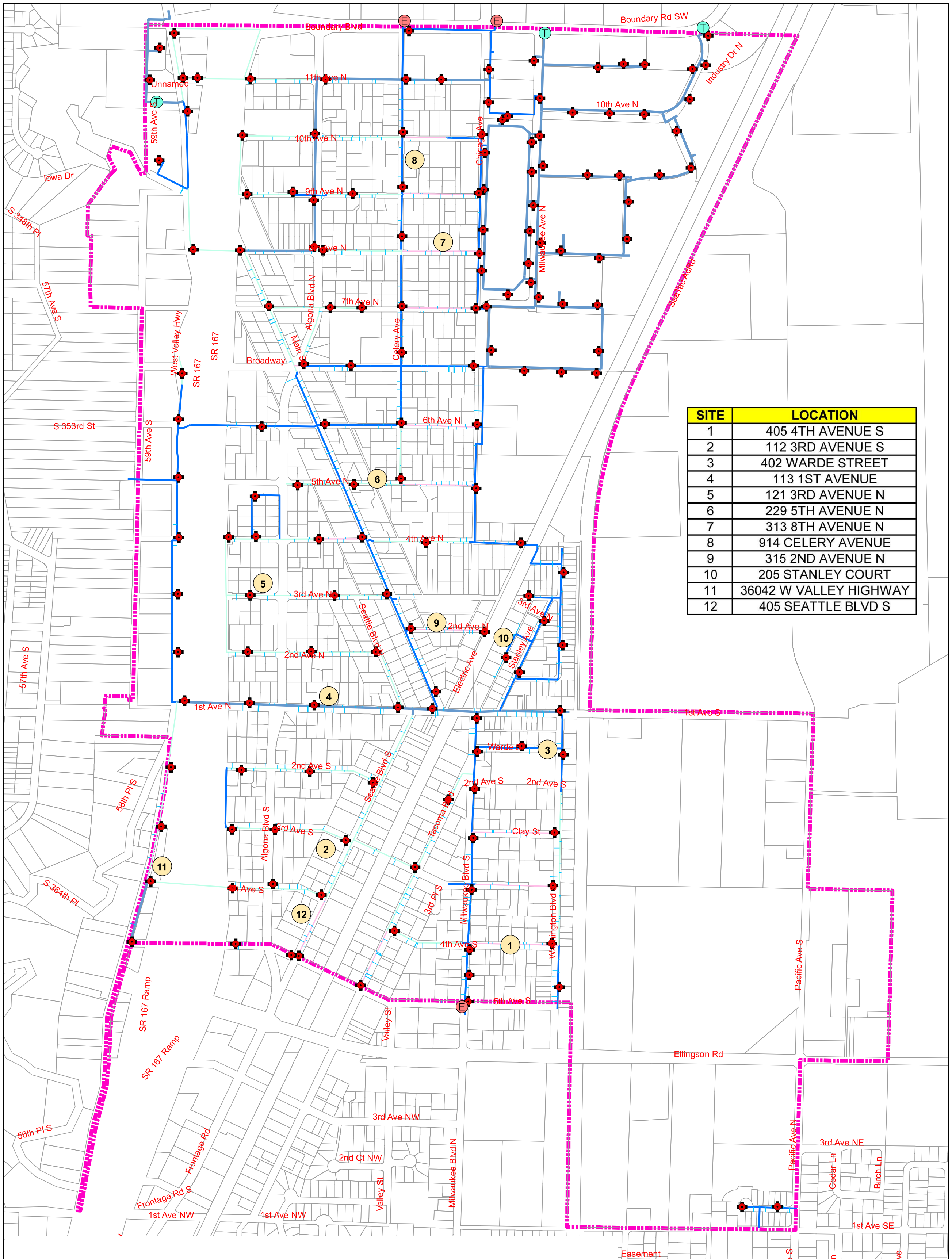
Distribution System *E. coli* Response Checklist

Background Information	**Yes**	**No**	**N/A**	**To Do List**
We inform staff members about activities within the distribution system that could affect water quality.	x	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	x	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	x	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.		☐	☐	x
We test all cross-connection control devices annually as required, with easy access to the proper documentation.		☐	☐	x
We routinely inspect all treatment facilities for proper operation.	☐	☐	x	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	x	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	x	☐	☐	☐

We can activate an emergency intertie with an adjacent water system in an emergency.	x	☐	☐	☐
We have a map of our service area boundaries.	x	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☐	☐	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☐	☐	☐	x
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☐	☐	☐	x
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	☐	☐	x
We have the capacity to print and distribute the required number of notices in a short time period.	x	☐	☐	
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of *E. coli*-present sample results with our policy makers.	x	☐	☐	☐
If we find *E. coli* in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	x	☐	☐	☐
Potential Public Notice Delivery Methods	**Yes**	**No**	**N/A**	**To Do List**
It is feasible to deliver a notice going door-to-door.	x	☐	☐	☐
We have a list of all of our customers' addresses.	x	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☐	☐	☐	x
We have a list of customer email addresses.	☐	☐	☐	x
We encourage our customers to remain in contact with us using social media.	☐	☐	☐	x
We have an active website we can quickly update to include important messages.	x	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	x	☐	☐	☐
We need a news release to supplement our public notification process.	☐	☐	☐	x
Public Notice	**Yes**	**No**	**N/A**	**To Do List**
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	x	☐	☐	☐
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our wholesale		☐	x	☐

customers and encouraged them to develop a response plan.				
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☐	☐	☐	x

G. System Map



SITE	LOCATION
1	405 4TH AVENUE S
2	112 3RD AVENUE S
3	402 WARDE STREET
4	113 1ST AVENUE
5	121 3RD AVENUE N
6	229 5TH AVENUE N
7	313 8TH AVENUE N
8	914 CELERY AVENUE
9	315 2ND AVENUE N
10	205 STANLEY COURT
11	36042 W VALLEY HIGHWAY
12	405 SEATTLE BLVD S

N

0 700 1,400 Feet

LEGEND:

- E EMERGENCY INTERTIE
- T SOURCE INTERTIE
- FIRE HYDRANT
- 1 COLIFORM LOCATION

WATERLINES:

- WS
- 4-INCH
- 6-INCH
- 8-INCH
- 12-INCH
- ALGONA CITY LIMITS

CITY OF ALGONA

WATER SYSTEM PLAN
COLIFORM MONITORING LOCATIONS

Gray & Osborne, Inc.

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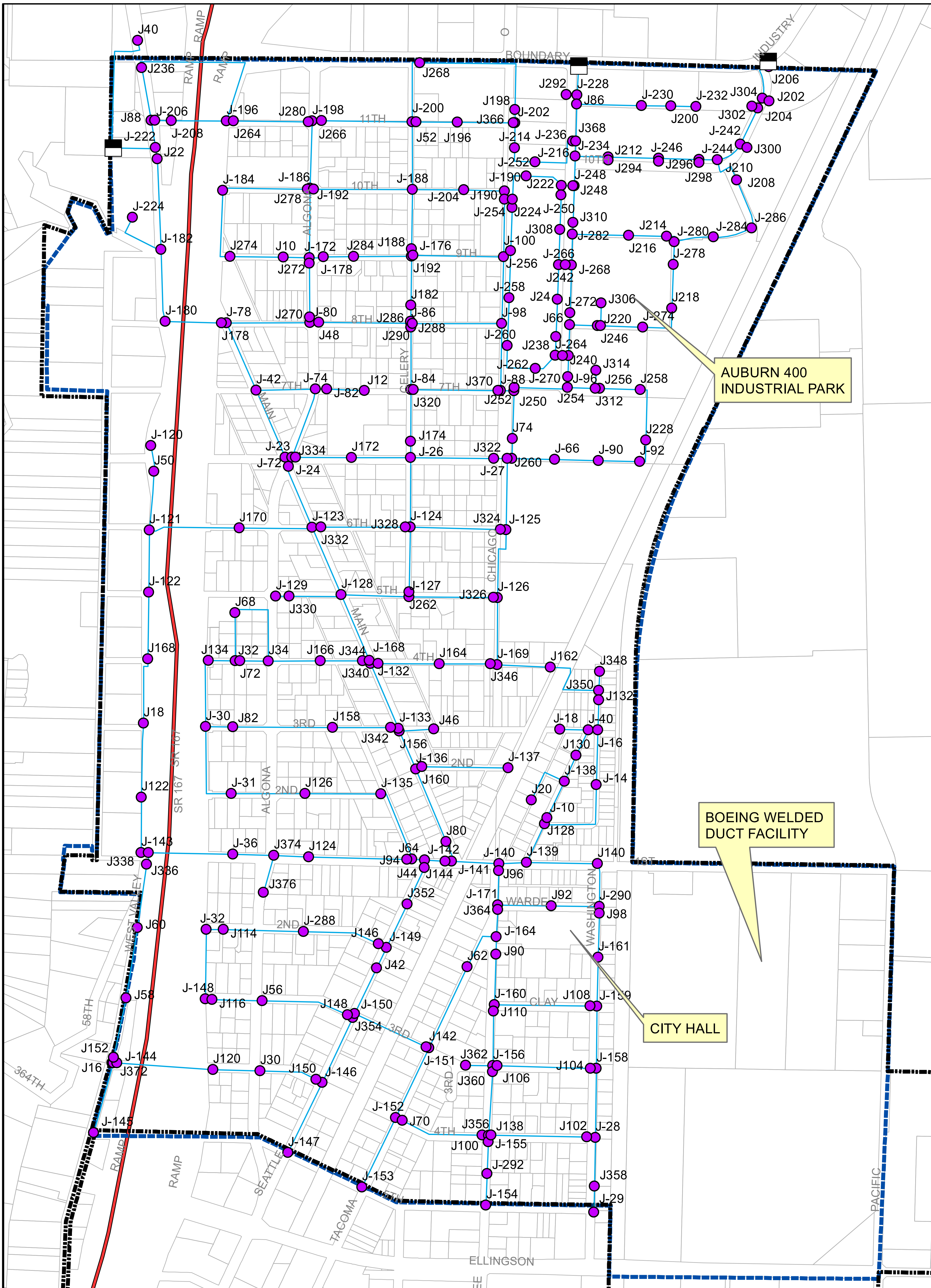
APPENDIX F

HYDRAULIC MODELING RESULTS



LEGEND

- Model Node
- Intertie
- City Limits
- Retail Service Area
- Parcels

N

0 250 500 1,000 Feet

CITY OF ALGONA

WATER SYSTEM PLAN

NODE ID MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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2021 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J-224	2.63	94	241.9	64.08
J18	2.63	89	240.52	65.65
J168	2.63	88	240.59	66.12
J122	2.63	87	240.46	66.49
J-122	2.63	87	240.65	66.58
J-121	2.63	87	240.72	66.61
J60	2.63	86	240.37	66.89
J-120	2.63	86	240.72	67.04
J-242	2.63	87	241.86	67.1
J300	2.63	87	241.86	67.1
J338	2.63	85	240.41	67.34
J-143	2.63	85	240.41	67.34
J50	2.63	85	240.72	67.47
J-244	2.63	86	241.82	67.52
J204	2.63	86	241.91	67.56
J304	2.63	86	241.93	67.56
J202	2.63	86	241.93	67.56
J336	2.63	84	240.41	67.77
J208	2.63	85	241.79	67.94
J302	2.63	85	241.91	67.99
J206	2.63	85	241.99	68.02
J152	2.63	83	240.33	68.17
J140	2.63	83	240.39	68.2
J-180	2.63	84	241.7	68.33
J298	2.63	84	241.81	68.38
J210	2.63	84	241.81	68.38
J58	2.63	82	240.35	68.61
J-18	2.63	82	240.46	68.66
J-16	2.63	82	240.46	68.66
J132	2.63	82	240.5	68.68
J348	2.63	82	240.52	68.68
J350	2.63	82	240.52	68.68
J218	2.63	83	241.71	68.77
J-286	2.63	83	241.77	68.79
J-182	2.63	83	241.9	68.85
J-144	2.63	81	240.33	69.04
J98	2.63	81	240.38	69.06
J-290	2.63	81	240.38	69.06
J130	2.63	81	240.45	69.09
J-40	2.63	81	240.46	69.09
J-66	2.63	82	241.55	69.13
J-90	2.63	82	241.56	69.14
J-92	2.63	82	241.57	69.14
J-234	2.63	82	241.79	69.24
J296	2.63	82	241.8	69.24
J-246	2.63	82	241.8	69.24

ID	Demand	Elevation	Head	Pressure
J-236	2.63	82	241.81	69.24
J372	2.63	80.5	240.33	69.26
J368	2.63	81.95	241.8	69.26
J-206	2.63	82	241.88	69.27
J-228	2.63	82	241.92	69.29
J22	2.63	82	241.97	69.31
J-222	2.63	82	241.98	69.32
J-125	2.63	81	241.2	69.41
J-145	2.63	80	240.33	69.47
J92	2.63	80	240.38	69.49
J-140	2.63	80	240.4	69.5
J-139	2.63	80	240.4	69.5
J-138	2.63	80	240.44	69.52
J-14	2.63	80	240.45	69.52
J260	2.63	81	241.49	69.54
J-27	2.63	81	241.54	69.56
J228	2.63	81	241.58	69.58
J250	2.63	81	241.58	69.58
J252	2.63	81	241.59	69.58
J162	2.63	80	240.64	69.6
J-270	2.63	81	241.67	69.62
J240	2.63	81	241.67	69.62
J-264	2.63	81	241.68	69.62
J238	2.63	81	241.68	69.62
J24	2.63	81	241.69	69.63
J-216	2.63	81	241.7	69.63
J-266	2.63	81	241.7	69.63
J242	2.63	81	241.7	69.63
J212	2.63	81	241.8	69.67
J294	2.63	81	241.8	69.67
J88	2.63	81	241.87	69.7
J-232	2.63	81	241.9	69.72
J292	2.63	81	241.92	69.73
J-126	2.63	80	240.95	69.74
J326	2.63	80	240.95	69.74
J40	2.63	81	242	69.76
J324	2.63	80	241.2	69.85
J104	2.63	79	240.34	69.91
J-158	2.63	79	240.34	69.91
J-159	2.63	79	240.35	69.91
J-161	2.63	79	240.37	69.92
J96	2.63	79	240.39	69.93
J-142	2.63	79	240.4	69.93
J144	2.63	79	240.4	69.93
J-141	2.63	79	240.4	69.93
J80	2.63	79	240.42	69.94

2021 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J-10	2.63	79	240.43	69.95
J128	2.63	79	240.43	69.95
J20	2.63	79	240.44	69.95
J134	2.63	79	240.48	69.97
J-137	2.63	79	240.48	69.97
J-136	2.63	79	240.49	69.97
J-133	2.63	79	240.53	69.99
J342	2.63	79	240.53	69.99
J74	2.63	80	241.55	70
J258	2.63	80	241.6	70.02
J256	2.63	80	241.61	70.02
J314	2.63	80	241.61	70.03
J312	2.63	80	241.61	70.03
J-262	2.63	80	241.68	70.06
J-260	2.63	80	241.68	70.06
J-168	2.63	79	240.68	70.06
J-258	2.63	80	241.68	70.06
J340	2.63	79	240.68	70.06
J-256	2.63	80	241.68	70.06
J-254	2.63	80	241.68	70.06
J224	2.63	80	241.68	70.06
J-252	2.63	80	241.7	70.06
J-274	2.63	80	241.7	70.07
J-268	2.63	80	241.7	70.07
J308	2.63	80	241.71	70.07
J222	2.63	80	241.71	70.07
J-250	2.63	80	241.72	70.07
J-282	2.63	80	241.72	70.07
J310	2.63	80	241.72	70.07
J-278	2.63	80	241.72	70.07
J248	2.63	80	241.73	70.08
J-248	2.63	80	241.73	70.08
J-284	2.63	80	241.75	70.08
J86	2.63	80	241.9	70.15
J364	2.63	78	240.38	70.36
J-171	2.63	78	240.38	70.36
J44	2.63	78	240.4	70.37
J64	2.63	78	240.4	70.37
J94	2.63	78	240.4	70.37
J160	2.63	78	240.49	70.41
J166	2.63	78	240.51	70.42
J46	2.63	78	240.53	70.42
J-96	2.63	79	241.62	70.46
J254	2.63	79	241.64	70.47
J-132	2.63	78	240.68	70.49
J344	2.63	78	240.68	70.49

ID	Demand	Elevation	Head	Pressure
J-272	2.63	79	241.69	70.5
J220	2.63	79	241.7	70.5
J246	2.63	79	241.7	70.5
J306	2.63	79	241.7	70.5
J216	2.63	79	241.72	70.51
J214	2.63	79	241.72	70.51
J346	2.63	78	240.74	70.52
J-169	2.63	78	240.74	70.52
J-128	2.63	78	240.86	70.57
J200	2.63	79	241.9	70.58
J-230	2.63	79	241.9	70.58
J-127	2.63	78	240.96	70.61
J262	2.63	78	240.97	70.61
J328	2.63	78	241.08	70.66
J-124	2.63	78	241.11	70.68
J16	2.63	77	240.33	70.77
J102	2.63	77	240.33	70.77
J110	2.63	77	240.35	70.78
J-160	2.63	77	240.35	70.78
J108	2.63	77	240.35	70.78
J90	2.63	77	240.36	70.78
J-164	2.63	77	240.36	70.78
J32	2.63	77	240.48	70.84
J72	2.63	77	240.48	70.84
J68	2.63	77	240.48	70.84
J288	2.63	78	241.49	70.84
J-86	2.63	78	241.51	70.85
J290	2.63	78	241.51	70.85
J286	2.63	78	241.51	70.85
J156	2.63	77	240.53	70.86
J198	2.63	78	241.6	70.89
J-202	2.63	78	241.6	70.89
J66	2.63	78	241.69	70.93
J164	2.63	77	240.71	70.94
J-280	2.63	78	241.73	70.94
J366	2.63	77.87	241.6	70.94
J-129	2.63	77	240.86	71
J-123	2.63	77	240.95	71.04
J12	2.63	77	241.24	71.16
J-26	2.63	77	241.32	71.2
J-29	2.63	76	240.33	71.2
J358	2.63	76	240.33	71.2
J-28	2.63	76	240.33	71.2
J106	2.63	76	240.34	71.21
J360	2.63	76	240.34	71.21
J-156	2.63	76	240.34	71.21

Model Demand Set Name
2021PHD_NOBOEING

2021 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J174	2.63	77	241.35	71.21
J352	2.63	76	240.35	71.21
J124	2.63	76	240.4	71.24
J374	2.63	76	240.4	71.24
J-135	2.63	76	240.41	71.24
J-84	2.63	77	241.42	71.24
J320	2.63	77	241.42	71.24
J322	2.63	77	241.47	71.26
J34	2.63	76	240.49	71.27
J158	2.63	76	240.51	71.28
J182	2.63	77	241.52	71.29
J370	2.63	77	241.58	71.31
J-88	2.63	77	241.58	71.31
J-98	2.63	77	241.6	71.32
J-208	2.63	77	241.85	71.43
J236	2.63	77	241.85	71.43
J376	2.63	75.5	240.4	71.45
J332	2.63	76	240.97	71.48
J-72	2.63	76	241.06	71.52
J-23	2.63	76	241.12	71.55
J334	2.63	76	241.23	71.59
J-74	2.63	76	241.24	71.6
J-24	2.63	76	241.27	71.61
J100	2.63	75	240.33	71.64
J356	2.63	75	240.33	71.64
J-155	2.63	75	240.33	71.64
J138	2.63	75	240.33	71.64
J-149	2.63	75	240.34	71.64
J-36	2.63	75	240.4	71.67
J126	2.63	75	240.42	71.68
J-176	2.63	76	241.55	71.73
J192	2.63	76	241.55	71.73
J48	2.63	76	241.55	71.73
J188	2.63	76	241.55	71.73
J-78	2.63	76	241.56	71.74
J178	2.63	76	241.56	71.74
J-80	2.63	76	241.56	71.74
J270	2.63	76	241.56	71.74
J-178	2.63	76	241.56	71.74
J272	2.63	76	241.56	71.74
J-172	2.63	76	241.56	71.74
J-198	2.63	76	241.59	71.75
J280	2.63	76	241.59	71.75
J-100	2.63	76	241.63	71.77
J-190	2.63	76	241.67	71.79
J190	2.63	76	241.67	71.79

ID	Demand	Elevation	Head	Pressure
J170	2.63	75	240.85	71.86
J330	2.63	75	240.86	71.87
J-42	2.63	75	241.26	72.04
J172	2.63	75	241.3	72.06
J-154	2.63	74	240.33	72.07
J-292	2.63	74	240.33	72.07
J354	2.63	74	240.33	72.07
J-151	2.63	74	240.33	72.07
J42	2.63	74	240.34	72.07
J362	2.63	74	240.34	72.07
J146	2.63	74	240.34	72.07
J62	2.63	74	240.35	72.08
J82	2.63	74	240.48	72.14
J-192	2.63	75	241.57	72.18
J-186	2.63	75	241.57	72.18
J278	2.63	75	241.57	72.18
J-188	2.63	75	241.57	72.18
J268	2.63	75	241.59	72.18
J-204	2.63	75	241.67	72.22
J-82	2.63	74	241.24	72.46
J-146	2.63	73	240.33	72.5
J-32	2.63	73	240.33	72.5
J114	2.63	73	240.33	72.5
J-152	2.63	73	240.33	72.5
J70	2.63	73	240.33	72.5
J-288	2.63	73	240.33	72.5
J-150	2.63	73	240.33	72.5
J-31	2.63	73	240.44	72.55
J-30	2.63	73	240.48	72.57
J284	2.63	74	241.56	72.6
J10	2.63	74	241.56	72.61
J274	2.63	74	241.56	72.61
J-184	2.63	74	241.57	72.61
J266	2.63	74	241.59	72.62
J-200	2.63	74	241.59	72.62
J52	2.63	74	241.59	72.62
J-147	2.63	72	240.32	72.93
J-148	2.63	72	240.33	72.94
J116	2.63	72	240.33	72.94
J142	2.63	72	240.33	72.94
J196	2.63	73	241.6	73.05
J30	2.63	71	240.33	73.37
J120	2.63	71	240.33	73.37
J56	2.63	71	240.33	73.37
J148	2.63	71	240.33	73.37
J-214	2.63	72	241.64	73.51

Model Demand Set Name
2021PHD_NOBOEING

2021 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J264	2.63	72	241.76	73.56
J150	2.63	70	240.33	73.8
J-153	2.63	70	240.33	73.8
J-196	2.63	70	241.78	74.43

Model Demand Set Name
2021PHD_NOBOEING

2031 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J-224	2.82	94	241.88	64.08
J18	2.82	89	240.32	65.57
J168	2.82	88	240.39	66.03
J122	2.82	87	240.24	66.40
J-122	2.82	87	240.47	66.50
J-121	2.82	87	240.54	66.53
J60	2.82	86	240.15	66.79
J-120	2.82	86	240.54	66.96
J-242	2.82	87	241.84	67.09
J300	2.82	87	241.84	67.09
J338	2.82	85	240.18	67.24
J-143	2.82	85	240.19	67.24
J50	2.82	85	240.54	67.40
J-244	2.82	86	241.79	67.50
J204	2.82	86	241.9	67.55
J304	2.82	86	241.92	67.56
J202	2.82	86	241.92	67.56
J336	2.82	84	240.18	67.67
J208	2.82	85	241.77	67.93
J302	2.82	85	241.9	67.99
J206	2.82	85	241.99	68.02
J152	2.82	83	240.1	68.07
J140	2.82	83	240.17	68.10
J-180	2.82	84	241.66	68.31
J298	2.82	84	241.79	68.37
J210	2.82	84	241.79	68.37
J58	2.82	82	240.12	68.51
J-18	2.82	82	240.24	68.57
J-16	2.82	82	240.25	68.57
J132	2.82	82	240.29	68.59
J348	2.82	82	240.31	68.59
J350	2.82	82	240.31	68.59
J218	2.82	83	241.67	68.75
J-286	2.82	83	241.73	68.78
J-182	2.82	83	241.88	68.84
J-144	2.82	81	240.09	68.94
J98	2.82	81	240.15	68.96
J-290	2.82	81	240.15	68.96
J130	2.82	81	240.23	69.00
J-40	2.82	81	240.24	69.00
J-66	2.82	82	241.49	69.11
J-90	2.82	82	241.5	69.11
J-92	2.82	82	241.51	69.12
J372	2.82	80.5	240.09	69.15
J-234	2.82	82	241.76	69.22
J296	2.82	82	241.78	69.23

ID	Demand	Elevation	Head	Pressure
J-246	2.82	82	241.78	69.23
J-236	2.82	82	241.78	69.23
J368	2.82	81.95	241.78	69.25
J-206	2.82	82	241.86	69.27
J-228	2.82	82	241.91	69.29
J22	2.82	82	241.97	69.31
J-222	2.82	82	241.98	69.32
J-125	2.82	81	241.09	69.37
J-145	2.82	80	240.09	69.37
J92	2.82	80	240.15	69.39
J-140	2.82	80	240.18	69.40
J-139	2.82	80	240.18	69.40
J-138	2.82	80	240.22	69.42
J-14	2.82	80	240.23	69.43
J260	2.82	81	241.42	69.51
J162	2.82	80	240.44	69.52
J-27	2.82	81	241.48	69.54
J228	2.82	81	241.52	69.55
J250	2.82	81	241.53	69.56
J252	2.82	81	241.53	69.56
J-270	2.82	81	241.63	69.60
J240	2.82	81	241.63	69.60
J-264	2.82	81	241.63	69.60
J238	2.82	81	241.64	69.60
J24	2.82	81	241.65	69.61
J-216	2.82	81	241.66	69.61
J-266	2.82	81	241.66	69.61
J242	2.82	81	241.66	69.62
J212	2.82	81	241.77	69.66
J294	2.82	81	241.77	69.66
J-126	2.82	80	240.8	69.67
J326	2.82	80	240.8	69.67
J88	2.82	81	241.85	69.70
J-232	2.82	81	241.88	69.71
J292	2.82	81	241.91	69.72
J40	2.82	81	242	69.76
J324	2.82	80	241.09	69.80
J104	2.82	79	240.1	69.81
J-158	2.82	79	240.11	69.81
J-159	2.82	79	240.12	69.81
J-161	2.82	79	240.15	69.82
J96	2.82	79	240.17	69.84
J-142	2.82	79	240.18	69.84
J144	2.82	79	240.18	69.84
J-141	2.82	79	240.18	69.84
J80	2.82	79	240.2	69.85

Model Demand Set Name
2031PHD_NOBOEING

2031 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J-10	2.82	79	240.21	69.85
J128	2.82	79	240.21	69.85
J20	2.82	79	240.22	69.86
J134	2.82	79	240.27	69.88
J-137	2.82	79	240.27	69.88
J-136	2.82	79	240.27	69.88
J-133	2.82	79	240.33	69.90
J342	2.82	79	240.33	69.90
J74	2.82	80	241.49	69.97
J-168	2.82	79	240.5	69.98
J340	2.82	79	240.5	69.98
J258	2.82	80	241.54	70.00
J256	2.82	80	241.55	70.00
J314	2.82	80	241.55	70.00
J312	2.82	80	241.55	70.00
J-262	2.82	80	241.63	70.04
J-260	2.82	80	241.63	70.04
J-258	2.82	80	241.64	70.04
J-256	2.82	80	241.64	70.04
J-254	2.82	80	241.64	70.04
J224	2.82	80	241.64	70.04
J-252	2.82	80	241.66	70.05
J-274	2.82	80	241.66	70.05
J-268	2.82	80	241.66	70.05
J308	2.82	80	241.67	70.05
J222	2.82	80	241.67	70.05
J-250	2.82	80	241.68	70.05
J-282	2.82	80	241.68	70.06
J310	2.82	80	241.68	70.06
J-278	2.82	80	241.68	70.06
J248	2.82	80	241.69	70.06
J-248	2.82	80	241.69	70.06
J-284	2.82	80	241.71	70.07
J86	2.82	80	241.88	70.14
J364	2.82	78	240.15	70.26
J-171	2.82	78	240.15	70.26
J44	2.82	78	240.18	70.27
J64	2.82	78	240.18	70.27
J94	2.82	78	240.18	70.27
J160	2.82	78	240.27	70.31
J166	2.82	78	240.3	70.33
J46	2.82	78	240.33	70.34
J-132	2.82	78	240.49	70.41
J344	2.82	78	240.49	70.41
J-96	2.82	79	241.57	70.44
J346	2.82	78	240.57	70.44

ID	Demand	Elevation	Head	Pressure
J-169	2.82	78	240.57	70.44
J254	2.82	79	241.59	70.45
J-272	2.82	79	241.65	70.48
J220	2.82	79	241.65	70.48
J246	2.82	79	241.65	70.48
J306	2.82	79	241.65	70.48
J216	2.82	79	241.68	70.49
J214	2.82	79	241.69	70.49
J-128	2.82	78	240.7	70.50
J-127	2.82	78	240.81	70.55
J262	2.82	78	240.83	70.55
J200	2.82	79	241.88	70.58
J-230	2.82	79	241.88	70.58
J328	2.82	78	240.95	70.61
J-124	2.82	78	240.99	70.62
J16	2.82	77	240.09	70.67
J102	2.82	77	240.1	70.67
J110	2.82	77	240.11	70.68
J-160	2.82	77	240.12	70.68
J108	2.82	77	240.12	70.68
J90	2.82	77	240.13	70.68
J-164	2.82	77	240.13	70.69
J32	2.82	77	240.27	70.75
J72	2.82	77	240.27	70.75
J68	2.82	77	240.27	70.75
J156	2.82	77	240.33	70.77
J288	2.82	78	241.42	70.81
J-86	2.82	78	241.44	70.82
J290	2.82	78	241.44	70.82
J286	2.82	78	241.44	70.82
J164	2.82	77	240.53	70.86
J198	2.82	78	241.55	70.86
J-202	2.82	78	241.55	70.87
J66	2.82	78	241.65	70.91
J366	2.82	77.87	241.55	70.92
J-280	2.82	78	241.69	70.93
J-129	2.82	77	240.7	70.93
J-123	2.82	77	240.81	70.98
J-29	2.82	76	240.1	71.10
J358	2.82	76	240.1	71.10
J-28	2.82	76	240.1	71.10
J106	2.82	76	240.1	71.11
J360	2.82	76	240.1	71.11
J-156	2.82	76	240.1	71.11
J352	2.82	76	240.12	71.11
J12	2.82	77	241.13	71.12

Model Demand Set Name
2031PHD_NOBOEING

2031 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J124	2.82	76	240.18	71.14
J374	2.82	76	240.18	71.14
J-135	2.82	76	240.19	71.14
J-26	2.82	77	241.23	71.16
J174	2.82	77	241.25	71.17
J34	2.82	76	240.28	71.18
J158	2.82	76	240.3	71.19
J-84	2.82	77	241.34	71.21
J320	2.82	77	241.34	71.21
J322	2.82	77	241.4	71.23
J182	2.82	77	241.45	71.26
J370	2.82	77	241.53	71.29
J-88	2.82	77	241.53	71.29
J-98	2.82	77	241.54	71.30
J376	2.82	75.5	240.18	71.36
J332	2.82	76	240.82	71.42
J-208	2.82	77	241.82	71.42
J236	2.82	77	241.83	71.42
J-72	2.82	76	240.93	71.46
J-23	2.82	76	241	71.50
J100	2.82	75	240.1	71.54
J356	2.82	75	240.1	71.54
J138	2.82	75	240.1	71.54
J-155	2.82	75	240.1	71.54
J-149	2.82	75	240.11	71.54
J334	2.82	76	241.12	71.55
J-74	2.82	76	241.13	71.55
J-24	2.82	76	241.17	71.57
J-36	2.82	75	240.18	71.57
J126	2.82	75	240.2	71.58
J-176	2.82	76	241.49	71.71
J192	2.82	76	241.49	71.71
J48	2.82	76	241.49	71.71
J188	2.82	76	241.49	71.71
J-78	2.82	76	241.5	71.71
J178	2.82	76	241.5	71.71
J-80	2.82	76	241.5	71.71
J270	2.82	76	241.5	71.71
J-178	2.82	76	241.5	71.71
J272	2.82	76	241.5	71.71
J-172	2.82	76	241.5	71.71
J-198	2.82	76	241.53	71.72
J280	2.82	76	241.53	71.72
J-100	2.82	76	241.58	71.75
J-190	2.82	76	241.63	71.77
J190	2.82	76	241.63	71.77

ID	Demand	Elevation	Head	Pressure
J170	2.82	75	240.69	71.79
J330	2.82	75	240.7	71.80
J-154	2.82	74	240.1	71.97
J-292	2.82	74	240.1	71.97
J354	2.82	74	240.1	71.97
J-151	2.82	74	240.1	71.97
J42	2.82	74	240.1	71.97
J362	2.82	74	240.1	71.97
J146	2.82	74	240.11	71.97
J62	2.82	74	240.12	71.98
J-42	2.82	75	241.16	72.00
J172	2.82	75	241.2	72.01
J82	2.82	74	240.27	72.04
J-192	2.82	75	241.51	72.15
J-186	2.82	75	241.51	72.15
J278	2.82	75	241.51	72.15
J-188	2.82	75	241.52	72.15
J268	2.82	75	241.54	72.16
J-204	2.82	75	241.62	72.20
J-146	2.82	73	240.09	72.40
J-32	2.82	73	240.09	72.40
J114	2.82	73	240.09	72.40
J-152	2.82	73	240.1	72.40
J70	2.82	73	240.1	72.40
J-288	2.82	73	240.1	72.40
J-150	2.82	73	240.1	72.40
J-82	2.82	74	241.13	72.42
J-31	2.82	73	240.23	72.46
J-30	2.82	73	240.26	72.48
J284	2.82	74	241.5	72.58
J10	2.82	74	241.5	72.58
J274	2.82	74	241.5	72.58
J-184	2.82	74	241.51	72.58
J266	2.82	74	241.53	72.59
J-200	2.82	74	241.53	72.59
J52	2.82	74	241.53	72.59
J-147	2.82	72	240.09	72.83
J-148	2.82	72	240.09	72.83
J116	2.82	72	240.09	72.83
J142	2.82	72	240.1	72.84
J196	2.82	73	241.54	73.03
J30	2.82	71	240.09	73.27
J120	2.82	71	240.09	73.27
J56	2.82	71	240.09	73.27
J148	2.82	71	240.1	73.27
J-214	2.82	72	241.59	73.49

Model Demand Set Name
2031PHD_NOBOEING

2031 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J264	2.82	72	241.73	73.54
J150	2.82	70	240.09	73.70
J-153	2.82	70	240.09	73.7
J-196	2.82	70	241.75	74.42

Model Demand Set Name
2031PHD_NOBOEING

2041 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J-224	3.03	94	241.87	64.07
J18	3.03	89	240.08	65.46
J168	3.03	88	240.16	65.93
J122	3.03	87	239.99	66.29
J-122	3.03	87	240.25	66.4
J-121	3.03	87	240.34	66.44
J60	3.03	86	239.89	66.68
J-120	3.03	86	240.33	66.87
J-242	3.03	87	241.81	67.08
J300	3.03	87	241.81	67.08
J338	3.03	85	239.93	67.13
J-143	3.03	85	239.94	67.13
J50	3.03	85	240.33	67.31
J-244	3.03	86	241.76	67.49
J204	3.03	86	241.89	67.55
J304	3.03	86	241.91	67.56
J202	3.03	86	241.91	67.56
J336	3.03	84	239.93	67.56
J208	3.03	85	241.73	67.91
J152	3.03	83	239.83	67.95
J302	3.03	85	241.89	67.98
J140	3.03	83	239.91	67.99
J206	3.03	85	241.99	68.02
J-180	3.03	84	241.61	68.29
J298	3.03	84	241.76	68.36
J210	3.03	84	241.76	68.36
J58	3.03	82	239.85	68.4
J-18	3.03	82	240	68.46
J-16	3.03	82	240	68.46
J132	3.03	82	240.05	68.48
J348	3.03	82	240.07	68.49
J350	3.03	82	240.07	68.49
J218	3.03	83	241.63	68.73
J-286	3.03	83	241.7	68.76
J-144	3.03	81	239.83	68.82
J-182	3.03	83	241.87	68.84
J98	3.03	81	239.89	68.85
J-290	3.03	81	239.89	68.85
J130	3.03	81	239.98	68.89
J-40	3.03	81	240	68.89
J372	3.03	80.5	239.83	69.04
J-66	3.03	82	241.42	69.08
J-90	3.03	82	241.43	69.08
J-92	3.03	82	241.44	69.09
J-234	3.03	82	241.73	69.21
J296	3.03	82	241.75	69.22

ID	Demand	Elevation	Head	Pressure
J-246	3.03	82	241.75	69.22
J-236	3.03	82	241.75	69.22
J368	3.03	81.95	241.74	69.24
J-145	3.03	80	239.82	69.25
J-206	3.03	82	241.84	69.26
J92	3.03	80	239.89	69.28
J-228	3.03	82	241.9	69.28
J-140	3.03	80	239.92	69.29
J-139	3.03	80	239.92	69.29
J-125	3.03	81	240.96	69.31
J22	3.03	82	241.96	69.31
J-138	3.03	80	239.97	69.32
J-222	3.03	82	241.97	69.32
J-14	3.03	80	239.98	69.32
J162	3.03	80	240.22	69.43
J260	3.03	81	241.34	69.48
J-27	3.03	81	241.4	69.5
J228	3.03	81	241.45	69.52
J250	3.03	81	241.46	69.53
J252	3.03	81	241.46	69.53
J-270	3.03	81	241.57	69.58
J240	3.03	81	241.58	69.58
J-264	3.03	81	241.58	69.58
J238	3.03	81	241.59	69.58
J24	3.03	81	241.6	69.59
J-216	3.03	81	241.61	69.59
J-266	3.03	81	241.61	69.59
J242	3.03	81	241.61	69.59
J-126	3.03	80	240.63	69.6
J326	3.03	80	240.63	69.6
J212	3.03	81	241.73	69.65
J294	3.03	81	241.73	69.65
J88	3.03	81	241.83	69.69
J104	3.03	79	239.84	69.69
J-158	3.03	79	239.84	69.69
J-159	3.03	79	239.86	69.7
J-232	3.03	81	241.87	69.7
J-161	3.03	79	239.88	69.71
J292	3.03	81	241.9	69.72
J96	3.03	79	239.91	69.72
J-142	3.03	79	239.92	69.73
J144	3.03	79	239.92	69.73
J-141	3.03	79	239.92	69.73
J80	3.03	79	239.94	69.74
J324	3.03	80	240.96	69.74
J-10	3.03	79	239.96	69.74

Model Demand Set Name
2041PHD_NOBOEING

2041 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J128	3.03	79	239.96	69.74
J20	3.03	79	239.97	69.75
J40	3.03	81	242	69.76
J134	3.03	79	240.02	69.77
J-137	3.03	79	240.02	69.77
J-136	3.03	79	240.03	69.77
J-133	3.03	79	240.09	69.8
J342	3.03	79	240.09	69.8
J-168	3.03	79	240.28	69.88
J340	3.03	79	240.28	69.88
J74	3.03	80	241.42	69.94
J258	3.03	80	241.47	69.97
J256	3.03	80	241.49	69.97
J314	3.03	80	241.49	69.97
J312	3.03	80	241.49	69.97
J-262	3.03	80	241.58	70.01
J-260	3.03	80	241.58	70.01
J-258	3.03	80	241.59	70.01
J-256	3.03	80	241.59	70.02
J-254	3.03	80	241.59	70.02
J224	3.03	80	241.59	70.02
J-252	3.03	80	241.61	70.03
J-274	3.03	80	241.61	70.03
J-268	3.03	80	241.62	70.03
J308	3.03	80	241.62	70.03
J222	3.03	80	241.63	70.03
J-250	3.03	80	241.63	70.03
J-282	3.03	80	241.63	70.04
J310	3.03	80	241.64	70.04
J-278	3.03	80	241.64	70.04
J248	3.03	80	241.65	70.04
J-248	3.03	80	241.65	70.04
J-284	3.03	80	241.67	70.05
J86	3.03	80	241.87	70.14
J364	3.03	78	239.89	70.15
J-171	3.03	78	239.89	70.15
J44	3.03	78	239.92	70.16
J64	3.03	78	239.92	70.16
J94	3.03	78	239.92	70.16
J160	3.03	78	240.03	70.21
J166	3.03	78	240.06	70.22
J46	3.03	78	240.09	70.23
J-132	3.03	78	240.28	70.32
J344	3.03	78	240.28	70.32
J346	3.03	78	240.36	70.35
J-169	3.03	78	240.36	70.35

ID	Demand	Elevation	Head	Pressure
J-96	3.03	79	241.5	70.41
J-128	3.03	78	240.51	70.42
J254	3.03	79	241.53	70.42
J-272	3.03	79	241.6	70.46
J220	3.03	79	241.6	70.46
J246	3.03	79	241.6	70.46
J306	3.03	79	241.6	70.46
J216	3.03	79	241.64	70.47
J214	3.03	79	241.64	70.47
J-127	3.03	78	240.65	70.47
J262	3.03	78	240.66	70.48
J328	3.03	78	240.81	70.54
J16	3.03	77	239.82	70.55
J102	3.03	77	239.83	70.55
J-124	3.03	78	240.84	70.56
J110	3.03	77	239.85	70.56
J-160	3.03	77	239.85	70.56
J108	3.03	77	239.85	70.56
J90	3.03	77	239.86	70.57
J200	3.03	79	241.87	70.57
J-230	3.03	79	241.87	70.57
J-164	3.03	77	239.87	70.57
J32	3.03	77	240.03	70.64
J72	3.03	77	240.03	70.64
J68	3.03	77	240.03	70.64
J156	3.03	77	240.09	70.67
J164	3.03	77	240.32	70.77
J288	3.03	78	241.34	70.77
J-86	3.03	78	241.36	70.78
J290	3.03	78	241.36	70.78
J286	3.03	78	241.36	70.79
J198	3.03	78	241.48	70.84
J-202	3.03	78	241.48	70.84
J-129	3.03	77	240.51	70.85
J66	3.03	78	241.6	70.89
J366	3.03	77.87	241.48	70.89
J-123	3.03	77	240.64	70.91
J-280	3.03	78	241.64	70.91
J-29	3.03	76	239.83	70.99
J358	3.03	76	239.83	70.99
J-28	3.03	76	239.83	70.99
J106	3.03	76	239.84	70.99
J-156	3.03	76	239.84	70.99
J360	3.03	76	239.84	70.99
J352	3.03	76	239.85	71
J124	3.03	76	239.92	71.03

Model Demand Set Name
2041PHD_NOBOEING

2041 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J374	3.03	76	239.92	71.03
J-135	3.03	76	239.93	71.03
J12	3.03	77	241.01	71.07
J34	3.03	76	240.03	71.07
J158	3.03	76	240.06	71.09
J-26	3.03	77	241.12	71.11
J174	3.03	77	241.15	71.13
J-84	3.03	77	241.24	71.17
J320	3.03	77	241.25	71.17
J322	3.03	77	241.31	71.2
J182	3.03	77	241.38	71.22
J376	3.03	75.5	239.92	71.24
J370	3.03	77	241.46	71.26
J-88	3.03	77	241.46	71.26
J-98	3.03	77	241.48	71.27
J332	3.03	76	240.65	71.34
J-72	3.03	76	240.78	71.4
J-208	3.03	77	241.8	71.41
J236	3.03	77	241.8	71.41
J100	3.03	75	239.83	71.42
J356	3.03	75	239.83	71.42
J138	3.03	75	239.83	71.42
J-155	3.03	75	239.83	71.42
J-149	3.03	75	239.84	71.42
J-23	3.03	76	240.86	71.43
J-36	3.03	75	239.92	71.46
J126	3.03	75	239.95	71.47
J334	3.03	76	241	71.49
J-74	3.03	76	241.01	71.5
J-24	3.03	76	241.05	71.52
J-176	3.03	76	241.42	71.67
J192	3.03	76	241.42	71.67
J48	3.03	76	241.42	71.68
J188	3.03	76	241.42	71.68
J-78	3.03	76	241.42	71.68
J178	3.03	76	241.42	71.68
J-80	3.03	76	241.43	71.68
J270	3.03	76	241.43	71.68
J-178	3.03	76	241.43	71.68
J272	3.03	76	241.43	71.68
J-172	3.03	76	241.43	71.68
J-198	3.03	76	241.46	71.69
J280	3.03	76	241.46	71.7
J170	3.03	75	240.5	71.71
J330	3.03	75	240.51	71.72
J-100	3.03	76	241.52	71.72

ID	Demand	Elevation	Head	Pressure
J-190	3.03	76	241.57	71.74
J190	3.03	76	241.58	71.74
J-154	3.03	74	239.83	71.85
J-292	3.03	74	239.83	71.85
J354	3.03	74	239.83	71.85
J-151	3.03	74	239.83	71.85
J42	3.03	74	239.84	71.86
J362	3.03	74	239.84	71.86
J146	3.03	74	239.84	71.86
J62	3.03	74	239.85	71.86
J82	3.03	74	240.03	71.94
J-42	3.03	75	241.04	71.95
J172	3.03	75	241.08	71.96
J-192	3.03	75	241.44	72.12
J-186	3.03	75	241.44	72.12
J278	3.03	75	241.44	72.12
J-188	3.03	75	241.45	72.12
J268	3.03	75	241.47	72.13
J-204	3.03	75	241.57	72.17
J-146	3.03	73	239.82	72.28
J-32	3.03	73	239.82	72.28
J114	3.03	73	239.82	72.28
J70	3.03	73	239.83	72.29
J-152	3.03	73	239.83	72.29
J-288	3.03	73	239.83	72.29
J-150	3.03	73	239.83	72.29
J-31	3.03	73	239.98	72.35
J-82	3.03	74	241.01	72.37
J-30	3.03	73	240.02	72.37
J284	3.03	74	241.42	72.54
J10	3.03	74	241.43	72.55
J274	3.03	74	241.43	72.55
J-184	3.03	74	241.44	72.55
J266	3.03	74	241.46	72.56
J-200	3.03	74	241.47	72.56
J52	3.03	74	241.47	72.56
J-147	3.03	72	239.82	72.71
J116	3.03	72	239.82	72.72
J-148	3.03	72	239.82	72.72
J142	3.03	72	239.83	72.72
J196	3.03	73	241.47	73
J30	3.03	71	239.82	73.15
J120	3.03	71	239.82	73.15
J56	3.03	71	239.82	73.15
J148	3.03	71	239.83	73.15
J-214	3.03	72	241.54	73.46

Model Demand Set Name
2041PHD_NOBOEING

2041 PHD Scenario Modeling Results

ID	Demand	Elevation	Head	Pressure
J264	3.03	72	241.69	73.53
J150	3.03	70	239.82	73.58
J-153	3.03	70	239.82	73.58
J-196	3.03	70	241.71	74.4

Model Demand Set Name
2041PHD_NOBOEING

2021 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-137	**1501.31**	578.2	J-137	20	-222.13	20	**578.2**	20
J-147	**2501.31**	602.04	J-147	20	-662.97	20	**602.04**	20
J-153	**2501.31**	618.73	J-153	20	-637.66	20	**618.73**	20
J102	**2501.31**	1437.08	J102	20	-69.24	20	**1437.08**	20.01
J358	**2501.31**	1501.2	J358	20	-59.04	20	**1501.2**	20.01
J166	**1501.31**	1517.17	J166	20	20.96	20	**1517.17**	20.02
J68	**1501.31**	1560.69	J68	20	23.48	20	**1560.69**	20.08
J72	**1501.31**	1577.52	J72	20	24.4	20	**1577.53**	20
J-145	**2501.31**	1580.26	J-145	20	-44.9	20	**1580.26**	20
J16	**2501.31**	1620.03	J-144	18.84	-41.82	20	**1599.45**	21.17
J134	**1501.31**	1637.51	J134	20	27.33	20	**1637.51**	20
J58	**2501.31**	1676.1	J58	20	-32.27	20	**1676.1**	20
J120	**2501.31**	1676.32	J120	20	-37.4	20	**1676.32**	20
J12	**1501.31**	1680.22	J12	20	29.59	20	**1680.22**	20
J104	**2501.31**	1691.77	J104	20	-31.96	20	**1691.77**	20
J30	**2501.31**	1737.8	J30	20	-30.3	20	**1737.8**	20
J114	**1501.31**	1746.71	J114	20	32.64	20	**1746.71**	20
J-31	**1501.31**	1748.07	J-31	20	32.76	20	**1748.07**	20
J126	**1501.31**	1748.07	J126	20	32.54	20	**1748.07**	20
J116	**1501.31**	1760.9	J116	20	33.33	20	**1760.9**	20
J330	**1501.31**	1846.25	J-129	19.13	35.51	20	**1829.38**	20.87
J56	**1501.31**	1843.82	J56	20	36.63	20	**1843.82**	20
J108	**1501.31**	1848.88	J108	20	36.01	20	**1848.88**	20
J-288	**1501.31**	1876.39	J-288	20	37.49	20	**1876.39**	20
J150	**2501.31**	1905.55	J150	20	-14.46	20	**1905.55**	20
J60	**2501.31**	1917.48	J60	20	-9.15	20	**1917.48**	20
J82	**1501.31**	1958.63	J82	20	40.02	20	**1958.63**	20
J-135	**1501.31**	1974.72	J-135	20	40.14	20	**1974.72**	20
J-154	**2501.31**	2071.38	J-154	20	-1.27	20	**2071.38**	20
J70	**2501.31**	2142.54	J70	20	2.96	20	**2142.54**	20
J158	**1501.31**	2163.25	J158	20	44.89	20	**2163.25**	20
J-292	**2501.31**	2224.81	J-292	20	7.69	20	**2224.81**	20
J50	**2501.31**	2307.04	J-120	19.57	12.02	20	**2295.46**	20.43
J62	**1501.31**	2376	J62	20	49.35	20	**2376**	20.01
J-82	**1501.31**	2409.22	J12	18.7	49.16	20	**2376.55**	21.3
J100	**2501.31**	2408.13	J100	20	16.33	20	**2408.13**	20
J148	**1501.31**	2447.46	J148	20	51.23	20	**2447.46**	20.02
J142	**1501.31**	2490.08	J142	20	51.66	20	**2490.08**	20.02
J20	**1501.31**	2511.17	J20	20	50.24	20	**2511.17**	20.01
J236	**2501.31**	2534.23	J236	20	21.23	20	**2534.22**	20
J146	**1501.31**	2562.13	J146	20	52.14	20	**2562.13**	20.02
J106	**1501.31**	2570.15	J106	20	51.7	20	**2570.14**	20.02

Model Demand Set Name
2021MDD_NOBOEING

2021 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-184	**2501.31**	2672.12	J-184	20	26.03	20	**2672.12**	20.04
J168	**2501.31**	2686.84	J168	20	25.61	20	**2686.84**	20
J18	**2501.31**	2705.51	J18	20	26.04	20	**2705.51**	20
J110	**1501.31**	2707.83	J110	20	53.13	20	**2707.83**	20.03
J-224	**2501.31**	2710.09	J-224	20	26.07	20	**2710.09**	20.02
J-122	**2501.31**	2738.06	J-122	20	27.04	20	**2738.06**	20
J-18	**1501.31**	2750.87	J-18	20	52.3	20	**2750.87**	20.02
J164	**1501.31**	2753.23	J164	20	53.96	20	**2753.23**	20.01
J-121	**2501.31**	2845	J-121	20	29.7	20	**2845**	20
J122	**2501.31**	2864.48	J122	20	30.08	20	**2864.48**	20
J274	**2501.31**	2865.04	J274	20	31.65	20	**2865.05**	20
J90	**1501.31**	2907.03	J90	20	55.19	20	**2907.03**	20.04
J-14	**1501.31**	2996.19	J-14	20	55.18	20	**2996.19**	20.03
J92	**2501.31**	3006.98	J92	20	33.92	20	**3006.98**	20
J98	**2501.31**	3009.62	J98	20	33.85	20	**3009.62**	20
J130	**1501.31**	3044.96	J130	20	55.26	20	**3044.96**	20.04
J-180	**2501.31**	3124.81	J-180	20	36.29	20	**3124.82**	20
J160	**1501.31**	3153.29	J-137	19.57	56.64	20	**3138.2**	20.47
J132	**1501.31**	3147.15	J132	20	55.75	20	**3147.15**	20.04
J364	**2501.31**	3153.72	J364	20	37.09	20	**3153.72**	20
J262	**1501.31**	3172.18	J262	20	57.63	20	**3172.19**	20.02
J128	**2501.31**	3208.69	J128	20	37.99	20	**3208.69**	20
J-36	**2501.31**	3335.25	J338	16.6	37.02	20	**3208.89**	23.46
J140	**2501.31**	3223.1	J140	20	37.56	20	**3223.09**	20.01
J124	**2501.31**	3371.42	J60	17.49	37.9	20	**3274.48**	22.62
J156	**1501.31**	3292.81	J156	20	58.41	20	**3292.81**	20.05
J162	**1501.31**	3330.38	J162	20	57.74	20	**3330.38**	20.04
J80	**2501.31**	3334.61	J80	20	40.08	20	**3334.61**	20.01
J96	**2501.31**	3334.75	J96	20	40.05	20	**3334.76**	20.01
J94	**2501.31**	3431.34	J60	18.05	39.09	20	**3353.98**	22.02
J144	**2501.31**	3440.95	J60	18.57	39.51	20	**3383.5**	21.49
J-208	**2501.31**	3393.81	J-208	20	42.16	20	**3393.82**	20
J170	**1501.31**	3476.04	J-121	19.66	56.22	20	**3461.96**	20.43
J264	**2501.31**	3531.19	J264	20	45.23	20	**3531.19**	20
J-168	**1501.31**	3601.9	J-168	20	59.6	20	**3601.9**	20.05
J-42	**1501.31**	3683.27	J-42	20	61.95	20	**3683.28**	20.01
J88	**2501.31**	3894.77	J88	20	47.76	20	**3894.77**	20
J-24	**1501.31**	3974.28	J-24	20	62.83	20	**3974.28**	20.02
J284	**1501.31**	4005.33	J284	20	63.92	20	**4005.33**	20.01
J-126	**1501.31**	4031.46	J-126	20	61.32	20	**4031.46**	20.05
J-128	**1501.31**	4195.66	J-128	20	62.52	20	**4195.66**	20.07
J172	**1501.31**	4476.9	J172	20	64.87	20	**4476.9**	20.03

Model Demand Set Name
2021MDD_NOBOEING

2021 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J324	**1501.31**	4524.64	J324	20	63.05	20	**4524.64**	20.04
J328	**1501.31**	4681.64	J328	20	64.08	20	**4681.64**	20.07
J332	**1501.31**	4699.97	J332	20	64.77	20	**4699.97**	20.09
J268	**2501.31**	4857.21	J268	20	56.74	20	**4857.21**	20
J48	**1501.31**	5070.47	J48	20	66.14	20	**5070.47**	20.02
J10	**2501.31**	5263.1	J10	20	59.12	20	**5263.1**	20
J320	**1501.31**	5475.5	J320	20	66.35	20	**5475.5**	20.04
J182	**1501.31**	5791.1	J182	20	66.88	20	**5791.11**	20.03
J174	**1501.31**	6061.71	J174	20	67.06	20	**6061.71**	20.07
J198	**2501.31**	6069.64	J198	20	60.83	20	**6069.64**	20.01
J-98	**1501.31**	6091.39	J-98	20	67.37	20	**6091.4**	20.02
J188	**1501.31**	6110.75	J188	20	67.71	20	**6110.75**	20.03
J-188	**2501.31**	6466.37	J-188	20	62.94	20	**6466.38**	20.01
J178	**2501.31**	6564.86	J178	20	62.8	20	**6564.86**	20.01
J-216	**2501.31**	6613.82	J-216	20	61.28	20	**6613.83**	20.01
J-214	**2501.31**	6783.05	J-214	20	64.88	20	**6783.04**	20.01
J-192	**2501.31**	7178.35	J-192	20	64.5	20	**7178.36**	20.02
J270	**2501.31**	7207.92	J270	20	64.16	20	**7207.93**	20.02
J322	**1501.31**	7283.25	J322	20	68.27	20	**7283.25**	20.09
J196	**2501.31**	7432.92	J196	20	65.75	20	**7432.93**	20.02
J272	**2501.31**	7452.22	J272	20	64.6	20	**7452.23**	20.02
J-232	**2501.31**	7592.46	J-232	20	63.28	20	**7592.47**	20
J-190	**2501.31**	7691.97	J-190	20	65.14	20	**7691.98**	20.01
J52	**2501.31**	7705.24	J52	20	65.81	20	**7705.25**	20.02
J370	**1501.31**	7738.36	J370	20	68.69	20	**7738.36**	20.05
J266	**2501.31**	7784.91	J266	20	65.92	20	**7784.92**	20.02
J200	**2501.31**	8533.36	J-232	19.13	64.43	20	**8453.82**	20.87
J-92	**2501.31**	8622.48	J-92	20	63.88	20	**8622.49**	20.04
J-90	**2501.31**	8682.36	J-90	20	63.93	20	**8682.38**	20.04
J228	**2501.31**	8726.06	J228	20	64.38	20	**8726.08**	20.04
J22	**2501.31**	8885.35	J22	20	64.55	20	**8885.37**	20
J-66	**2501.31**	8967.79	J-66	20	64.19	20	**8967.81**	20.05
J258	**2501.31**	9218.23	J258	20	65.26	20	**9218.24**	20.04
J74	**2501.31**	9746.58	J74	20	65.63	20	**9746.6**	20.06
J-230	**2501.31**	10043.26	J-232	19.13	65.78	20	**9949.58**	20.87
J256	**2501.31**	10009.67	J256	20	65.89	20	**10009.69**	20.05
J-258	**2501.31**	10324.14	J-258	20	66.22	20	**10324.17**	20.03
J252	**2501.31**	10343.3	J252	20	65.69	20	**10343.32**	20.07
J-256	**2501.31**	10558.53	J-256	20	66.37	20	**10558.55**	20.03
J-260	**2501.31**	10591.11	J-260	20	66.38	20	**10591.13**	20.04
J218	**2501.31**	11041.29	J218	20	65.45	20	**11041.32**	20.03
J-274	**2501.31**	11173.1	J-274	20	66.73	20	**11173.13**	20.04

Model Demand Set Name
2021MDD_NOBOEING

2021 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-254	**2501.31**	11353.24	J-254	20	66.8	20	**11353.27**	20.04
J-262	**2501.31**	11698.17	J-262	20	66.95	20	**11698.2**	20.05
J-278	**2501.31**	11962.95	J-278	20	67.12	20	**11962.98**	20.04
J220	**2501.31**	11979.89	J220	20	67.5	20	**11979.92**	20.05
J254	**2501.31**	11980.14	J254	20	67.41	20	**11980.17**	20.08
J-252	**2501.31**	12182.57	J-252	20	67.18	20	**12182.61**	20.05
J-286	**2501.31**	12193.19	J-286	20	66.04	20	**12193.23**	20.03
J-284	**2501.31**	12289.83	J-284	20	67.28	20	**12289.87**	20.04
J24	**2501.31**	12323.96	J24	20	66.81	20	**12324**	20.06
J216	**2501.31**	12352.05	J216	20	67.68	20	**12352.09**	20.05
J238	**2501.31**	12421.87	J238	20	66.84	20	**12421.9**	20.06
J214	**2501.31**	12607.94	J214	20	67.79	20	**12607.98**	20.05
J308	**2501.31**	12917.84	J308	20	67.46	20	**12917.89**	20.06
J-272	**2501.31**	12947.3	J-272	20	67.86	20	**12947.33**	20.07
J240	**2501.31**	13034.58	J240	20	67.04	20	**13034.62**	20.08
J208	**2501.31**	13234.38	J208	20	65.6	20	**13234.43**	20.03
J296	**2501.31**	13465.18	J296	20	66.92	20	**13465.23**	20.03
J242	**2501.31**	13701.48	J242	20	67.28	20	**13701.53**	20.08
J222	**2501.31**	13706.25	J222	20	67.71	20	**13706.3**	20.07
J310	**2501.31**	13803.58	J310	20	67.74	20	**13803.64**	20.07
J294	**2501.31**	14257.58	J294	20	67.54	20	**14257.65**	20.04
J298	**2501.31**	14295.03	J298	20	66.33	20	**14295.1**	20.03
J368	**2501.31**	14319.57	J368	20	67.17	20	**14319.63**	20.04
J300	**2501.31**	14492.44	J300	20	65.18	20	**14492.51**	20.02
J248	**2501.31**	15121	J248	20	68.08	20	**15121.07**	20.09
J302	**2501.31**	16506.55	J302	20	66.46	20	**16506.66**	20.01
J304	**2501.31**	17015.33	J304	20	66.14	20	**17015.45**	20.01
J292	**2501.31**	18322.78	J292	20	68.41	20	**18322.93**	20.02
J206	**2501.31**	48070.71	J304	27.36	67.39	20	**48070.71**	20

Model Demand Set Name
2021MDD_NOBOEING

2031 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-137	**1501.41**	577.71	J-137	20	-222.31	20	**577.71**	20
J-147	**2501.41**	601.41	J-147	20	-663.31	20	**601.41**	20.01
J-153	**2501.41**	618.11	J-153	20	-637.99	20	**618.11**	20
J102	**2501.41**	1434.17	J102	20	-69.54	20	**1434.17**	20.01
J358	**2501.41**	1498.06	J358	20	-59.34	20	**1498.06**	20.01
J166	**1501.41**	1514.47	J166	20	20.79	20	**1514.47**	20.02
J68	**1501.41**	1557.77	J68	20	23.31	20	**1557.77**	20.08
J72	**1501.41**	1574.54	J72	20	24.23	20	**1574.54**	20
J-145	**2501.41**	1576.63	J-145	20	-45.2	20	**1576.63**	20.01
J16	**2501.41**	1616.33	J-144	18.84	-42.12	20	**1595.7**	21.18
J134	**1501.41**	1634.28	J134	20	27.16	20	**1634.28**	20
J58	**2501.41**	1672.16	J58	20	-32.56	20	**1672.16**	20
J120	**2501.41**	1672.59	J120	20	-37.71	20	**1672.59**	20
J12	**1501.41**	1678.87	J12	20	29.52	20	**1678.87**	20
J104	**2501.41**	1687.91	J104	20	-32.25	20	**1687.91**	20
J30	**2501.41**	1733.83	J30	20	-30.61	20	**1733.83**	20
J114	**1501.41**	1742.69	J114	20	32.44	20	**1742.69**	20
J126	**1501.41**	1744.65	J126	20	32.38	20	**1744.65**	20
J-31	**1501.41**	1744.69	J-31	20	32.59	20	**1744.69**	20
J116	**1501.41**	1756.85	J116	20	33.13	20	**1756.85**	20
J330	**1501.41**	1843.67	J-129	19.13	35.39	20	**1826.79**	20.87
J56	**1501.41**	1839.5	J56	20	36.44	20	**1839.5**	20
J108	**1501.41**	1844.59	J108	20	35.83	20	**1844.59**	20
J-288	**1501.41**	1871.91	J-288	20	37.29	20	**1871.91**	20
J150	**2501.41**	1900.96	J150	20	-14.76	20	**1900.96**	20
J60	**2501.41**	1912.58	J60	20	-9.42	20	**1912.58**	20
J82	**1501.41**	1954.5	J82	20	39.85	20	**1954.5**	20
J-135	**1501.41**	1970.44	J-135	20	39.97	20	**1970.44**	20
J-154	**2501.41**	2066.07	J-154	20	-1.56	20	**2066.07**	20
J70	**2501.41**	2136.99	J70	20	2.68	20	**2136.99**	20
J158	**1501.41**	2158.51	J158	20	44.73	20	**2158.51**	20
J-292	**2501.41**	2218.76	J-292	20	7.4	20	**2218.76**	20
J50	**2501.41**	2302.36	J-120	19.57	11.83	20	**2290.78**	20.43
J62	**1501.41**	2369.54	J62	20	49.16	20	**2369.54**	20.01
J-82	**1501.41**	2406.75	J12	18.7	49.09	20	**2374.08**	21.3
J100	**2501.41**	2401.11	J100	20	16.05	20	**2401.1**	20
J148	**1501.41**	2440.44	J148	20	51.04	20	**2440.44**	20.02
J142	**1501.41**	2482.99	J142	20	51.47	20	**2482.99**	20.02
J20	**1501.41**	2504.56	J20	20	50.08	20	**2504.56**	20.01
J236	**2501.41**	2533.71	J236	20	21.21	20	**2533.7**	20
J146	**1501.41**	2554.44	J146	20	51.95	20	**2554.44**	20.02
J106	**1501.41**	2562.26	J106	20	51.52	20	**2562.25**	20.02

Model Demand Set Name
2031MDD_NOBOEING

2031 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-184	**2501.41**	2670.59	J-184	20	25.98	20	**2670.59**	20.05
J168	**2501.41**	2679.9	J168	20	25.4	20	**2679.9**	20
J18	**2501.41**	2698.01	J18	20	25.82	20	**2698.01**	20
J110	**1501.41**	2699.23	J110	20	52.94	20	**2699.23**	20.03
J-224	**2501.41**	2709.56	J-224	20	26.06	20	**2709.56**	20.02
J-122	**2501.41**	2731.31	J-122	20	26.85	20	**2731.31**	20
J-18	**1501.41**	2743	J-18	20	52.14	20	**2743**	20.02
J164	**1501.41**	2747.09	J164	20	53.83	20	**2747.09**	20.02
J-121	**2501.41**	2838.09	J-121	20	29.51	20	**2838.09**	20
J122	**2501.41**	2855.77	J122	20	29.84	20	**2855.77**	20
J274	**2501.41**	2863.31	J274	20	31.59	20	**2863.31**	20
J90	**1501.41**	2897.47	J90	20	55.01	20	**2897.47**	20.04
J-14	**1501.41**	2987.05	J-14	20	55.02	20	**2987.05**	20.04
J92	**2501.41**	2996.92	J92	20	33.66	20	**2996.92**	20
J98	**2501.41**	2999.46	J98	20	33.59	20	**2999.46**	20
J130	**1501.41**	3035.46	J130	20	55.09	20	**3035.46**	20.04
J-180	**2501.41**	3123.62	J-180	20	36.26	20	**3123.62**	20
J160	**1501.41**	3143.81	J-137	19.57	56.48	20	**3128.72**	20.48
J132	**1501.41**	3137.51	J132	20	55.6	20	**3137.51**	20.05
J364	**2501.41**	3142.87	J364	20	36.83	20	**3142.87**	20
J262	**1501.41**	3166.49	J262	20	57.54	20	**3166.49**	20.02
J-36	**2501.41**	3324.13	J338	16.6	36.77	20	**3197.6**	23.47
J128	**2501.41**	3198.28	J128	20	37.75	20	**3198.28**	20
J140	**2501.41**	3211.63	J140	20	37.3	20	**3211.63**	20.01
J124	**2501.41**	3359.9	J60	17.47	37.65	20	**3262.5**	22.63
J156	**1501.41**	3283.1	J156	20	58.26	20	**3283.1**	20.05
J162	**1501.41**	3321.11	J162	20	57.6	20	**3321.11**	20.05
J96	**2501.41**	3322.97	J96	20	39.8	20	**3322.97**	20.01
J80	**2501.41**	3323.26	J80	20	39.84	20	**3323.26**	20.01
J94	**2501.41**	3419.16	J60	18.04	38.84	20	**3341.42**	22.03
J144	**2501.41**	3428.59	J60	18.56	39.26	20	**3370.73**	21.5
J-208	**2501.41**	3392.94	J-208	20	42.14	20	**3392.94**	20
J170	**1501.41**	3467.98	J-121	19.62	56.1	20	**3452.48**	20.47
J264	**2501.41**	3530.02	J264	20	45.2	20	**3530.02**	20
J-168	**1501.41**	3591.58	J-168	20	59.47	20	**3591.58**	20.06
J-42	**1501.41**	3678.64	J-42	20	61.89	20	**3678.64**	20.01
J88	**2501.41**	3893.69	J88	20	47.74	20	**3893.69**	20
J-24	**1501.41**	3968.46	J-24	20	62.77	20	**3968.47**	20.02
J284	**1501.41**	4002.23	J284	20	63.88	20	**4002.23**	20.01
J-126	**1501.41**	4022.01	J-126	20	61.22	20	**4022.01**	20.06
J-128	**1501.41**	4184.4	J-128	20	62.4	20	**4184.4**	20.08
J172	**1501.41**	4469.8	J172	20	64.8	20	**4469.8**	20.04

Model Demand Set Name
2031MDD_NOBOEING

2031 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J324	**1501.41**	4516.23	J324	20	62.98	20	**4516.24**	20.05
J328	**1501.41**	4671.04	J328	20	63.99	20	**4671.04**	20.08
J332	**1501.41**	4687.89	J332	20	64.67	20	**4687.89**	20
J268	**2501.41**	4853.33	J268	20	56.7	20	**4853.33**	20
J48	**1501.41**	5065.61	J48	20	66.1	20	**5065.61**	20.02
J10	**2501.41**	5258.07	J10	20	59.07	20	**5258.07**	20.01
J320	**1501.41**	5468.03	J320	20	66.3	20	**5468.03**	20.04
J182	**1501.41**	5784.19	J182	20	66.84	20	**5784.19**	20.04
J174	**1501.41**	6050.96	J174	20	67	20	**6050.96**	20.08
J198	**2501.41**	6063.88	J198	20	60.78	20	**6063.89**	20.01
J-98	**1501.41**	6085.95	J-98	20	67.34	20	**6085.95**	20.02
J188	**1501.41**	6103.92	J188	20	67.67	20	**6103.92**	20.03
J-188	**2501.41**	6459.41	J-188	20	62.89	20	**6459.41**	20.01
J178	**2501.41**	6557.2	J178	20	62.75	20	**6557.21**	20.01
J-216	**2501.41**	6608.85	J-216	20	61.24	20	**6608.86**	20.01
J-214	**2501.41**	6777.31	J-214	20	64.84	20	**6777.29**	20.01
J-192	**2501.41**	7169.77	J-192	20	64.45	20	**7169.78**	20.02
J270	**2501.41**	7198.84	J270	20	64.11	20	**7198.85**	20.02
J322	**1501.41**	7271.2	J322	20	68.22	20	**7271.21**	20
J196	**2501.41**	7424.79	J196	20	65.7	20	**7424.8**	20.02
J272	**2501.41**	7442.7	J272	20	64.55	20	**7442.71**	20.02
J-232	**2501.41**	7590	J-232	20	63.27	20	**7590.01**	20
J-190	**2501.41**	7685.22	J-190	20	65.1	20	**7685.23**	20.01
J52	**2501.41**	7696.33	J52	20	65.76	20	**7696.34**	20.02
J370	**1501.41**	7728.95	J370	20	68.65	20	**7728.95**	20.06
J266	**2501.41**	7775.55	J266	20	65.87	20	**7775.56**	20.02
J200	**2501.41**	8530.38	J-232	19.13	64.41	20	**8450.83**	20.87
J-92	**2501.41**	8609.9	J-92	20	63.83	20	**8609.91**	20.04
J-90	**2501.41**	8669.22	J-90	20	63.87	20	**8669.23**	20.04
J228	**2501.41**	8713.57	J228	20	64.33	20	**8713.58**	20.04
J22	**2501.41**	8883.85	J22	20	64.55	20	**8883.86**	20
J-66	**2501.41**	8953.31	J-66	20	64.13	20	**8953.32**	20.05
J258	**2501.41**	9205.05	J258	20	65.21	20	**9205.07**	20.05
J74	**2501.41**	9729.86	J74	20	65.57	20	**9729.88**	20.07
J-230	**2501.41**	10039.3	J-232	19.13	65.77	20	**9945.62**	20.87
J256	**2501.41**	9994.72	J256	20	65.85	20	**9994.74**	20.06
J-258	**2501.41**	10312.31	J-258	20	66.18	20	**10312.33**	20.04
J252	**2501.41**	10326.42	J252	20	65.64	20	**10326.44**	20.07
J-256	**2501.41**	10546.36	J-256	20	66.33	20	**10546.38**	20.04
J-260	**2501.41**	10578.55	J-260	20	66.34	20	**10578.57**	20.04
J218	**2501.41**	11029.05	J218	20	65.42	20	**11029.08**	20.04
J-274	**2501.41**	11160.46	J-274	20	66.7	20	**11160.49**	20.04

Model Demand Set Name
2031MDD_NOBOEING

2031 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-254	**2501.41**	11339.5	J-254	20	66.77	20	**11339.54**	20.05
J-262	**2501.41**	11682.95	J-262	20	66.91	20	**11682.98**	20.06
J-278	**2501.41**	11949.64	J-278	20	67.09	20	**11949.67**	20.05
J254	**2501.41**	11961.38	J254	20	67.37	20	**11961.41**	20.09
J220	**2501.41**	11965.11	J220	20	67.47	20	**11965.14**	20.06
J-252	**2501.41**	12167.5	J-252	20	67.15	20	**12167.53**	20.06
J-286	**2501.41**	12181.51	J-286	20	66.01	20	**12181.55**	20.04
J-284	**2501.41**	12277.24	J-284	20	67.25	20	**12277.28**	20.04
J24	**2501.41**	12307.9	J24	20	66.78	20	**12307.94**	20.07
J216	**2501.41**	12337.84	J216	20	67.65	20	**12337.89**	20.05
J238	**2501.41**	12405.01	J238	20	66.8	20	**12405.04**	20.07
J214	**2501.41**	12593.62	J214	20	67.76	20	**12593.65**	20.05
J308	**2501.41**	12901.37	J308	20	67.42	20	**12901.42**	20.07
J-272	**2501.41**	12930.03	J-272	20	67.83	20	**12930.06**	20.08
J240	**2501.41**	13015.36	J240	20	67	20	**13015.4**	20
J208	**2501.41**	13222.36	J208	20	65.58	20	**13222.42**	20.04
J296	**2501.41**	13453.23	J296	20	66.9	20	**13453.29**	20.04
J242	**2501.41**	13682.58	J242	20	67.25	20	**13682.64**	20.09
J222	**2501.41**	13688.26	J222	20	67.68	20	**13688.31**	20.08
J310	**2501.41**	13785.8	J310	20	67.71	20	**13785.85**	20.08
J294	**2501.41**	14243.89	J294	20	67.52	20	**14243.96**	20.05
J298	**2501.41**	14282.63	J298	20	66.31	20	**14282.7**	20.04
J368	**2501.41**	14305.86	J368	20	67.14	20	**14305.92**	20.05
J300	**2501.41**	14482.75	J300	20	65.17	20	**14482.82**	20.02
J248	**2501.41**	15100.45	J248	20	68.05	20	**15100.53**	20
J302	**2501.41**	16498.89	J302	20	66.45	20	**16499**	20.01
J304	**2501.41**	17008.51	J304	20	66.13	20	**17008.62**	20.01
J292	**2501.41**	18313.54	J292	20	68.4	20	**18313.68**	20.02
J206	**2501.41**	48063.11	J304	27.34	67.38	20	**48063.11**	20

Model Demand Set Name
2031MDD_NOBOEING

2041 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-137	**1501.51**	577.16	J-137	20	-222.52	20	**577.16**	20
J-147	**2501.51**	600.73	J-147	20	-663.69	20	**600.73**	20.01
J-153	**2501.51**	617.43	J-153	20	-638.34	20	**617.43**	20.01
J102	**2501.51**	1431	J102	20	-69.87	20	**1431**	20.01
J358	**2501.51**	1494.64	J358	20	-59.67	20	**1494.64**	20.01
J166	**1501.51**	1511.52	J166	20	20.61	20	**1511.52**	20.01
J68	**1501.51**	1554.58	J68	20	23.12	20	**1554.58**	20.08
J72	**1501.51**	1571.29	J72	20	24.04	20	**1571.29**	20
J-145	**2501.51**	1572.67	J-145	20	-45.53	20	**1572.67**	20.01
J16	**2501.51**	1612.3	J-144	18.84	-42.46	20	**1591.62**	21.18
J134	**1501.51**	1630.76	J134	20	26.97	20	**1630.76**	20
J58	**2501.51**	1667.87	J58	20	-32.88	20	**1667.87**	20.01
J120	**2501.51**	1668.54	J120	20	-38.04	20	**1668.54**	20.01
J12	**1501.51**	1677.39	J12	20	29.43	20	**1677.39**	20
J104	**2501.51**	1683.72	J104	20	-32.56	20	**1683.72**	20
J30	**2501.51**	1729.52	J30	20	-30.93	20	**1729.52**	20
J114	**1501.51**	1738.31	J114	20	32.22	20	**1738.31**	20
J126	**1501.51**	1740.93	J126	20	32.19	20	**1740.93**	20
J-31	**1501.51**	1741	J-31	20	32.4	20	**1741.01**	20
J116	**1501.51**	1752.44	J116	20	32.91	20	**1752.44**	20
J330	**1501.51**	1840.85	J-129	19.13	35.26	20	**1823.97**	20.87
J56	**1501.51**	1834.8	J56	20	36.22	20	**1834.8**	20
J108	**1501.51**	1839.94	J108	20	35.62	20	**1839.94**	20
J-288	**1501.51**	1867.03	J-288	20	37.08	20	**1867.03**	20
J150	**2501.51**	1895.96	J150	20	-15.08	20	**1895.96**	20
J60	**2501.51**	1907.25	J60	20	-9.72	20	**1907.25**	20
J82	**1501.51**	1950	J82	20	39.66	20	**1950**	20
J-135	**1501.51**	1965.78	J-135	20	39.79	20	**1965.78**	20
J-154	**2501.51**	2060.3	J-154	20	-1.87	20	**2060.3**	20
J70	**2501.51**	2130.97	J70	20	2.37	20	**2130.97**	20
J158	**1501.51**	2153.36	J158	20	44.56	20	**2153.36**	20.01
J-292	**2501.51**	2212.2	J-292	20	7.09	20	**2212.19**	20
J50	**2501.51**	2297.26	J-120	19.57	11.63	20	**2285.69**	20.43
J62	**1501.51**	2362.52	J62	20	48.97	20	**2362.52**	20.01
J-82	**1501.51**	2404.06	J12	18.7	49.01	20	**2371.39**	21.3
J100	**2501.51**	2393.48	J100	20	15.74	20	**2393.48**	20
J148	**1501.51**	2432.83	J148	20	50.83	20	**2432.83**	20.02
J142	**1501.51**	2475.29	J142	20	51.27	20	**2475.29**	20.02
J20	**1501.51**	2497.39	J20	20	49.9	20	**2497.39**	20.02
J236	**2501.51**	2533.13	J236	20	21.18	20	**2533.12**	20
J146	**1501.51**	2546.08	J146	20	51.75	20	**2546.08**	20.03
J106	**1501.51**	2553.7	J106	20	51.31	20	**2553.69**	20.03

Model Demand Set Name
2041MDD_NOBOEING

2041 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-184	**2501.51**	2668.93	J-184	20	25.92	20	**2668.93**	20.05
J168	**2501.51**	2672.36	J168	20	25.17	20	**2672.36**	20
J18	**2501.51**	2689.87	J18	20	25.58	20	**2689.86**	20
J110	**1501.51**	2689.91	J110	20	52.74	20	**2689.91**	20.03
J-224	**2501.51**	2708.99	J-224	20	26.04	20	**2708.99**	20.02
J-122	**2501.51**	2723.96	J-122	20	26.63	20	**2723.96**	20
J-18	**1501.51**	2734.46	J-18	20	51.97	20	**2734.46**	20.03
J164	**1501.51**	2740.42	J164	20	53.68	20	**2740.42**	20.02
J-121	**2501.51**	2830.58	J-121	20	29.31	20	**2830.58**	20
J122	**2501.51**	2846.31	J122	20	29.59	20	**2846.31**	20
J274	**2501.51**	2861.42	J274	20	31.53	20	**2861.42**	20
J90	**1501.51**	2887.11	J90	20	54.81	20	**2887.11**	20.05
J-14	**1501.51**	2977.14	J-14	20	54.84	20	**2977.14**	20.04
J92	**2501.51**	2986.01	J92	20	33.37	20	**2986.01**	20
J98	**2501.51**	2988.45	J98	20	33.3	20	**2988.45**	20
J130	**1501.51**	3025.15	J130	20	54.92	20	**3025.15**	20.05
J160	**1501.51**	3133.53	J-137	19.57	56.32	20	**3118.43**	20.48
J-180	**2501.51**	3122.31	J-180	20	36.23	20	**3122.31**	20
J132	**1501.51**	3127.05	J132	20	55.43	20	**3127.05**	20.05
J364	**2501.51**	3131.1	J364	20	36.55	20	**3131.1**	20.01
J262	**1501.51**	3160.31	J262	20	57.43	20	**3160.31**	20.02
J-36	**2501.51**	3312.07	J338	16.6	36.5	20	**3185.35**	23.47
J128	**2501.51**	3186.98	J128	20	37.49	20	**3186.98**	20.01
J140	**2501.51**	3199.2	J140	20	37.03	20	**3199.2**	20.01
J124	**2501.51**	3347.42	J60	17.46	37.38	20	**3249.5**	22.64
J156	**1501.51**	3272.57	J156	20	58.1	20	**3272.57**	20.06
J96	**2501.51**	3310.2	J96	20	39.52	20	**3310.2**	20.01
J80	**2501.51**	3310.95	J80	20	39.57	20	**3310.95**	20.01
J162	**1501.51**	3311.05	J162	20	57.45	20	**3311.05**	20.05
J94	**2501.51**	3405.97	J60	18.03	38.57	20	**3327.81**	22.05
J144	**2501.51**	3415.21	J60	18.55	38.99	20	**3356.88**	21.51
J-208	**2501.51**	3391.98	J-208	20	42.12	20	**3391.98**	20
J170	**1501.51**	3459.23	J-121	19.59	55.96	20	**3442.2**	20.52
J264	**2501.51**	3528.75	J264	20	45.17	20	**3528.75**	20
J-168	**1501.51**	3580.37	J-168	20	59.32	20	**3580.37**	20.07
J-42	**1501.51**	3673.59	J-42	20	61.82	20	**3673.59**	20.02
J88	**2501.51**	3892.51	J88	20	47.72	20	**3892.51**	20
J-24	**1501.51**	3962.14	J-24	20	62.69	20	**3962.14**	20.03
J284	**1501.51**	3998.86	J284	20	63.84	20	**3998.86**	20.01
J-126	**1501.51**	4011.75	J-126	20	61.11	20	**4011.75**	20.06
J-128	**1501.51**	4172.2	J-128	20	62.28	20	**4172.2**	20
J172	**1501.51**	4462.09	J172	20	64.73	20	**4462.09**	20.04

Model Demand Set Name
2041MDD_NOBOEING

2041 Fire Flow Scenario Modeling Results

ID	**Total Demand (gpm)**	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	**Hydrant Design Flow (gpm)**	Hydrant Pressure at Design Flow (psi)
J324	**1501.51**	4507.1	J324	20	62.9	20	**4507.1**	20.05
J328	**1501.51**	4659.54	J328	20	63.89	20	**4659.54**	20.09
J332	**1501.51**	4674.78	J332	20	64.56	20	**4674.78**	20
J268	**2501.51**	4849.1	J268	20	56.64	20	**4849.11**	20
J48	**1501.51**	5060.31	J48	20	66.06	20	**5060.32**	20.02
J10	**2501.51**	5252.6	J10	20	59.01	20	**5252.6**	20.01
J320	**1501.51**	5459.91	J320	20	66.25	20	**5459.92**	20.05
J182	**1501.51**	5776.67	J182	20	66.79	20	**5776.67**	20.04
J174	**1501.51**	6039.3	J174	20	66.93	20	**6039.31**	20
J198	**2501.51**	6057.62	J198	20	60.73	20	**6057.62**	20.01
J-98	**1501.51**	6080.03	J-98	20	67.3	20	**6080.04**	20.02
J188	**1501.51**	6096.49	J188	20	67.63	20	**6096.5**	20.04
J-188	**2501.51**	6451.84	J-188	20	62.84	20	**6451.84**	20.01
J178	**2501.51**	6548.89	J178	20	62.69	20	**6548.89**	20.02
J-216	**2501.51**	6603.44	J-216	20	61.21	20	**6603.45**	20.01
J-214	**2501.51**	6771.06	J-214	20	64.8	20	**6771.05**	20.01
J-192	**2501.51**	7160.46	J-192	20	64.39	20	**7160.46**	20.02
J270	**2501.51**	7188.98	J270	20	64.05	20	**7188.99**	20.02
J322	**1501.51**	7258.14	J322	20	68.17	20	**7258.15**	20
J196	**2501.51**	7415.96	J196	20	65.65	20	**7415.96**	20.02
J272	**2501.51**	7432.35	J272	20	64.49	20	**7432.36**	20.03
J-232	**2501.51**	7587.32	J-232	20	63.25	20	**7587.33**	20
J-190	**2501.51**	7677.88	J-190	20	65.06	20	**7677.89**	20.01
J52	**2501.51**	7686.65	J52	20	65.71	20	**7686.66**	20.03
J370	**1501.51**	7718.73	J370	20	68.62	20	**7718.73**	20.07
J266	**2501.51**	7765.38	J266	20	65.82	20	**7765.39**	20.03
J200	**2501.51**	8527.14	J-232	19.13	64.4	20	**8447.59**	20.87
J-92	**2501.51**	8596.24	J-92	20	63.77	20	**8596.26**	20.05
J-90	**2501.51**	8654.95	J-90	20	63.82	20	**8654.97**	20.05
J228	**2501.51**	8700	J228	20	64.28	20	**8700.02**	20.05
J22	**2501.51**	8882.2	J22	20	64.54	20	**8882.21**	20
J-66	**2501.51**	8937.59	J-66	20	64.07	20	**8937.6**	20.06
J258	**2501.51**	9190.75	J258	20	65.16	20	**9190.77**	20.05
J74	**2501.51**	9711.72	J74	20	65.51	20	**9711.74**	20.08
J-230	**2501.51**	10034.99	J-232	19.13	65.75	20	**9941.31**	20.87
J256	**2501.51**	9978.5	J256	20	65.8	20	**9978.51**	20.07
J-258	**2501.51**	10299.47	J-258	20	66.14	20	**10299.49**	20.04
J252	**2501.51**	10308.12	J252	20	65.59	20	**10308.13**	20.08
J-256	**2501.51**	10533.15	J-256	20	66.3	20	**10533.17**	20.05
J-260	**2501.51**	10564.92	J-260	20	66.3	20	**10564.94**	20.05
J218	**2501.51**	11015.76	J218	20	65.39	20	**11015.79**	20.04
J-274	**2501.51**	11146.75	J-274	20	66.66	20	**11146.77**	20.05

Model Demand Set Name
2041MDD_NOBOEING

2041 Fire Flow Scenario Modeling Results

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-254	**2501.51**	11324.6	J-254	20	66.73	20	**11324.63**	20.06
J-262	**2501.51**	11666.43	J-262	20	66.87	20	**11666.46**	20.07
J-278	**2501.51**	11935.19	J-278	20	67.06	20	**11935.22**	20.05
J254	**2501.51**	11941.04	J254	20	67.32	20	**11941.08**	20
J220	**2501.51**	11949.08	J220	20	67.43	20	**11949.11**	20.07
J-252	**2501.51**	12151.14	J-252	20	67.11	20	**12151.18**	20.07
J-286	**2501.51**	12168.82	J-286	20	65.98	20	**12168.86**	20.04
J-284	**2501.51**	12263.59	J-284	20	67.22	20	**12263.62**	20.05
J24	**2501.51**	12290.47	J24	20	66.74	20	**12290.51**	20.08
J216	**2501.51**	12322.43	J216	20	67.62	20	**12322.47**	20.06
J238	**2501.51**	12386.73	J238	20	66.76	20	**12386.76**	20.08
J214	**2501.51**	12578.07	J214	20	67.72	20	**12578.1**	20.06
J308	**2501.51**	12883.5	J308	20	67.39	20	**12883.54**	20.08
J-272	**2501.51**	12911.3	J-272	20	67.79	20	**12911.32**	20.09
J240	**2501.51**	12994.51	J240	20	66.96	20	**12994.56**	20
J208	**2501.51**	13209.32	J208	20	65.56	20	**13209.37**	20.04
J296	**2501.51**	13440.27	J296	20	66.87	20	**13440.32**	20.04
J242	**2501.51**	13662.1	J242	20	67.21	20	**13662.16**	20
J222	**2501.51**	13668.74	J222	20	67.64	20	**13668.8**	20
J310	**2501.51**	13766.51	J310	20	67.68	20	**13766.57**	20.09
J294	**2501.51**	14229.03	J294	20	67.5	20	**14229.1**	20.05
J298	**2501.51**	14269.18	J298	20	66.29	20	**14269.25**	20.04
J368	**2501.51**	14290.99	J368	20	67.12	20	**14291.06**	20.05
J300	**2501.51**	14472.23	J300	20	65.15	20	**14472.3**	20.03
J248	**2501.51**	15078.17	J248	20	68.01	20	**15078.25**	20
J302	**2501.51**	16490.57	J302	20	66.44	20	**16490.68**	20.02
J304	**2501.51**	17001.09	J304	20	66.12	20	**17001.2**	20.01
J292	**2501.51**	18303.5	J292	20	68.38	20	**18303.64**	20.02
J206	**2501.51**	48054.83	J304	27.32	67.38	20	**48054.83**	20

Model Demand Set Name
2041MDD_NOBOEING

2041 Fire Flow Scenario Modeling Results
with Improvements

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J166	**1501.51**	1566.16	J166	20	23.76	20	**1566.16**	20.07
J68	**1501.51**	1613.6	J68	20	26.3	20	**1613.6**	20
J72	**1501.51**	1632.07	J72	20	27.22	20	**1632.07**	20
J12	**1501.51**	1699	J12	20	30.45	20	**1699**	20.08
J134	**1501.51**	1699.59	J134	20	30.16	20	**1699.59**	20
J-31	**1501.51**	1821.98	J-31	20	35.71	20	**1821.98**	20
J126	**1501.51**	1824.46	J126	20	35.54	20	**1824.46**	20
J330	**1501.51**	1925	J-129	19.13	38.21	20	**1907.5**	20.87
J114	**1501.51**	2023.53	J114	20	42.08	20	**2023.53**	20
J116	**1501.51**	2044.12	J116	20	42.82	20	**2044.12**	20
J82	**1501.51**	2059.68	J82	20	42.91	20	**2059.68**	20
J-135	**1501.51**	2087.34	J-135	20	43.22	20	**2087.34**	20
J56	**1501.51**	2175.05	J56	20	46.25	20	**2175.05**	20
J108	**1501.51**	2199.71	J108	20	45.5	20	**2199.71**	20
J-288	**1501.51**	2221.47	J-288	20	46.83	20	**2221.47**	20
J158	**1501.51**	2300.16	J158	20	47.79	20	**2300.16**	20
J-82	**1501.51**	2457.18	J12	18.7	50.02	20	**2423.98**	21.3
J236	**2501.51**	2533.35	J236	20	21.19	20	**2533.35**	20
J-137	**1501.51**	2575.46	J-137	20	51.32	20	**2575.46**	20.01
J-154	**2501.51**	2594.07	J-154	20	23.33	20	**2594.07**	20
J358	**2501.51**	2622.01	J358	20	24.2	20	**2622.01**	20
J-184	**2501.51**	2687.02	J-184	20	26.5	20	**2687.02**	20.05
J-147	**2501.51**	2738.9	J-147	20	28.05	20	**2738.9**	20
J20	**1501.51**	2742.14	J20	20	53.27	20	**2742.14**	20.01
J-153	**2501.51**	2778.98	J-153	20	29.37	20	**2778.98**	20
J274	**2501.51**	2883.51	J274	20	32.12	20	**2883.52**	20
J-292	**2501.51**	2901.89	J-292	20	32.29	20	**2901.89**	20
J164	**1501.51**	2989.37	J164	20	56.46	20	**2989.37**	20.01
J-18	**1501.51**	3056.11	J-18	20	55.26	20	**3056.11**	20.02
J120	**2501.51**	3090.28	J120	20	36.99	20	**3090.28**	20
J102	**2501.51**	3159.33	J102	20	37.47	20	**3159.33**	20
J30	**2501.51**	3274.65	J30	20	40.59	20	**3274.65**	20
J-224	**2501.51**	3323.35	J-224	20	37.86	20	**3323.35**	20
J104	**2501.51**	3329.11	J104	20	40.09	20	**3329.11**	20
J100	**2501.51**	3337.52	J100	20	40.94	20	**3337.52**	20
J50	**2501.51**	3374.25	J-120	19.57	39.74	20	**3357.53**	20.43
J-145	**2501.51**	3361.73	J-145	20	40.49	20	**3361.73**	20
J-208	**2501.51**	3392.99	J-208	20	42.12	20	**3392.99**	20
J110	**1501.51**	3394.22	J110	20	59.07	20	**3394.22**	20.05
J-14	**1501.51**	3395.75	J-14	20	58.19	20	**3395.75**	20.04
J106	**1501.51**	3411.22	J106	20	59.5	20	**3411.21**	20.05
J16	**2501.51**	3444.08	J16	20	42.29	20	**3444.08**	20.01

Model Demand Set Name 2041MDD_NOBOEING
Model Pipe Set Name 2021WSP_CIP

2041 Fire Flow Scenario Modeling Results
with Improvements

ID	**Total Demand (gpm)**	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	**Hydrant Design Flow (gpm)**	Hydrant Pressure at Design Flow (psi)
J130	**1501.51**	3468.43	J130	20	58.26	20	**3468.43**	20.04
J18	**2501.51**	3470.54	J18	20	40.51	20	**3470.55**	20
J262	**1501.51**	3471.25	J262	20	59.78	20	**3471.25**	20.01
J148	**1501.51**	3477.37	J148	20	61.61	20	**3477.37**	20.05
J264	**2501.51**	3531.6	J264	20	45.22	20	**3531.6**	20
J122	**2501.51**	3536.52	J122	20	41.67	20	**3536.52**	20.01
J92	**2501.51**	3545.34	J92	20	43.07	20	**3545.35**	20.01
J132	**1501.51**	3582.13	J132	20	58.56	20	**3582.13**	20.04
J58	**2501.51**	3596.82	J152	19.73	43	20	**3585.82**	20.28
J160	**1501.51**	3606.64	J-137	19.57	59.63	20	**3589.5**	20.48
J90	**1501.51**	3606.12	J90	20	60.24	20	**3606.12**	20.06
J98	**2501.51**	3613.8	J98	20	43.74	20	**3613.81**	20.01
J146	**1501.51**	3623.35	J146	20	61.4	20	**3623.35**	20.06
J60	**2501.51**	3643.98	J60	20	43.07	20	**3643.99**	20.01
J168	**2501.51**	3680.43	J168	20	43.35	20	**3680.43**	20
J70	**2501.51**	3692.58	J70	20	46.44	20	**3692.58**	20.01
J150	**2501.51**	3710.71	J150	20	47.35	20	**3710.71**	20.01
J128	**2501.51**	3713.48	J128	20	45.44	20	**3713.49**	20.01
J162	**1501.51**	3753.39	J162	20	60.18	20	**3753.39**	20.04
J156	**1501.51**	3784.31	J156	20	61.3	20	**3784.31**	20.05
J-42	**1501.51**	3804.09	J-42	20	62.63	20	**3804.09**	20.01
J364	**2501.51**	3829.01	J364	20	46.9	20	**3829.01**	20.01
J140	**2501.51**	3834.95	J140	20	45.8	20	**3834.95**	20.01
J62	**1501.51**	3846.68	J-164	19.81	61.31	20	**3838.74**	20.28
J142	**1501.51**	3897.84	J-151	19.21	62.49	20	**3865.32**	20.87
J88	**2501.51**	3894.73	J88	20	47.73	20	**3894.74**	20
J-36	**2501.51**	4027.1	J60	17.28	45.78	20	**3902.81**	22.85
J80	**2501.51**	3933.53	J80	20	47.8	20	**3933.53**	20.01
J96	**2501.51**	3984.97	J96	20	48.25	20	**3984.97**	20.02
J124	**2501.51**	4049.27	J60	18.76	46.59	20	**3990.77**	21.34
J284	**1501.51**	4049.67	J284	20	64.1	20	**4049.67**	20.01
J94	**2501.51**	4123.12	J60	19.37	47.46	20	**4092.52**	20.69
J144	**2501.51**	4134.25	J140	19.2	48.24	20	**4096.66**	20.83
J-24	**1501.51**	4202.94	J-24	20	63.81	20	**4202.94**	20.01
J-168	**1501.51**	4219.39	J-168	20	62.33	20	**4219.39**	20.06
J-122	**2501.51**	4250.46	J-122	20	48.95	20	**4250.46**	20.01
J-126	**1501.51**	4482.57	J-126	20	62.94	20	**4482.57**	20.04
J172	**1501.51**	4795.68	J172	20	65.85	20	**4795.68**	20.02
J324	**1501.51**	4892.18	J324	20	64.07	20	**4892.18**	20.03
J268	**2501.51**	4914.25	J268	20	57.07	20	**4914.25**	20
J170	**1501.51**	5117.96	J170	20	66.43	20	**5117.96**	20.04
J48	**1501.51**	5184.9	J48	20	66.36	20	**5184.91**	20.02

Model Demand Set Name 2041MDD_NOBOEING
Model Pipe Set Name 2021WSP_CIP

2041 Fire Flow Scenario Modeling Results
with Improvements

ID	**Total Demand (gpm)**	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	**Hydrant Design Flow (gpm)**	Hydrant Pressure at Design Flow (psi)
J-128	**1501.51**	5187.28	J-128	20	65.23	20	**5187.29**	20.07
J10	**2501.51**	5375.94	J10	20	59.63	20	**5375.94**	20.01
J328	**1501.51**	5505.26	J328	20	65.96	20	**5505.26**	20.04
J320	**1501.51**	5700.21	J320	20	66.78	20	**5700.21**	20.03
J182	**1501.51**	5940.71	J182	20	67.11	20	**5940.72**	20.03
J-121	**2501.51**	6056.51	J-121	20	57.42	20	**6056.52**	20.02
J332	**1501.51**	6069.51	J332	20	67.47	20	**6069.51**	20.07
J198	**2501.51**	6172.8	J198	20	61.13	20	**6172.8**	20.01
J-98	**1501.51**	6208.34	J-98	20	67.52	20	**6208.34**	20.02
J188	**1501.51**	6251.39	J188	20	67.89	20	**6251.4**	20.03
J-180	**2501.51**	6613.81	J-224	18.54	56.13	20	**6496.55**	21.57
J174	**1501.51**	6588.83	J174	20	67.75	20	**6588.83**	20.05
J-188	**2501.51**	6615.56	J-188	20	63.33	20	**6615.56**	20.01
J-216	**2501.51**	6685.23	J-216	20	61.45	20	**6685.24**	20
J-214	**2501.51**	6881.99	J-214	20	65.11	20	**6881.97**	20.01
J178	**2501.51**	6974.28	J178	20	63.69	20	**6974.29**	20.02
J-192	**2501.51**	7425.94	J-192	20	64.95	20	**7425.95**	20.02
J270	**2501.51**	7574.55	J270	20	64.79	20	**7574.56**	20.02
J-232	**2501.51**	7616.57	J-232	20	63.32	20	**7616.58**	20
J196	**2501.51**	7620.85	J196	20	66.07	20	**7620.86**	20.02
J272	**2501.51**	7788.83	J272	20	65.13	20	**7788.84**	20.02
J-190	**2501.51**	7835.26	J-190	20	65.37	20	**7835.27**	20.01
J52	**2501.51**	7925.76	J52	20	66.15	20	**7925.77**	20.02
J322	**1501.51**	7941.81	J322	20	68.76	20	**7941.81**	20.07
J266	**2501.51**	8041.14	J266	20	66.3	20	**8041.15**	20.02
J370	**1501.51**	8045.22	J370	20	68.9	20	**8045.23**	20.05
J200	**2501.51**	8566.36	J-232	19.13	64.46	20	**8486.51**	20.87
J-92	**2501.51**	9120.9	J-92	20	64.44	20	**9120.91**	20.03
J228	**2501.51**	9214.46	J228	20	64.92	20	**9214.48**	20.03
J-90	**2501.51**	9231.78	J-90	20	64.53	20	**9231.8**	20.03
J-66	**2501.51**	9634.68	J-66	20	64.84	20	**9634.7**	20.04
J258	**2501.51**	9740.55	J258	20	65.76	20	**9740.57**	20.03
J-230	**2501.51**	10095.71	J-232	19.13	65.82	20	**10001.56**	20.87
J22	**2501.51**	10037.03	J22	20	65.4	20	**10037.05**	20.01
J74	**2501.51**	10610.9	J74	20	66.3	20	**10610.93**	20.06
J256	**2501.51**	10643.44	J256	20	66.37	20	**10643.46**	20.05
J-258	**2501.51**	10679.9	J-258	20	66.47	20	**10679.92**	20.03
J-256	**2501.51**	10927.01	J-256	20	66.61	20	**10927.04**	20.03
J-260	**2501.51**	10987.68	J-260	20	66.64	20	**10987.71**	20.03
J252	**2501.51**	11141.46	J252	20	66.22	20	**11141.48**	20.06
J218	**2501.51**	11398.49	J218	20	65.66	20	**11398.52**	20.03
J-274	**2501.51**	11559.21	J-274	20	66.95	20	**11559.25**	20.03

Model Demand Set Name 2041MDD_NOBOEING
Model Pipe Set Name 2021WSP_CIP

2041 Fire Flow Scenario Modeling Results
with Improvements

ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
J-254	**2501.51**	11796.03	J-254	20	67.03	20	**11796.07**	20.04
J-262	**2501.51**	12246.04	J-262	20	67.21	20	**12246.07**	20.05
J-278	**2501.51**	12373.17	J-278	20	67.31	20	**12373.21**	20.04
J220	**2501.51**	12485.77	J220	20	67.74	20	**12485.81**	20.05
J-286	**2501.51**	12507.76	J-286	20	66.17	20	**12507.8**	20.03
J-284	**2501.51**	12655.53	J-284	20	67.44	20	**12655.57**	20.03
J-252	**2501.51**	12696.36	J-252	20	67.4	20	**12696.4**	20.05
J216	**2501.51**	12814.09	J216	20	67.88	20	**12814.14**	20.04
J254	**2501.51**	12854.7	J254	20	67.8	20	**12854.74**	20.07
J24	**2501.51**	12907.87	J24	20	67.06	20	**12907.9**	20.05
J238	**2501.51**	13062.32	J238	20	67.1	20	**13062.36**	20.06
J214	**2501.51**	13070.12	J214	20	67.97	20	**13070.16**	20.04
J308	**2501.51**	13516.57	J308	20	67.68	20	**13516.62**	20.06
J208	**2501.51**	13552.6	J208	20	65.71	20	**13552.66**	20.03
J-272	**2501.51**	13608.24	J-272	20	68.11	20	**13608.28**	20.06
J296	**2501.51**	13785.22	J296	20	67.02	20	**13785.28**	20.03
J240	**2501.51**	13849.04	J240	20	67.32	20	**13849.09**	20.08
J222	**2501.51**	14389.95	J222	20	67.92	20	**14390.01**	20.07
J242	**2501.51**	14449.49	J242	20	67.51	20	**14449.55**	20.07
J310	**2501.51**	14471.24	J310	20	67.95	20	**14471.31**	20.07
J298	**2501.51**	14624.42	J298	20	66.42	20	**14624.5**	20.03
J294	**2501.51**	14662.13	J294	20	67.65	20	**14662.2**	20.04
J300	**2501.51**	14705.88	J300	20	65.23	20	**14705.95**	20.02
J368	**2501.51**	14730.62	J368	20	67.26	20	**14730.69**	20.04
J248	**2501.51**	15958.81	J248	20	68.27	20	**15958.89**	20.09
J302	**2501.51**	16650.3	J302	20	66.49	20	**16650.41**	20.01
J304	**2501.51**	17133.75	J304	20	66.16	20	**17133.86**	20.01
J292	**2501.51**	18531.05	J292	20	68.43	20	**18531.2**	20.02
J206	**2501.51**	48209.15	J304	27.72	67.39	20	**48209.15**	20

Model Demand Set Name 2041MDD_NOBOEING
Model Pipe Set Name 2021WSP_CIP

APPENDIX G

SAMPLE MAINTENANCE FORMS

VALVE MAINTENANCE / INSPECTION REPORT

Valve #__________, Valve Size __________, Section ______/______/4, Map #__________

Location:

Principle St:____________________ __________ ft. ____________________ of center line

Intersecting St:____________________ __________ ft. ____________________ of center line

Specific Location: Checked OK __________ or measured as follows:

__________ ft. ____________________ of ____

__________ ft. ____________________ of ____

__________ ft. ____________________ of ____

Found: ____________________, # of turns: _______________, Left: _______________

Packing: OK __________, Leaking: ____

Stem: OK __________, Bent / Broken: __________________________________

Nut: OK __________, Missing / Damaged: ______________________________

Gears: OK __________, Faulty: ____

Lid: OK __________, Missing / Broken: _______________, Replaced _______________

Box: OK __________, Cold mixed <u>*Yes / No*</u> needed? <u>*Yes / No*</u>

Buried <u>*Yes / No*</u> _______________, Protruding <u>*Yes / No*</u> _______________ "

Too Close to Operating Nut <u>*Yes / No*</u>

Other Problems / Work Needed: ____

____

____

Work / Repairs Completed:

____ By: _______________ Date ____/____/____

____ By: _______________ Date ____/____/____

____ By: _______________ Date ____/____/____

Inspection/Maintenance Completed by: _________________________ Date ____/____/____

Remarks on back of page _____ Yes _____ No

VALVE REPAIR REPORT

Valve #__________ Valve Size ____________ Section _____ _____/4 Map #_________

Connecting Pipe #______________ to Pipe/Node #_______________, Installed_____/_____

Type _____________, Connecting ends ________ x ________, Make _____________________

Opens _______________, # of turns ____________, Depth to operate nut _______________

Normally _______________, Valve box cold-mixed? ___________ needed? ____________

General Location:

Principle St:_______________________ _________ ft. __________________ of center line

Intersecting St:_____________________ _________ ft. __________________ of center line

Specific Location:

___________ ft. __________________ of ______________________________________

___________ ft. __________________ of ______________________________________

___________ ft. __________________ of ______________________________________

Valve/Site Map:

Last corrected ____/____/____ dBase enter ____/____/____ CAD Map ____/____/____

Remarks on back of page _____ Yes _____ No

HYDRANTS MAINTENANCE / INSPECTION REPORT

Hydrant #________, Valve Size ________, Section _____/_____/4, Map #________

Location:

Principle St:____________________ ________ ft. ____________ of center line

Intersecting St:____________________ ________ ft. ____________ of center line

Specific Location: Checked OK ________ or measured as follows:

________ ft. ____________ of ____________________

________ ft. ____________ of ____________________

________ ft. ____________ of ____________________

Caps Missing: ____________, Replaced: ____________, Greased: ____________

Chains Missing: ____________, Replaced: ____________, Freed: ____________

Paint: OK ____________, Repaint: ____________________

Oper. Nut: OK ____________, Greased: __________ Replaced: __________

Nozzles: OK ____________, Caulked: __________ Replaced: __________

Valve & Seat: OK ____________, Replaced: ____________________

Packing: OK ____________, Tightened: __________ Replaced: __________

Drainage: OK ____________, Corrected: ____________________

Flushed: __________ Minutes __________ Nozzle Open

Pressure: Static: __________ Residual: __________ Flow __________ gpm

Branch Valve: Condition: ____________________

Other Problems / Work Needed: ____________________

____

____

Work / Repairs Completed:

________________________ By: __________ Date ___/___/___

________________________ By: __________ Date ___/___/___

________________________ By: __________ Date ___/___/___

Inspection/Maintenance Completed by: ________________ Date ___/___/___

Remarks on back of page _____ Yes _____ No

MAIN REPAIR REPORT

Main #____________ Main Size ______________ Section _____ _____/4 Map #_______

Node #__________ (Valve/Main #________) to Node #_______ (Valve/Main #________)

Date Installed _____/_____ Type ______________ Manufacturer ____________________

Length of Main __________ ft. Number of Connections on Main ____________________

Valves to Isolate ________, ________, ________, ________, ________, ________,________

Location:

______________ side of ____

From ______________________________ St. to ____________________________

Other Location Information:

____

____

Specific Location:

________ ft. ______________ of ________________________________

________ ft. ______________ of ________________________________

Site Map:

Last corrected _____/_____/_____ dBase enter_____/_____/_____ Map _____/_____/_____

Remarks on back of page _____ Yes _____ No

City of Algona Administrative Policy

RE: Response to customer complaint regarding potable water

The City occasionally receives complaints regarding water quality. These complaints include but are not limited to:

1. Taste
2. Oder
3. Sand or other particles in the water.

The following procedure is adopted for responding to these complaints:

<u>Step 1</u>
A complaint is referred to the Public Works Director and the Public Works Supervisor.

<u>Step 2</u>
The customer is contacted either by phone, e-mail or in person. The complaint is discussed to determine if there is a reasonable explanation for the problem, possible solutions are suggested and a follow up is made to determine if the problem persists.

Depending on the severity of the concern, the City may recommend:

1. That the water be tested at the City's expense.
2. That the customer discontinue drinking and/or bathing with the water.
3. Notification to the City of Auburn, (who provides the water) and the Department of Health.
4. A record of the complaint and the resolution is maintained.
5. Periodically flush hot water tank. (most frequent problem)

APPENDIX H

CROSS-CONNECTION CONTROL PLAN

City of Algona
Premises Isolation and In-Premises Protection
Cross-Connection Control Program

Purpose:

The purpose of the City of Algona cross-connection program shall be to protect the public water system, as defined in WAC 246-290-010, form contamination via cross-connections.

General:

Except where specifically designated herein, all words used in this procedure shall carry their customary meanings. Words used in the present tense include the future, and plural includes the singular: The word "shall" is always mandatory; the word "may" denotes a use of discretion in making a decision.

Definitions:

"Approved air gap" means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or nonpressurized receiving vessel. To be an air gap approved by the department of health, the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and
- Three times the diameter of the supply piping, if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.

"Approved atmospheric vacuum breaker" means an AVB of make, model, and size that is approved by the department of health. AVBs that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, of UL) acceptable to the local administrative authority are considered approved by the department.

"Approved backflow preventer" means an approved air gap, an approved backflow prevention assembly, or an approved AVB. The terms "approved backflow preventer," "approved air gap," or "approved backflow prevention assembly" refer only to those approved backflow preventers relied upon by the purveyor for the protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventers installed for other purposes.

"Approved backflow prevention assembly" means an RPBA, RPDA, DCVA, DCDA, PVBA, or SVBA of make, model, and size that is approved by the department. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or other entity acceptable to the department are considered approved by the department.

"Assessment of risk" means the results of an evaluation of a health, system, or plumbing hazard. The evaluation required in making a determination of the type of backflow preventer needed to isolate a specific cross connection (e.g., a plumbing fixture), or a group of cross connections contained within a facility or complex of facilities (e.g., a shopping mall) is comprised of the following steps:

- Determine the degree of potential health hazard risk to the public water system. (In assessing the purveyor's risk of contamination of the public water system, if knowledge of the degree of hazard posed by a substance is not known, the purveyor must assume that it is high.
- Determine the probability (high or low) that a cross-connection may occur.
    1. The probability increases that an existing cross-connection will go undetected as the complexity of a piping system increases.
    2. Piping changes will create new cross-connections, or change the operating conditions from backsiphonage to backpressure conditions.
    3. A backflow preventer could be bypassed or removed from service.
    4. A substance could be changed or increased in strength.
    5. A substance may deteriorate, and thus become a health hazard.
    6. A substance, when combined with the chemicals in the potable water supply, or when exposed to certain piping material, may react and form a compound that poses a health hazard, such as CO2 mixing with water to form carbolic acid that leaches copper form a copper service pipe.
    7. A substance, if it contains a bacteriological contaminant, could become a health hazard long after it enters the potable water supply, through bacteria regrowth.
- Determine the risk level acceptable to the purveyor, and
- Determine the reliability required of the backflow preventer.
- Determine the appropriate backflow prevention commensurate with the assessed risk using WAC 246-290-490 Table 8.

"Authorized agent" means any person who:

- Makes decisions regarding the operation and management of a public water system whether or not he or she is engaged in the physical operation of the system;
- Makes decisions whether to improve, expand, purchase, or sell the system; or
- Has discretion over the finances of the system.

"Backflow" means the undesirable reversal of flow of water of other substances through a cross-connection into the public water system or consumer's potable water system.

"Backflow Assembly Tester" means a person holding a valid BAT certificate issued in accordance with Chapter 246-292 WAC.

"Backpressure" means a pressure (caused by a pump, elevated tank or piping, boiler, or other means such as thermal expansion) on the consumer's side of the service connection that is greater than the pressure provided by the public water system and which may cause backflow.

"Backsiphonage" means backflow due to a reduction in system pressure in the purveyor's distribution system and/or consumer's water system.

"Combination fire protection system" means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection; and
- Is constructed of approved potable water piping and materials that service both the fire sprinkler system and the consumer's potable water system.

"Consumer" means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, "consumer" means the owner or operator of a water system connected to a public water system through a service connection.

"Consumer's water system" means any potable and/or industrial water system that begins at the public water system point of delivery; that is, at the immediate downstream side of the water meter, and is located on the consumer's premises. The consumer's water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

"Contaminant" means a substance present in drinking water that may adversely affect the health of the consumer or the aesthetic qualities of the water.

"Cross-connection" means any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow.

"Cross-connection control program" means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.

"Cross-connection control specialist" (CCS) means a person holding a valid Washington State Cross-Connection Control Specialist certificate issued in accordance with Chapter 246-292 WAC.

"Cross-connection control summary report" means the annual report required by the department that describes the status of the purveyor's cross-connection control program.

"Department" means the Washington State Department of Health or health officer as identified in a joint plan of operation in accordance with WAC 246-290-030(1).

"Direct service connection" means a service hookup to a property that is contiguous to a water distribution main and where additional mains or extensions are not needed to provide service.

"Distribution system" means all piping components of a public water system that service to convey water from transmission mains linked to source, storage and treatment facilities to the consumer excluding individual services.

"Flow-through fire protection system" means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection;
- Is constructed of approved potable water piping and materials to which sprinkler heads are attached; and
- Terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

"Health hazard" means any condition, device, or practice in a water supply system and/or it operation that creates or may create, a danger to the health and well being of a customer.

"Health officer" means the health officer of the city, county, city-county health department or district, or an authorized representative.

"High health cross-connection hazard" means a cross-connection which could impair the quality of potable water and create an actual public health hazard through poisoning or spread of disease by sewage, industrial liquids or wastes.

"In-premises protection" means a method of protecting the health of consumers served by the consumer's potable water system, located within the property lines of the consumer's premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

"Local administrative authority" means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under Chapter 19.27 RCW (WAC 51-46-0603.3.3).

"Low health cross-connection hazard" means a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic quantities of such potable waters for domestic use.

"Potable" means water suitable for drinking by the public.

"Premises isolation" means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor (at the point where the water purveyor no longer has legal jurisdiction and/or authority to control the water) to isolate the consumer's water system from the purveyor's distribution system.

"Plumbing hazard" shall mean a cross-connection in a consumer's potable water system that may permit backsiphonage in the event of a negative pressure in the supply line.

"Public water system" is defined and referenced under WAC 246-290-020.

"Public Works Director" shall mean the Public Works Director of the City of Algona. Any act in the cross-connection control program required or authorized by the Public Works Director may be done on his or her behalf by a certified cross-connection control specialists (CCS) who is an authorized representative of the City of Algona.

"Purveyor" means an agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or person or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

"Resident" means an individual living in a dwelling unit served by a public water system.

"Service connection" means a connection to a public water system designed to provide potable water to a single-family residence, or other residential or nonresidential population.

"System hazard" shall mean a threat to the physical properties of the public or the consumer's potable water system by a material not dangerous to health but aesthetically objectionable that would have a degrading effect on the quality of the potable water in the system.

"Unapproved auxiliary water supply" means a water supply (other than the purveyor's water supply) on or available to the consumer's premise that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

"Used water" means water which has left the control of the purveyor.

Code Authority and Enforcement:

The enforcement of this cross-connection control program in the area served by the City of Algona, will be in accordance with WAC 246-290-490, cross-connection control, effective April 27, 2003, City of Algona Ordinance 13.02.160 and the City of Algona Cross-Connection Control Program.

General Policy:

It is the intention of this policy to provide for the permanent abatement or control of all cross-connections under the control of the water purveyor of the City of Algona. Where it is officially, actually and/or economically unfeasible to find, eliminate or to permanently control all cross-connections of the consumer's water system, and when it is mandated by WAC 246-290-490 and/or deemed necessary by the City of Algona cross-connection specialist, there shall be installed at the water service connection an approved backflow prevention assembly commensurate with the assessed degree of hazard posed by the consumer's water system upon the public water supply.

The following methods of cross-connection control are considered minimum protection at the water service connection at the property line:

1. The public water supply to any premise listed under WAC 246-290-490(4)(b)(i)(ii)(iii)(Table 9) or deemed a "Table 9 Type Facility" by the City of Algona CCS shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

2. The public water supply to any premise on which material dangerous to health or toxic substances are stored or handled, and which, in the assessment of the City of Algona CCS poses a potential high health cross-connection hazard to the public water system, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

3. The public water supply to any premise where entry is restricted so that inspection for cross-connections cannot be made with sufficient frequency or at sufficient short notice to assure that cross-connections do not exist shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

4. The public water supply to any premise having a repeated history of cross-connections being established or re-established, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

5. The public water supply to any premise which has an unapproved auxiliary water supply on or available to the consumer's premise that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor, and with no known cross-connections, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

6. The public water supply to any premise which has internal cross-connections that are not correctable or which has complex plumbing arrangements that make it impractical to ascertain whether or not cross-connections exist, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

7. The public water supply to any premise which poses a high probability of changes in the use of water by tenants, such as, but not limited to, strip malls or shopping malls, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

8. The public water supply to any premise with a fire system with any chemical additives, including food-grade additives or chemicals that would be injected into the fire system by a responding fire department shall require an approved reduced pressure backflow assembly (or reduced pressure detector assembly) installed immediately downstream of the public water service connection, prior to any branch connections.

9. The public water supply to any premise with a fire system with no chemical additives and that shall never be injected with chemicals by a responding fire department shall require an approved double check valve assembly (or double check detector assembly) installed immediately downstream of the public water service connection, prior to any branch connections.

10. The public water supply to any premise where cross-connections are unavoidable or not correctable, such as, but not limited to, tall buildings (over 30 feet), or water booster pump systems, shall require an approved double check valve assembly installed immediately downstream of the water service connection, prior to any branch connections.

<u>Coordination and delineation of responsibilities with local administrative authorities</u>

The control of cross-connections requires cooperation between the water purveyor, the local administrative authority, the health officer and the consumer.

- WAC 246-290-490(1)(d): The purveyor's responsibility for cross-connection control shall begin at the water supply source, include all the public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter located on the public right-of-way or utility-held easement.

- WAC 246-290-490(1)(e): Under the provisions of this section, purveyors are not responsible for eliminating or controlling cross-connections within the consumer's water system. Under Chapter 19.27 RCW, the responsibility for cross-connections within the consumer's water system, i.e., within the property lines of the consumer's premise, falls under the jurisdiction of the local administrative authority.

- WAC 246-290-490(2)(d): The purveyor shall coordinate with the local administrative authority in all matters concerning cross-connection control. The purveyor shall document and describe such coordination, including delineation of responsibilities, in the written cross-connection control program required in (e) of this subsection.

The City of Algona CCS shall make available to all local administrative agencies the information maintained in the cross-connection control program files, which may include, but is not limited to: (1) a master list of all premises that have been isolated from the public water system in accordance with the cross-connection control program; (2) information concerning any internal cross-connections that come to the attention of the CCS during risk assessment evaluations or premises; and (3) notification of any termination of water service for failure to comply with the requirements of WAC 246-290-490, or the City of Algona Ordinance 13.02.160, or the City of Algona Cross-Connection Control Program.

<u>Risk Assessment Survey:</u>

A risk assessment survey for cross-connections and sanitary hazards requires a water use evaluation of new and existing buildings, structures, and ground. The systematic evaluation shall be prioritized by risk to public health and shall be conducted as outlined below:

1. Upon application for a water service connection, the property owner (applicant) shall complete an application for City of Algona water service and a water usage questionnaire, which shall be reviewed by the City of Algona CCS. The CCS shall make a determination of the risk posed to the public water system by the property owner's water system. The CCS shall classify the water service connection as either a high health hazard or a low health hazard cross-connection, and shall specify the need and identify the type of backflow protection required (if applicable) for premises isolation backflow protection. When deemed necessary, the CCS shall request the City of Algona engineering division to require a detailed plan and specification for the plumbing installation in order to facilitate risk-assessment review of the water use at the property.

2. The CCS shall review all purveyor and consumer water system related plans and specifications to assess the following:
    - The actual or potential health hazard or contamination risk to the public water system.
    - The complexity of any existing and/or proposed water piping system.
    - The probability of occurrence of cross-connections within a purveyor or consumer water system.

- The determination of what cross-connections might constitute acceptable risks.
- The determination of the reliability required of any backflow prevention assembly utilized within a facility or mandated for premises isolation.
- The actual or potential use and/or availability of any unapproved auxiliary water supply system.
- The storage and handling of material dangerous to health or toxic substances which, if introduced into the water system, would constitute a system, plumbing, or health hazard.

If, upon review, it is determined that any of these conditions will exist, the CCS will advise the purveyor or property owner in writing that such cross-connections exist, and will offer technical guidance in eliminating or controlling such cross-connections. If the CCS determines that the property owner's water system represents a potential health hazard risk to the district water system, such as, but not limited to, WAC 246-290-490(4)(b)(Table 9) type facilities or systems, an approved backflow prevention assembly commensurate with the assessed degree of hazard shall be required for premises isolation at the water service connection, notwithstanding any point of hazard, point of use, or fixture protection existing within the property lines of the premises.

3. During the construction phase of any new building, structure, or ground installation, the City of Algona CCS shall perform the require premises isolation cross-connection control survey inspection. Upon completion of the inspection, but prior to the establishment of a water service connection, the CCS shall advise the property owner/authorized agent, that subject cross-connection control inspection has been made and advise if any additional backflow protection is required. The CCS shall advise the property owner/authorized agent that it is the property owner's responsibility to have a Washington State certified backflow assembly tester (BAT) test the backflow assembly prior to use of the water service, and that annual testing is required thereafter. The CCS shall attend and witness the initial test of all backflow assemblies installed as premises isolation under the City of Algona's jurisdiction. It is the responsibility of the property owner/authorized agent to contract the CCS and coordinate an appointment time for the CCS to attend and witness the required test of a backflow assembly (minimum 24 hour advance notice required).

<u>Existing Buildings, Structures, and Grounds:</u>

The CCS will evaluate the high health hazard premises, all commercial and/or industrial premises, all premises with fire systems, all premises with water system using booster pumps, all premises with buildings 30 feet of more in height, and all residential properties to insure premises isolation protection has been provided at the water service connection, if applicable. Premises not on the established survey priority list that come to the attention of the CCS, and upon evaluation are determined deficient in required premises isolation of other backflow protection, shall be brought into current compliance without regard to any established priority list. Inspections of residential properties will normally follow completion of premises isolation of high health hazard facilities unless those residential properties appear to pose a high health hazard risk to the public water supply, and for any reason, come to the attention of the CCS.

The initial evaluation shall proceed according to the following steps:

1. A priority list shall be established using existing water service records, telephone directory yellow pages listings, and other available resources.

2. Beginning with the highest rates health hazard on the program's survey priority list, the CCS will make a risk assessment evaluation of each property for actual or potential cross-connections and/or any conditions that might tend to contaminate the public water system.

3. Upon completion of the risk assessment evaluation, the CCS will determine whether or not premises isolation backflow protection will be required, whether internal backflow protection is required, and will determine the level of protection required commensurate with the assessed degree of hazard.

4. The CCS will prepare a written report to the file system that may include, but is not limited to, the following:

   a. A list of all cross-connections found, their location, and any optional methods of elimination or control.
   b. Any applicable drawings, sketches, blueprints, or photos.
   c. A summary of the findings, recommendations and requirements for corrective actions, and a time frame (normally a maximum of 90 days for high health hazards) in which the corrective action must be completed.

5. The CCS shall notify the property owner/authorized agent, in writing, of the City of Algona requirement for premises isolation backflow protection. The code enforcement letter shall include the requirements for corrective actions and a corrective action completion date. One copy of the completed letter shall reside in the cross-connection control program jacket file for the facility.

6. On the corrective action completion date, the CCS shall contact the property owner/authorized agent and ask if the corrective actions have been completed. If the corrective actions have been completed, the CSC shall inspect each required premises isolation backflow assembly located at the water service connection to the property. If the corrective actions are in progress but more time is required for completion, a new completion date may be set by the CCS. If corrective actions have been disregarded, the

City of Algona shall take appropriate corrective action within its authority, per WAC 246-290-490(23)(j)(i)(ii)(iii), City of Algona Ordinance 13.02.160 and the City of Algona Cross-Connection Control Program, which may include, but is not limited to, denying or discontinuing water service to a consumer's premises until the cross-connection hazard is eliminated or controlled to the satisfaction of the City of Algona CCS.

7. When all required actions have been completed, a copy of the completed required actions letter shall be placed in the cross-connection control file for the property, together with all copies of correspondence, notes, related documents and any completed backflow assembly test report forms.

8. Reinspection of premises isolation for each premises found to be subject to this procedure shall be accomplished annually, if possible, or more often if a risk assessment so indicates, or whenever there is a change in the use of water within the premises or whenever there is a change of tenant.

<u>Records and Reports:</u>

Cross-Connection Control Program File System:

1. A separate jacket file shall be established by the CCS, for each individual customer that requires the installation of a premises isolation backflow prevention assembly. Jacket files shall be filed in alphabetical sequence by premise name or customer name (last name first, first name last). A computer software database will be utilized for compiling as well as Department of Health annual summary reporting.

2. The following information shall be maintained in each individual jacket file:
   (a) Copies of all correspondence with customer relative to cross-connection control.
   (b) Copies of evaluation reports, complete with field drawings (if applicable).
   (c) Copies of all completed backflow assembly test report forms.
   (d) Copies of all reports or correspondence pertaining to enforcement action, cross-connections, or backflow incidents.

<u>Backflow Incident Response</u>

A backflow incident occurs when an undesirable reversal of flow of water or other substances into the public water system from a customer's water system occurs. Water purveyors are required, as a part of the CCCP, to plan for emergency response procedures for backflow incidents resulting in contamination or potential contamination of the water system. The following procedures will be taken in response to a backflow incident:

1. The City shall notify DOH, the authority having jurisdiction, and the local health jurisdiction as soon as possible, but no later than the end of the next business day, when a backflow incident is known by the purveyor to have:

   (a) Contaminated the public water system; or

   (b) Occurred within the premises of a consumer served by the purveyor.

2. The City shall take corrective actions, if needed.

Corrective actions taken by the City may include:
- Flushing and cleaning water pmains or customer plumbing,
- Disinfecting water mains or customer plumbing,
- Replacing water mains or customer plumbing,
- Other actions.

Corrective actions ordered by the City may include:
- Elimination of cross-connections,
- Remove by-pass,
- Install new cross-connection control device,
- Change existing cross-connection control device,
- Other actions.

In addition the City may also need to:
- Notify customers,
- Issue a boil water notice,
- Issue other notification as required by DOH.

3. The City shall document details of backflow incidents contaminating the public water system:

   (a) The following information shall be gathered on a backflow incident report form and provided to DOH:
- Time, data and location of incident,
- Premise type, hazard category and date of most current hazard evaluation,
- Type of backflow preventer if premise isolation was required,
- Method of discovery of the backflow incident,
- Contaminant information, laboratory test results, extent of contamination,
- Water quality complaints received, number of illnesses reported,
- Source of contamination,
- Type of backflow, water main pressure, cause of backflow,
- Backflow preventer information,
- Corrective actions taken, Notifications,

(b) Include all backflow incident report(s) in the annual cross-connection program summary report, unless otherwise requested by the department.

replacement or repair cost of the meter in the event it is destroyed or damaged beyond normal wear and tear by any cause other than the fault of the city. The city shall bill the original charge and the cost of any such repair or replacement to the property owner and, if it is not paid, the unpaid charge or cost shall be certified and filed as a lien in the manner provided by law, or otherwise collected as other water charges in the manner provided by law and ordinance.

C. The installation of the meter shall be done under the supervision of the director or his representative at a location approved by him.

D. The director or his representative shall have access at all reasonable hours to the meters so installed for the purpose of inspecting, maintaining, repairing, replacing and reading them.

E. No building or structure shall be furnished water service unless each such building or structure has a meter installed pursuant to this section. (Ord. 947-04 § 2 (part)).

13.02.110 Water rate charges.
The rates for water service charges, hookup charges, meter and new installation are designated by Chapter 2.50 of this code. (Ord. 947-04 § 2 (part)).

13.02.120 Meter testing.
When any consumer whose water service is metered makes a complaint that the bill for any past time has been excessive, the water department will, upon request, have such meter reread and the service inspected for leaks. Should the consumer thereafter desire that the meter be tested a meter testing fee may be required. (Ord. 947-04 § 2 (part)).

13.02.130 Supplying water to additional families.
It is unlawful for any person whose premises are supplied with water to furnish water to additional families or premises. (Ord. 947-04 § 2 (part)).

13.02.140 Fishing or swimming in reservoir.
It is unlawful for any person to bathe in, fish in or throw any substance into any reservoir, or place any foreign substance upon any grounds belonging to, connected with or under the control of the water department of the city. (Ord. 947-04 § 2 (part)).

13.02.150 Interfering with or damage to water department property.
A. It is unlawful for any person, firm or corporation to open, close or interfere with, or attempt to, or connect with any fire hydrant, stop valve or stop cock, belonging to the city water department unless authorized by the director, but this section shall not apply to members of the city's authorized fire department while acting in such capacity.

B. It is unlawful for any person unless duly authorized by the director to disturb, interfere with, or damage any water main, water pipe, machinery, tool, meter or any other appliances, buildings, improvements, lawns, grass plots, flowers, vines, bushes or trees belonging to, connected with, or under the control of the water department of the city. (Ord. 947-04 § 2 (part)).

13.02.160 Illegal connections.
The installation or maintenance of any cross-connection which would endanger the public water supply of the city of Algona is prohibited. Any such cross-connection now existing or hereafter installed is hereby declared subject to immediate termination of water service and any such cross-connection shall be abated immediately.

A. The control or elimination of cross-connections shall be in accordance with the provisions of the Washington Administrative Code (WAC 246-290-490). The policies, procedures, and criteria for determining appropriate levels of protection shall be in accordance with the Accepted Procedure and Practice in Cross-Connection Control Manual, Pacific Northwest Section, American Waterworks Association, Fifth Edition, or any superseding edition.

B. The city of Algona may deny or discontinue water service to any customer failing to cooperate in the installation, maintenance, testing, or inspection of backflow prevention assemblies required and stated in WAC 246-290-490.

C. As a condition of new or continued water service, approved backflow prevention assemblies shall be installed and maintained by all customers who:

1. Are industrial or commercial customers not entitled to an exemption under subsection E of this section;

2. Operate commercial or residential fire sprinkler systems connected to their plumbing;

3. Operate irrigation systems connected to their plumbing and the city's system;

4. Maintain cross-connections of their water system with air-conditioning systems, medical apparatuses, or other devices or processes where chemicals or other objectionable substances may be siphoned into the water system.

D. An "approved backflow prevention assembly" means a backflow prevention assembly model approved by the state of Washington, Department of Health, and the city of Algona. Unless an exemption is granted, the minimum requirement for a backflow prevention assembly shall be that it consists of a double-check valve assembly. A reduced pressure backflow assembly is required whenever toxic materials are present, whenever the city finds the cross-connection poses a health hazard, or whenever the city finds intricate plumbing arrangements which make it impractical to ascertain whether or not cross-connections exist. The reduced pressure backflow assembly shall be installed at the service connection immediately downstream from the water meter prior to any branch connections.

E. Pressure vacuum breakers may be substituted for other backflow prevention assemblies required under this regulation where the public works director or his designee determines that the circumstances and good engineering practices allow such substitution without compromising protection of water quality and public health. Where an industrial or commercial customer can demonstrate to the satisfaction of the public works director that there are no cross-connections with the water supply system on his premises and that no health hazard is posed by reason of the presence of toxic materials in the environment, the public works director or his staff may grant the customer an exemption from the cross-connection requirements herein, so long as cross-connections are not installed. Decisions made under this section shall be made at the sole discretion of the public works department or such staff member as he designates to carry out the cross-connection control programs of the city. Exemptions are subject to periodic review and may be revoked whenever a cross-connection is made or a risk to public health or water quality is present.

F. The public works director and such staff members as he may designate are delegated the authority to inspect, approve, and disapprove backflow prevention assemblies; to require correction, modifications, repairs, or maintenance on backflow prevention assemblies and to inspect all premises of customers where backflow prevention assemblies may be required. A minimum standard for the maintenance and installation of backflow prevention assemblies shall be those set forth in the "Accepted Procedures and Practice in the Cross-Connection Control Manual," May 1990, Fifth Edition, as published by the Pacific Northwest Section of the American Waterworks Committee and any subsequent edition or amendment of said manual. The public works director is authorized to establish higher standards for the installation and maintenance of backflow prevention assemblies where he finds that good engineering practice, industry standards or the protection of public health requires such higher standards.

G. As a condition of a continued water service, customers shall make their premises, including buildings and structures, to which water is supplied, accessible to city personnel periodically to determine whether backflow prevention assemblies are required or are properly installed and maintained. Testing and inspections will be made annually.

H. As a condition of continued water service, it shall further be the responsibility of each customer to maintain and repair backflow prevention assemblies and to upgrade any backflow prevention assembly which does not comply with the requirements of this chapter or the standards established by the city.

I. Prior to the installation of irrigation systems (fire sprinkler systems) and backflow prevention assemblies, the customer shall obtain a permit from the city for such installation.

J. Should a customer fail to install, maintain or repair a backflow prevention assembly as directed by the public works director, water service to the customer shall be terminated upon order of the public works director or city council, as directed by WAC 246-290-490.

K. The requirements herein for backflow prevention assembly installation shall apply even though local building and/or plumbing codes may not require backflow prevention assemblies.

L. The city of Algona strictly prohibits interconnection of other water supplies with the city's distribution system. Auxiliary water supplies (private wells, piped irrigation sources, etc.) are a major cross-connection control hazard and, therefore, must be effectively isolated from the domestic water supply. City of Algona cross-connection control policies and requirements for customers with private wells are as follows:

1. No backflow protection is required if the source is verified to be permanently inactivated. In such cases, formal abandonment in accordance with the requirements of the department of health should be pursued by the owner.

2. If the well remains active and the piping system is verified to be physically separated and permanently disconnected from the city's distribution main, an approved double-check valve assembly is required at the service connection to provide a measure of protection against inadvertent interconnection of the supplies.

New services will be locked off until compliance is verified by the city of Algona. Visual inspection of piping is required for premises retaining active well systems.

All backflow prevention assemblies are subject to annual inspection and testing. The cost of annual performance testing and any required maintenance is the responsibility of the backflow prevention assembly owner.

M. The city of Algona strictly prohibits the connection to any fire hydrant, standpipe, or blow-off. All connections to the above shall be considered a cross-connection and will be terminated immediately. The following are exceptions:

1. The fire department for fire protection and training;

2. The water department for service and maintenance of system;

3. The cross-connection control specialist may make exceptions with the use of an approved backflow assembly. (Ord. 947-04 § 2 (part)).

13.02.170 Right of entry to read meters.
Officers and employees of the city water department shall be entitled at proper hours of the day (8:00 a.m. through 5:00 p.m.) to enter upon property to which water is supplied under this chapter, for the purpose of reading the meter, and it is unlawful for any owner or any occupant of any premises supplied with city water to fail, neglect or refuse to give free access to such premises for such purposes. (Ord. 947-04 § 2 (part)).

13.02.180 Discontinuance of water service.
Should the owner of any premises desire to discontinue the use of water, the owner shall give the city notice in writing and pay in full all outstanding charges on the account at the office of the city clerk. The water shall then be shut off. Availability charges will then commence as established in Chapter 2.50 of this code. Upon application and payment of a reconnect fee in the amount set forth in Chapter 2.50 of this

BACKFLOW INCIDENT REPORT FORM

There are many backflow incidents which occur that are not reported. This is usually because they are of short duration and are not detected, the customer is not aware they should be reported, or it may not be known to whom they should be reported.

The PNWS/AWWA Cross Connection Control Committee is making an effort to bring these incidents to the attention of water purveyors and the public. If you have any knowledge regarding backflow incidents, please fill out a copy of this form and return it to any member of the committee, or to the individual named on the reverse side. In addition, the state health agency must be notified.

Reporting Agency: ____________________ Report Date: ____________

Reported By: ____________________ Title: ____________

Mail Address: ____________________ City: ____________

State: __________ Zip Code: __________ Telephone: ____________

Date of Incident: ____________________ Time of Occurrence: ____________

General Location (Street, Block, etc.): ____________________

Backflow Originated From:

Name of Premise: ____________________

Street Address: ____________________ City: ____________

Contact Person: ____________________ Telephone: ____________

Type of Business: ____________________

Description of Contaminants:
(Attach chemical analysis or MSDS if available)

____

____

Distribution of Contaminant:

Contained within customer's premise: Yes: ________ No: ________

Number of persons affected: ____________

Effect of Contamination:

Illness reported: ____________________

Physical irritation reported: ____________________

(over)

Cross Connection Source of Contaminant:
(boiler, chemical pump, irrigation system, etc.)

____

____

Cause of Backflow:
(main break, fire flow, etc.)

____

____

Corrective Action Taken to Restore Water Quality:
(main flushing, disinfection, etc.)

____

____

Corrective Action Ordered to Eliminate or Protect Cross Connection:
(type of backflow preventer, location, etc.)

____

____

Previous Cross Connection Survey of Premise:

Date: ______________________ By: ______________________

Type of Backflow Preventer Isolating Premise:

RPBA: ______ RPDA: ______ DCVA: ______ DCDA: ______ None: ______

Type of Backflow Preventer Isolating Source of Contaminant:

RPBA: ______ RPDA: ______ DCVA: ______ DCDA: ______ PVBA: ______ AVB: ________

Air Gap: ____ None: ______

Date of latest Test of Assembly: ______________________

Notification of State Health Department:

Date: ____________ Time: ____________ Person Notified: ______________________

Notified By: ______________________________________

Attach sheets with additional remarks, sketches, and/or media information.

Mail to:

CROSS CONNECTION CONTROL SURVEY REPORT

DATE	FILE NO.	TIME

Firm Name: ______________________ Type Of Business: ______________________

Address: ______________________ Zip: __________ Phone No.: ______________

Party Contacted: ______________________ Address: ______________________

Letter To:

Firm Name: ______________________ Address: ______________________

City: ______________ State: __________ Zip: ________ Phone No.: ______________

City Water Service	Size	Pressure	Meter No.
Domestic			
Fire			
Irrigation			
Other Water Supply			

Source __________ Use __________

No.	Type Of Cross-Connection And Location	Recommended Remedy

(Sketch)

No.	Type Of Cross-Connection And Location	Recommended Remedy

(Sketch)

Copy to:

- [ ] P. W. Bldg Dept.
- [ ] Architect
- [ ] Engineer
- [ ] Contractor
- [ ] Fire Prevention Bureau

WATER SYSTEM PLAN CHECK

PROJECT

PROJECT LOCATION

NAME Plans Submitted By | DATE

ADDRESS Street City Zip

PHONE

WATER DISTRIBUTION SECTION

Requirements:

DISTRIBUTION ENGINEER

WATER QUALITY SECTION

Requirements:

WATER QUALITY ENGINEER

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

Return No Later Than: ____________

Name of Premises: ______________________ File No.: ________

Service Address: ______________________________

Location of Assembly: ______________________________

Assembly: ______________ ________ ________ ________
Manufacturer *Model* *Size* *Serial No.*

Line Pressure at Time of Test: ________ LBS. Type of Assembly: ________

	Reduced Pressure Assemblies			Pressure Vacuum Breaker	
	Double Check Assemblies		Relief Valve	Air Inlet	Check Valve
	1st Check	2nd Check		Opened at ______ psid	______ psid
Initial Test	DC-closed tight .... ☐ RP- ______ psid Leaked .... ☐	Closed tight .... ☐ Leaked .... ☐	Opened at ______ psid	Did not open .... ☐	Leaked .... ☐
Repairs and Materials Used					
Test After Repair	DC-closed tight .... ☐ RP- ______ psid	Closed tight .... ☐	Opened at ______ psid	Opened at ______ psid	______ psid

Air Gap Inspection: Required minimum air gap separation provided ....Yes ☐ No ☐

Remarks: ______________________________

____

The Above Report Is Certified To Be True:

Initial Test Performed By: ______________ Cert. No.: ________ Date: ________

Repaired By: ______________________________ Date: ________

Final Test Performed By: ______________ Cert. No.: ________ Date: ________

Water Service Restored Yes ☐ No ☐

____
Customer's Signature

NO. 000000

☐ New
☐ Replacement

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

Firm Name: ____________________

Device Address: ____________________
Street

____
City *Zip*

Device Size: ☐☐•☐☐ Device Make: ☐☐☐☐☐☐☐ Model: ☐☐☐☐☐☐☐☐☐☐

Water System: ____________________ Serial Number: ☐☐☐☐☐☐☐☐☐☐☐

Device Location: ____________________

	REDUCED PRESSURE ASSEMBLY			PRESSURE VACUUM BREAKER		INITIAL TEST
	DOUBLE CHECK VALVE		Check #1			
	Check #1	Check #2		Air Inlet	Check	
INITIAL TEST	Tight ☐ Leaked ☐ Press Drop ☐☐•☐ psid	Tight ☐ Leaked ☐	Relief Opened At ☐☐•☐ psid **Relief Valve** Passed ☐ Failed ☐	Opened At ☐☐•☐ psid Did Not Open ☐	Press Drop ☐☐•☐ psid Leaked ☐	Passed ☐ Failed ☐ Date: ☐☐☐☐☐☐
REPAIRS AND/OR PARTS						
TEST AFTER REPAIR	Tight ☐	Tight ☐	#1 Press Drop ☐☐•☐ psid Relief Open ☐☐•☐ psid	Opened At ☐☐•☐ psid	Press Drop ☐☐•☐ psid	**After Repair** Date: ☐☐☐☐☐☐

Detector Meter Reading: ____________

IN COMPLETING AND SUBMITTING THIS TEST REPORT, THE TESTER CERTIFIES THAT THE DEVICE HAS BEEN TESTED AND MAINTAINED IN ACCORDANCE WITH ALL APPLICABLE RULES AND REGULATIONS OF THE WATER SYSTEM OWNER AND THE STATE.

____________________ ____________ ____________
Tester's Signature *Gauge #* *Cert. #*

Report Received By: ____________________ (Representative or Firm)

White - Water System   Pink - Customer   Yellow - Tester

BACKFLOW PREVENTION ASSEMBLY TEST RECORD CARD

FIRM NAME	FILE NO.	ASSEMBLY NO.
ADDRESS	ZIP	PHONE NO.
PARTY CONTACTED	TITLE	

TYPE OF ASSEMBLY

☐ Reduced Pressure Backflow Assembly ☐ Double Check Valve Assembly ☐ Pressure Vacuum Breaker Assembly

MAKE OF ASSEMBLY	MODEL	SERIAL NO.	SIZE
DATE INSTALLED		METER NO.	

CROSS-CONNECTION CONTROLLED

LOCATION OF ASSEMBLY

(Reverse Side of Card)

DATE TESTED	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	POPPET (PVBA)	DATE REPAIRS MADE	REMARKS

TEST EQUIPMENT CALIBRATION FORM

Name: ____________________

Address: ____________________
Street
____
City Zip

Gauge I.D. #: ☐☐☐☐☐☐ Type: Duplex ☐ Diff. Press. ☐

Make: ____________ Model #: ☐☐☐☐☐

Calibration Adjustment Required

Duplex:	Green (Low Needle):	Low ☐	High ☐	None ☐
	Red (High Needle):	Low ☐	High ☐	None ☐
Differential Pressure:		Low ☐	High ☐	None ☐

Repairs And/
Or Parts ____________________
____

Comments: ____________________
____
____
____
____

	Yes	No
All necessary adjustments have been made:	☐	☐

This gauge has been calibrated in compliance with ____________
Administrative Rules.

Date Of Calibration: ☐☐☐

Next Calibration Date: ☐☐☐

Calibrator's Name: ____________________

Calibrator's #: ☐☐☐☐☐

American Water Works Association
Pacific Northwest Section
Cross Connection Control Committee

Summary Of Annual Test Reports - Year: ____________

Reduced Pressure Backflow Assemblies

Make & Model Of Assembly: ____

SIZE OF ASSEMBLY (Inches)	TOTAL NUMBER OF TESTS	NUMBER OF FAILURES						
		(a) No. 1 Check	*(b) No. 2 Check*	*(c) Both Checks*	*(d) Relief Valve*	*(e) Relief & Either Check*	*(f) Relief & Both Checks*	*(g) No. 1 CV - Relief < 3 PSI*
0.375								
0.50								
0.75								
1.00								
1.25								
1.50								
2.00								
2.50								
3.00								
4.00								
6.00								
8.00								
10.00								

Name Of Water Utility: ____

Report By: ______________________________ Telephone No.: ____________________

American Water Works Association
Pacific Northwest Section
Cross Connection Control Committee

Summary Of Annual Test Reports - Year: ____________

Double Check Valve Assemblies

Make & Model Of Assembly: ____

SIZE OF ASSEMBLY (Inches)	TOTAL NUMBER OF TESTS	NUMBER OF FAILURES		
		(a) *No. 1 Check*	*(b)* *No. 2 Check*	*(c)* *Both Checks*
0.375				
0.50				
0.75				
1.00				
1.25				
1.50				
2.00				
2.50				
3.00				
4.00				
6.00				
8.00				
10.00				

Name Of Water Utility: ____

Report By: ______________________ Telephone No.: ______________

American Water Works Association
Pacific Northwest Section
Cross Connection Control Committee

Summary Of Annual Test Reports - Year: ____________

Pressure Vacuum Breaker Assemblies

Make & Model Of Assembly: ____

SIZE OF ASSEMBLY (Inches)	TOTAL NUMBER OF TESTS	NUMBER OF FAILURES		
		(a) Air Inlet	*(b) Check Valve*	*(c) Both CV & Inlet*
0.50				
0.75				
1.00				
1.25				
1.50				
2.00				

Name Of Water Utility: ____

Report By: ______________________________ Telephone No.: ____________________

Other Publications Available From The Pacific Northwest Section American Water Works Association:

Summary Of Backflow Incidents

A 3-ring binder containing reports of backflow incidents. Updated reports are provided periodically to holders of this binder. It is a very useful educational tool.

Home Irrigation Safety

A 3 1/2 X 8 1/2, 4-fold pamphlet illustrating backflow protection for home irrigation systems. The pamphlet illustrates installation standards and describes the AVB, PVBA, DCVA, and RPBA. Up to 25 copies are available with no charge. Camera-ready copy is available to permit printing your utility or company name and phone number.

Cross Connection Control For Residential Fire Sprinkler Systems

A 3 1/2 X 8 1/2, 4-fold pamphlet illustrating the difference between direct and indirect systems, and their backflow protection requirements. Up to 25 copies are available with no charge. Camera-ready copy is available to permit printing your utility or company name and phone number.

Cross Connections Can Create Health Hazards

A 3 1/2 X 8 1/2, tri-fold pamphlet explaining in simple terms what constitutes a cross connection, and danger associated with cross connections. Up to 25 copies are available with no charge. Camera-ready copy is available to permit printing your utility or company name and phone number.

Solar Domestic Hot Water Systems And The Water Purveyor

A 5 1/2 X 8 1/2, 12-page manual that describes solar domestic hot water systems and gives precautions that should be taken to protect the consumers' hot water system. It also provides recommendations to protect the public water supply.

Computer Data Base Program

Backflow Prevention Assemblies computer data base software which will allow water purveyors to manage a cross connection program to insure that all backflow prevention assemblies are tested annually while developing statistics on problems encountered by particular makes, models, or sizes of assemblies.

These publications may be ordered from:

Pacific Northwest Section-AWWA
P. O. Box 19581
Portland, OR 97280
503/246-5845

APPENDIX I

CIP COST ESTIMATES

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT ST-1
Purchase Additional Storage From Auburn

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Additional Storage Capacity	170,000	gallons	$ 2.56	$ 436,000.00
	Subtotal:......				$ 436,000.00
	Sales Tax (10%):......				$ 44,000.00
	TOTAL ESTIMATED PROJECT COST:......				$ 480,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT ST-2
Demolition and Decomissioning of Abandonned Reservoir

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Demolish and Decomission Reservoir	LUMP SUM	$ 30,000.00	$ 30,000.00
	Subtotal:			$ 30,000.00
	Sales Tax (10%):			$ 3,000.00
	Subtotal:			$ 33,000.00
	Contingency (40%):			$ 13,000.00
	TOTAL ESTIMATED PROJECT COST:			$ 46,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-1
Seattle Boulevard South, Between 3rd Avenue S and 5th Avenue NW

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM		$ 30,000.00	$ 30,000.00
2	8-inch D.I. Water Pipe, Including Fittings	515	LF	$ 120.00	$ 61,800.00
3	12-inch D.I. Water Pipe, Including Fittings	510	LF	$ 180.00	$ 91,800.00
4	Locate Existing Utilities	LUMP SUM		$ 1,000.00	$ 1,000.00
5	Erosion Control	LUMP SUM		$ 1,000.00	$ 1,000.00
6	Additional Pipe Fittings	250	LB	$ 4.00	$ 1,000.00
7	Trench Safety Systems	LUMP SUM		$ 2,600.00	$ 2,600.00
8	8-inch Gate Valves	1	EA	$ 2,000.00	$ 2,000.00
9	12-inch Gate Valves	1	EA	$ 3,000.00	$ 3,000.00
10	Fire Hydrants	2	EA	$ 5,500.00	$ 11,000.00
11	Service Connections	20	EA	$ 2,000.00	$ 40,000.00
12	Abandon Existing A/C Watermain	1,025	LF	$ 5.00	$ 5,125
13	Sawcutting	2,050	LF	$ 3.00	$ 6,150
14	Gravel Backfill	460	TN	$ 35.00	$ 16,100.00
15	Connections to Existing	3	EA	$ 6,000.00	$ 18,000.00
16	Crushed Surfacing Top Course	120	TN	$ 20.00	$ 2,400.00
17	HMA Cl. 1/2" PG 58-22	100	TN	$ 200.00	$ 20,000.00
18	Foundation Gravel	60	TN	$ 35.00	$ 2,100.00
19	Cold Mix Asphalt	40	TN	$ 170.00	$ 6,800.00
20	Traffic Control	64	HRS	$ 100.00	$ 6,400.00
	Subtotal:				$ 328,275.00
	Sales Tax (10%):				$ 32,827.50
	Subtotal:				$ 361,102.50
	Contingency (20%):				$ 72,220.50
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 433,323.00
	Engineering and Administrative Costs (30%):				$ 129,996.90
	TOTAL ESTIMATED PROJECT COST:				$ 564,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-2
Tacoma Boulevard and 3rd Avenue S

NO.	ITEM	QUANTITY			UNIT PRICE		AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM		$	77,000.00	$	77,000.00
2	8-inch D.I. Water Pipe, Including Fittings	510	LF	$	120.00	$	61,200.00
2	12-inch D.I. Water Pipe, Including Fittings	1,960	LF	$	180.00	$	352,800.00
3	Locate Existing Utilities	LUMP SUM		$	2,000.00	$	2,000.00
4	Erosion Control	LUMP SUM		$	2,000.00	$	2,000.00
5	Additional Pipe Fittings	500	LB	$	4.00	$	2,000.00
6	Trench Safety Systems	LUMP SUM		$	2,600.00	$	2,600.00
7	8-inch Gate Valves	1	EA	$	2,000.00	$	2,000.00
	12-inch Gate Valves	6		$	3,000.00	$	18,000.00
8	Fire Hydrants	6	EA	$	5,500.00	$	33,000.00
9	Service Connections	54	EA	$	2,000.00	$	108,000.00
10	Abandon Existing A/C Watermain	2,470	LF	$	5.00	$	12,350
11	Sawcutting	4,940	LF	$	3.00	$	14,820
10	Gravel Backfill	1200	TN	$	35.00	$	42,000.00
11	Connections to Existing	5	EA	$	6,000.00	$	30,000.00
12	Crushed Surfacing Top Course	310	TN	$	20.00	$	6,200.00
13	HMA Cl. 1/2" PG 58-22	260	TN	$	200.00	$	52,000.00
14	Foundation Gravel	30	TN	$	35.00	$	1,050.00
15	Cold Mix Asphalt	60	TN	$	170.00	$	10,200.00
16	Traffic Control	132	HRS	$	100.00	$	13,200.00
	Subtotal:..					$	842,420.00
	Sales Tax (10%):..					$	84,242.00
	Subtotal:..					$	926,662.00
	Contingency (20%):..					$	185,332.40
	TOTAL ESTIMATED CONSTRUCTION COST:..					$	1,111,994.00
	Engineering and Administrative Costs (30%):..					$	333,598.20
	TOTAL ESTIMATED PROJECT COST:..					$	1,446,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-3
West Valley Highway, Between 9th Avenue N and Broadway Street

NO.	ITEM	QUANTITY			UNIT PRICE		AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM		$	60,000.00	$	60,000.00
2	12-inch D.I. Water Pipe, Including Fittings	1,875	LF	$	180.00	$	337,500.00
3	Locate Existing Utilities	LUMP SUM		$	800.00	$	800.00
4	Erosion Control	LUMP SUM		$	800.00	$	800.00
5	Additional Pipe Fittings	400	LB	$	4.00	$	1,600.00
6	Trench Safety Systems	LUMP SUM		$	9,400.00	$	9,400.00
7	12-inch Gate Valves	6	EA	$	3,000.00	$	18,000.00
8	Fire Hydrants	4	EA	$	5,500.00	$	22,000.00
9	Service Connections	0	EA	$	2,000.00	$	-
10	Abandon Existing A/C Watermain	1,875	LF	$	5.00	$	9,375
11	Sawcutting	3,750	LF	$	3.00	$	11,250
12	Connections to Existing	3	EA	$	6,000.00	$	18,000.00
13	Crushed Surfacing Top Course	1210	TN	$	20.00	$	24,200.00
14	HMA Cl. 1/2" PG 58-22	630	TN	$	200.00	$	126,000.00
15	Foundation Gravel	120	TN	$	35.00	$	4,200.00
16	Cold Mix Asphalt	50	TN	$	170.00	$	8,500.00
17	Traffic Control	104	HRS	$	100.00	$	10,400.00
	Subtotal:..........					$	662,025.00
	Sales Tax (10%):..........					$	66,202.50
	Subtotal:..........					$	728,227.50
	Contingency (20%):..........					$	145,645.50
	TOTAL ESTIMATED CONSTRUCTION COST:..........					$	873,873.00
	Engineering and Administrative Costs (30%):..........					$	262,161.90
	TOTAL ESTIMATED PROJECT COST:..........					$	1,137,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-4
4th Avenue S, Between Washington Blvd and Milwaukee Blvd

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM		$ 34,000.00	$ 34,000.00
2	8-inch D.I. Water Pipe, Including Fittings	1300	LF	$ 120.00	$ 156,000.00
3	Locate Existing Utilities	LUMP SUM		$ 750.00	$ 750.00
4	Erosion Control	LUMP SUM		$ 750.00	$ 750.00
5	Additional Pipe Fittings	200	LB	$ 4.00	$ 800.00
6	Trench Safety Systems	LUMP SUM		$ 6,500.00	$ 6,500.00
7	8-inch Gate Valves	4	EA	$ 2,000.00	$ 8,000.00
8	Fire Hydrants	3	EA	$ 5,500.00	$ 16,500.00
9	Service Connections	26	EA	$ 2,000.00	$ 52,000.00
10	Sawcutting	2,600	LF	$ 3.00	$ 7,800
11	Gravel Backfill	570	TN	$ 35.00	$ 19,950.00
12	Connections to Existing	4	EA	$ 6,000.00	$ 24,000.00
13	Crushed Surfacing Top Course	160	TN	$ 20.00	$ 3,200.00
14	HMA Cl. 1/2" PG 58-22	130	TN	$ 200.00	$ 26,000.00
15	Foundation Gravel	70	TN	$ 35.00	$ 2,450.00
16	Cold Mix Asphalt	30	TN	$ 170.00	$ 5,100.00
17	Traffic Control	72	HRS	$ 100.00	$ 7,200.00
	Subtotal:				$ 371,000.00
	Sales Tax (10%):				$ 37,100.00
	Subtotal:				$ 408,100.00
	Contingency (20%):				$ 81,620.00
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 489,720.00
	Engineering and Administrative Costs (30%):				$ 146,916.00
	TOTAL ESTIMATED PROJECT COST:				$ 637,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-5
West Valley Highway, Between 1st Avenue and 4th Avenue S

NO.	ITEM	QUANTITY		UNIT PRICE		AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM		$ 46,000.00	$	46,000.00
2	12-inch D.I. Water Pipe, Including Fittings	1,410	LF	$ 180.00	$	253,800.00
3	Locate Existing Utilities	LUMP SUM		$ 2,000.00	$	2,000.00
4	Erosion Control	LUMP SUM		$ 2,000.00	$	2,000.00
5	Additional Pipe Fittings	300	LB	$ 4.00	$	1,200.00
6	Trench Safety Systems	LUMP SUM		$ 7,100.00	$	7,100.00
7	12-inch Gate Valves	4	EA	$ 3,000.00	$	12,000.00
8	Fire Hydrants	3	EA	$ 5,500.00	$	16,500.00
9	Service Connections	6	EA	$ 2,000.00	$	12,000.00
10	Abandon Existing A/C Watermain	1,410	LF	$ 5.00	$	7,050
11	Sawcutting	2,820	LF	$ 3.00	$	8,460
10	Connections to Existing	2	EA	$ 6,000.00	$	12,000.00
11	Crushed Surfacing Top Course	910	TN	$ 20.00	$	18,200.00
12	HMA Cl. 1/2" PG 58-22	470	TN	$ 200.00	$	94,000.00
13	Foundation Gravel	90	TN	$ 35.00	$	3,150.00
14	Cold Mix Asphalt	40	TN	$ 170.00	$	6,800.00
15	Traffic Control	80	HRS	$ 100.00	$	8,000.00
	Subtotal:..				$	510,260.00
	Sales Tax (10%):..				$	51,026.00
	Subtotal:..				$	561,286.00
	Contingency (20%):..				$	112,257.20
	TOTAL ESTIMATED CONSTRUCTION COST:................................				$	673,543.00
	Engineering and Administrative Costs (30%):..........................				$	202,062.90
	TOTAL ESTIMATED PROJECT COST:................................				$	876,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-6
2nd Avenue N, East of Main Street

NO.	ITEM	QUANTITY		UNIT PRICE		AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$	16,000.00	$	16,000.00
2	8-inch D.I. Water Pipe, Including Fittings	575 LF	$	120.00	$	69,000.00
3	Locate Existing Utilities	LUMP SUM	$	2,000.00	$	2,000.00
4	Erosion Control	LUMP SUM	$	2,000.00	$	2,000.00
5	Additional Pipe Fittings	100 LB	$	4.00	$	400.00
6	Trench Safety Systems	LUMP SUM	$	2,900.00	$	2,900.00
7	8-inch Gate Valves	1 EA	$	2,000.00	$	2,000.00
8	Fire Hydrants	1 EA	$	5,500.00	$	5,500.00
9	Service Connections	16 EA	$	2,000.00	$	32,000.00
10	Abandon Existing A/C Watermain	575 LF	$	5.00	$	2,875
11	Sawcutting	1,150 LF	$	3.00	$	3,450
10	Gravel Backfill	250 TN	$	35.00	$	8,750.00
11	Connections to Existing	1 EA	$	6,000.00	$	6,000.00
12	Crushed Surfacing Top Course	70 TN	$	20.00	$	1,400.00
13	HMA Cl. 1/2" PG 58-22	60 TN	$	200.00	$	12,000.00
14	Foundation Gravel	30 TN	$	35.00	$	1,050.00
15	Cold Mix Asphalt	20 TN	$	170.00	$	3,400.00
16	Traffic Control	32 HRS	$	100.00	$	3,200.00
	Subtotal:				$	173,925.00
	Sales Tax (10%):				$	17,392.50
	Subtotal:				$	191,317.50
	Contingency (20%):				$	38,263.50
	TOTAL ESTIMATED CONSTRUCTION COST:				$	229,581.00
	Engineering and Administrative Costs (30%):				$	68,874.30
	TOTAL ESTIMATED PROJECT COST:				$	299,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-7
Washington Boulevard, Between City hall and 4th Avenue S

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM		$ 48,000.00	$ 48,000.00
2	8-inch D.I. Water Pipe, Including Fittings	2000	LF	$ 120.00	$ 240,000.00
3	Locate Existing Utilities	LUMP SUM		$ 2,000.00	$ 2,000.00
4	Erosion Control	LUMP SUM		$ 2,000.00	$ 2,000.00
5	Additional Pipe Fittings	300	LB	$ 4.00	$ 1,200.00
6	Trench Safety Systems	LUMP SUM		$ 10,000.00	$ 10,000.00
7	8-inch Gate Valves	6	EA	$ 2,000.00	$ 12,000.00
8	Fire Hydrants	5	EA	$ 5,500.00	$ 27,500.00
9	Service Connections	18	EA	$ 2,000.00	$ 36,000.00
10	Abandon Existing A/C Watermain	2,000	LF	$ 5.00	$ 10,000
11	Sawcutting	4,000	LF	$ 3.00	$ 12,000
10	Gravel Backfill	880	TN	$ 35.00	$ 30,800.00
11	Connections to Existing	4	EA	$ 6,000.00	$ 24,000.00
12	Crushed Surfacing Top Course	240	TN	$ 20.00	$ 4,800.00
13	HMA Cl. 1/2" PG 58-22	200	TN	$ 200.00	$ 40,000.00
14	Foundation Gravel	110	TN	$ 35.00	$ 3,850.00
15	Cold Mix Asphalt	50	TN	$ 170.00	$ 8,500.00
16	Traffic Control	112	HRS	$ 100.00	$ 11,200.00

Subtotal:	$ 523,850.00
Sales Tax (10%):	$ 52,385.00
Subtotal:	$ 576,235.00
Contingency (20%):	$ 115,247.00
TOTAL ESTIMATED CONSTRUCTION COST:	$ 691,482.00
Engineering and Administrative Costs (30%):	$ 207,444.60
TOTAL ESTIMATED PROJECT COST:	$ 899,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-8
4th Avenue S, Between SR 167 and Seattle Blvd S

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM		$ 21,000.00	$ 21,000.00
2	8-inch D.I. Water Pipe, Including Fittings	740	LF	$ 120.00	$ 88,800.00
3	Locate Existing Utilities	LUMP SUM		$ 2,000.00	$ 2,000.00
4	Erosion Control	LUMP SUM		$ 2,000.00	$ 2,000.00
5	Additional Pipe Fittings	150	LB	$ 4.00	$ 600.00
6	Trench Safety Systems	LUMP SUM		$ 3,700.00	$ 3,700.00
7	8-inch Gate Valves	2	EA	$ 2,000.00	$ 4,000.00
8	Fire Hydrants	1	EA	$ 5,500.00	$ 5,500.00
9	Service Connections	21	EA	$ 2,000.00	$ 42,000.00
10	Abandon Existing A/C Watermain	740	LF	$ 5.00	$ 3,700
11	Sawcutting	1,480	LF	$ 3.00	$ 4,440
10	Gravel Backfill	330	TN	$ 35.00	$ 11,550.00
11	Connections to Existing	2	EA	$ 6,000.00	$ 12,000.00
12	Crushed Surfacing Top Course	90	TN	$ 20.00	$ 1,800.00
13	HMA Cl. 1/2" PG 58-22	80	TN	$ 200.00	$ 16,000.00
14	Foundation Gravel	40	TN	$ 35.00	$ 1,400.00
15	Cold Mix Asphalt	20	TN	$ 170.00	$ 3,400.00
16	Traffic Control	40	HRS	$ 100.00	$ 4,000.00
	Subtotal:				$ 227,890.00
	Sales Tax (10%):				$ 22,789.00
	Subtotal:				$ 250,679.00
	Contingency (20%):				$ 50,135.80
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 300,815.00
	Engineering and Administrative Costs (30%):				$ 90,244.50
	TOTAL ESTIMATED PROJECT COST:				$ 392,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-9
3rd Avenue South, Milwaukee Blvd S to Washington Blvd

NO.	ITEM	QUANTITY		UNIT PRICE		AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$	16,000.00	$	16,000.00
2	8-inch D.I. Water Pipe, Including Fittings	650 LF	$	120.00	$	78,000.00
3	Locate Existing Utilities	LUMP SUM	$	2,000.00	$	2,000.00
4	Erosion Control	LUMP SUM	$	2,000.00	$	2,000.00
5	Additional Pipe Fittings	100 LB	$	4.00	$	400.00
6	Trench Safety Systems	LUMP SUM	$	3,300.00	$	3,300.00
7	8-inch Gate Valves	2 EA	$	2,000.00	$	4,000.00
8	Fire Hydrants	1 EA	$	5,500.00	$	5,500.00
9	Service Connections	7 EA	$	2,000.00	$	14,000.00
10	Abandon Existing A/C Watermain	650 LF	$	5.00	$	3,250
11	Sawcutting	1,300 LF	$	3.00	$	3,900
10	Gravel Backfill	290 TN	$	35.00	$	10,150.00
11	Connections to Existing	2 EA	$	6,000.00	$	12,000.00
12	Crushed Surfacing Top Course	80 TN	$	20.00	$	1,600.00
13	HMA Cl. 1/2" PG 58-22	70 TN	$	200.00	$	14,000.00
14	Foundation Gravel	40 TN	$	35.00	$	1,400.00
15	Cold Mix Asphalt	20 TN	$	170.00	$	3,400.00
16	Traffic Control	40 HRS	$	100.00	$	4,000.00
	Subtotal:				$	178,900.00
	Sales Tax (10%):				$	17,890.00
	Subtotal:				$	196,790.00
	Contingency (20%):				$	39,358.00
	TOTAL ESTIMATED CONSTRUCTION COST:				$	236,148.00
	Engineering and Administrative Costs (30%):				$	70,844.40
	TOTAL ESTIMATED PROJECT COST:				$	307,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-10
Seattle Boulevard South (North End)

NO.	ITEM	QUANTITY		UNIT PRICE		AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$	9,000.00	$	9,000.00
2	12-inch D.I. Water Pipe, Including Fittings	265 LF	$	180.00	$	47,700.00
3	Locate Existing Utilities	LUMP SUM	$	2,000.00	$	2,000.00
4	Erosion Control	LUMP SUM	$	2,000.00	$	2,000.00
5	Additional Pipe Fittings	100 LB	$	4.00	$	400.00
6	Trench Safety Systems	LUMP SUM	$	1,300.00	$	1,300.00
7	Service Connections	4 EA	$	2,000.00	$	8,000.00
8	Abandon Existing A/C Watermain	265 LF	$	5.00	$	1,325
9	Sawcutting	530 LF	$	3.00	$	1,590
10	Gravel Backfill	140 TN	$	35.00	$	4,900.00
11	Connections to Existing	2 EA	$	6,000.00	$	12,000.00
12	Crushed Surfacing Top Course	40 TN	$	20.00	$	800.00
13	HMA Cl. 1/2" PG 58-22	30 TN	$	200.00	$	6,000.00
14	Foundation Gravel	20 TN	$	35.00	$	700.00
15	Cold Mix Asphalt	10 TN	$	170.00	$	1,700.00
16	Traffic Control	16 HRS	$	100.00	$	1,600.00
	Subtotal:				$	101,015.00
	Sales Tax (10%):				$	10,101.50
	Subtotal:				$	111,116.50
	Contingency (20%):				$	22,223.30
	TOTAL ESTIMATED CONSTRUCTION COST:				$	133,340.00
	Engineering and Administrative Costs (30%):				$	40,002.00
	TOTAL ESTIMATED PROJECT COST:				$	174,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT D-11
Replacement of AC Water Mains

NO.	ITEM	QUANTITY		UNIT PRICE		AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$	18,000.00	$	18,000.00
2	8-inch D.I. Water Pipe, Including Fittings	700 LF	$	120.00	$	84,000.00
3	Locate Existing Utilities	LUMP SUM	$	800.00	$	800.00
4	Erosion Control	LUMP SUM	$	800.00	$	800.00
5	Additional Pipe Fittings	150 LB	$	4.00	$	600.00
6	Trench Safety Systems	LUMP SUM	$	3,500.00	$	3,500.00
7	8-inch Gate Valves	2 EA	$	2,000.00	$	4,000.00
8	Fire Hydrants	1 EA	$	5,500.00	$	5,500.00
9	Service Connections	12 EA	$	2,000.00	$	24,000.00
10	Abandon Existing A/C Watermain	700 LF	$	5.00	$	3,500
11	Sawcutting	1,400 LF	$	3.00	$	4,200
12	Gravel Backfill	310 TN	$	35.00	$	10,850.00
13	Connections to Existing	2 EA	$	6,000.00	$	12,000.00
14	Crushed Surfacing Top Course	90 TN	$	20.00	$	1,800.00
15	HMA Cl. 1/2" PG 58-22	70 TN	$	200.00	$	14,000.00
16	Foundation Gravel	40 TN	$	35.00	$	1,400.00
17	Cold Mix Asphalt	20 TN	$	170.00	$	3,400.00
16	Traffic Control	40 HRS	$	100.00	$	4,000.00
	Subtotal:				$	196,350.00
	Sales Tax (10%):				$	19,635.00
	Subtotal:				$	215,985.00
	Contingency (20%):				$	43,197.00
	TOTAL ESTIMATED CONSTRUCTION COST:				$	259,182.00
	Engineering and Administrative Costs (30%):				$	77,754.60
	TOTAL ESTIMATED PROJECT COST:				$	337,000.00

CITY OF ALGONA
CAPITAL IMPROVEMENT PROJECTS
PRELIMINARY COST ESTIMATE-PROJECT G-1
Water Meter Replacement Program

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Radio Read Meter	200	$ 300.00	$ 60,000.00
	Subtotal:..			$ 60,000.00
	Sales Tax (10%):..			$ 6,000.00
	TOTAL ESTIMATED CONSTRUCTION COST:..			$ 66,000.00

APPENDIX J

AVAILABLE FUNDING SOURCES

AVAILABLE CAPITAL PROJECT FUNDING SOURCES

This section describes several funding sources available to the City without reference to any specific project, including information on the following, which were considered by the City:

Loans: Public Works Trust Fund Loan
Drinking Water State Revolving Fund
USDA Rural Development (RD)
Community Economic Revitalization Board

Bonds: Revenue Bonds

PUBLIC WORKS TRUST FUND

The Public Works Trust Fund (PWTF) is a revolving loan fund designed to help local governments finance needed public works projects through low-interest loans and technical assistance. The PWTF, established in 1985 by the legislature, offers loans below market rates, payable over periods ranging up to 20 years.

Interest rates are 0.5 percent, 1 percent, or 2 percent, with the lower rates providing an incentive for a higher financial share. For the local community to qualify for a 2-percent loan, it must provide a minimum of 5 percent of the project's costs. A 10-percent local share qualifies the applicant for a 1 percent interest rate and a 15-percent local share qualifies for a 0.5-percent loan. The useful life of the project determines the loan term, with a maximum term of 20 years.

To be eligible, an applicant must be a local government such as a city, town, county, or special purpose utility district, and have a long-term plan for financing its public work needs. If the applicant is a city, town, or county it must adapt the 1/4-percent real estate excise tax dedicated to capital purposes. Eligible public works systems include streets and roads, bridges, storm sewers, sanitary sewers, and domestic water. Loans are presently offered only for purposes of repair, replacement, rehabilitation, reconstruction or improvement of existing service users. A recent change has now made projects intended to meet reasonable growth (as detailed in a 20-year growth management plan) eligible for PWTF funding.

An applicant can apply to the construction program for up to $10,000,000 per biennium. Applications for the construction program are due in May of each year, with funds available approximately 1 year later. Preconstruction loans are limited to $1,000,000 per biennium and can be submitted throughout the year. A preconstruction application must be submitted to the Public Works Board on or before the 15th of each month. The Board meets on a monthly basis and makes the award decisions at that time. Preconstruction funds are available as soon as the contracts can be issued.

DRINKING WATER STATE REVOLVING FUND (DWSRF)

DWSRF will provide loan funding for water system projects. Health and safety projects will receive the highest rankings and receive funding. Water main projects, even those projects that improve fire flow typically do not receive a ranking high enough to receive funding.

COMMUNITY ECONOMIC REVITALIZATION BOARD (CERB)

The Community Economic Revitalization Board's prime mission is to partner with business and industry and local governments to maintain and create jobs. Established by the Legislature in 1982, CERB provides low-interest loans or, in unique circumstances, grants to help finance local public infrastructure necessary to develop or retain stable business and industrial activities. Projects eligible for funding include domestic and industrial waters systems, sanitary and storm sewers, port facilities, and telecommunications.

Typically, CERB provides loans in the amount of $1 million and, where applicable, grants in the amount of $300,000. The interest rate is tied to the current cost of a 10-year bond and a local match of 10 percent is required.

Eligible applicants include Washington State subdivisions in partnership with private enterprise. If there is no economic partner, a local government can produce a feasibility study that documents realistic job retention or creation. Applications must be submitted 45 days prior to a regularly scheduled CERB Meeting, which typically meets in January, March, July, and November.

REVENUE BONDS

The most common source of funds for construction of major utility improvements is the sale of revenue bonds. These are tax-free bonds are issued by a city or town. The major source of funds for debt service on revenue bonds is from monthly water or sewer service charges. In order to qualify to sell revenue bonds marketable to investors, the bonds typically have contractual provisions for the city or town to meet debt coverage requirements. The city or town must show that its annual net operating income (gross income less operation and maintenance expenses) must be equal to or greater than a factor, typically 1.2 to 1.4 times the annual debt service on all par debt. If a coverage factor has not been specified it will be determined at the time of any future bond issues.

DEVELOPER FINANCING

Developers may fund the construction of extensions to the water system to property within new plats. The developer extensions are turned over to the City for operation and maintenance when completed.

It may be necessary, in some cases, to require the developer to construct more facilities than those required by the development in order to provide either extensions beyond the plat and/or larger pipelines for the ultimate development of the water system. The City may, by policy, reimburse the Developer through either direct outlay, latecomer charges, or reimbursement agreements for the additional cost of facilities, including increased size of pipelines over those required to serve the property under development. Compensation for oversizing is usually considered when it is necessary to construct a pipe larger than eight inches in diameter in a residential area to comply with the intent of the City's comprehensive plan. Construction of any pipe in commercial or industrial areas that is larger than the size required to serve the development should also be considered as an oversized line, therefore possibly eligible for compensation. Developer reimbursement (latecomer) agreements provide up to 10 years or more for developers to receive payment form other connections made to the developer-financed improvements.

APPENDIX K

SEPA CHECKLIST

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [HELP]

1. Name of proposed project, if applicable:

City of Algona Water System Plan

2. Name of applicant:

City of Algona

3. Address and phone number of applicant and contact person:

Salvador Marez
salvadorm@algonawa.gov
253-833-2897
200 Washington Blvd,
Algona, WA 98001

4. Date checklist prepared:

May 2022

5. Agency requesting checklist:

City of Algona

6. Proposed timing or schedule (including phasing, if applicable):

Each project proposed in the Water System Plan will be scheduled and completed on a project-specific basis. The recommendations proposed in the current 10-year and future 20-year planning periods are subject to change based on changing priorities and effort to coordinate with other projects.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

This proposal is a non-project action, therefore this question does not apply.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Each capital project will be evaluated on a project specific basis.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

None Applicable

10. List any government approvals or permits that will be needed for your proposal, if known.

- **Department of Health – Water System Plan Approval**
- **City of Algona Council – Approval**
- **City of Algona Planning Department**

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The proposed Plan is a planning document evaluating and describing the system and providing a list of capital projects necessary to provide water service through the 10-year planning period. It is used as a resource by the System and state regulatory agencies. The plan describes management, standards, policies, service area, geography, quality, infrastructure, operations, and finance of the System.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The "project area" is the System's water service area as shown in Figure 1-1.

B. Environmental Elements [HELP]

1. *Earth* [help]

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____________

The topography varies throughout the water service area. The watershed is bound by hills to the west, south, and east. See figure 1-9 for topography withing the City's retail service area.

b. What is the steepest slope on the site (approximate percent slope)?

See response for part a. above.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Soils will be considered on a project-specific basis.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Unstable soils will be evaluated on a project-specific basis. Refer to Figure 1-4 for slope stability and harzard areas within the City's retail service area.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

No filling or grading will occur at this time. Grading and filling quantities will be developed along with permits and approvals on a project-specific basis.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Construction associated with recommended water system capital improvement projects will include protective measures for erosion control where necessary. Appropriate best management practices, erosion control, and mitigation measures will be determined on a project-specific basis.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

This will be determined on a project specific basis.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

To be determined on a project-specific basis.

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Recommended water system capital improvement construction projects should not result in impacts to air quality with the possible exception of dust and vehicle emissions from construction equipment. Project specific impacts will be evaluated on a project-specific basis.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

To be determined on a project-specific basis.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

To be determined on a project-specific basis. Construction area will be maintained dust free, and any roads utilized for construction access will be swept and washed to control dust.

3. Water [help]

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

To be determined on a project-specific basis.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

To be determined on a project-specific basis.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

To be determined on a project-specific basis.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

To be determined on a project-specific basis.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Portions of the water system lie within the 100 year flood plain (refer to Figure 1-4). Impacts to specific project will be determined on a project-specific basis.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

None anticipated.

b. Ground Water: [help]

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

To be determined on a project-specific basis.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None anticipated. However, this will be determined on a project-specific basis.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

To be determined on a project-specific basis.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Not Anticipated

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

This will be determined on a project-specific basis.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

None required with this Plan. Individual projects will be evaluated on a project-specific basis and utilize best management practices to control runoff water impacts.

4. Plants [help]

a. Check the types of vegetation found on the site:

__✖_deciduous tree: alder, maple, aspen, other
__✖_evergreen tree: fir, cedar, pine, other
__✖_shrubs
__✖_grass
__✖_pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
__✖_ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
__✖_water plants: water lily, eelgrass, milfoil, other
__✖_other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

This will be determined on a project-specific basis.

c. List threatened and endangered species known to be on or near the site.

This will be determined on a project-specific basis.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

This will be determined on a project-specific basis.

e. List all noxious weeds and invasive species known to be on or near the site.

This will be determined on a project-specific basis.

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: **hawk, heron, eagle, songbirds,** other:
mammals: **deer,** bear, elk, beaver, other:
fish: bass, salmon, **trout**, herring, shellfish, other ________

b. List any threatened and endangered species known to be on or near the site.

- **Marbled Murrelet**
- **Streaked Horned Lark**
- **Yellow Billed Cuckoo**
- **Bull Run Trout**

c. Is the site part of a migration route? If so, explain.

No threatened or endangered species have been identified within the water service area or surrounding area.

d. Proposed measures to preserve or enhance wildlife, if any:

This will be determined on a project-specific basis.

e. List any invasive animal species known to be on or near the site.

This will be determined on a project-specific basis.

6. Energy and Natural Resources [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Energy needs will be evaluated on a project-specific basis. However, energy demands will largely consist of electrical energy for operation of pumps and electronics systems.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

Potential impacts will be evaluated on a project-specific basis, but projects are unlikely to impact potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Opportunities for energy-conserving features will be identified on a project-specific basis.

7. Environmental Health [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Potential hazards will be identified on a project-specific basis.

1) Describe any known or possible contamination at the site from present or past uses.

To be determined on a project-specific basis.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

To be determined on a project-specific basis.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

To be determined on a project-specific basis.

4) Describe special emergency services that might be required.

To be determined on a project-specific basis.

5) Proposed measures to reduce or control environmental health hazards, if any:

To be determined on a project-specific basis.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Ambient noise is primarily from traffic and will not affect the projects proposed in the plan

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

To be determined on a project-specific basis.

3) Proposed measures to reduce or control noise impacts, if any:

To be determined on a project-specific basis.

8. Land and Shoreline Use [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

To be determined on a project-specific basis.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

To be determined on a project-specific basis.

c. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

None anticipated. However, this will be determined on a project-specific basis.

d. Describe any structures on the site.

This will be determined on a project-specific basis.

e. Will any structures be demolished? If so, what?

This will be determined on a project-specific basis.

f. What is the current zoning classification of the site?

This will be determined on a project-specific basis.

g. What is the current comprehensive plan designation of the site?

This will be determined on a project-specific basis.

h. If applicable, what is the current shoreline master program designation of the site?

This will be determined on a project-specific basis.

i. Has any part of the site been classified as a critical area by the city or county? If so, specify.

This will be determined on a project-specific basis.

j. Approximately how many people would reside or work in the completed project?

None anticipated.

k. Approximately how many people would the completed project displace?

None anticipated.

l. Proposed measures to avoid or reduce displacement impacts, if any:

This will be determined on a project-specific basis. None anticipated.

m. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Proposals will be consistent with local ordinances related to land use planning and will be determined on a project specific basis.

n. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

No impacts anticipated.

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

No impacts anticipated.

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

To be determined on a project-specific basis.

b. What views in the immediate vicinity would be altered or obstructed?

To be determined on a project-specific basis. None anticipated.

c. Proposed measures to reduce or control aesthetic impacts, if any:

To be determined on a project-specific basis. None anticipated.

11. Light and Glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

To be determined on a project-specific basis.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

To be determined on a project-specific basis. No impacts anticipated.

c. What existing off-site sources of light or glare may affect your proposal?

To be determined on a project-specific basis. None anticipated

d. Proposed measures to reduce or control light and glare impacts, if any:

To be determined on a project-specific basis. No impacts anticipated

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity?

To be determined on a project-specific basis.

b. Would the proposed project displace any existing recreational uses? If so, describe.

To be determined on a project-specific basis.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

To be determined on a project-specific basis. None anticipated

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe.

This plan is a non-project action and does not affect a specific site. There are many historic sites in the surrounding area. Site preservation status will be evaluated on a project specific basis.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

To be determined on a project-specific basis.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

Future projects will adhere to and comply with all local, State, and Federal historical and archaeological preservation laws, should any artifacts or items be discovered during construction. Washington cultural resource laws (RCW 27.53) state that no known archaeological resources or site can knowingly be damaged without obtaining a certified permit from the Washington State Office of Archaeology and Historic Preservation (OAHP). Also under Washington State law, all archaeological sites and resources are protected on private and public lands (RCW 27.53). Section 106 of the National Historic Preservation Act of 1996, as amended, stipulates early, often, and continuous consultation with the project's Federal/State lead agency and affected Native American Tribe(s) depending on the jurisdiction of the proposed project. If any significant archaeological resources are discovered during project related construction excavation and/or operation/maintenance, all activities must stop in the immediate area. A professional archaeologist should be contacted to inspect and assess the disturbed archaeological deposits. If necessary, OAHP and the affected Native American Tribe(s) would be contacted to further assess the damaged cultural resources. Future site- specific project actions would be subject to further environmental review on a case-by-case basis.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

To be determined on a project-specific basis.

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

To be determined on a project-specific basis.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

To be determined on a project-specific basis.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

To be determined on a project-specific basis.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

To be determined on a project-specific basis.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

To be determined on a project-specific basis.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

To be determined on a project-specific basis.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

To be determined on a project-specific basis.

h. Proposed measures to reduce or control transportation impacts, if any:

To be determined on a project-specific basis.

15. Public Services [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No. Projects will facilitate provision of public services such as drinking water and fire protection.

b. Proposed measures to reduce or control direct impacts on public services, if any.

No effects anticipated.

16. Utilities [help]

a. Circle utilities currently available at the site:

electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other ___________

electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, phone, cable television

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Projects recommended by this plan propose water utility improvements, provided by the City of Algona.

C. Signature [HELP]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: ____

Name of signee Keenan Ferar

Position and Agency/Organization Consulting Engineer/Gray and Osborne, Inc

Date Submitted: 5/24/2022

D. Supplemental sheet for nonproject actions [HELP]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

To be determined on a project-specific basis.

2. Proposed measures to avoid or reduce such increases are:

To be determined on a project-specific basis.

3. How would the proposal be likely to affect plants, animals, fish, or marine life?

To be determined on a project-specific basis.

4. Proposed measures to protect or conserve plants, animals, fish, or marine life are:

If threatened or endangered plant, animal, fish or marine species are discovered during construction, all work will cease until the Department of Fish and Wildlife or the Department of Natural Resources can be contacted and an expert brought on to the site.

5. How would the proposal be likely to deplete energy or natural resources?

To be determined on a project-specific basis.

6. Proposed measures to protect or conserve energy and natural resources are:

To be determined on a project-specific basis.

7. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

To be determined on a project-specific basis.

8. Proposed measures to protect such resources or to avoid or reduce impacts are:

To be determined on a project-specific basis.

9. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

To be determined on a project-specific basis.

10. Proposed measures to avoid or reduce shoreline and land use impacts are:

To be determined on a project-specific basis.

11. How would the proposal be likely to increase demands on transportation or public services and utilities?

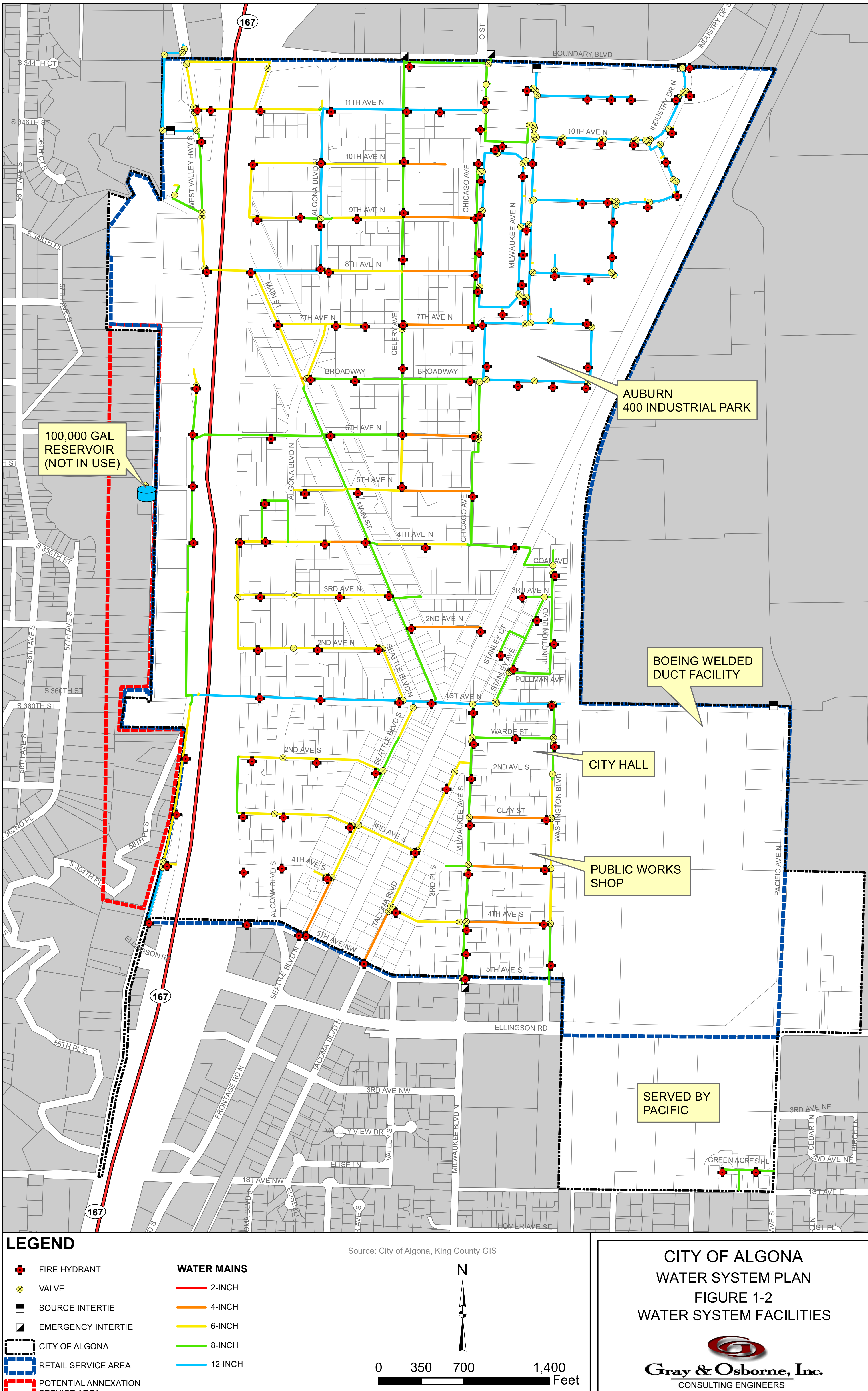
To be determined on a project-specific basis.

12. Proposed measures to reduce or respond to such demand(s) are:

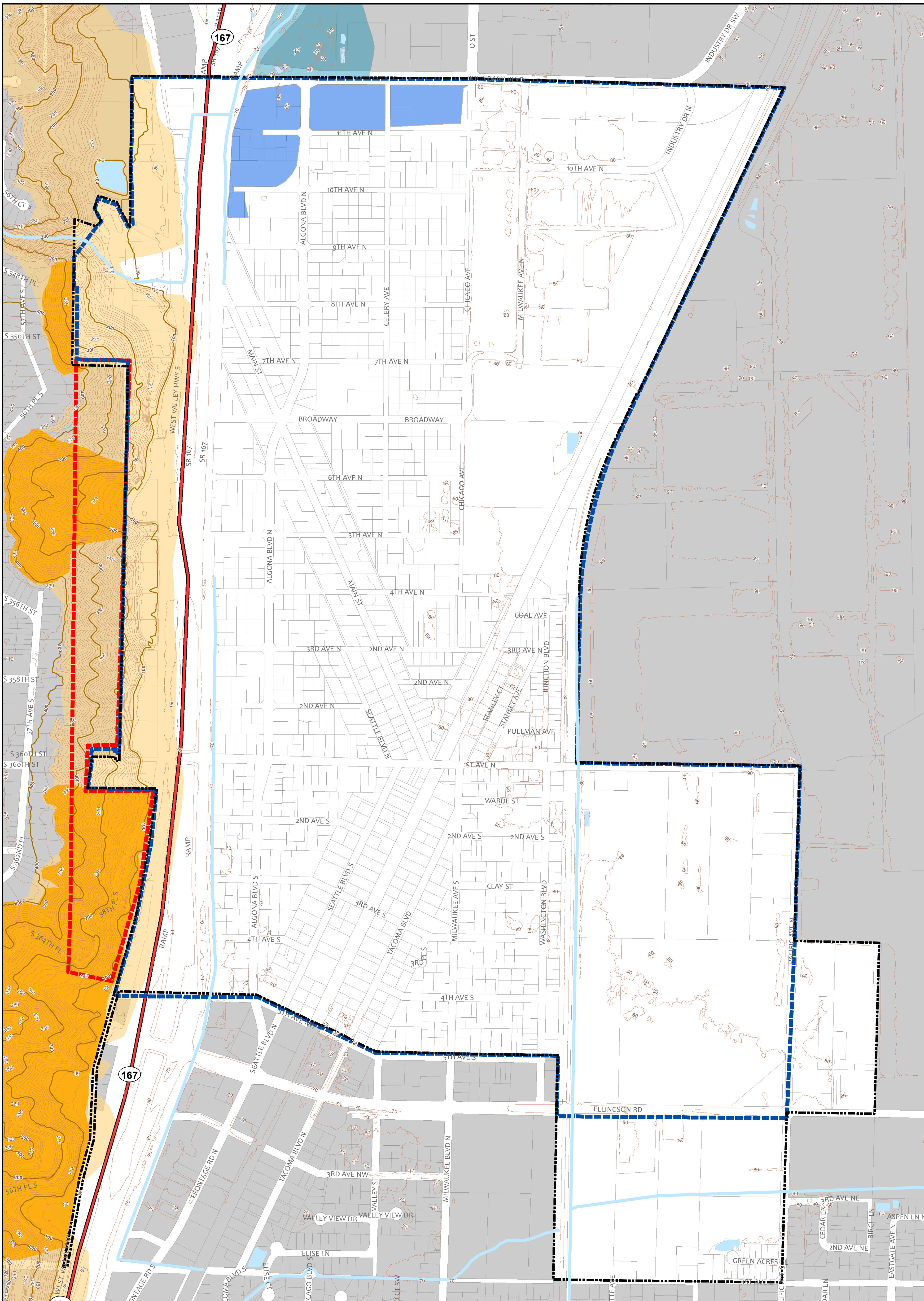
To be determined on a project-specific basis.

13. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

To be determined on a project-specific basis.



L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 1-2 WATER SYSTEM.mxd



LEGEND

- CITY OF ALGONA
- RETAIL SERVICE AREA
- POTENTIAL ANNEXATION SERVICE AREA
- 100' CONTOURS
- 10' CONTOURS
- POTENTIAL LANDSLIDE AREAS
- 100YR FLOODPLAIN ESTIMATED (PAL-TECH) 1988
- FEMA 100YR FLOODPLAIN
- STEEP SLOPE & EROSION HAZARD AREA
- CITY OF ALGONA

Source: City of Algona, King County GIS

N

0 350 700 1,400 Feet

CITY OF ALGONA
WATER SYSTEM PLAN
FIGURE 1-4
CRITICAL AREAS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

L:\ALGONA\20619 Water System Plan\GIS\MXDS\FIGURE 1-4 CRITICAL AREAS.mxd

APPENDIX L

CORRESPONDENCE, CONSISTENCY STATEMENTS AND APPROVALS

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: City of Algona PWS ID: 01450V

Planning/Engineering Document Title: Water System Plan Plan Date: May 2022

Local Government with Jurisdiction Conducting Review: City of Algona

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Page 1-9 & Fig 1-5	Yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Page 2-9 & 2-10	Yes, see pg. 36
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	Page 1-7 thru 1-20	Yes
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Page 1-7 thru 1-20	Yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Page 1-10 & 1-11	Yes, see Water System Plan Appendices

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.

Eric Jensen

Signature

6/27/2022

Date

Eric Jensen, Director of Planning, Blueline consulting

Printed Name, Title, & Jurisdiction

Gray & Osborne, Inc.
CONSULTING ENGINEERS

October 6, 2022

Mr. Jim Morgan
Public Works Director
City of Pacific
100 3rd Avenue SE
Pacific, Washington 98047

SUBJECT: WATER SYSTEM PLAN
CITY OF ALGONA, KING COUNTY, WASHINGTON
G&O #20619.00

Dear Mr. Morgan:

On behalf of the City of Algona, I would like to notify you that the *Algona 2022 Draft Water System Plan* is available for review. In accordance with WAC 246-290-100(7), the City is making this Plan available to all adjacent water purveyors so that they can assess consistency with ongoing and adopted planning efforts. Please find a USB drive containing an electronic copy of the Plan enclosed.

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 about the Plan to the undersigned at the phone number (306) 454-5490.

Sincerely,

GRAY & OSBORNE, INC.

Stacey Clear, PE

SAC/sr
Encl.

3710 168th Street NE, Building B, Suite 210 Arlington, Washington 98223 (360) 454-5490 Fax (360) 454-5491

Gray & Osborne, Inc.
CONSULTING ENGINEERS

October 6, 2022

Mr. John Bowman
General Manager
Lakehaven Water & Sewer District
31627 1st Avenue South
Federal Way, Washington 98063

SUBJECT: WATER SYSTEM PLAN
CITY OF ALGONA, KING COUNTY, WASHINGTON
G&O #20619.00

Dear Mr. Bowman:

On behalf of the City of Algona, I would like to notify you that the *Algona 2022 Draft Water System Plan* is available for review. In accordance with WAC 246-290-100(7), the City is making this Plan available to all adjacent water purveyors so that they can assess consistency with ongoing and adopted planning efforts. Please find a USB drive containing an electronic copy of the Plan enclosed.

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Stacey Clear, PE

SAC/sr
Encl.

3710 168th Street NE, Building B, Suite 210 Arlington, Washington 98223 (360) 454-5490 Fax (360) 454-5491

Gray & Osborne, Inc.
CONSULTING ENGINEERS

October 6, 2022

Susan Fenhaus
Water Utility Engineer
City of Auburn
1 Main Street
Auburn, Washington 98001

SUBJECT: WATER SYSTEM PLAN
CITY OF ALGONA, KING COUNTY, WASHINGTON
G&O #20619.00

Dear Ms. Fenhaus

On behalf of the City of Algona, I would like to notify you that the *Algona 2022 Draft Water System Plan* is available for review. The City is making this Plan available to the City of Auburn, the City of Algona's wholesale water provider, so that they can assess consistency with ongoing and adopted planning efforts, water use efficiency, and water quality monitoring. Please see the enclosed USB drive containing an electronic copy of the Plan.

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 to comments and questions about the Plan to the undersigned at the phone number (306) 454-5490.

Sincerely,

GRAY & OSBORNE, INC.

Stacey Clear, P.E.

SAC/sr
Encl.