CITY OF ZILLAH
WATER SYSTEM PLAN

HLA
Engineering and Land Surveying, Inc.

PROJECT NO. 19202E

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WATER SYSTEM PLAN

Prepared by:

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Engineering and Land Surveying, Inc.

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INTRODUCTION

AND

EXECUTIVE SUMMARY

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INTRODUCTION

The City of Zillah is in the south-central portion of Washington State in Yakima County. The City lies just north of Interstate 82, approximately 18 miles southeast of the City of Yakima. Along with increasing growth within the Yakima Valley, there has been an increase in population within the City of Zillah. A future service area for Zillah, known as the Urban Growth Area (UGA), has been established through the Growth Management Act planning process. Zillah's economy depends largely on the agricultural and wine industry. Produce and wine grapes grown throughout the Yakima Valley is processed and shipped from facilities within the area, and much of the employment in Zillah is tied directly and indirectly to these agricultural facilities.

Zillah recognizes the need to improve and expand its water system to meet the demands of its system users and keep pace with other growth-oriented improvements in this vital Yakima County community. HLA Engineering and Land Surveying, Inc. (HLA), was authorized by the City of Zillah to prepare this Water System Plan, which represents the culmination of planning and data collection efforts.

PLANNING REQUIREMENTS

Water systems with 1,000 or more services are required to have a water system plan approved by the Washington State Department of Health (DOH) pursuant to the Washington Administrative Code, WAC 246-290-100 and WAC 246-291-140.

To assist water utilities in preparing their plans, DOH has published a *Water System Planning Guidebook*, Publication No. 331-068. This guidebook identifies information needed in a water system plan to "identify future needs and apply available resources most efficiently in order to provide high quality service at lowest cost while protecting the health of the community." The guidebook is organized into ten major chapters, with each chapter representing a basic water system plan component. The ten chapters are:

1. Description of the Water System
2. Basic Planning Data
3. System Inventory and Analysis
4. Water Use Efficiency Program
5. Source Water Protection
6. Operation and Maintenance Program
7. Distribution Facilities Design and Construction Standards
8. Capital Improvement Program
9. Financial Program
10. Miscellaneous Documents

Each chapter is divided into several sections to address specific topics in detail. The City of Zillah *2021 Water System Plan* update has been prepared in the format of DOH *Water System Planning Handbook*.

OBJECTIVE

The principal goal of water system planning is to make efficient use of available resources. This is accomplished by making decisions about water system capital improvements and operations which are in accordance with overall system policies and directions expressed in a utility's water system plan.

An equally important reason for developing a water system plan is to assure orderly growth of the system while maintaining reliable delivery of high-quality water. The plan is intended to guide water utility actions in a manner consistent with other activities taking place in the community.

The water system plan is intended to look ahead at least 20 years into the future. Development of a definite improvement schedule and financial program is required for the plan approval period, while the planning approach for the second period may be more conceptual. DOH plan approval is effective for ten years from the date of written approval, unless otherwise requested by DOH. To continually provide adequate guidance to decision makers, the plan must be updated prior to expiration of the current plan approval.

Once adopted by the City of Zillah and approved by DOH, the Water System Plan is considered by DOH "to be a commitment to implement the actions identified in the improvement schedule." Future water system decisions shall be in accordance with the Water System Plan.

PROJECTED WATER DEMANDS

To plan for Zillah's future water needs, the following items were examined:

Basic Planning Data (CHAPTER 2): Land use, future service area boundary, and population growth are used to evaluate demands on the Zillah water system. The City's 2019 population was estimated by the Office of Financial Management in Washington as 3,185, and the future populations projected for the 10-year (2031) and 20-year (2041) planning periods by Yakima County are 4,300 and 5,100 respectively. Zillah's 2017-2019 three-year average number of residential water services was 886, and the future number of residential services is projected to be 1,247 by the year 2031.

Current Water Demands (CHAPTER 2): Zillah's greatest year of water consumption in the last six years was in 2015 when 139.5 million gallons was consumed. This is equal to an average daily consumption of 0.382 million gallons. The maximum month of water consumption was experienced in July 2015, when the average daily consumption for the month was 0.726 million gallons. Maximum day consumption (based upon the maximum day of water production in the month) was 0.8 million gallons on July 1, 2015, and peak hour consumption was calculated to be 945 gpm.

Projected Water Demands (CHAPTER 2): Zillah's water demand forecast for the year 2031, and the City's current source capacity and water rights are listed below:

	PROJECTED YEAR	CURRENT SOURCE	CURRENT
	2031 Demand	Capacity	Water Rights
ERUs	3,332	- - - - - - -	- - - - - - -
Annual	205.954 MG	788.400 MG	571.536 MG
Maximum Day	1.246 MGD	2.160 MGD	3.672 MGD
Peak Hour	1,505 gpm	1,500 gpm	2,550 gpm

SUMMARY OF SYSTEM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

The following is a listing of the major water system deficiencies and recommended improvements which have been identified in the existing water system. A more detailed description of these deficiencies and related improvements can be found in CHAPTER 8.

SUPPLY

Water Rights – The City's current water rights are adequate to satisfy existing and projected 20-year demands, however, additional source well capacity will be needed to fully utilize the City's total authorized instantaneous water right (Q_i) of 2,550 gpm. No water right deficiency exists unless a change application is needed to provide additional source well capacity.

Source Well Capacity – Source well capacity is not currently deficient but will need to be increased by year 2031. Additional source well capacity will provide supply redundancy, improve system reliability, maximize existing instantaneous water rights, and eliminate the need for equalizing storage in the future by meeting peak hourly demands. Construction of a new source well to increase capacity will need to be coordinated with existing water rights.

The City purchased the Joseph Well as part of the 0.6 MG storage reservoir and booster pump station improvement project in 2009 and plans to either rehabilitate the existing well or drill a new well at the Joseph Well site or another property owned by the City to supply an additional 1,050 gpm of water. The location of the new well will need to be coordinated with existing water rights, otherwise alternate locations may need to be evaluated.

Source Well Water Quality – The Third Ave Well (S02) has a history of aesthetic/water quality issues due to elevated manganese levels. The City receives an increased number of customer complaints when this well is running. Elevated levels of manganese are not a significant health risk but can cause substantial aesthetic water quality issues, especially when oxidation and precipitation occur. Treatment to reduce manganese levels may become necessary in the future if levels begin to increase or chlorine disinfection becomes necessary. It is anticipated that a high-rate inline pressure filter system will need to be installed for removal of manganese from the source water.

Protective Covenants – Of the City's three well sites, only WIPPCO Well (S03) has a recorded protective covenant, establishing the required 100-foot sanitary protective radius around the well. Protective covenants are required at Zillah's other two source wells. Protective well covenants will be created and executed for the remaining two wells owned by the City of Zillah to provide the necessary 100-foot sanitary protective radius around the wells.

System Disinfection/Chlorination – Water system disinfection/chlorination is not a required improvement nor an existing deficiency, but as the City's water system continues to grow it may become one. Chlorination is used to ensure consistent, safe water quality throughout the distribution system. Disinfection improvements will include installation of chlorination equipment at the City's source wells and booster pump stations and control system upgrades to manage and monitor system disinfection.

STORAGE

Reservoir Coatings – The City's two elevated reservoirs were last painted in 1991 and have not been inspected since that time. To determine the existing condition of the interior of Reservoir No. 1 and 2 it is recommended that the City contract with certified divers to visually inspect and clean the interior of these reservoirs. If any structural or mechanical deficiencies are uncovered, they can be addressed while the reservoir is offline for recoating. It is recommended that both reservoirs be taken offline and be completely recoated inside and out.

Storage Capacity – Storage capacity is currently the City's limiting system component based on standby storage requirements. Additional storage capacity will be needed by year 2031 based on population and service projections.

As described in CHAPTER 3, the City's ground level storage reservoir (Reservoir No. 3) was designed to allow for future expansion to provide an additional 400,000 gallons of storage. Increasing the Reservoir No. 3 storage capacity to one million gallons will provide sufficient storage to meet 20-year demand projections.

DISTRIBUTION

Service Meters – Approximately 400 service meters must be manually read and do not work with the current touch-read equipment. Approximately 30 service meters will be replaced annually with new radio-read meters to improve service meter accuracy and reduce the time necessary to read meters.

Booster Pump Station Pumps – The Cutler Way Booster Station and Zone 2 Constant Pressure Booster Station were constructed without the designed, spare pump due to budget constraints. Without a spare pump, the booster station capacity is impacted when the primary pump is out of service due to maintenance or repairs. Installation of the third and second 1,500 GPM booster pumps at Cutler Way Booster Station and Zone 2 Constant Pressure Booster Stations respectively will be completed as a recommended system improvement.

Fire Protection Water Main Upsizing and Replacement – Several locations throughout the City's distribution system were identified in CHAPTER 3 as having insufficient fire flow capacities. Fire flow deficiencies will require pipeline upsizing or looping in the future. Upsizing existing water mains or providing new connections and loops will increase system flows and pressure to areas identified as deficient in CHAPTER 3. Installation of water main loops, main upsizing, and replacing old leaking mains will improve overall system capacity, reliability, and water loss.

PROPOSED WATER SYSTEM FINANCIAL PROGRAM

Recommended system improvements are scheduled for completion in annual increments for the next ten (10) years, as shown in CHAPTER 8. Scheduling of the remaining improvements beyond this ten-year planning period needs to be reviewed annually as priorities and City growth patterns change and progress. Major recommended improvements for future years (2032 through 2041) have been estimated but have not been scheduled at this time. Estimated improvement costs and total projected annual capital improvement costs are provided in CHAPTER 8.

To fund the recommended water system improvements discussed in this Plan, a proposed financial program has been developed and is provided in CHAPTER 9. The proposed financial program incorporates projected operations, improvements, and loan costs for the next ten-year period. Projected revenues and expenditures of the water system include growth factors and inflation rates, in addition to the recommended revenue and rate increases, to account for estimated growth within the City, as discussed in CHAPTER 9.

As discussed in CHAPTER 9, the City of Zillah owns and maintains its own irrigation system that serves a portion of irrigation water users within the City's current service area. Projected irrigation revenues and expenditures have been included in financial plan because they are currently part of the City's water system fund balances. The irrigation revenue was estimated to increase at the rates provided, but no further analysis of the irrigation department rate structure or financial viability were conducted as part of this report.

The City of Zillah will continue annual reviews of the water system's financial program during their budget preparation process. The financial program will also be reviewed and revised as needed during the next update of the *Water System Plan*. This continued review will allow for modifications to the proposed rate and revenue increases, should financial conditions change.

CHAPTER 1 -

DESCRIPTION OF THE WATER SYSTEM

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1.1 OWNERSHIP AND MANAGEMENT

1.1.1 Water System Ownership

The City of Zillah, a municipal corporation located within the eastern part of Yakima County in the lower valley as shown in Figure 1-1 State Vicinity Map, owns and operates its own water system. Decisions regarding daily water system operations are made by the City Manager and the Public Works Director. Financial decisions regarding major water system improvements and establishment of water rates are made by the Zillah City Council. The following parties are involved in the operation, maintenance, and planning for the Zillah water production, storage, and distribution facilities:

WATER SYSTEM NAME, OWNER, OPERATOR, AND IDENTIFICATION NUMBER:

City of Zillah Water System

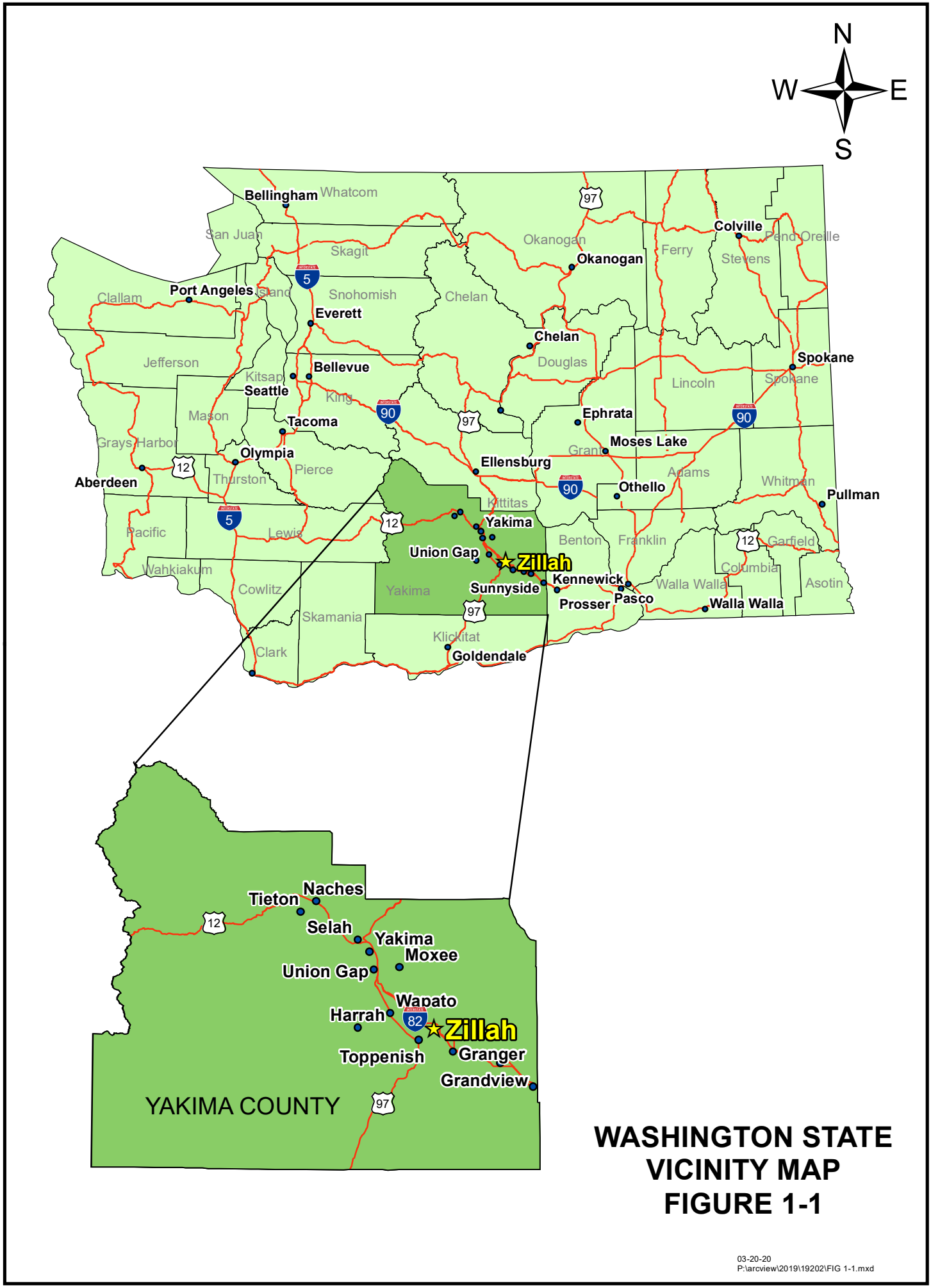
City of Zillah
503 First Avenue
Zillah, WA 98953
Phone: (509) 829-5151

Mayor: Scott Carmack
City Administrator: Sharon Bounds
Public Works Director: John Simmons
Water System Identification Number: 99800W

WATER SYSTEM CONSULTING ENGINEER:

HLA Engineering and Land Surveying, Inc. (HLA)
2803 River Road
Yakima, WA 98902
Phone: (509) 966-7000
Project Engineer: Justin L. Bellamy, PE

A description of the City's water system management structure is presented in CHAPTER 6. A copy of the City's Water Facility Inventory (WFI) form is included in CHAPTER 10.



WASHINGTON STATE VICINITY MAP FIGURE 1-1

03-20-20
P:\arcview\2019\19202\FIG 1-1.mxd

1.2 SYSTEM BACKGROUND

1.2.1 History of Water System Development and Growth

The City of Zillah was incorporated in 1911, after its population grew due to agricultural development with the construction of the Sunnyside canal in the 1890's. The City's water system was first constructed in 1908, when the Third Ave Well was drilled. Table 1-1 provides some information as to the development of Zillah's water system.

Table 1-1 provides some information as to the development of Zillah's water system.

TABLE 1-1 MAJOR WATER SYSTEM IMPROVEMENTS

Year	Improvement Description
1908	Zillah water system constructed
1928	75,000-gallon elevated reservoir constructed
1958	Third Ave Well re-drilled
1958	Rainer Ave Well constructed
1962	75,000-gallon elevated reservoir repaired and repainted
1965	783,000-gallon standpipe reservoir constructed
1986	Third Ave Well repaired
1987	WIPPCO Well acquired
1991	75,000-gallon elevated reservoir repainted
1998	783,000-gallon standpipe reservoir repainted
2000	Comprehensive Water Plan completed
2002	12-Inch water main to High School completed
2009	Cutler Way 613,000-gallon reservoir constructed
2010	Cutler Way and Zone 2 booster pump station constructed
2014	Water System Plan Update (HLA Project No. 13033)
2018	Source Well Improvements (HLA Project No. 16080)
2020	Vintage Valley water improvements (HLA Project No. 13103)

Zillah's first *Comprehensive Water Plan (*CWP*)*, completed in 2000, provided the City with an in-depth look at its water system, deficiencies, and potential growth. In 2006, an update of the CWP was completed in accordance with DOH requirements. Zillah's latest update in 2014 changed the document title to Water System Plan (WSP).

A summary of the growth of Zillah's water system is provided in Table 1-2.

TABLE 1-2 WATER SYSTEM GROWTH SUMMARY

	Year					% Increase 1970-2018
	2001	2004	2009	2014	2019	
Population*	2,472	2,596	2,923*	3,140*	3,185*	28.8%
Total Water Services	914	938	1,019	1,079	1,151	25.9%
Total Annual Metered Consumption (MG)	108.2	113.2	127.3	140.6	123.2	13.9%
Total Source Capacity (MGD)	2.30	2.30	2.30	2.30	2.30	0.0%
Total Storage Capacity (MG)	0.858	0.858	1.461	1.461	1.461	70.3%
* Based on Washington State Office of Financial Management (OFM) census data and estimates.						

1.2.2 Geography

The City of Zillah and its Urban Growth Area are located in the Lower Yakima Valley, the eastern part of Yakima County, in the south-central portion of Washington State, as shown in Figure 1-1. The City lies approximately 18 miles southeast of the City of Yakima, just north of Interstate 82. The City is situated at an elevation of 760 - 870 feet above mean sea level. The Yakima River lies just south of the City, and most of the older part of the City is situated on a bench separated from the Yakima River flood plain by a steep bluff.

Zillah's existing and retail water service area boundaries generally correspond to the current City Limits. Zillah's future retail service area boundary corresponds to its Urban Growth Area Boundary and is shown in Figure 1-2.

Like the rest of the Yakima Valley, Zillah and its Urban Growth Area has a warm and dry climate. The Cascade Mountain Range acts as a barrier between Yakima County and the Pacific Ocean, keeping precipitation low and temperatures warm. The mean annual temperature range is from a low of 24.8°F to a high of 89.4°F. The median temperature is 64.7°F and mean annual precipitation is 8.0 inches. With a warm climate and rich volcanic soils, Yakima County is a significant agricultural region, as well as a recreational area.

Zillah's economy depends largely on the agricultural and wine industry. The City also has a viable commercial and service business community.

1.2.3 Neighboring/Adjacent Purveyors

Residences currently within Zillah's Urban Growth Area, which are not connected to the City's water system, generally utilize individual wells for water supply. Other municipal water systems in the area include the City of Toppenish's municipal water system, located approximately three miles to the southwest, the City of Granger municipal water system, located approximately six miles to the southeast, and the Buena water system (owned and operated by Yakima County), located approximately three miles to the northwest, but directly abutting the City Limits and UGA.

Two parcels within Zillah's Urban Growth Area are also identified in Buena's Water Service Area. Currently the parcel at the southeast corner of Yakima Valley Highway and Buena Road is served by the Buena System. The City of Zillah water system does not extend to these two parcels.

Due to the proximity of the Buena and Zillah water systems to one another, the 2017 Yakima County Capital Facilities Plan describes the Buena Water System's need of constructing an intertie between the systems including a pressure reducing and metering station. As the Zillah Lakes development expands towards Buena the cost of completing this improvement would be reduced. An intertie would provide emergency service for the Buena system initially and may serve Buena for peak or normal demands when Buena is at full build-out. Although the proposed intertie has been discussed for several years, a formal study has not been completed for plans to move forward. This intertie is further discussed in CHAPTER 6.

1.2.4 Ordinances/Bylaws

The City of Zillah operates its water system in accordance with the following municipal code chapters and ordinances:

Chapter 13.04	Joint Operations of Water, Sewer, and Garbage Systems
Chapter 13.08	Water Systems
Chapter 13.10	Temporary Water Meters
Chapter 13.18	Utility Standards for Urban Growth Areas
Chapter 13.28	Reduction in Water Billings Due to Leaks
Chapter 13.30	Utility Reimbursement Agreements
Chapter 13.34	Utility Tax Discount
Chapter 13.38	Infrastructure Improvement Program
Ordinance 635	Cross Connections
Ordinance 913	Utility Reimbursement Agreements
Ordinance 916	Cross Connection Control manual
Ordinance 946	Charges for Water Service
Ordinance 1045	Water System Connection Within the Urban Growth Area
Ordinance 1060	Utilization of Temporary Water Meters During Construction
Ordinance 1077	Water Service, Sewer Service, and Garbage Service Tax Rates
Ordinance 1084	Water Connections
Ordinance 1162	Water Service Improvement Capital Cost Recovery Areas
Ordinance 1367	Water Rates
Ordinance 1408	Fire Hydrants
Ordinance 1421	Utility Tax
Ordinance 1428	Utility Tax Discount
Ordinance 1484	Temporary water meters (13.10)
Ordinance 1501	Amends Ch. 13.28, reduction in utility billings due to leaks

Copies of these Zillah Municipal Code chapters are included in CHAPTER 10 and are maintained online at https://www.codepublishing.com/WA/Zillah/.

CITY OF ZILLAH

Water System Plan Update

EXISTING AND FUTURE SERVICE AREA BOUNDARIES

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Feet

Buena
DOH ID
#34501

Bonair Winary
DOH ID #AB703

Stadelman Fruit
DOH ID #AD636

Faith Community Church
DOH ID #06287

Toppenish
DOH ID
#88850

Highland Dr
S Bonair Rd
S Manuel Ln
SVID CANAL
Bella Terra Rd
Buena Rd
Ballbee Rd
Valleyview Rd
Salisbury Ln
Cheyne Rd
Yakima Valley Hwy
I-82 Hwy
Cutler Wy
Golden Rd
Roza Dr
Schooley Rd
W Centennial Dr
E Centennial Dr
Belly Acre Ln
Smith Rd
Nathaniel Ln
Leland St
Carlsberg Ln
Fourth Ave
Third Ave
First Ave
Canal Rd
Meadowlark Ln
Zillah Heights Rd
Zillah Dr
Cooper Ct
Consolidated Ln
Railroad Ave
Elm Ln
Glenwood Dr
Division Rd
Railroad Ave
State Route 22
N Mercer Rd
Fraley Rd
Fraley Cut Off Rd
Old McCoy Rd
Piscoe Ave
N Fir St
YAKIMA RIVER

LEGEND

- Zillah City Limits
- Zillah Existing Service Area*
- Future Retail Service Area (UGA)*
- Toppenish City Limits
- Toppenish UGA Boundary
- Buena - Yakima County Rural Settlement Boundary
- Buena - Yakima County Future Service Area
- Private Water Systems

* WATER RIGHTS PLACE OF USE MATCHES THE EXISTING AND FUTURE SERVICE AREA IN ACCORDANCE WITH RCW 90.03.386

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FIGURE 1-2

1.3 INVENTORY OF EXISTING FACILITIES

1.3.1 General Description of Existing System Facilities and Major Components

The existing City of Zillah domestic water system consists of two distribution pressure zones between elevations 760 feet to 920 feet, shown on Figure 3-1, which is served by an elevated steel storage tank, a steel standpipe, a ground level standpipe, and the Zone 2 constant pressure booster station. The combined nominal capacity of the three reservoirs is 1,471,000 gallons. Static service pressures within the water system, under normal operating conditions, range from a minimum of 42 psi to a maximum of 92 psi in pressure Zone 1 and a minimum of 50 psi in pressure Zone 2. In 2019, there were 1,145 total services in the Zillah water system.

The City is supplied water from three City-owned source wells. The maximum pumping capacity of the three wells is 1,500 gallons per minute (gpm) or 2.16 million gallons per day (MGD). The City's current telemetry system controls the activity of the wells based on the water level in the steel standpipe.

The City's water rights allow up to 2,550 gpm to be withdrawn at any given time, and up to 1,458 acre-feet per year (475.1 million gallons per year).

The existing transmission and distribution system is looped where possible and consists of mainly 6-inch and 8-inch PVC, asbestos-cement, or galvanized iron pipes. Currently, Zillah has no interties with neighboring water purveyors. A more detailed description of Zillah's water system is presented in CHAPTER 3. Zillah's existing water system is shown in detail on Map A provided in CHAPTER 10.

1.3.2 Existing Irrigation Systems

The City of Zillah currently has a Class 1 irrigation water right from the Sunnyside Valley Irrigation District (SVID). The City's Class 1 water right entitles it to 3 acre-feet per year (AFY) for each acre of land within the city limits. Additional water rights of 33 cfs are available to portions of the City through the Konewock Ditch Company. Irrigation water is supplied to approximately 90 percent of the City's water service area through four irrigation districts as shown in Table 1-3. See Figure 1-3 for areas within the existing UGA, served by the irrigation districts in Table 1-3.

TABLE 1-3 CITY OF ZILLAH IRRIGATION DISTRICTS

	Zillah Irrigation District	City of Zillah Irrigation District	Konewock Ditch Company	SVID
Source Water	SVID	SVID	SVID	SVID
Administration of Water Assessment	Zillah Irrigation District	City of Zillah	Konewock Ditch Company	SVID
System Description	Shares Distribution Box w/ City of Zillah Irrigation District	Shares Distribution Box w/ Zillah Irrigation District	Independent of other systems	Independent and purveyor to Zillah and City of Zillah Irrigation Districts
Owner/Operator	Zillah Irrigation District	City of Zillah	Konewock Ditch Company	SVID
Water Rights	Class 1			

The City of Zillah Irrigation District was created in 1987 by City Ordinance 1015. All other irrigation districts within the city limits are owned and operated by independent boards. Irrigation water is delivered to City customers through underground piping systems, and approximately half of users have privately owned pumping facilities to pressurize their systems.

CITY OF ZILLAH

Water System Plan Update

IRRIGATION DISTRICT SERVICE AREA MAP

LEGEND

- ZILLAH CITY LIMITS
- ZILLAH UGA BOUNDARY
- KONNOWAC DITCH COMPANY
- SUNNYSIDE VALLEY IRRIG. DISTRICT
- CITY OF ZILLAH IRRIG. DISTRICT
- ZILLAH IRRIG. DISTRICT

N W E S

0 400 800 1600

EXIT 50 EXIT 52 EXIT 54

INTERSTATE 82

YAKIMA VALLEY HIGHWAY

BARBEE ROAD BUENA LOOP RD. ROBINSON ROAD EMERSON ROAD ABBY LANE BUENA ROAD BELLA TERRA ROAD BARBEE COURT CRESTVIEW BLVD. KONNOWAC PUMP LINE MEYERS COURT YAKIMA VALLEY PUMPING PLANT

VALLEY VIEW RD. SANSBURY LANE CHEVNE ROAD SVID CANAL ROZA DRIVE

CUTLER WAY GOLDEN DRIVE MIDDLE SCHOOL CHEVNE ROAD MATLOCK LANE

YAKIMA VALLEY HIGHWAY CUTLER WAY ROZA DRIVE W. CENTENNIAL RD. E. CENTENNIAL RD. ALTEVEER ROAD HAMILTON DRIVE

NORTHSTONE PARKWAY MORGAN LANE MERCANTILE LANE MORGAN ST. DUCKY ST. BASSETT ST. DANCO ST. REED STREET NATHANIEL LANE HAKATA WAY SCHOOLEY PL. SCHOOLEY LANE

CARLSON ST. LELAND ST. EDISON ST. GLEN ST. ELEMENTARY SCHOOL FOURTH AVE. FOURTH STREET FIFTH STREET SVID CANAL CANAL ROAD ELLEN LANE MEADOWLARK LANE

FACTORY LANE 1ST ST. PARK ST. SHIRLEY ST. PENN ST. OAK ST. WATERCRESS ST. WESTWIND DRIVE BAKER DR. GLENWOOD DRIVE CHERRY BLOSSOM LANE N. 7TH STREET VIRGINIA CT. CONCORD STREET

ZILLAH CEMETERY FIRST AVE. ZILLAH WEST DR. MIDDLE SCHOOL THIRD STREET THIRD AVENUE THIRD DRIVE

FIRST AVENUE SECOND AVENUE RAILROAD AVENUE LOCUST DRIVE LOCUST PARK 5TH ST. 6TH ST. 7TH ST. 8TH ST. RUNNER AVENUE SCHOENTRUP LANE ZILLAH HEIGHTS ROAD ZILLAH DR. SVID CANAL MATLOCK AVENUE CANAL ROAD SECOND AVENUE

NOE HILL AVE. BARTLE AVE. PEARSON STREET ADAMS PARK DR. ADAMS PARK SUNSET WAY ANN ST. BIRCH WALNUT MILES DR. HIGH SCHOOL CHENAUK DR. SHARON AVE. LINDA STREET KAGELY WAY FIRST AVE.

VINTAGE VALLEY PARKWAY

SR 22 YAKIMA RIVER N. MEYERS RD. INTERSTATE 82 YAKIMA RIVER YAKIMA VALLEY HIGHWAY (OLD S.R. 12)

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P:\Projects\2019\19202\2021 WSP FIGURES.dwg

FIGURE 1-3

1.4 RELATED PLANS

1.4.1 Previous Comprehensive Water Plans

The City's first Comprehensive Water Plan was completed in 2000, which provided Zillah with an in-depth look at its water system, deficiencies, and potential growth. Updates were completed in August 2008 and December 2014.

1.4.2 Water System Plans for Adjacent Water Systems

The City of Granger, Zillah's municipal neighbor located six miles southeast of Zillah, adopted its most recent water system plan in 2010 and is in the process of updating their plan again. The City of Toppenish, located three miles to the southwest, adopted its current water system plan in 2017, and the community of Buena located approximately three miles to the northwest, adopted its current water system plan in 2013. There are currently no water service area agreements between any of these neighboring communities and the City of Zillah.

1.4.3 Urban Growth Area Comprehensive Plan

The City of Zillah's current adopted Growth Management Act (GMA) Comprehensive Plan (Comprehensive Plan) was updated in March 2018. The next Comprehensive Plan update is scheduled to be completed in 2026. The Comprehensive Plan identifies Zillah's physical environment, economic characteristics, population demographics, land uses, and various infrastructure systems within the City and its Urban Growth Area. The typical Comprehensive Plan format is to describe current conditions, develop forecasts for a 20-year planning period, evaluate observed or predicted deficiencies, strategize for addressing current and future challenges, and budget for necessary improvements. Understanding and predicting future changes within the City and its Urban Growth Area are critical in forecasting future demands on the City's water system. As a result, Zillah's Urban Growth Area Comprehensive Plan was an important tool in development of this Water System Plan update.

1.4.4 Wellhead Protection Program

In 2000, the City of Zillah completed its Wellhead Protection Plan (WHPP). The WHPP was updated as part of this Water System Plan (WSP). This WSP identifies potential sources of contamination near ground water supplies, proposes management strategies to prevent contamination of those supplies, and develops a contingency plan for contamination mitigation in the event that ground water becomes contaminated. The document contains the following elements:

1. Identification of the wellhead protection areas for each well;
2. An inventory of potential ground water contaminant sources;
3. A contingency plan which includes short and long-term alternate water sources, and emergency and spill response procedures; and
4. A local wellhead protection management plan.

1.4.5 General Sewer Plans

In 2012, the City of Zillah completed a General Sewer Plan for the City and its Urban Growth Area. This document includes the following:

1. Description of existing and future sewer service areas (Urban Growth Area);
2. Description of existing conditions, including the condition and location of existing trunk and interceptor sewers, pumping stations, the collection system, current system operation and maintenance, and problem areas;
3. Forecasts future wastewater loadings based upon growth projections;

4. Recommends a wastewater system improvement plan and a financial plan; and
5. Design standards for recommended wastewater collection system improvements.

The General Sewer Plan provides Zillah with one of its Capital Improvement Plans for various infrastructure systems, predicts future sanitary sewer services within City Limits and Urban Growth Boundaries, and is the wastewater counterpart to the Water System Plan.

1.4.6 Watershed Plan

In 1998, the Washington State Legislature passed the Watershed Planning Act (RCW 90.82), providing a framework for developing local solutions to water issues on a watershed basis. Framed around watersheds, this voluntary comprehensive planning process was designed to allow local citizens, governments, and tribes to form watershed management planning units to develop watershed management plans.

The watershed planning process consists of three phases. In Phase 1 (Organization), initiating governments (the counties, largest city, and largest water utility in the watershed) identify and appoint Watershed Planning Unit members who represent water resource interests within the watershed. Phase 1 activities also include the development of operating and decision-making structures and goals, and development of a scope of work for Phase 2.

Phase 2 (Technical Assessment), directed by the watershed planning unit, focuses on developing strategies for improving water quality, protecting or enhancing fish habitat, setting instream flow recommendations, and applies for funding for the collection, management, and distribution of data. Phase 2 is at least a one-year process.

Phase 3 (Plan Development and Approval) requires actual development of the watershed plan. The plan must include water supply strategies to meet minimum flows for fish and to provide for future out-of-stream uses. Phase 3 is at least a one-year process.

The City of Zillah is in the Lower Yakima River Basin Watershed Planning Area (WRIA 37). In 1998, the Yakima River Basin Watershed Planning Unit was formed to develop a comprehensive watershed management plan for the entire Yakima River Basin and the Naches River Basin watersheds. In December 2002, the Watershed Planning Unit completed and approved the *Yakima River Basin Watershed Management Plan* (Phase 3 of the planning process) and forwarded the Plan to the county commissioners of Yakima, Benton, Klickitat, and Kittitas Counties. In late 2005, Yakima, Benton, and Klickitat Counties approved and adopted the Plan, while Kittitas County opted to withdraw from the process. The watershed plan contains no obligations for county or state agencies. There is not an operating lead agency for the purposes of adopted watershed plan implementation needs. Instead, water quantity-related plan implementation needs are being addressed by the Yakima River Basin Water Enhancement Project working group.

In 2009, Ecology and Reclamation formed the Yakima River Basin Water Enhancement Project Working Group (Group) to help develop a solution to the basin's water problems. The Group includes the Yakama Nation, irrigation districts, federal, state, county, and city governments, and environmental organizations and developed the *Yakima River Basin Integrated Water Resource Management Plan* (Plan). Elements of the Plan include construction of fish passages at dams, habitat restoration, watershed protection, development of new surface water retention and groundwater storage, enhanced agricultural and municipal water conservation programs, and more effective water banking processes. In total, approximately $3.8 billion is needed to complete the priority projects identified in the Plan.

The *Final Programmatic Environmental Impact Statement* (FPEIS) was issued in March 2012 for the Plan. The FPEIS evaluates two alternatives to meet the water supply and environmental needs in the Yakima River Basin; "No Action Alternative" and "Yakima River Basin Integrated Water Resource Management Plan Alternative," the latter is the preferred alternative.

In July 2013, the Legislature approved more than $130 million in state funding to advance the *Yakima River Basin Integrated Water Plan*. The funding will purchase 50,000 acres of privately owned timber land in the Teanaway River basin, east of Cle Elum, helping to preserve the area's watershed.

In June 2017, A study titled *Water Security for the Yakima River Basin's Economy, Communities, and Watersheds* was released. In 2018, Ecology and Treasurer's Debt Management Division released cost estimates of implementing the Yakima Basin Integrated Plan (YBIP) in a publication titled *2018 Cost Estimate and Financing Plan Yakima River Basin Integrated Water Resource Management Plan.*

The City of Zillah's *Water System Plan* is consistent with the *Yakima River Basin Integrated Water Plan*.

1.5 EXISTING SERVICE AREA

The existing water system serves a combination of residential, commercial, industrial, and public users. The boundary of the Existing Service Area is as shown on Figure 1-2.

The Existing Service Area is approximately 1,381 acres, most of which is within the City Limits. Figure 1-5 and Map A, in the back pocket of this Plan, show the existing Zillah water system, including the general location of water mains, valves, fire hydrants, wells, and reservoirs.

The Zillah City Limits includes an area of approximately 1,137 acres. Existing zoning within the City is presented in Table 1-4, and is shown in Figure 1-4.

TABLE 1-4 EXISTING ZONING WITHIN ZILLAH CITY LIMITS

Zoning (Grouped Land Use) Category	Total Acreage*	Percent of Total
Residential (R-1, R-2, R-3, SR)	366	32.2%
Commercial (C-1)	109	9.6%
Industrial (M-1)	64	5.6%
Planned Development (CT)	164	14.4%
Community Facilities (PC)	125	11.0%
Environmentally Constrained	129	11.9%
Un-zoned**	180	15.8%
TOTAL	1,137	100.0%

*Source: Yakima County Staff Report Yakima County's 2017 Review of its UGAs and Permitted Densities for City of Zillah August 26, 2016.
**Un-zoned areas include streets, alleys, right-of-way, and other un-zoned areas within the City limits boundary.

As shown in Table 1-4 Residential is the largest land use within the City Limits, comprising approximately 366 acres or 32.2% of the land. Most commercial uses are located on 1st Avenue or adjacent to Yakima Valley Highway and total 109 acres (approximately 9.6% of the land within the City). Industrial development within Zillah comprises approximately 64 acres (5.6% of the land within the City) and is generally located in two central areas: on Cheyne Road between Cutler Way and 1st Avenue, and on 1st Avenue between Meade Drive and Miles Drive.

CITY OF ZILLAH

Water System Plan Update

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Feet

EXISTING ZONING MAP
LEGEND

- Zillah City Limits
- Zillah UGA Boundary
- Zillah Proposed UGA
- Toppenish City Limits
- Toppenish UGA Boundary
- Buena - Yakima County Rural Settlement Boundary

CITY ZONING

- Commercial (C-1)
- Commercial Tourism (CT)
- Light Manufacturing (M-1)
- Public Lands/Church Zone (PC)
- Single Family Residential (R-1)
- Two Family Residential (R-2)
- Multi-Family Residential (R-3)
- Suburban Residential (SR)

YAKIMA COUNTY ZONING

- General Commercial (GC)
- Single Family Residential (R-1)
- Two Family Residential (R-2)
- Remote/Limited Development Potential (RLDP)
- Suburban Residential (SR)
- Light Industrial (M-1)

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FIGURE 1-4

1.6 FUTURE SERVICE AREA

The Future Service Area for the City of Zillah water generally corresponds to the City's Urban Growth Area (UGA), as adopted in the City's *GMA Comprehensive Plan*. Often, future planning distinguishes the area within the City Limits, the area inside the UGA but outside of the City Limits, and the total 20-year anticipated area of growth when the UGA and City Limits areas are combined. The Future Service Area/UGA boundary is shown in Figure 1-2. The area outside of the City Limits, but inside the UGA boundary is approximately 723 acres and the breakdown of the Yakima County zoning designations outside of the City Limits, but inside the UGA boundary, is presented in Table 1-5.

TABLE 1-5 GMA PLANNING AREA OUTSIDE CITY LIMITS AND WITHIN UGA

Zoning Category	Total Acreage*	Percent of Total
Residential (R-1, R-2, SR)	523	72.3%
Commercial (CG)	72	10.0%
Industrial (M-1)	112	15.5%
Environmentally Constrained	0	0%
Un-zoned**	16	2.2%
TOTAL	723	100.0%

*Source: Yakima County Staff Report Yakima County's 2017 Review of its UGAs and Permitted Densities for City of Zillah August 26, 2016 and Yakima County GIS.
**Un-zoned areas include streets, alleys, right-of-way, and other un-zoned areas within the City limits boundary.

When combined to represent the anticipated area to which the City will provide services in twenty years, the customary planning period for the GMA, the area totals approximately 1,860 acres. Table 1-6 combines the information in Table 1-4 and Table 1-5 to show the land use breakdown adopted in Zillah's latest comprehensive plan. Future land uses within the City's Urban Growth Area (UGA) boundary, including those within in the City Limits are shown in Figure 1-5.

TABLE 1-6 ZILLAH FUTURE LAND USE ACREAGE

Land Use Category	Total Acreage*	Percent of Total
Non-Residential	396	41.8%
Residential	1,074	13.7%
Mixed Land Use	229	3.4%
Un-zoned**	161	14.7%
TOTAL	1,860	100.0%

*Source: Yakima County GIS.
**Un-zoned areas include streets, alleys, right-of-way, and other un-zoned areas within the UGA and City limits boundary.

CITY OF ZILLAH

Water System Plan Update

FUTURE LAND USE MAP

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Feet

LEGEND

- Zillah City Limits
- Zillah UGA Boundary
- Toppenish City Limits
- Toppenish UGA Boundary
- Buena - Yakima County Rural Settlement Boundary
- Mixed Land Use
- Non-Residential
- Residential

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03/26/21
Path: P:\arcview\2019\19202\FIG 1-5.mxd

FIGURE 1-5

1.7 SERVICE AREA AGREEMENTS

There are currently no other water purveyors within Zillah's UGA, with the exception of the two parcels in Buena's water service area as discussed in Section 1.2.3. Zillah currently has no water service area agreements with its nearest municipal neighbors, the City of Granger, located six miles to the southeast, or with the City of Toppenish, located three miles to the southwest, or with Yakima County's Buena water system, located three miles to the northwest.

1.8 SERVICE AREA POLICIES

Many policies are established by a utility which affect its growth and development. Some policies deal specifically with drinking water and have a direct impact upon utility development within its future service area. The City of Zillah has identified the following policies which directly or indirectly affect the water system:

1. The City will provide domestic water service to new customers within their Future Service Area (Urban Growth Area) under the following conditions:

    - All costs associated with providing water service, e.g., extending water mains to the site, shall be the responsibility of the proponent/developer. Requirements to be met by proponents/developers when extending the City's water system are identified in "Extension by Developers" which is provided in CHAPTER 10.
    - The City may choose to participate in such improvements through grant, loan, and/or City funding on a case-by-case basis if it is determined that such an investment is in the interests of the community.
    - The City maintains adequate water rights capacity per DOH's required "water rights self-assessment" to serve the proposed property/properties.
    - The City maintains adequate physical source and/or storage capacity to serve the proposed property/properties.
    - The proponent/developer shall transfer all potable water rights associated with the property/properties to the City.
    - The proponent/developer shall "decommission" all groundwater wells on the property in accordance with the applicable Washington Administrative Code (WAC) requirements, unless a well is to become part of the City's water system.
    - The proponent/developer shall allow the City the opportunity to purchase any irrigation water rights/shares associated with the property/properties prior to offering said irrigation rights/shares to any other interested party.

2. The City may choose to require a water main extension to be oversized for future demand. The difference in material and construction costs between the two sizes may be paid for by the City, or it may enter into an agreement requiring those costs to be repaid by the future users.

3. Service will not be provided to proposed structures which have fire flow requirements greater than the capacity of the system. The cost of upgrading the existing water system which is required by a development to meet fire flow requirements shall be the responsibility of the developer including, but not limited to:

    - Upsizing existing water mains.
    - Looping of the distribution system by installing new water mains.
    - Increasing storage and/or pumping capacities.

4. The City will administratively assist property owners who wish to establish a Local Improvement District for the purposes of constructing water system improvements, as long as the facilities do not extend outside the City's established service area.

5. The City has established a process for the administration of reimbursement agreements for developers using private funds to construct a public utility and/or street improvement, as described in Ordinance No. 913. Under this ordinance the developer may apply to the City for a reimbursement agreement in order to recover/share the construction costs with other property owners later benefiting from the improvements.

6. The City will not allow its mains to be used to transmit another water purveyor's water through the City's system to other non-City water users (wheeling of water).

7. The City will not wholesale water to other utilities.

8. The City may provide water service to properties outside the City Limits in accordance with Chapter 13.08.065 of the Zillah Municipal Code and Ordinance 1284. A copy of these documents is provided in CHAPTER 10. The "outside customers" will be assessed water rates which are higher than those charged to customers within the City Limits. (Ordinance No. 1284, provided in CHAPTER 10 establishes rates for services both within and outside the City Limits).

9. The City may choose to manage and operate or provide specific contract services for a satellite water system outside the City Limits, but within the City's service area. In making its decision, the City will take into consideration factors such as:

    - Possibility of extending water service to the area and annexing the property;
    - Construction materials, standards, and specifications of the satellite system;
    - Condition of the various components of the satellite system including, but not limited to, pipes, valves, pumps, reservoirs, and sources of supply;
    - Easements and access of the satellite system;
    - Fire protection capability of the satellite system;
    - Cross-connection control of the satellite system;
    - Specific operation, management, or contract service responsibilities to be provided; and
    - Conditions for assuming management and operation of the satellite system.

    City operation of satellite systems will be made on a case-by-case basis. In those cases where agreements for City operation are reached between the City and the satellite system, contracts for ownership, operation, and maintenance will be developed and included in the Water System Plan.

10. Newly annexed properties will transfer the balance of unused domestic and/or irrigation water rights to the City.

1.9 SATELLITE MANAGEMENT AGENCIES

As discussed previously in Section 1.8, the City of Zillah may, in the future, choose to manage and operate a satellite water system outside the City Limits, but within the City's Urban Growth Area. However, the City has no specific plans at this time to become a satellite management agency. If and when Zillah has specific plans to manage and/or operate a satellite water system, the City will develop a Satellite Management Program.

1.10 CONDITIONS OF SERVICE

Persons requesting water service shall complete a utility connect order form at City Hall. Information regarding such items as water service charges, billing information, developer extension requirements, meter and material specifications, connection fee schedule, cross-connection control requirements, and latecomer payback provisions are presented to customers, builders, and developers when they apply to the City for water service.

1.11 COMPLAINTS

Zillah operates and maintains a written record of water system complaints. This system is administered by the City's Public Works Department. Zillah's complaint response program is discussed in more detail in CHAPTER 6.

1.12 DUTY TO SERVE

The City of Zillah is committed to providing water service to those persons and commercial and industrial establishments in accordance with City Code Chapter 13.04, 13.08, 13.10 13.18, 13.28, 13.30, 13.34 and 13.38. Copies of these City codes are included in CHAPTER 10.

The following is a summary of the City's procedures for addressing requests for water service:

Service Requests – Applications for water service within the City and within the UGA are addressed in accordance with City Code Chapter 13.18. Applicants are required to complete a City of Zillah Utility Connect Order form. A copy of this form is included in CHAPTER 10.

Water Rights Adequacy – Each application for water service is reviewed by the City to determine the amount of water requested, and that the City has sufficient water rights to provide service.

Conditions of a Non-Technical Nature – Conditions for connection to the City's water system are addressed in accordance with City Code Chapter 13.04, 13.08, 13.10, 13.18, 13.28, 13.30, 13.34, and 13.38. Copies of these City code chapters are included in CHAPTER 10.

Procedures for Handling Time Extensions, Disputes, and Appeals – The City currently has no procedures established for addressing denial of water service, as denials have never occurred. Such procedures will be developed as needed.

CHAPTER 2 -

BASIC PLANNING DATA

HLA
Engineering and Land Surveying, Inc.

2.1 POPULATION

According to the U.S. Census Bureau, the 2010 population of the City of Zillah was 2,964, an increase of 34.8%, or 766 people since 2000. The resulting annual growth rate for the period 2000-2010 was approximately 3.04%. This ten-year growth rate was slightly lower than previous decades. Population trends based on Census information for the City of Zillah, Yakima County, and the State of Washington between 1910 and 2010 are presented in Table 2-1.

TABLE 2-1 CENSUS POPULATION TRENDS

Year	City of Zillah		Yakima County		State of Washington	
	Population*	Percent Change	Population	Percent Change	Population	Percent Change
1910	-	-	41,709		1,141,990	
1920	647	-	63,710	52.7%	1,356,621	18.8%
1930	728	12.5%	77,402	21.5%	1,563,396	15.2%
1940	803	10.3%	99,019	27.9%	1,736,191	11.1%
1950	911	13.4%	135,723	37.1%	2,378,963	37.0%
1960	1,059	16.2%	145,112	6.9%	2,853,214	19.9%
1970	1,138	7.4%	145,212	0.1%	3,413,244	19.6%
1980	1,599	40.5%	172,508	18.8%	4,132,353	21.1%
1990	1,911	19.5%	188,823	9.5%	4,866,692	17.8%
2000	2,198	15.0%	222,581	17.9%	5,894,121	21.1%
2010	2,964	34.8%	243,231	9.3%	6,724,540	14.1%

Source: U.S. Census Bureau

Every year, the Washington State Office of Financial Management (OFM) develops population estimates for the state, each county, and all cities. Refer to Table 2-2 for a summary of population estimates between 2011 and 2019. Before initiation of Yakima County's Comprehensive Plan update, County staff begins with the OFM estimate for each jurisdiction in Yakima County and then allocates future population in an iterative negotiation with each city. Population allocation was most recently completed for the City of Zillah in 2017. Based on land use and employment calculations, Yakima County population estimates for Zillah and for Yakima County between 2020 and 2040 are added to Table 2-3. An additional year was extrapolated to align with this WSP. Zillah's growth rate is anticipated to increase as shown in Table 2-3.

TABLE 2-2 OFM POPULATION TRENDS						
Year	City of Zillah		Yakima County		State of Washington	
	Population	Percent Change	Population	Percent Change	Population	Percent Change
2011	3,000	1.2%	244,700	0.6%	6,767,900	0.6%
2012	3,035	1.2%	246,000	1.1%	6,817,770	1.4%
2013	3,115	2.6%	247,250	0.5%	6,882,400	0.9%
2014	3,140	0.8%	248,800	0.6%	6,968,170	1.2%
2015	3,140	0%	249,970	0.5%	7,061,410	1.3%
2016	3,145	0.2%	250,900	0.4%	7,183,700	1.7%
2017	3,150	0.2%	253,000	0.8%	7,310,300	1.8%
2018	3,165	0.5%	254,500	0.6%	7,427,570	1.6%
2019	3,185	0.6%	255,950	0.6%	7,546,410	1.6%
Source: Washington State Office of Financial Management (OFM)						

TABLE 2-3 CITY POPULATION PROJECTIONS					
Year	Future Population	% Increase from Previous Year	Year	Future Population	% Increase from Previous Year
2020	3,523	10.6	2031	4,300	1.77
2021	3,589	1.96	2032	4,376	1.77
2022	3,657	1.96	2033	4,453	1.77
2023	3,725	1.96	2034	4,531	1.77
2024	3,794	1.96	2035	4,610	1.73
2025	3,864	1.83	2036	4,689	1.73
2026	3,935	1.83	2037	4,770	1.73
2027	4,006	1.83	2038	4,851	1.73
2028	4,079	1.83	2039	4,933	1.73
2029	4,152	1.83	2040	5,016	1.67
2030	4,226	1.77	2041[b]	5,100	1.67
Sources: [a] Yakima County's 2017 Review of its UGAs and Permitted Densities for City of Zillah August 26, 2016, Staff Report [b] Extrapolation of Yakima County estimates for one additional year					

2.2 CURRENT AND FUTURE WATER SERVICES

Water is supplied by the City to customers through metered water services, which are divided into several different user categories (customer classes) for tracking and billing purposes. The current number of metered water services by user category is used as a basis for projecting the number of future water services from population estimates provided in Section 2.1. Throughout this Plan the term "service" refers to the current and future number of metered customers the City supplies water to. The term "service connection" or "connection" is defined by DOH as the number of residences and/or multi-family residential units the City provides water service to. Equivalent residential units (ERUs) are defined as the amount of water consumed by a typical full-time single-family residential service. More information on ERUs is provided in Section 2.3.7. The correlation between services, connections, and ERUs is described in more detail in Section 3.5.

2.2.1 Current Water Services

The location of the population of a purveyor whose water system includes multiple distribution pressure zones is critical in assessing demands on the various water system components. The City generally determines the population location by identifying user categories and number of water services within each pressure zone. In addition to determining population locations and related residential water services, it is important to understand the location of all other water service users. Water services are divided into user categories and distributed throughout water system pressure zones as shown in Table 2-4.

TABLE 2-4 YEAR 2021 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE

User Category	Zone 1	Zone 2	Total
Single-Family Residential	1,011	30	1,041
Multi-Family Residential	114	0	114
Commercial	103	0	103
Industrial	8	0	8
Churches	7	1	8
City	9	0	9
Parks	6	0	6
WWTP Utility	1	0	1
TOTAL	1,259	31	1,290

2.2.2 Future Water Services

The number of residential water services within the City Limits is anticipated to increase consistent with the population growth rate projection shown in Table 2-3. However, increases in population per pressure zone will vary depending on the availability of undeveloped land, and potential for new home construction. Based on available land and planned development, residential construction will most likely occur within Zone 1 at the Zillah Lakes area with some infill. Locations of anticipated future residential water services for the years 2031 and 2041 were determined based on these discussions.

The City of Zillah currently provides water service to a limited number of customers outside of the City Limits. In 2012 the City annexed the Nugent and Alteejen areas which previously had contained the largest number of services outside the City Limits. There is not a significant residential population in the UGA, however it is likely the City will continue to serve some residences outside the City Limits. Currently the City serves 14 residential connections outside city limits, and it is assumed this will remain constant.

It is difficult to predict how population increases within the City and the UGA will affect increases in other user categories. The water service totals in remaining user categories were projected to increase at a rate like the population growth rate. The locations of these future services were determined based on the existing zoning and future land uses within the City. Future water services by user category per distribution pressure zone for the years 2031 and 2041 are shown respectively in Table 2-5 and Table 2-6.

TABLE 2-5 YEAR 2031 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE			
User Category	Zone 1	Zone 2	Total
Single-Family Residential	1,211	36	1,247
Multi-Family Residential	137	0	137
Commercial	123	0	123
Industrial	9	0	9
Churches	8	1	9
City	11	0	11
Parks	8	0	8
WWTP Utility	1	0	1
TOTAL	1,508	37	1,545

TABLE 2-6 YEAR 2041 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE			
User Category	Zone 1	Zone 2	Total
Single-Family Residential	1,436	43	1,479
Multi-Family Residential	163	0	163
Commercial	146	0	146
Industrial	11	0	11
Churches	10	1	11
City	13	0	13
Parks	9	0	9
WWTP Utility	1	0	1
TOTAL	1,789	44	1,833

2.3 CURRENT WATER PRODUCTION AND CONSUMPTION

Current and historical metered water production and consumption data records are the preferred method for determining demand trends and establishing a basis for forecasting future demand. All water system sources and services in the City of Zillah are metered. Production meters are typically read daily, and consumption meters are read monthly, except for months where snow prevents meter access, in which case the following month the meter readings are cumulative.

2.3.1 Water Production

Annual water production by source well for the period 2014 through 2019 is presented in Table 2-7. Total production has generally been stable.

TABLE 2-7 ZILLAH ANNUAL WATER PRODUCTION 2014 – 2019
(values are in million gallons)

Source	2014	2015	2016	2017	2018	2019
Rainier Ave Well (S01)	135.045	114.704	136.335	140.518	115.995	80.221
Third Ave Well (S02)	0.072	40.342	3.924	0.000	5.036	1.649
WIPPCO Well (S03)	25.517	10.507	16.471	0.205	16.310	49.666
TOTAL	160.634	165.553	162.784	150.245	146.415	131.536

Monthly water production for each source in 2015 (year of highest annual production in the last six years) is provided in Table 2-8.

TABLE 2-8 ZILLAH MONTHLY WATER PRODUCTION 2015
(values are in million gallons)

Month	Rainier Ave Well (S01)	Third Ave Well (S02)	WIPPCO Well (S03)	All Wells
January	0.036	15.095	0.019	15.150
February	0.079	8.081	0.001	8.161
March	2.326	6.839	0.003	9.168
April	3.764	8.693	0.001	12.458
May	4.720	10.84	0.003	15.563
June	3.989	10.788	10.289	25.066
July	5.545	15.379	0.15	21.074
August	5.548	12.442	0.006	17.996
September	5.052	9.073	0.035	14.160
October	5.722	5.246	0.000	10.968
November	3.123	4.321	0.000	7.444
December	0.438	7.907	0.000	8.345
TOTAL	40.342	114.704	10.507	165.553

2.3.2 Current Water Consumption

Currently, water consumption data is maintained by a computer database at Zillah Public Works Department office. Services are billed based on consumption volume alone, however, user categories are still tracked to evaluate water demands from different user types. User categories and services for each category are presented in Table 2-9.

TABLE 2-9 METERED WATER SERVICES BY USER CATEGORY 2014-2019

User Category	2014	2015	2016	2017	2018	2019	2014-2019 Avg.	2017-2019 Avg.
Single-Family Residential	870	867	876	804	932	924	879	886
Multi-Family Residential	99	97	97	98	103	102	99	101
Commercial	82	80	83	84	87	91	85	87
Industrial	4	4	4	6	7	7	5	7
Churches	8	7	8	8	8	7	8	8
City	11	14	11	10	7	8	10	9
Parks	4	5	4	5	5	6	5	5
WWTP Utility	1	1	1	1	1	1	1	1
TOTAL	1,079	1,075	1,085	1,016	1,149	1,145	1,092	1,104

The annual volume of water consumed (in million gallons per year) by user category for the period 2014 through 2019 is presented in Table 2-10, including six-year and three-year averages. Annual consumption by the WWTP dropped substantially in 2019 due to some significant leaks that were repaired by the City.

TABLE 2-10 ANNUAL WATER CONSUMPTION BY USER CATEGORY 2014-2019
(values are in million gallons per year)

User Category	2014	2015	2016	2017	2018	2019	2014-2019 Avg.	2017-2019 Avg.
Single-Family Residential	53.705	53.876	54.935	55.216	54.033	52.953	54.120	54.068
Multi-Family Residential	8.833	9.339	9.299	8.570	8.688	8.266	8.833	8.508
Commercial	21.962	16.949	21.237	14.896	16.551	21.621	18.869	17.689
Industrial	14.887	16.200	11.818	20.224	16.828	17.956	16.319	18.336
Churches	0.594	0.612	0.585	0.592	0.929	0.473	0.631	0.665
City	21.979	1.908	3.804	5.290	6.817	2.811	7.102	4.973
Parks	9.175	29.029	23.821	17.909	16.044	19.010	19.165	17.655
WWTP Utility	9.483	11.615	13.778	14.638	18.464	2.757	11.789	11.953
TOTAL	140.618	139.528	139.277	137.335	138.354	125.847	136.828	133.847

The average day water consumption per service by user category (in gallons per service per day) for the period 2014 through 2019 including three and six-year averages is presented in Table 2-11.

TABLE 2-11 AVERAGE DAY WATER CONSUMPTION BY USER CATEGORY 2014-2019 (values are in gallons per service per day)								
User Category	2014	2015	2016	2017	2018	2019	2014-2019 Avg.	2017-2019 Avg.
Single-Family Residential	169	170	172	188	159	157	169	167
Multi-Family Residential	245	264	264	239	232	223	244	231
Commercial	731	579	697	485	523	650	611	555
Industrial	10,196	11,096	8,094	8,937	6,586	7,028	8,311	7,461
Churches	203	226	207	203	312	191	225	238
City	5,566	380	933	1,464	2,547	917	1,902	1,595
Parks	5,643	17,674	14,776	10,667	8,941	9,137	11,020	9,536
WWTP Utility	25,980	31,822	37,747	40,105	50,587	7,552	32,299	32,748

2.3.3 Seasonal Water Consumption

Water consumption in the City of Zillah varies throughout the year with the seasons, but not drastically. A separate non-potable irrigation system is available to most properties within the City, so domestic water is generally not used for irrigation. Figure 2-1 shows the seasonal change in residential consumption per service from 2014 through 2019.

Figure 2-2 shows the seasonal change for non-residential consumers for the same period.

FIGURE 2-1
SEASONAL SINGLE-FAMILY RESIDENTIAL CONSUMPTION

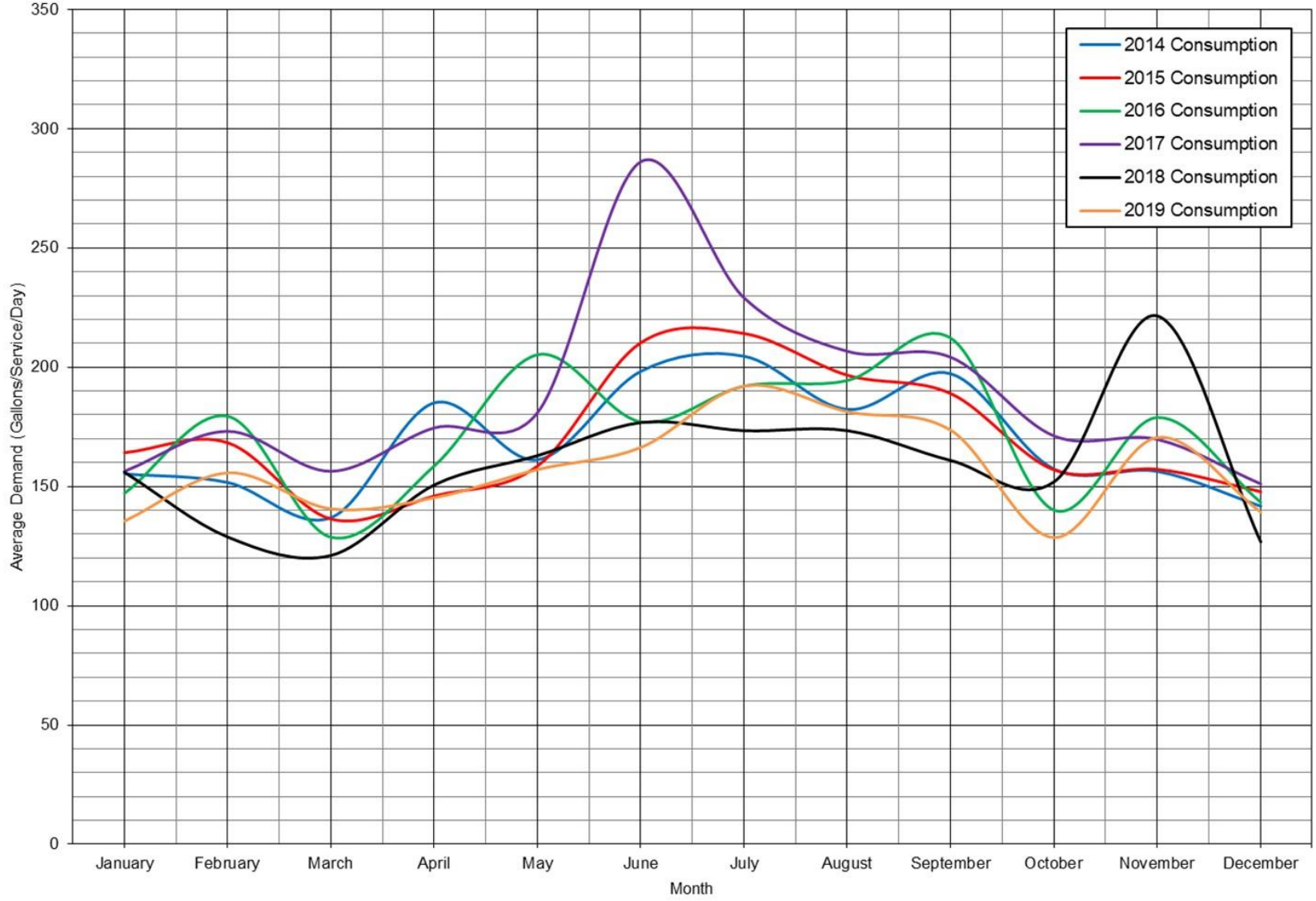
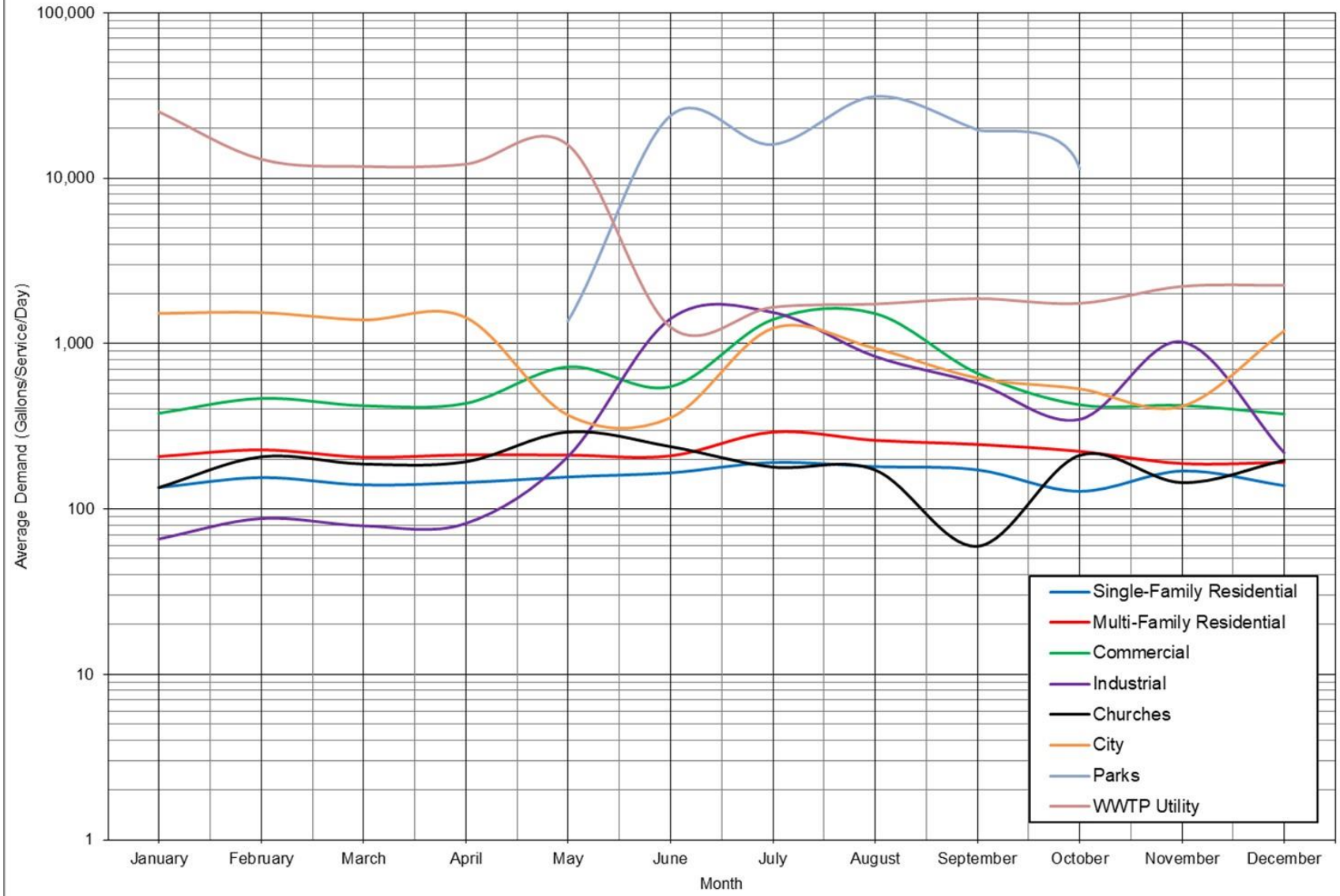


FIGURE 2-2
SEASONAL CONSUMPTION BY USER CATEGORY 2019



2.3.4 Maximum and Peak Consumption

Between the years 2014 and 2019, the largest annual consumption took place in 2018, with a total measured consumption of 152.3 million gallons (MG). The maximum month of water consumption between 2014 and 2019 was experienced in July 2015 when 22.5 MG of water was consumed. This maximum month consumption is approximately 1.63 times greater than the average monthly consumption in 2015. July 2015 provides a realistic representation of maximum and peak consumption for the six-year period, as the maximum month to average month ratio is consistent with most other years. A breakdown of water consumption by user category for July 2015 is shown in Table 2-12.

TABLE 2-12 MAXIMUM MONTH WATER CONSUMPTION, JULY 2015

User Category	No. of Services	Maximum Month Consumption (gallons)	Average Day Consumption (gallons)	Maximum Month Consumption per Service (gallons)	Average Day Consumption per Service (gallons)
Single-Family Residential	869	5,749,490	185,467	6,616	213
Multi-Family Residential	97	1,117,926	36,062	11,525	372
Commercial	80	2,278,349	73,495	28,479	919
Industrial	4	4,205,758	135,670	1,051,439	33,917
Churches	7	33,872	1,093	4,839	156
City	20	202,797	6,542	10,140	327
Parks	8	8,051,306	259,720	1,006,413	32,465
WWTP Utility	1	874,772	28,218	874,772	28,218
TOTAL	1,086	22,514,271	726,267		

The maximum day of recorded water production in July 2015 occurred on July 1, 2015, when 950,000 gallons was pumped into the water system. Utilizing the percentage breakdown of demand per user category from the July 2015 consumption data, maximum day demand (MDD) was calculated as shown in Table 2-13.

Peak hour demand (PHD), also shown in Table 2-13, was calculated by the following equation:

$$PHD = (ERU_{MDD}/1440)\,[(C)(N) + F] + 18$$ *(2019 Water System Design Manual*, Equation 3-1)

Where:
PHD = Peak Hourly Demand, (gpm).
C = Coefficient associated with ranges of ERUs, 1.6 *(2019 Water System Design Manual Table 3-1)*
N = Number of ERUs based on the ERU_{MDD} value (GPD).
F = Factor associated with ranges of ERUs, 225 *(2019 Water System Design Manual Table 3-1).*
ERU_{MDD} = MDD per ERU (GPD).

The calculated PHD is 1.7 times the MDD.

TABLE 2-13 MAXIMUM DAY AND PEAK HOUR DEMAND, JULY 1, 2015					
User Category	No. of Services	Maximum Day Demand (gallons)	Maximum Day Demand per Service (gallons)	Peak Hour Demand (gpm)	Peak Hour Demand per Service (gpm)
Single-Family Residential	869	204,465	235.29	241.38	0.28
Multi-Family Residential	97	39,756	409.86	46.93	0.48
Commercial	80	81,023	1,012.79	95.65	1.20
Industrial	4	149,567	37,391.64	176.57	44.14
Churches	7	1,205	172.08	1.42	0.20
City	20	7,212	360.60	8.51	0.43
Parks	8	286,323	35,790.40	338.02	42.25
WWTP Utility	1	31,109	31,108.93	36.73	36.73
TOTAL	1,086	800,660		945.21	
* 950,000 gallons production less 15.72% DSL (2015 average DSL) to arrive at a maximum day consumption of 800,660 gallons.					

2.3.5 Distribution System Leakage (DSL)

Table 2-14 shows annual water production, annual metered water consumption, and the difference between production and total consumption (DSL), including the DSL percentage. Water production from Zillah's source wells for the period 2014 through 2019 totaled 917 million gallons. Metered consumption during that same time totaled almost 821 million gallons. The difference between production and metered consumption for that period was nearly about 96 million gallons, or 10.49% of total water production for the period. The average DSL for the past three years (2017-2019) has dropped to about 6.23% and will be used as the DSL for this Plan.

TABLE 2-14 WATER PRODUCTION AND CONSUMPTION 2014-2019				
Year	Production	Consumption	DSL	% DSL
2014	160,634,000	140,616,085	20,017,915	12.46%
2015	165,553,000	139,529,876	26,023,124	15.72%
2016	162,784,400	139,276,254	23,508,146	14.44%
2017	150,245,000	137,336,656	12,908,344	8.59%
2018	146,415,000	138,354,824	8,060,176	5.51%
2019	131,536,000	125,847,563	5,688,437	4.32%
TOTAL	917,167,400	820,961,258	96,206,142	10.49%
3-Year Average	142,732,000	133,846,348	8,885,652	6.23%

The City will continue to track the difference between production and total authorized consumption and will work towards further reducing the volume of DSL through the implementation of supply-related water use efficiency measures. Water use efficiency measures are discussed in further detail in CHAPTER 4.

2.3.6 Water Supply Characteristics and Trends

The single most important aspect of a water utility is its domestic water supply source. The City of Zillah's water supply is dependent on ground water sources. As previously discussed in this Plan, the City utilizes three source wells. The locations of these wells within the water system are shown on Map A enclosed in the back of this Plan. Currently, the only well with a protective covenant to establish a 100-foot sanitary radius is the WIPPCO Well, as discussed in CHAPTER 5.

As discussed in CHAPTER 3, there has been no significant change in source well water quality from any of Zillah's wells as demonstrated by inorganic chemical and volatile organic chemical monitoring over time. Zillah has taken steps to protect its aquifers through implementation of a Wellhead Protection Program. Completed in 2000, the program is intended to protect Zillah's aquifers through a combination of regulatory measures, best management practices, and public education and awareness. Details of Zillah's Wellhead Protection Program are provided in CHAPTER 10.

The existing City wells all withdraw water from the Columbia River Basalt Group. This geologic formation consists of four distinct hydrogeologic units. Starting with the oldest, these four units are known as the Grande Ronde, Wanapum, and Saddle Mountain Units (made up primarily of basalts of the same name, but also include sedimentary interbeds), and the Overburden Unit.

The Grande Ronde, Wanapum, and Saddle Mountain Units vary in thickness in South-Central Washington. Each unit is composed of numerous to several hundred individual basalt flows, which can range in thickness from a few inches to more than 300 feet, with sedimentary interbeds. Distinct, thick sedimentary interbeds separate the Grande Ronde, Wanapum, and Saddle Mountain Units.

The Rainier Ave Well is drilled to a depth of 280 feet; the Third Ave Well is drilled to a depth of 950 feet; and the WIPPCO Well is drilled to a depth of approximately 260 feet. From the well log of the Rainier Ave Well, it appears this well draws water from the Ellensburg Formation of the Overburden Unit, which contains beds of undivided Miocene sedimentary rock. Although no well log is available for the WIPPCO Well, it probably also draws water from the Ellensburg Formation, because of its similar depth to the Rainier Ave Well. It has been determined, through a geologic assessment by Ecology, that the Third Ave Well also draws water from Ellensburg Formation aquifer. A copy of Ecology's memorandum, clarifying the aquifer designations for the City's groundwater wells, is provided in CHAPTER 10.

Locally, other municipalities and individuals utilize water primarily from the Ellensburg Formation of the Overburden Unit, and the other units, for domestic and irrigation supply. Consequently, many Yakima area communities have experienced diminishing capacities and/or lowering drawdown levels in their source wells over years. Trends in groundwater levels are one of several factors important in determining source reliability. The United States Geological Survey (USGS) completed reports determining and analyzing such trends. The *Groundwater Status and Trends for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho* (Scientific Investigations Report 2012-5261), published in 2012 by USGS, concluded that groundwater levels in the aquifer have risen since the 1950s in areas heavily irrigated with surface water and have declined since the 1970s in areas irrigated with groundwater. For wells examined in the Report, typical rises in water level under surface-water irrigation areas were 50 feet. Declines of 200 feet or greater were common in areas where pumping groundwater is the dominant source of irrigation water. The USGS Report concluded that 72% of the wells within the aquifer experienced declines over the study period, 1968-2009. Furthermore, the trends for all wells within the aquifer declined at a mean rate of 1.9 ft/year.

Municipal source wells within Zillah were not directly involved with the USGS studies and reports. Because of this and the absence of historical well level measurements, an accurate determination of diminished capacities and lower drawdown cannot be concluded for the City's source wells. Though the City has not noticed a decline in well capacity because of declining groundwater levels, the importance of establishing a record of water levels to anticipate any potential future source deficiencies before they occur is recognized. The City began tracking static and drawdown water levels in 2019 following improvements to their source wells. Provided in Table 2-15 is a summary of monthly static and dynamic water levels from January 2019 through January 2021. Water level conditions will continue to be tracked by the City. At a minimum, groundwater levels will be monitoring on a seasonal basis, including low demand and high demand periods, in accordance with WAC 246-290-415(10).

TABLE 2-15 ZILLAH GROUNDWATER LEVEL CONDITIONS 2019 – 2021

Month-Year	Source					
	Rainer Ave (S01) (ft. BGS)		Third Ave (S02) (ft. BGS)		WIPPCO (S03) (ft. BGS)	
	Static	Dynamic	Static	Dynamic	Static	Dynamic
Jan-2019	–	–	55	59	58	76
Feb-2019	–	–	54	64	58	76
Mar-2019	–	–	54	–	59	77
April-2019	102	156	54	65	58	76
May-2019	104	156	55	67	59	77
June-2019	106	157	58	69	61	79
July-2019	106	157	58	70	61	79
Aug-2019	105	157	58	70	61	80
Sept-2019	105	156	57	67	59	77
Oct-2019	103	154	56	66	58	75
Nov-2019	102	151	56	–	58	76
Dec-2019	102	150	56	68	58	76
Jan-2020	102	149	56	–	57	–
Feb-2020	102	148	56	–	57	75
Mar-2020	103	149	57	67	58	76
April-2020	104	149	57	67	59	78
May-2020	104	148	57	68	59	78
June-2020	106	150	59	70	60	79
July-2020	106	152	59	70	61	81
Aug-2020	106	151	60	71	60	80
Sept-2020	105	151	61	72	59	74
Oct-2020	103	151	59	70	58	77
Nov-2020	102	151	59	69	57	76
Dec-2020	131	132	61	72	58	76
Jan-2021	102	148	58	70	58	77

2.3.7 Equivalent Residential Units (ERU)

An ERU is defined as the amount of water consumed by a typical full-time single-family residence. The actual quantity of water represented by an ERU is related to the type of demand (average day or maximum day) being considered. As discussed previously, maximum day and peak hour demands were calculated from the maximum day of production in the highest maximum month of consumption for the period between 2014 and 2019. As a result, the peaking factor from an average day demand (ADD) to a maximum day demand (MDD) is not the same for all service categories. Therefore, ERU values for ADD and MDD have been calculated as shown in Table 2-16. This ERU information is useful for forecasting and analyzing future water system demand.

Residential ADD per service values from the 2014 to 2019 period vary from a high of 188 gallons per service per day in 2017 to a low of 157 gallons per service per day in 2019 as shown in Table 2-11. Similar variation in consumption per service occurs in the other user categories. The City has generally seen consistent demands over the past three years, providing a suitable representation of existing conditions. The average ADD from each user category for the period 2014 through 2019 from Table 2-11 was used in producing Table 2-16, except for the WWTP Utility Demand user category. Significant leaks were repaired at the WWTP in 2019, so the average 2019 demand will be used for the calculation of ADD ERUs for the WWTP.

The maximum day demand per service and peak hour demand per service provided in Table 2-16 are based upon the calculated demand for July 1, 2015, which was the maximum day of production for the highest maximum month of consumption in the last six years.

TABLE 2-16 EQUIVALENT RESIDENTIAL UNIT FACTORS (ERUS)

User Category	ADD (2014-2019)		MDD (JULY 2015)	
	GPD/ Service[a]	ERUs	GPD/ Service[b]	ERUs
Single-Family Residential	169	1.0	235	1.0
Multi-Family Residential	244	1.4	410	1.7
Commercial	611	3.6	1,013	4.3
Industrial	8,331	49.4	37,392	158.9
Churches	225	1.3	172	0.7
City	1,902	11.3	361	1.5
Parks	11,020	65.3	35,790	152.1
WWTP Utility	7,552	44.8	31,109	132.2

[a] ADD values based upon 2014 through 2019 average (except for WWTP Utility).
[b] Maximum Day Demand is based upon calculated demand for July 1, 2015 as provided in Table 2-11.

2.4 FORECAST OF FUTURE WATER DEMAND

Water use is contingent upon several varying and uncertain factors, which makes forecasting future demand difficult. Of primary importance are the following factors:

1. Population;
2. Type of residential development (i.e., single-family, multi-family, rural, large or small lot);
3. Per capita income;
4. Types of commercial and industrial enterprises;
5. Climate;
6. Irrigation use of water; and
7. Price charged for water and type of rate structure (i.e. the base water quantity and cost for individual service meters).

Forecasting future system demands is based on the projected number of single-family residential, multi-family residential, commercial, industrial, churches, City, parks, and WWTP Utility, and the annual average day, maximum day, and peak hour water demand.

As discussed previously in Section 2.1, the population projections for the City of Zillah are based on Yakima County population projections. Projected population increases as shown in Table 2-3. Future water services are based upon the projected City population growth. However, based upon impacts to Zillah's reservoir storage capacity, the City will only provide water service to new customers outside of their existing service area under specific conditions (previously specified within this Plan).

Zillah is positioned within relatively short driving distance from several communities and rural residences, so increases in population do not always correlate to increases in commercial businesses. Therefore, it is difficult to predict how population increases within the City and the UGA will affect increases in other user categories. However, the water service totals in remaining user categories were projected to increase at a rate similar to the population growth rate, and as determined by the City Planner and City Administration.

Other factors such as income, climate and water cost will be assumed to remain consistent with current trends. Climate does have a major influence on Zillah's water consumption during summer months due to use of domestic water supply for irrigation purposes. However, the area's climate has generally remained consistent with historical averages.

2.4.1 Future ERUs and ADD

The number of water system services, ERUs, and ADD, are calculated from the current water services by user category as shown in Table 2-17, Table 2-18, and Table 2-19 the average 2014 through 2019 demand per service for each user category, provided in Table

The calculated future number of services, ERUs, and projected ADD for years 2021, 2031, and 2041 are presented in Table 2-17, Table 2-18, and Table 2-19 respectively.

TABLE 2-17 YEAR 2021 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	1,041	1.0	169	1,041.0	175,929
Multi-Family Residential	114	1.4	244	159.6	27,816
Commercial	103	3.6	611	370.8	62,933
Industrial	8	49.4	8,331	395.2	66,648
Churches	8	1.3	225	10.4	1,800
City	9	11.3	1,902	101.7	17,118
Parks	6	65.3	11,020	391.8	66,120
WWTP Utility	1	44.8	7,552	44.8	7,552
Subtotal	1,290			2,515.3	425,916
10% Contingency				251.5	42,592
TOTAL	1,290			2,766.8	468,508

TABLE 2-18 YEAR 2031 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	1,247	1.0	169	1,247.0	210,743
Multi-Family Residential	137	1.4	244	191.8	33,428
Commercial	123	3.6	611	442.8	75,153
Industrial	9	49.4	8,331	444.6	74,979
Churches	9	1.3	225	11.7	2,025
City	11	11.3	1,902	124.3	20,922
Parks	8	65.3	11,020	522.4	88,160
WWTP Utility	1	44.8	7,552	44.8	7,552
Subtotal	1,545			3,029.4	512,962
10% Contingency				302.9	51,296
TOTAL	1,545			3,332.3	564,258

TABLE 2-19 YEAR 2041 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	1,479	1.0	169	1,479.0	249,951
Multi-Family Residential	163	1.4	244	228.2	39,772
Commercial	146	3.6	611	525.6	89,206
Industrial	11	49.4	8,331	543.4	91,641
Churches	11	1.3	225	14.3	2,475
City	13	11.3	1,902	146.9	24,726
Parks	9	65.3	11,020	587.7	99,180
WWTP Utility	1	44.8	7,552	44.8	7,552
Subtotal	1,833			3,569.9	604,503
10% Contingency				357.0	60,450
TOTAL	1,833			3,926.9	664,953

2.4.2 Future MDD and PHD

Future Maximum Day Demand (MDD) and Peak Hour Demand (PHD) for the water system were calculated for the years 2021, 2031, and 2041 using the projected number of services for each user category and the MDD per service for July 1, 2015, as discussed in Section 2.3.4. Calculated future MDD and PHD values for 2021, 2031, and 2041 are presented in Table 2-20, Table 2-21, and Table 2-22 respectively.

TABLE 2-20 YEAR 2021 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	PHD/ Service (gpm)	Total PHD (gpm)
Single-Family Residential	1,041	1.0	1,041.0	235	244,635	0.3	312.3
Multi-Family Residential	114	1.7	193.8	410	46,740	0.5	57.0
Commercial	103	4.3	442.9	1,013	104,339	1.2	123.6
Industrial	8	158.9	1,271.2	37,392	299,136	44.1	352.8
Churches	8	0.7	5.6	172	1,376	0.2	1.6
City	9	1.5	13.5	361	3,249	0.4	3.6
Parks	6	152.1	912.6	35,790	214,740	42.3	253.8
WWTP Utility	1	132.2	132.2	31,109	31,109	36.7	36.7
Subtotal	1,290		4,012.8		945,324		1,141.4
10% Contingency			401.3		94,532		114.1
TOTAL	1,290		4,414.1		1,039,856		1,255.5

TABLE 2-21 YEAR 2031 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	PHD/ Service (gpm)	Total PHD (gpm)
Single-Family Residential	1,247	1.0	1,247.0	235	293,045	0.3	374.1
Multi-Family Residential	137	1.7	232.9	410	56,170	0.5	68.5
Commercial	123	4.3	528.9	1,013	124,599	1.2	147.6
Industrial	9	158.9	1,430.1	37,392	336,528	44.1	396.9
Churches	9	0.7	6.3	172	1,548	0.2	1.8
City	11	1.5	16.5	361	3,971	0.4	4.4
Parks	8	152.1	1,216.8	35,790	286,320	42.3	338.4
WWTP Utility	1	132.2	132.2	31,109	31,109	36.7	36.7
Subtotal	1,545		4,810.7		1,133,290		1,368.4
10% Contingency			481.1		113,329		136.8
TOTAL	1,545		5,291.8		1,246,619		1,505.2

TABLE 2-22 YEAR 2041 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	PHD/ Service (gpm)	Total PHD (gpm)
Single-Family Residential	1,479	1.0	1,479.0	235	347,565	0.3	443.7
Multi-Family Residential	163	1.7	277.1	410	66,830	0.5	81.5
Commercial	146	4.3	627.8	1,013	147,898	1.2	175.2
Industrial	11	158.9	1,747.9	37,392	411,312	44.1	485.1
Churches	11	0.7	7.7	172	1,892	0.2	2.2
City	13	1.5	19.5	361	4,693	0.4	5.2
Parks	9	152.1	1,368.9	35,790	322,110	42.3	380.7
WWTP Utility	1	132.2	132.2	31,109	31,109	36.7	36.7
Subtotal	1,833		5,660.1		1,333,409		1,610.3
10% Contingency			566.0		133,341		161.0
TOTAL	1,833		6,226.1		1,466,750		1,771.3

CHAPTER 3 -

SYSTEM INVENTORY AND ANALYSIS

HLA
Engineering and Land Surveying, Inc.

3.1 SYSTEM DESIGN STANDARDS

Standardized performance and design criteria are essential for the efficient evaluation, construction, and operation of a water utility. Establishing minimum criteria assures a base level of system reliability and enhances the utility's ability to assess system deficiencies and to plan for future improvements. Provided in Table 3-1 is a listing of performance and design criteria established by the City of Zillah for their water system.

TABLE 3-1 SYSTEM DESIGN STANDARDS

Parameter	Design Standard	Regulatory Reference
Water Quality	Provide water quality consistent with applicable state (DOH) and federal (EPA) requirements	Chapter 246-290 WAC, Part 3
Average Daily Demand (ADD)	Equivalent to the daily consumption per service in a user category averaged for the period 2014-2019, except as otherwise adjusted to account for recent changes in demand trends as discussed in CHAPTER 2. ADD/ERU = 169 gallons/day	WAC 246-290-221
Maximum Daily Demand (MDD)	Equivalent to the maximum day of consumption per service in a user category, as calculated using the volume of water from the maximum day of production as described in CHAPTER 2. MDD/ERU = 235 gallons/day	WAC 246-290-221
Peak Hourly Demand (PHD)	Equivalent to the peak hour consumption per service in a user category, as calculated using a factor of 1.7 times the MDD, as described in CHAPTER 2. PHD/ERU = 0.28 gpm.	WAC 246-290-221
Storage Requirements	Based on providing minimum operational (OS), equalizing (ES), standby (SB), and fire suppression (FSS) storage for the entire water system as calculated using the *DOH Water System Design Manual* equations. Minimum storage volumes are as calculated in Section 3.4.4.	WAC 246-290-235
Fire Suppression Storage (FSS) and Fire Flow	The minimum water demand and duration required for fire flow and/or fire suppression storage shall be determined by the local fire control authority. Minimum FSS is 0.24 MG, which is based on providing 2,000 gpm for 2 hours.	WAC 246-290-221(5)
Flow Rates and Velocities	Pipelines shall be sized for a maximum allowable water flow velocity of 8 ft/s under PHD conditions. Maximum pipe velocities may exceed 8 ft/s under fire flow conditions. The basis for pipe size design shall be per computer model analysis.	2019 DOH Water System Design Manual
System Pressures	Minimum service pressure under PHD conditions with ES storage depleted shall be 30 psi, measured at the service meter. Under MDD plus required fire flow conditions, the minimum distribution system pressure shall be 20 psi. Additional information regarding system pressure requirements under specific hydraulic analysis scenarios is presented in Section 3.4.6.	WAC 246-290-230(5) and WAC 246-290-230(6)
Minimum Pipe Sizes	The minimum pipe size allowed within the system shall be 8-inch diameter. Where fire flow requirements exceed 1,000 gpm, the minimum pipeline size shall be determined by hydraulic analysis.	City of Zillah Design and Construction Standards

Additional design standards and requirements for water main construction in the City of Zillah are included in the City's Design and Construction Standards provided in CHAPTER 10.

3.2 WATER QUALITY

A public water utility must supply safe and aesthetically pleasing water to its customers. However, source waters of most water utilities vary in the types and amounts of impurities which have been acquired during their passage through atmosphere, ground surfaces, or underground strata. To assure that all drinking waters maintain a standard level of quality, acceptable limits of contaminants have been established in Part 4 of WAC Chapter 246-290, *Group A Public Water Supplies*, latest edition.

These standards of acceptability establish "maximum contaminant levels" (MCLs) and "Maximum Residual Disinfectant Levels" (MRDLs) for bacteriological, inorganic chemical and physical, and other elements. The Regulations also set forth procedures to be followed if the MCL limits are exceeded.

The City of Zillah monitors its system's water quality in accordance with the requirements of WAC 246-290-300, and 246-290-310. Follow-up action, if required, is completed in accordance with the requirements of WAC 246-290-320 and the Groundwater Rule (GWR). Bacteriological monitoring is performed at three (3) locations within the water system in accordance with the City's *Coliform Monitoring Plan*. Included in the City's *Coliform Monitoring Plan* is a follow-up procedure when a sample is coliform positive, meeting the Triggered Source Water Monitoring requirements. Lead and copper distribution system monitoring is completed in accordance with the City's lead and copper monitoring program. Inorganic chemical (IOC), volatile organic chemical (VOC), synthetic organic chemical (SOC), and radionuclide testing are performed on the City's source wells.

3.2.1 Water Source Sampling and Testing

Inorganic Chemical (IOC) Monitoring: Water quality monitoring for primary IOCs, secondary IOCs and physical parameters is required from each source generally once every compliance cycle. Compliance cycles are nine years, per 40 CFR 141.23. Zillah collects water samples for IOCs and physical parameters at each well, after treatment and prior to entry into the distribution system.

Certain chemical characteristics must be monitored more frequently than the general monitoring requirements, such as nitrates which must be monitored annually. Other chemical characteristics monitoring requirements may be waived by DOH. For example, asbestos monitoring requirements have been waived for the City of Zillah through December 2028.

Results of Zillah's latest source well IOC and physical analysis test results are summarized in Table 3-2, and Table 3-3. These results show the City remains in compliance with State standards, except for the recommended level for sodium in all its wells and the secondary contaminant level for manganese in the Third Ave Well (S02). Exceedances are highlighted in Table 3-2 and Table 3-3. The City has a history of elevated manganese levels in the Third Ave Well, so more frequent monitoring is conducted. Historical IOC testing results for each source well is provided in Table 3-4, Table 3-5, and Table 3-6. These results indicate that water quality in each of the wells has not significantly changed over time.

TABLE 3-2 INORGANIC (PRIMARY SUBSTANCES) CHEMICAL ANALYSIS SUMMARY				
Chemical Characteristics	MCL (mg/l)	Rainier Ave Well (S01) 09/13/2016	Third Ave Well (S02) 09/18/2018	WIPPCO Well (S03) 09/13/2016
Antimony (Sb)	0.006	0.0001	0.0001	0.0001
Arsenic (As)	0.010	0.0017	0.0001	0.0025
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1181	0.0533	0.0841
Beryllium (Be)	0.004	0.0001	0.0001	0.0001
Cadmium (Cd)	0.005	0.0001	0.0001	0.0001
Chromium (Cr)	0.1	0.0041	0.0103	0.0052
Copper (Cu)*	1.3	0.0006	0.0004	0.0017
Cyanide (HCN)	0.2	0.0100	0.0100	0.0100
Fluoride (F)	4.0	0.1000	0.3600	0.3000
Lead (Pb)*	0.015	0.0001	0.0002	0.0003
Mercury (Hg)	0.0020	0.0002	0.0002	0.0002
Nickel (Ni)	0.10	0.0001	0.0082	0.0001
Nitrate (as N)	10.0	6.16	0.0500	4.8400
Nitrite (as N)	1.0	0.0500	0.0500	0.0500
Selenium (Se)	0.05	0.0018	0.0005	0.0014
Sodium (Na)*	20	31.2000	24.0000	57.4000
Thallium (Tl)	0.002	0.0002	0.0001	0.0001
* No DOH established MCL. Represents EPA established “action levels” for lead and copper, and recommended level for sodium.				

TABLE 3-3 INORGANIC (SECONDARY SUBSTANCES) CHEMICAL ANALYSIS SUMMARY				
Chemical Characteristics	MCL (mg/l)	Rainier Ave Well (S01) 09/13/2016	Third Ave Well (S02) 09/18/2018	WIPPCO Well (S03) 09/13/2016
Chloride (Cl)	250.0	19.0	4.5	10.8
Fluoride (F)	2.0	0.1000	0.3600	0.3000
Iron (Fe)	0.3	0.0097	0.0466	0.0097
Manganese (Mn)	0.05	0.0001	0.0850	0.0003
Silver (Ag)	0.1	0.0001	0.0001	0.0001
Sulfate (SO_4)	250.0	72.5	13.9	45.8
Zinc (Zn)	5.0	0.0071	0.0044	0.0119
Color	15 Color Units	4.0	4.0	4.0
Specific Conductivity	700 umhos/cm	675	220	671
Total Dissolved Solids (TDS)	500	440	176	402

Table 3-4, Table 3-5, and Table 3-6 present both the latest, and previously conducted IOC analysis test results for each source well.

TABLE 3-4 INORGANIC CHEMICAL ANALYSIS RESULTS FOR RAINIER AVE WELL (S01)					
Chemical or Physical Characteristics	MCL (mg/l)	06/11/1999	02/03/2000	09/20/2007	09/13/2016
Primary Substances					
Antimony (Sb)	0.006	0.0050	0.0050	0.0050	0.0001
Arsenic (As)	0.010	0.0100	0.0100	0.0020	0.0017
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1000	0.1500	0.1250	0.1181
Beryllium (Be)	0.004	0.0030	0.0030	0.0002	0.0001
Cadmium (Cd)	0.005	0.0020	0.0020	0.0003	0.0001
Chromium (Cr)	0.1	0.0100	0.0100	0.0047	0.0041
Copper (Cu)*	1.3	0.2000	0.2000	0.0021	0.0006
Cyanide (HCN)	0.2	0.0500	0.0500	0.0100	0.0100
Fluoride (F)	4.0	0.50	0.20	0.26	0.10
Lead (Pb)*	0.015	0.0020	0.0020	0.0005	0.0001
Mercury (Hg)	0.0020	0.0005	0.0005	0.0003	0.0002
Nickel (Ni)	0.1000	0.0400	0.0400	0.0100	0.0001
Nitrate (as N)	10.0	6.5	6.90	2.46	6.16
Nitrite (as N)	1.0	0.5000	0.5000	0.0500	0.0500
Selenium (Se)	0.05	0.0050	0.0050	0.0050	0.0018
Sodium (Na)*	20	28.0	29.0	30.4	31.2
Thallium (Tl)	0.002	0.0020	0.0020	0.0010	0.0002
Secondary Substances					
Chloride (Cl)	250.0	21.0	24.0	11.8	19.0
Fluoride (F)	2.0	0.50	0.20	0.26	0.10
Iron (Fe)	0.3	0.1000	0.1000	0.0097	0.0097
Manganese (Mn)	0.05	0.0100	0.0100	0.0020	0.0001
Silver (Ag)	0.1	0.0100	0.0100	0.0047	0.0001
Sulfate (SO_4)	250.0	82.0	84.0	55.9	72.5
Zinc (Zn)	5.0	0.2000	0.2000	0.0200	0.0071
Color	15 Color Units	5.0	5.0	4.0	4.0
Specific Conductivity	700 umhos/cm	710	690	566	675
Total Dissolved Solids (TDS)	500	480	----	372	440
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.					

TABLE 3-5 INORGANIC CHEMICAL ANALYSIS RESULTS FOR THIRD AVE WELL (S02)					
Chemical or Physical Characteristics	MCL (mg/l)	06/11/1999	02/03/2000	09/20/2007	9/18/2018
Primary Substances					
Antimony (Sb)	0.006	0.0050	0.0050	0.0050	0.0001
Arsenic (As)	0.010	0.0100	0.0100	0.0020	0.0001
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1000	0.1000	0.055	0.0533
Beryllium (Be)	0.004	0.0030	0.0030	0.0002	0.0001
Cadmium (Cd)	0.005	0.0020	0.0020	0.0003	0.0001
Chromium (Cr)	0.1	0.0100	0.0100	0.0047	0.0103
Copper (Cu)*	1.3	0.2000	0.2000	0.0027	0.0004
Cyanide (HCN)	0.2	0.050	0.050	0.010	0.010
Fluoride (F)	4.0	0.40	0.30	0.49	0.36
Lead (Pb)*	0.015	0.0030	0.0020	0.0006	0.0002
Mercury (Hg)	0.0020	0.0005	0.0005	0.0003	0.0002
Nickel (Ni)	0.10	0.04	0.04	0.01	0.0082
Nitrate (as N)	10.0	0.50	0.50	0.0500	0.0500
Nitrite (as N)	1.0	0.50	0.50	0.050	0.050
Selenium (Se)	0.05	0.0050	0.0050	0.0050	0.0005
Sodium (Na)*	20	22.0	23.0	24.2	24.0
Thallium (Tl)	0.002	0.0020	0.0020	0.0010	0.0001
Secondary Substances					
Chloride (Cl)	250.0	20.0	20.0	3.86	4.55
Fluoride (F)	2.0	0.4	0.3	0.49	0.36
Iron (Fe)	0.3	0.3	0.2	0.0670	0.0466
Manganese (Mn)	0.05	0.08	0.0870	0.0825	0.085
Silver (Ag)	0.1	0.01	0.01	0.0047	0.0001
Sulfate (SO_4)	250.0	10.0	10.0	9.43	13.9
Zinc (Zn)	5.0	0.2	0.2	0.063	0.0044
Color	15 Color Units	5.0	5.0	4.0	4.0
Specific Conductivity	700 umhos/cm	230	230	225	220
Total Dissolved Solids (TDS)	500	---	---	162	176
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.					

TABLE 3-6 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WIPPCO WELL (S03)					
Chemical or Physical Characteristics	MCL (mg/l)	06/11/1999	02/03/2000	09/20/2007	09/13/2016
Primary Substances					
Antimony (Sb)	0.006	0.0050	0.0050	0.0050	0.0001
Arsenic (As)	0.010	0.01	0.01	0.002	0.0025
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.13	0.13	0.12	0.0841
Beryllium (Be)	0.004	0.0030	0.0030	0.0002	0.0001
Cadmium (Cd)	0.005	0.002	0.002	0.0003	0.0001
Chromium (Cr)	0.1	0.0100	0.0100	0.0047	0.0052
Copper (Cu)*	1.3	0.20	0.20	0.0020	0.0017
Cyanide (HCN)	0.2	0.0500	0.0500	0.0100	0.0100
Fluoride (F)	4.0	0.5	0.2	0.26	0.3000
Lead (Pb)*	0.015	0.0020	0.0020	0.0005	0.0003
Mercury (Hg)	0.0020	0.0005	0.0005	0.0003	0.0002
Nickel (Ni)	0.10	0.0400	0.0400	0.0100	0.0001
Nitrate (as N)	10.0	3.10	3.20	2.48	4.84
Nitrite (as N)	1.0	0.5	0.5	0.05	0.05
Selenium (Se)	0.05	0.0050	0.0050	0.005	0.0014
Sodium (Na)*	20	27	28	28	57.4
Thallium (Tl)	0.002	0.0020	0.0020	0.0010	0.0001
Secondary Substances					
Chloride (Cl)	250.0	20.0	20.0	11.9	10.8000
Fluoride (F)	2.0	0.5	0.2	0.26	0.3
Iron (Fe)	0.3	0.70	0.19	0.0175	0.0097
Manganese (Mn)	0.05	0.02	0.0100	0.0020	0.0003
Silver (Ag)	0.1	0.0100	0.0100	0.0047	0.0001
Sulfate (SO_4)	250.0	66.0	69.0	55.6	45.8000
Zinc (Zn)	5.0	0.20	0.20	0.02	0.0119
Color	15 Color Units	5.0	5.0	4.0	4.0
Specific Conductivity	700 umhos/cm	610	600	565	671
Total Dissolved Solids (TDS)	500	---	---	370	402
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.					

Nitrate/Nitrite Monitoring: The City of Zillah conducts annual monitoring for Nitrate and Nitrite on Rainier Ave Well and WIPPCO Well, and as of the fall of 2019 Third Ave Well is monitored quarterly. In 2016 WIPPCO Well was also required to be monitored quarterly for that year only. The maximum contaminant levels (MCL) for Nitrate and Nitrite are 10.0 mg/l and 1.0 mg/l, respectively. Nitrates exceeding this concentration in drinking water can be a health hazard, especially to infants below six months of age.

Test results for the period 2015 through 2020, summarized in Table 3-7, show the City remains in compliance with State standards. The City has had a history of elevated nitrates levels in the Rainier Ave Well and WIPPCO Well, but the levels appear to be steady when looking at test results for the last six years. The City will continue to closely monitor nitrate levels in all of its source wells.

TABLE 3-7 NITRATE / NITRITE CHEMICAL ANALYSIS RESULTS

	2015	2016	2017	2018	2019	2020
Rainier Ave Well (S01) – Annual Testing						
Nitrate (NO_3-N)	6.6	6.18	5.76	---	6.4	6.45
Nitrite (NO_2-N)	<0.05	<0.05	<0.05	---	<0.05	<0.05
Total Nitrate/Nitrite	6.6	6.18	5.76	---	6.4	6.45
Third Ave Well (S02) – Quarterly Testing						
Nitrate (NO_3-N)	<0.05	---	---	---	6.8	0.08
Nitrite (NO_2-N)	<0.05	---	---	---	<0.05	<0.05
Total Nitrate/Nitrite	<0.05	---	---	---	6.8	0.08
WIPPCO Well (S03) – Annual Testing						
Nitrate (NO_3-N)	5.5	5.6	3.69	5.04	5.64	3.87
Nitrite (NO_2-N)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Nitrate/Nitrite	5.5	5.6	3.69	5.04	5.64	3.87

Volatile Organic Chemical Monitoring: Volatile Organic Chemical (VOC) monitoring is required once every year for the first three years of sampling, per 40 CFR 141.24. Samples are to be taken following water treatment. If no VOCs are detected during the first three years of testing, future monitoring shall be at least once every compliance period. The DOH may grant waivers for monitoring requirements. Zillah currently has a waiver from DOH and performs VOC testing every six years at each of its source wells. Test results show the City is in compliance with State standards.

Synthetic Organic Chemical (SOC) Monitoring: SOC monitoring is required once every year for the first three years of sampling, per 40 CFR 141.24. Samples are to be taken following water treatment. If no SOCs are detected during the first three years of testing, future monitoring shall be at least once every compliance period. The DOH may grant waivers for monitoring requirements. Zillah is currently testing every nine years under the DOH waiver. Test results show the City in compliance with State standards and showed no presence of any of these substances in the water from the City's wells.

Radionuclide Monitoring: For the City of Zillah, radionuclide sampling from each source is required once every six years. The DOH may reduce monitoring requirements to once every nine years based on criteria set forth in 40 CFR 141.26. Test results show the City remains in compliance with State standards.

3.2.2 Distribution System Sampling and Testing

Bacteriological: Drinking water samples are required to be collected monthly at various locations throughout the water distribution system for bacteriological analysis in accordance with the City's *Coliform Monitoring Plan*. The minimum number of samples required for collection by a water utility is based on the population served. The City of Zillah is required to sample a minimum of three (3) locations within the distribution system. The *Coliform Monitoring Plan* and representative copies of bacteriological analysis results are provided in CHAPTER 10.

Lead and Copper: Lead and copper sampling is required once every three years as approved by DOH, per 40 CFR 141.86. In 1993, Zillah began a tap water lead and copper monitoring program to determine the lead and copper concentrations in drinking water to which its customers may be exposed. In 2020, ten (10) samples were collected from various locations throughout the water system and tested for concentrations of lead and copper. Results from the latest (2020) monitoring indicated that none of the samples exceeded the federal action levels of 1.3 mg/l for copper and 0.015 mg/l for lead. Table 3-8 provides a summary of the 2020 copper and lead monitoring results, which are also provided in CHAPTER 10.

TABLE 3-8 TABLE LEAD AND COPPER MONITORING PROGRAM SUMMARY OF RESULTS
(all values are in milligrams per liter)

Sample Number	Sample Location	Year 2011	
		Copper (Federal Action Level 1.3 mg/l)	Lead (Federal Action Level 0.015 mg/l)
1	Intermediate School 303 2nd Avenue	0.2060	0.0006
2	107 Linda Street	0.330	0.00091
3	Zillah Elementary School 211 4th Avenue	0.1980	0.0003
4	Zillah Middle School 1301 Cutler Way	0.0879	0.0003
5	Zillah High School 1602 2nd Avenue	0.3430	0.0004
6	103 Second Avenue	0.0494	0.0002
7	408 Edson Street	0.00580	0.00695
8	102 Northstone Parkway	0.0408	<0.0005
9	506 North 8th Street	0.0305	<0.0005
10	505 Virginia Court	0.0149	<0.0005

3.2.3 Future Source Water and Distribution System Sampling and Testing

A summary of future source and distribution system monitoring requirement frequencies, dates and sample status, as provided in the City's *Water Quality Monitoring Report for the Year 2020* (WQMR), is provided below in Table 3-9 and Table 3-10, respectively. A copy of the City's 2020 WQMR is provided in CHAPTER 10.

TABLE 3-9 FUTURE SOURCE WATER SAMPLING REQUIREMENTS

Sample Type	Frequency	Last Sample	Next Sample	Status
Rainer Ave Well (S01)				
Inorganic Chemicals (IOCs)	Once/9 years	September 2016	September 2025	Within MCLs
Nitrate/Nitrite	Once/Year	October 2020	October 2021	Within MCLs
Volatile Organic Chemicals (VOCs)	Once/6 Years	May 2017	May 2023	Within MCLs
Synthetic Organic Chemicals (SOCs)	Once/9 Years	June 2018	June 2027	Within MCLs
Gross Alpha	Once/3 Years	May 2014	May 2020	Within MCLs
Radium 226 + 228	Once/9 Years	May 2014	May 2020	Within MCLs
Third Ave Well (S02)				
Inorganic Chemicals (IOCs)	Once/9 years	September 2018	September 2027	Within MCLs
Nitrate/Nitrite	Once/Quarterly	October 2020	January 2021	Within MCLs
Volatile Organic Chemicals (VOCs)	Once/6 Years	December 2018	October 2024	Within MCLs
Synthetic Organic Chemicals (SOCs)	Once/9 Years	December 2018	December 2027	Within MCLs
Gross Alpha	Once/6 Years	December 2018	December 2024	Within MCLs
Radium 228	Once/6 Years	December 2018	December 2024	Within MCLs
WIPPCO Well (S03)				
Inorganic Chemicals (IOCs)	Once/9 years	September 2016	September 2025	Within MCLs
Nitrate/Nitrite	Once/Year	December 2018	December 2020	Within MCLs
Volatile Organic Chemicals (VOCs)	Once/6 Years	April 2016	April 2022	Within MCLs
Synthetic Organic Chemicals (SOCs)	Once/9 Years	June 2018	June 2027	Within MCLs
Gross Alpha	Once/6 Years	July 2020	July 2026	Within MCLs
Radium 228	Once/6 Years	July 2020	July 2026	Within MCLs

TABLE 3-10 FUTURE DISTRIBUTION SYSTEM SAMPLING REQUIREMENTS

Sample Type	Frequency	Last Sample	Next Sample	Status
Coliform Bacteria	3/Month	November 2020	December 2020	Within MCLs
Lead & Copper	10 samples/3 Years	August 2020	August 2023	No Exceedance
Asbestos	Waiver*	N/A	N/A	N/A
* Waived through December 2028.				

Future sampling requirements are discussed further in CHAPTER 6. The City's 2020 and future WQMRs should be consulted regarding the dates for future testing.

3.3 SYSTEM DESCRIPTION AND INVENTORY

The existing City of Zillah domestic water system consists of two distribution pressure zones, as shown in Table 3-11 Water System Pressure Zones, both of which provide a minimum of 30 psi static service elevation, as required by DOH. Information on those two pressure zones, including their service elevations, pressure ranges, and how each zone is served is provided in Table 3-11.

TABLE 3-11 WATER SYSTEM PRESSURE ZONES

Service Pressure Zone	Supply Source	Storage Reservoirs	Highest Service Elevation (Static Pressure)	Lowest Service Elevation (Static Pressure)
Zone 1	Rainier Ave Well (S01) Third Ave Well (S02) WIPPCO Well (S03)	Reservoir No. 1 (OF Elev. 976.9 ft.) Reservoir No. 2 (OF Elev. 972.6 ft.) Reservoir No. 3 (OF Elev. 850.0 ft.)	872 ft. (43 psi)	760 ft. (92 psi)
Zone 2	From Zone 1 via Constant Pressure Booster Station	500-gallon hydro-pneumatic pressure tank	900 ft. (50 psi)	890 ft. (55 psi)

The City is supplied water from three primary source wells. The maximum pumping capacity of the three primary wells is 1,500 gpm or 2.16 million gallons per day.

System storage is provided by an elevated steel storage tank reservoir, a steel standpipe reservoir, and a boosted ground level standpipe reservoir with a total combined nominal capacity of 1.471 million gallons, however, the total effective storage capacity of the reservoirs is 1.046 million gallons. Zone 2 is currently served by the Zone 2 constant pressure booster pump station. Static service pressures within the water system under normal operating conditions ranges from a minimum of 43 psi to a maximum of 92 psi as shown on Figure 3-1.

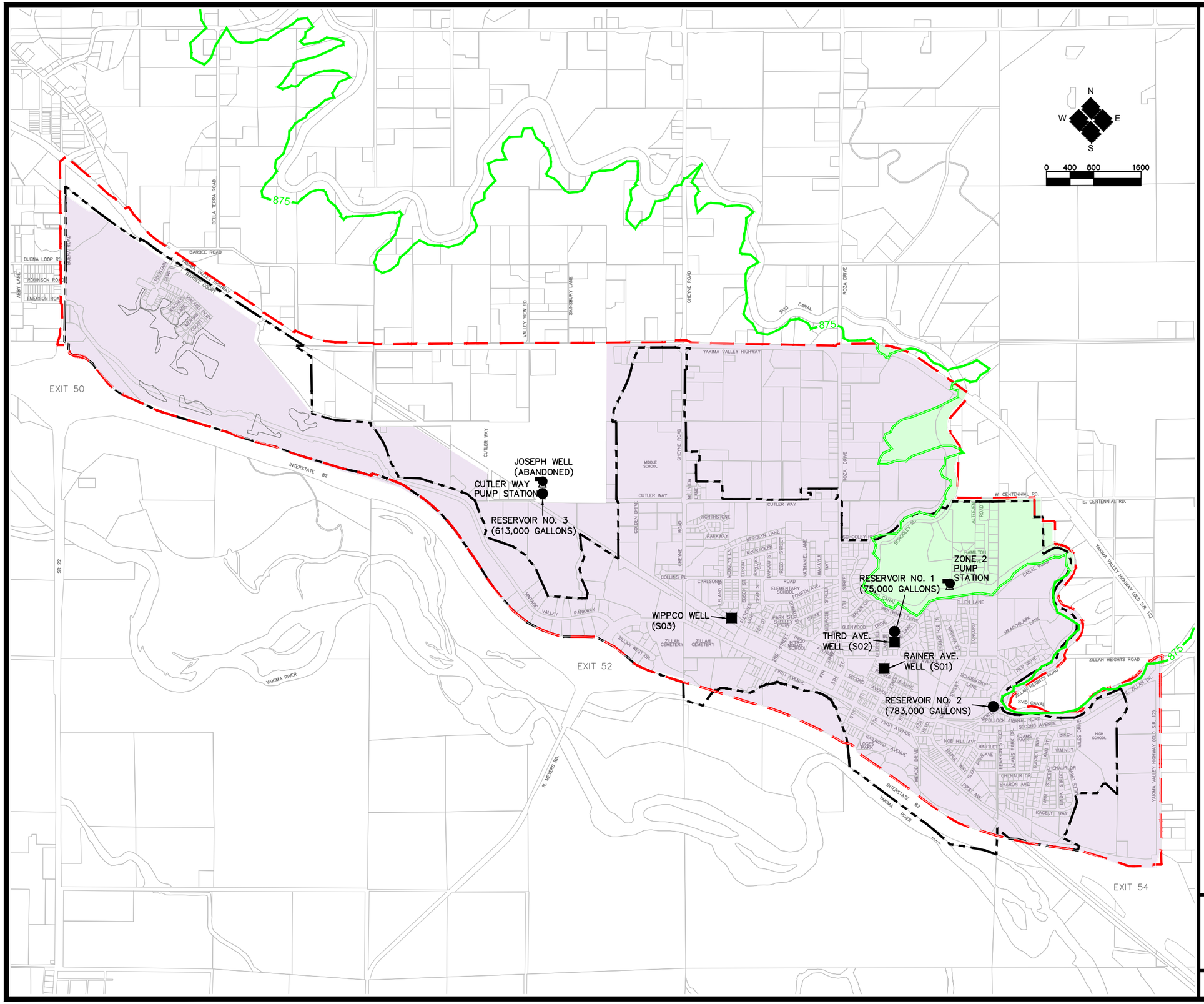
Zillah's water transmission and distribution system is comprised of nearly 130,000 lineal feet of pipe, ranging in diameter from 2-inch to 12-inch. The system is looped where possible, and a majority of the material is 6-inch or larger ductile iron or cast-iron pipe. The layout of Zillah's water distribution system, including pipe sizes and valve, hydrant, reservoir, and well locations is shown in Figure 3-1. The maximum water service elevation of the existing system is also indicated in Figure 3-1. An enlarged map (Map A) of the water system is included in CHAPTER 10.

Figure 3-2 provides a schematic depicting the interrelationship between the water system components. The existing distribution system is looped where possible and consists of mainly 6-inch and 8-inch water mains as shown in Figure 3-3 Water System Pipe Sizes Map. A map of Zillah's existing water system is enclosed as Map A in CHAPTER 10 of this Plan.

CITY OF ZILLAH

Water System Plan Update

WATER SYSTEM SERVICE PRESSURES MAP



LEGEND

- ZILLAH CITY LIMITS
- ZILLAH UGA BOUNDARY
- ZONE 1 MAX SERVICE ELEVATION
- PRESSURE ZONE 1
- PRESSURE ZONE 2
- RESERVOIR LOCATION
- WELL LOCATION
- BPS LOCATION

HLA Engineering and Land Surveying, Inc.
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4/1/21
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FIGURE 3-1

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Water System Plan Update

WATER SYSTEM SCHEMATIC

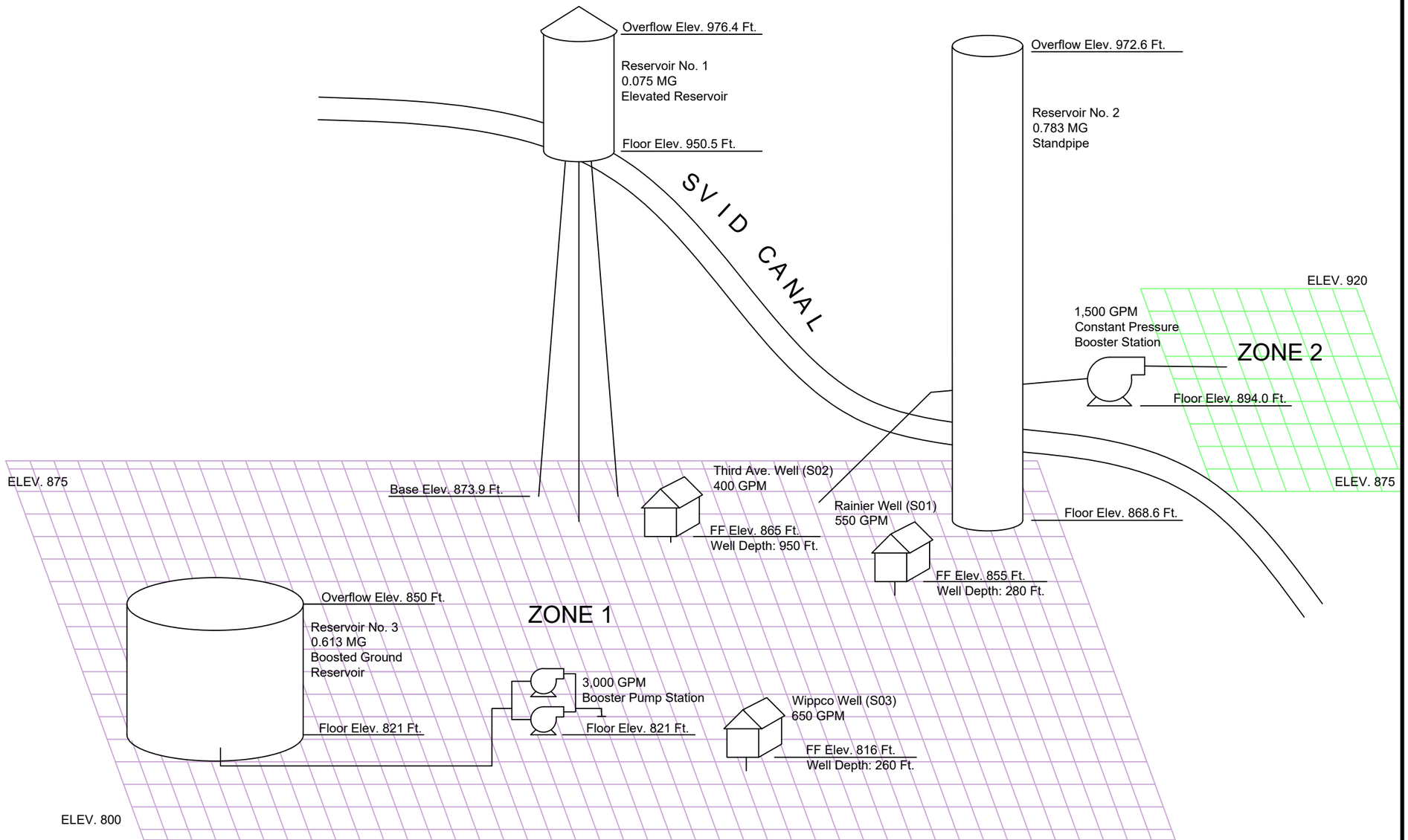

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FIGURE 3-2

CITY OF ZILLAH

Water System Plan Update

WATER SYSTEM PIPE SIZES MAP

N

W E

S

0 400 800 1600

LEGEND

- ZILLAH CITY LIMITS
- ZILLAH UGA BOUNDARY
- 12" WATERMAIN
- 10" WATERMAIN
- 8" WATERMAIN
- 6" WATERMAIN
- 4" WATERMAIN
- 2" WATERMAIN
- < 2" WATERMAIN

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4/2/21
P:\Projects\2019\19202\2021 WSP FIGURES.dwg

FIGURE 3-3

3.3.1 Water Sources

The City of Zillah has three primary source wells, all located on City-owned properties within Service Pressure Zone 1, as shown in Figure 3-1 and Map A, enclosed in the back of this Plan. The following are descriptions of the City's wells and pump installations.

Rainer Ave Well (S01): Rainer Ave Well is located at 605 Rainer Avenue as shown in Figure 3-1 and Map A. Drilled in 1958, the well was 280 feet deep, and had a static water level of 109 feet below ground surface in 1958. The bottom of the well filled in, the new depth is 270 feet deep. The current (2021) static water level is about 102 feet below ground surface. Significant upgrades were made to this well in 2018, including a new pump and wellhouse for electrical and control equipment. The well is equipped with a 8-stage Hydroflo model 9MH-8 submersible pump that has a design capacity of 550 gpm at 290 feet of total dynamic head (TDH) and is powered by a 60 horsepower, 460 volt, 3 phase, 1,800 RPM Telsa motor.

The discharge piping, electrical equipment, instrumentation, and controls are housed in a heated and ventilated concrete block wellhouse building. A check valve, air release, and inline electromagnetic flow meter are installed in the discharge piping. The well is equipped with an electrical connection point for City's mobile generator.

Third Ave Well (S02): Third Ave Well is located at 605 Blossom Lane as shown in Figure 3-1 and Map A. Drilled in 1940, the well depth is recorded as 950 feet, however, a video scan in 2018 shows an obstruction at approximately 613 feet so the total well depth is unknown. As a result of reduced capacity, the existing turbine pump was replaced in 2008 with a new submersible turbine pump. Significant upgrades were made to this well in 2018, including a new pump, centrifugal sand separator, and electrical and control equipment. The current (2021) static water level is about 58 feet below ground surface. The well is equipped with a 7-stage Hydroflo model 6HL-7 submersible pump that has a design capacity of 400 gpm at 230 feet of total dynamic head (TDH) and is powered by a 40 horsepower, 460-volt, 3 phase, 3450 RPM Telsa motor. During installation of the submersible pump in 2018, the set depth had to be decreased due to the location of downhole casing reductions. The pump capacity is limited at about 300 gpm due to excessive drawdown in the well.

The pump is housed in a sheet metal building that is heated and cooled. The discharge piping includes an electromagnetic flow meter, check valve, air release valve, and Lakos centrifugal sand separator model PVC-1040-V. The electrical gear and controls are housed inside the pumphouse.

WIPPCO Well (S03): WIPPCO Well is located at 107 First Avenue as shown in Figure 3-1 and Map A. Drilled in 1942, the well is 260 feet deep. Significant upgrades were made to this well in 2018, include a new pump, centrifugal sand separator, electrical and control equipment, and wellhouse. The current (2021) static water level is about 58 feet below ground surface. The well is equipped with a 10-stage Hydroflo model 9HL-10 submersible pump that has a design capacity of 650 gpm at 270 feet of total dynamic head (TDH) and is powered by a 75 horsepower, 460-volt, 3 phase, 1760 RPM Telsa motor.

The discharge piping, centrifugal sand separator, electrical equipment, instrumentation, and controls are housed in a heated and ventilated concrete block wellhouse building. A check valve, air release, and inline electromagnetic flow meter are installed in the discharge piping. The well is equipped with an electrical connection point for City's mobile generator.

A summary of Zillah's source wells, including well depth, current static water levels and capacity is provided in Table 3-12.

TABLE 3-12 SOURCE WELL INFORMATION SUMMARY

	Rainer Ave Well (S01)	Third Ave Well (S02)	WIPPCO Well (S03)
Date Drilled	1958	1940	1942
Ground Elevation	859 ft	878 ft	818 ft
Well Depth	280 ft	950 ft	260 ft
Depth to First Open Interval	238 ft	146 ft	128 ft
Casing Size/Depth	12-in diam 0-242 ft 12-in diam screen assembly 238-280 ft	12-in diam. 0-2 ft 10-in diam 2-146 ft 8-in diam 146-360 ft 6-in diam 360-460 ft 5-in diam 460-613 ft final depth unknown (obstruction at 613 ft)	12-in diam 0-260 ft (casing perforated 128-260 ft)
Static Water Level (Year)	109 ft (1958) 102 ft (2021)	116 ft (1940) 58 feet (2021)	58 ft (2021)
Initial Flow @ Drawdown (Year)	813 gpm @ 119 ft, 1958	276 gpm @ 276 ft, 1940	Unknown
Current Flow @ Drawdown	550 gpm @ 148 ft	300 gpm @ 70 ft	650 gpm @ 77 ft
Pump Intake Set Depth	215 ft	139 ft	118 ft
Current Pump Capacity	550 gpm	300 gpm	650 gpm
Pump Motor Size	60 HP	40 HP	75 HP

3.3.2 Water Treatment

Zillah provides no treatment or disinfection of its water supply. When constructed in 2010, the Zone 2 booster pump station was designed to allow for the future installation of chlorination equipment, and the Cutler Way booster station can chlorinate when in operation via a Constant Chlor® calcium hypochlorite feed system in the Joseph Well building.

In 2018 Rainier Ave Well and WIPPCO Well were improved with new buildings, both with storage rooms large enough to house chlorination equipment if needed.

The introduction of chlorine to the water system will require the implementation of an aggressive and coordinated flushing program both prior to and during initial chlorination to reduce the aesthetic impacts potentially caused by chlorination. The removal of existing organic materials, minerals, and sediment deposits in the distribution and storage system will minimize the amount of chlorine consumed and formation of disinfection byproducts.

Consideration for treatment at the Third Ave Well will also be needed if chlorine is introduced into the City's distribution system due to high levels of manganese. The aesthetic water quality issues with manganese can be worsened when oxidation and precipitation occur because of chlorination.

An evaluation of chlorination options should be completed to compare available alternatives and select an option that best serves the City of Zillah.

3.3.3 Booster Pump Stations

Water is supplied to the pressure zones of the City's distribution system through two booster pump stations. The location of each booster pump station is shown on Figure 3-1 and in Map A in CHAPTER 10 of the Plan.

The Zone 2 constant pressure booster pump station increases water pressure to services located north and east of the SVID canal. The pump station is located on the north side of the SVID irrigation canal and south of the Church located at 704 Schooley Road. This booster station is equipped with a 3 HP, 10 to 60 gpm variable frequency drive (VFD) Grundfos model CR 10-03 pump, a 15 HP, 50 to 300 gpm VFD Grundfos model CR 64-1 pump, and a 60 HP, 1,500 gpm PACO model KPV 5012-7 fire suppression pump for reliability, but it is not currently installed. Due to the smaller number of initial service connections within Zone 2 a 500-gallon hydro-pneumatic pressure tank was installed to allow the pumps to shut off during low demand periods. The pump station was designed to allow for the future installation of chlorination equipment and has an exterior pad mounted backup power generator for emergency operation.

The Cutler Way pump station located on the Cutler Way Reservoir No. 3 site (953 Cutler Way) boosts water pressure from Reservoir No. 3 to the Zone 1 distribution system. This booster station is currently equipped with two 100 HP, 1,500 gpm VFD PACO Model KPV 5015-9 pumps and was designed to accommodate a third pump for greater system reliability. A maximum of two pumps can be operated at any given time with a maximum VFD controlled flow rate of 3,000 gpm. The booster pumps are also used periodically at a VFD reduced flow rate of 500 gpm to "refresh" the water in the reservoir. During the "refresh" cycle. An actuator closes the 12-inch butterfly valve on the water line bypassing Reservoir No. 3 and one pump draws water from the reservoir to force it west towards the Zillah Lakes development. The emergency fire supply operation of the pump station is controlled by the level of Reservoirs No. 1 and No. 2. If the elevated reservoir levels fall below the set point (945-feet) one or two pumps will be called to draw water from Reservoir No. 3 and fill Reservoirs No. 1 and No. 2. The pump station has an exterior pad mounted backup power generator for emergency operation.

Provided in Table 3-13 is a summary of the City's booster pump stations, including number of pumps, model numbers, and capacities.

TABLE 3-13 BOOSTER PUMP STATION INFORMATION					
Pump Station Name	Year Installed	Service Pressure Zone	Pump Make/Model	Number of Pumps	Maximum Capacity (gpm)
Zone 2 Booster Pump Station	2010	Zone 2	Grundfos CR 10-03 Grundfos CR 64-1 PACO KPV 5012-7	3	1,860
Cutler Way Booster Pump Station	2010	Zone 1	PACO KPV 5015-9	2	3,000

3.3.4 Storage Facilities

The City's water storage facilities consist of an elevated steel reservoir, concrete standpipe, and a ground level concrete reservoir with a total capacity of 1,471,000 gallons. Water is pumped from all the City's wells directly into the lowest pressure level (Zone 1), including the three Zone 1 reservoirs. Water from Zone 1 is pumped through the Zone 2 Booster Station into Zone 2. Table 3-14 summarizes information on the City's water storage facilities, descriptions of which are provided below.

TABLE 3-14 WATER RESERVOIR INFORMATION				
Reservoir Name	Pressure Zone	Capacity (gallons)	Floor Elevation (feet)	Overflow Elevation (feet)
Elevated Tank	Zone 1	75,000	950.2	976.9
Standpipe	Zone 1	783,000	868.6	972.6
Ground Level Standpipe	Zone 1	613,000	821.0	850.0
TOTAL		1,471,000		

See Figure 3-4 Year 2021 Reservoir Storage Levels for a schematic representation of the year 2021 reservoir level elevations. Figure 3-5 shows anticipated reservoir storage level elevations for the year 2041.

Zone 1 Reservoirs

Reservoir No. 1: The City's 75,000-gallon elevated storage reservoir is located by the Third Ave Well, north of Third Avenue, and west of Westwood Drive, as shown in Map A. Constructed in 1928, the ellipsoidal storage reservoir is 22 feet in diameter and is connected to the City's distribution system via a single 8-inch transmission main. This reservoir's interior was re-coated in 1962 and again in 1991. The overflow elevation of the elevated tank reservoir is 976.9 feet above sea level, but the operational storage elevation is only 972 feet above sea level due to the overflow elevation of Reservoir No. 2. Therefore, the effective storage capacity of Reservoir No. 1 is only approximately 61,000 gallons.

Reservoir No. 2: The City's 783,000-gallon standpipe reservoir is located on Moritz Drive, as shown in Map A. Constructed in 1965, the steel standpipe is 35.8 feet in diameter, has a total height of 104 feet, although only 28 feet of storage (208,000 gallons) is above 30 psi static pressure level, and 51 feet of storage (382,000 gallons) exists above the 20-psi static pressure level. The standpipe is connected to the City's distribution system via a 10-inch transmission main. The overflow elevation of the standpipe reservoir is 972.6 feet above sea level.

CITY OF ZILLAH

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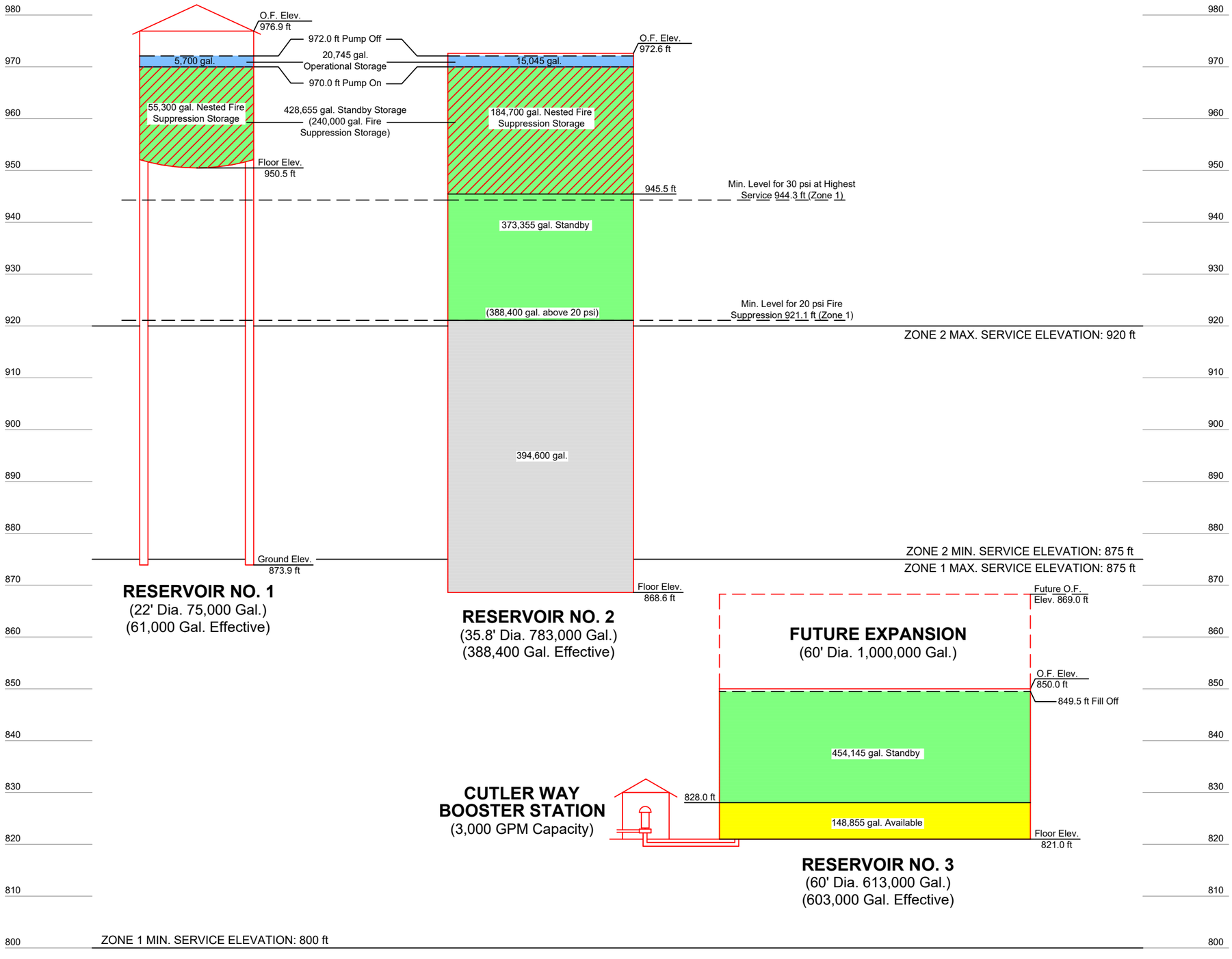
2021 RESERVOIR STORAGE LEVELS



LEGEND

- OPERATIONAL STORAGE
- FIRE SUPPRESSION STORAGE (NESTED IN STANDBY)
- STANDBY STORAGE
- EQUALIZING STORAGE
- AVAILABLE STORAGE
- DEAD STORAGE

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FIGURE 3-4

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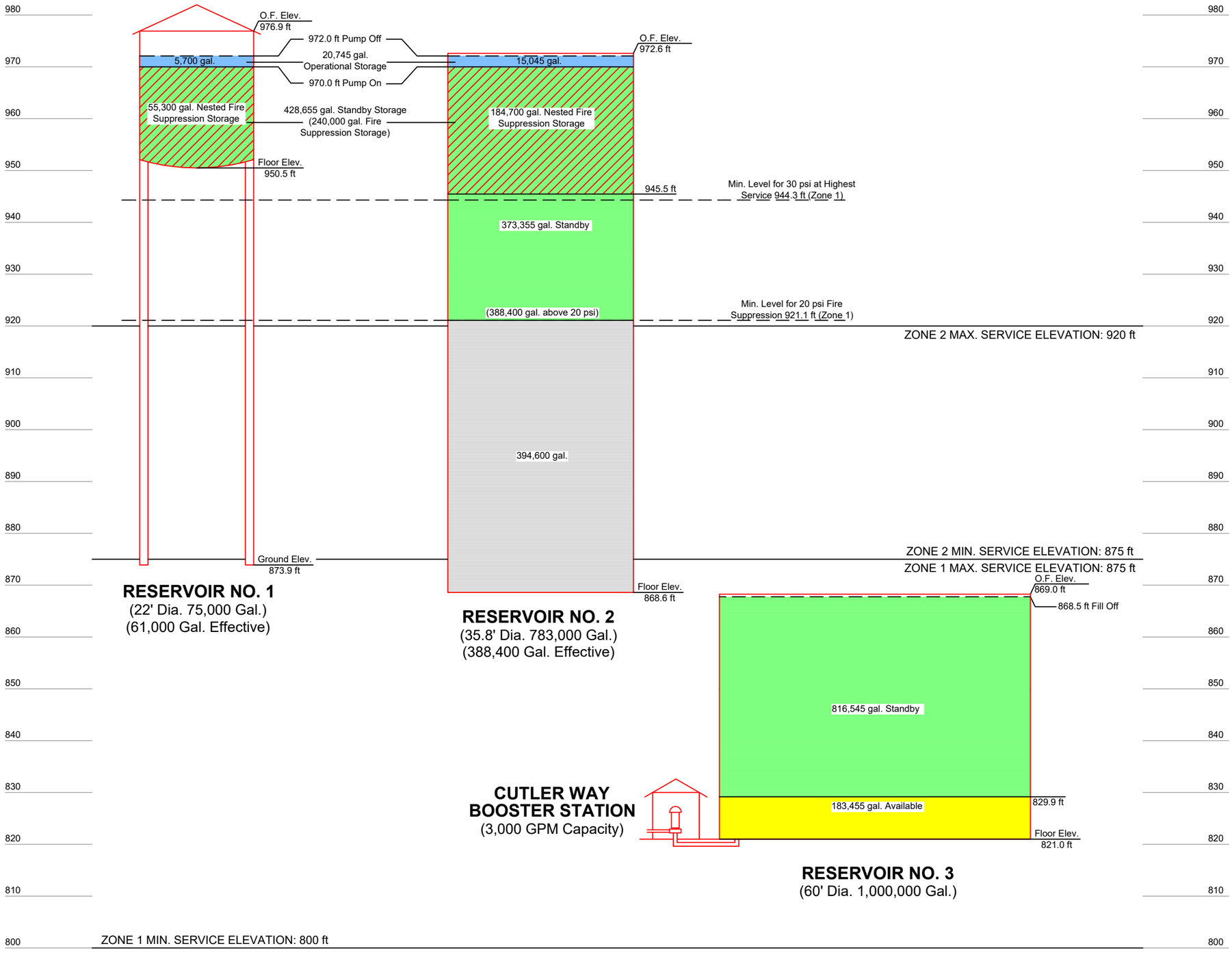
Water System Plan Update

2041 RESERVOIR STORAGE LEVELS



LEGEND

- OPERATIONAL STORAGE
- FIRE SUPPRESSION STORAGE (NESTED IN STANDBY)
- STANDBY STORAGE
- EQUALIZING STORAGE
- AVAILABLE STORAGE
- DEAD STORAGE

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4/2/21
P:\Projects\2019\19202\2021 WSP FIGURES.dwg

FIGURE 3-5

Reservoir No. 3: The City's 613,000-gallon ground level reservoir is located on Cutler Way, as shown in Map A. Constructed in 2009, the steel reservoir is 60.0 feet in diameter, has a total height to overflow of 29 feet, with 28.5 feet being operational storage (603,000 gallons). The reservoir is connected to the City's distribution system via a 12-inch main, a 6-inch altitude control valve manufactured by Cla-Val Co., and the Cutler Way Booster Pump Station controlled by the level of Reservoirs No. 1 and No. 2 (to maintain reservoir elevations above 945-feet). The altitude valve is set based on the level of Reservoir No. 3 to open and close to fill the reservoir from the Zone 1 distribution system. See Section 3.3.3 for additional information.

Reservoir No. 3 was designed to allow for future expansion to a total height of 48 feet. With an operational height of 47.5 feet the future storage capacity could be increased to approximately 1 million gallons. The overflow elevation of the standpipe reservoir is 850.0 feet above sea level.

3.3.5 Telemetry Control System

Zillah's telemetry control system was installed in December of 2002 and upgraded in 2010 with the construction of the Cutler Way and Zone 2 Booster Pump Stations. The system exercises supervisory control, data collection, and monitoring of water system operation from a computer located in City Hall. The HMI software used for Zillah's telemetry system is Wonderware Intouch 2012, version 10.5 with Win911 Version 7.12 for annunciating alarms. Data is monitored by Allen Bradley Micrologix PLCs at each site and sent to the telemetry system computer by means of radio communication. The system monitors source production, reservoir level information, and issues commands to start and stop wells and booster pumps. The reservoir water levels are sensed by pressure transmitters and source production is measured by flow meters at each of the three source wells.

The source pumps are controlled by the water level in the operator-selected reservoir. The telemetry control settings for operating the various wells based on water levels in the reservoirs, are shown in Table 3-15 and Table 3-16.

Should source pumps fail to respond as ordered (on or off) by the telemetry system, or a high or low water condition exists in the reservoirs, an alarm is sounded at City Hall and through the City's answering service. An automatic telephone dialer (Win911) is also activated, which then proceeds to contact preprogrammed telephone numbers of key personnel until the alarm is properly acknowledged.

TABLE 3-15 EXISTING TELEMETRY CONTROL SOURCE WELL SETTINGS BASED ON ELEVATED RESERVOIR LEVELS

Source Well / Operation	Reservoir Level (feet)	Approximate Elevation (feet)*
Rainier Ave Well (S01)		
Pump On	90.4	970.0
Pump Off	92.4	972.0
Third Ave Well (S02)		
Pump On	76.5	893.5
Pump Off	76.0	893.0
WIPPCO Well (S03)		
Pump On	89.7	969.3
Pump Off	92.3	971.9
*Approximate elevation calculated by adding the reservoir level to a base elevation of 879.6.		

TABLE 3-16 EXISTING TELEMETRY CONTROL RESERVOIR SETTINGS		
Reservoir / Operation	Level (feet)	Approximate Elevation (feet)
Reservoir No. 1		
Low Level Alarm	85.0	964.6
High Level Alarm	99.5	979.1
Reservoir No. 2		
Low Level Alarm	76.0	955.6
High Level Alarm	94.0	973.6
Reservoir No. 3		
Low Level Alarm (Float)	2.0	823.0
Low Level Alarm (Pressure Trans.)	3.0	824.0
Inlet Valve Open (Pressure Trans.)	19.0	840.0
Inlet Valve Closed (Pressure Trans.)	28.0	849.0
High Level Alarm (Float and Pressure Trans.)	28.3	849.3
High Level Alt. Shutoff (Pressure Trans.)	28.5	849.5

3.3.6 Transmission and Distribution Systems

The City's existing transmission and distribution system along with water main sizes, valve, and fire hydrant locations is shown in Figure 3-1 and Map A in CHAPTER 10 of this Plan. Most line sizes within the system are six inches in diameter or larger. The majority of the City's water mains are constructed of PVC pipes, and most are looped except where topography or City limit boundaries make loops impractical. An inventory of the total length of Zillah's water distribution system piping, including the length and percentage of each diameter of pipe is presented below in Table 3-17.

TABLE 3-17 WATER DISTRIBUTION SYSTEM PIPE SIZE SUMMARY		
Pipe Diameter (inches)	Length (feet)	Percent of Total
2	790	0.69%
4	1,868	1.62%
6	47,341	41.06%
8	41,899	36.34%
10	8,335	7.23%
12	15,072	13.07%
TOTAL	115,305	100.0%

3.3.7 Asset Condition Assessment

The age and condition of the City's major water system assets is summarized in Table 3-18. This information is valuable in evaluating and timing of future maintenance improvements necessary to maintain a high level of system reliability. Condition ratings provided in Table 3-18 are based on DOH recommendations and the descriptions provided in the *Asset Inventory Worksheet* developed by Rural Community Assistance Corporation (RCAC). In general, a rating of 1 is equal to good and/or expected condition and a rating of 10 equal to unserviceable (may need replacement) condition.

TABLE 3-18 ASSET CONDITION ASSESSMENT SUMMARY

Water System Component/Name, Capacity, and Type	Date Originally Constructed	Expected Useful Life (Years)[a]	Date of Last Service/ Replacement	Critical Number (1 to 5)[b]	Condition Rating[c]	Expected Remaining Useful Life (Years)
Rainier Ave Well (S01) Rainier Well pumphouse 550 gpm, 60 HP submersible pump	1958 2018 2018	60 60 15	2018 2018 2018	2	1	42 42 13
Third Ave Well (S02) Third Avenue Well pumphouse 300 gpm, 40HP submersible pump	1940 Unknown 2018	60 60 15	2018 2018 2018	3	1	42 42 13
WIPPCO Well (S03) WIPPCO Well pumphouse 650 gpm, 75 HP submersible pump	1942 2018 2018	60 60 15	2018 2018 2018	2	1	42 42 13
Zone 2 Booster Pump Station (1,560 gpm) Pump station building 60 gpm, 3 HP vertical multistage pump 300 gpm, 15 HP vertical multistage pump 1,500 gpm, 60 HP vertical split-case pump	 2010 2010 2010 2010	 60 15 15 15	 2010 2010 2010 2010	2	4	 50 5 5 5
Cutler Way Booster Pump Station Pump station building 3,000 gpm, 100 HP vertical split-case pumps	 2010 2010	 60 15	 2010 2010	2	4	 50 5
Reservoir No. 1, 0.075 MG elevated steel	1928	60	Unknown	1	8	0
Reservoir No. 2, 0.783 MG steel standpipe	1965	60	Unknown	1	8	5
Reservoir No. 3, 0.613 MG ground level steel standpipe	2009	60	2009	1	4	49
Telemetry Control System	2002	5	2018	2	1	5
Water System Piping	1928	75	Varies	2	5	10
Water Service Meters	Unknow	50	Varies	4	5	5

[a] Typical equipment life expectancy from EPA publication EPA 816-R-03-016 Sept. 2003.
[b] Critical number designation of 1 means system would essentially shut down if component failed, and no backup available, e.g., well failure on a single well system without a backup. Critical number of 4 means failure of asset would cause inconvenience, but not cause harm to the system. Critical number of 5 means the assets condition is not well known and should be later evaluated.
[c] Condition ratings are based on recommendations in DOH Water System Planning Guidebook, with a rating of 1 equal to good/expected condition and a rating of 10 equal to unserviceable (may need replacement) condition.

3.4 SYSTEM CAPACITY ANALYSIS

Review and analysis of the capacity of all system components, including water sources, storage facilities, and distribution components described in Section 3.3, is important to maintain the City's level of service and ensure the current and future system satisfies the requirements of WAC 246-290-100(4)(e).

3.4.1 Source of Supply and Reliability Analysis

Existing source well production is summarized in CHAPTER 2, along with projections of future water system demand and ERUs. It is crucial to compare existing and future demand trends with the water supply capacities summarized in Section 3.3 and DOH recommended reliability criteria summarized in Section 3.10.5 of the 2019 Water System Design Manual. The following are the applicable water source reliability recommendations:

- Two or more supply sources are available.
- Permanent and seasonal sources are capable of replenishing depleted fire suppression storage within 72-hours while concurrently supplying the MDD for the water system.
- Permanent and seasonal source capacity is enough to supply MDD in a pumping period of 20 hours or less.
- With the largest source out of service, the remaining permanent and seasonal source(s) can provide a minimum of ADD for the water system.
- Source of supply pump stations have power connections to two independent primary public power sources, have in-place auxiliary power available (auto transfer capable), and/or maintain adequate gravity standby storage.
- A factor of safety is applied to well pumping test safe yield determinations.

A summary of the City's total well source capacity compared to the DOH reliability recommendations is provided in Table 3-19. A factor of safety (10% contingency) is applied to all demand projections that are used to calculate the reliability criteria demands provided in Table 3-19.

TABLE 3-19 WATER SUPPLY RELIABILITY SUMMARY			
DOH Water Supply Reliability Criteria	2021	2031	2041
MDD + FSS[a] in 72 hours (gpm)	778	922	1,075
Source Well Capacity Existing (gpm) With proposed improvements (gpm)	 1,500 1,500	 1,500 1,500	 1,500 1,500
Meets Reliability Criteria?	Yes	Yes	Yes
MDD in 20 hours (gpm)	867	1,039	1,222
Source Well Capacity Existing (gpm) With proposed improvements (gpm)	 1,500 1,500	 1,500 1,500	 1,500 1,500
Meets Reliability Criteria?	Yes	Yes	Yes
ADD (gpm)	325	392	462
Source Well Capacity With largest source (WIPPCO Well) out of service (gpm)	 850	 850	 850
Meets Reliability Criteria?	Yes	Yes	Yes
[a] Refer to Section 3.4.4 for FSS requirements. FSS converted to 72 hours of pumping = 56 gpm (240,000 gallons/4,320 minutes). [b] Backup sources are designated as emergency.			

Power supply reliability is also an important factor in the source of supply reliability analysis. The City does not have in-place auxiliary engine generators, with automatic transfer switch capability at any of its sources of supply but does have portable generator receptacles at its two primary source wells, Rainier Ave Well and WIPPCO Well.

3.4.1.1 Alternative Sources of Supply

As system demands continue to increase, the City may need to pursue alternative sources of supply to supplement groundwater source well supply and increase system reliability. Alternative sources of supply may include irrigation supply sources, water reuse, and water system interties.

Pursuing and developing seasonal water sources to offset high peak demands in the summer months may be a viable option for the City. Seasonal irrigation demand can have a significant impact on the City's water system supply capacity. Expansion of existing irrigation systems to serve more customers is an option to consider in the future.

Water reuse options could be considered by the City to provide an additional water supply. The primary source for reclaimed or reused water within or near the City of Zillah includes the City's wastewater treatment plant. Zillah currently discharges treated wastewater to Yakima River, near the City's wastewater treatment facility.

Another possible use of reclaimed water from the City's wastewater treatment facility is to irrigate City parks and/or school athletic fields. This would require upgrading City's wastewater treatment facility to Class A reclaimed water standards plus costs associated with construction of a separate reclaimed water transmission and distribution system (pumps and pipeline) to deliver reclaimed water to various parks and school fields throughout the City.

Water system interties with neighboring water purveyors can be a possible option for an emergency or supplemental source of supply. In some circumstances pursuing a water system intertie can be more cost-effective than new source development. The nearest large municipal water purveyor to the City of Zillah is

the City of Toppenish, approximately three miles to the southeast, however Toppenish is located on the south side of the Yakima River, so a future intertie may be impractical. The Buena water system, owned and operated by Yakima County, is located approximately three miles to the northwest. An intertie with Buena may be a viable option in the future but no plans are currently in place to construct an intertie between the two systems.

If an intertie is proposed, the City will need to develop an agreement with the other purveyor, obtain approval of the intertie from DOH and the Ecology, modify appropriate water rights to reflect the intertie, and incorporate the intertie into the Water System Plan. The intertie agreement would include the following:

- A discussion on the place of use as authorized in appropriate water rights documents.
- Identification of the specific time(s) in which water will be provided.
- Quantification of the amount of water available for use.
- A discussion on seasonal or other restrictions on water availability; and
- A discussion of how water conservation programs, data collection and other operational matters will be conducted and coordinated.

3.4.2 Water Right Self-Assessment

The City of Zillah currently maintains certificated and permitted water rights from the State of Washington Department of Ecology (Ecology) for the appropriation of ground water at each of its wells. A copy of the City's water right certificates, permits, claims, and applications, and any associated reports of examination (ROE) and water right correspondence documents are provided in CHAPTER 10.

Rainier Ave Well (S01)

Zillah's Certificate of Ground Water Right (GWC3350) for the Rainier Ave Well is for a maximum annual volume of 296-acre feet (96.45 MG), and a maximum instantaneous flow rate of 550 gpm. In addition, in 1988, Zillah submitted Groundwater Application G4-29869 for the withdrawal of 1,600 gpm from the Rainier Ave Well for continuous municipal and industrial use, and for the irrigation of 150 acres. This application does not specify an annual quantity. The application has not been acted upon by Ecology.

Third Ave Well (S02)

Zillah's Certificate of Ground Water Right (GWC606-D) for the Third Ave Well is for a maximum annual volume of 150-acre feet, and a maximum instantaneous flow rate of 276 gpm. In addition, Zillah's Groundwater Permit (G4-29702P) authorizes 2,000 gpm and 1,458.1-acre feet per year from the Third Ave Well and from the WIPPCO Well. A portion of this right (600-acre feet per year) is primarily for irrigation of 150 acres. The remainder of the right is supplemental, allowing the City to withdraw water from either the WIPPCO Well or from the Third Ave Well.

WIPPCO Well (S03)

Zillah's Groundwater Permit (G4-29702P) authorizes 2,000 gpm and 1,458.1-acre feet per year from the Third Ave Well and from the WIPPCO Well. A portion of this right (600-acre feet per year) is primarily for irrigation of 150 acres. The remainder of the right is supplemental, allowing the City to withdraw water from either the WIPPCO Well or from the Third Ave Well. Zillah's Water Rights Claim (CG4-WRC007086) for the WIPPCO Well is for a maximum annual volume of 858.1-acre feet, and a maximum instantaneous flow rate of 700 gpm.

The status of Zillah's water rights as compared to their current and future water system demand is shown in Table 3-20. The excess and/or deficiencies in the City's water rights are also shown in these tables. Existing water rights for the City are adequate to satisfy current and future annual and instantaneous demands. Although the City's existing water rights are adequate to satisfy the projected demand for the next 20-year period, Zillah will pursue water conservation measures, continue its annual review of water production and consumption data, and evaluate the possibility of alternative and/or additional sources of supply, if necessary, in the future.

TABLE 3-20 WATER RIGHT SELF-ASSESSMENT

Water Right Permit, Certificate, or Claim #	WFI Source #	Existing Water Rights				Current Source Production (2019)				10-Year Forecasted Source Production (2031)				20-Year Forecasted Source Production (2041)			
		Primary Q_i (gpm)	Non-Additive Q_i (gpm)	Primary Q_a (acre-feet)	Non-Additive Q_a (acre-feet)	Total Q_i (gpm)	Current Excess (Deficiency)	Total Q_a (acre-feet)	Current Excess (Deficiency)	Total Q_i (gpm)	10-Year Forecasted Excess (Deficiency)	Total Q_a (acre-feet)	10-Year Forecasted Excess (Deficiency)	Total Q_i (gpm)	20-Year Forecasted Excess (Deficiency)	Total Q_a (acre-feet)	20-Year Forecasted Excess (Deficiency)
1. GWC606-D	S02, Third Ave Well	276	–	150.0	–	300	(24)	5.1	144.9	300	(24)	8.0	142.0	300	(24)	9.4	140.6
2. GWC3350	S01, Rainier Ave Well	550	–	296.0	–	550	0	246.2	49.8	550	0	296.0	0	550	0	296.0	0
3. G4-29702P[a]	S02, Third Ave Well S03, WIPPCO Well	1,024	976	600.0	858.1	650	374	152.4	447.6	650	374	328.1	271.9	650	374	439.5	160.5
4. WRC007086	S03, WIPPCO Well	700	–	412.1	446.0	0	700	0	412.1	0	700	0	412.1	0	700	0	412.1
TOTAL		2,550	976	1,458.1	1,304.1	1,500	1,050	403.7	1,054.4	1,500	1,050	632.1	826.0	1,500	1,050	744.9	713.2

Pending Water Right Applications

Application #	Applicant and Source Name	Application Type	Date Submitted	Quantities Requested			
				Primary Qi (gpm)	Non-Additive Qi (gpm)	Additive Qa (acre-feet)	Non-Additive Qa (acre-feet)
G4-29869[b]	City of Zillah, Rainier Ave Well (S01)	New	12/16/1988	1,600	–	–	–

[a] The combined withdrawal between Ground Water Certificates Nos. 606-D, and 3350-A, the approved certificate of change for Water Right Claim No. 007086, and Ground Water Permit G4-29702 shall not exceed 2,550 gpm and 1,458.1 acre-feet per year..
[b] Groundwater application G4-29869 proposes the withdrawal of 1,600 gpm from the Rainier Ave Well (S01) for continuous municipal and industrial use, and irrigation of 150 acres. This application does not specify an annual quantity. The application, submitted in 1988, has not been acted upon by Ecology.

3.4.3 Storage Analysis

Reservoir facilities are necessary in a water utility's system to provide required storage in three critical areas:

1. Standby Storage: Adequate water reserves need to be maintained to meet system demands during abnormal operating conditions, such as structural, electrical, mechanical, or treatment process failure; or source contamination. Standby storage may be "nested" within the fire suppression storage volume. Standby storage shall be provided at a minimum pressure of 20 psi throughout the distribution system.

2. Fire Suppression Storage: Adequate water reserves need to be maintained to meet the system's highest fire flow requirement with no assistance from existing water supply sources and at a minimum pressure of 20 psi throughout the distribution system. Fire suppression storage may be "nested" within the standby storage volume.

3. Equalizing Storage: Adequate water reserves need to be maintained to meet that portion of the system's maximum instantaneous demand (peak hour), which exceeds the existing water supply source capacity. Equalizing storage must be available to all service connections at a minimum pressure of 30 psi.

Storage facilities also provide a volume of water for supply to the system between source pumping operations. This "operational" volume is established by each utility and is generally based on limiting, as much as practical, the number of pump cycles per hour.

Total System Storage Analysis

Standby Storage: The purpose of standby storage is to provide a measure of reliability should sources fail, or unusual conditions impose higher demands than anticipated. The Department of Health (DOH) defines standby storage as the volume of stored water available for use during a loss of source capacity, power, or similar short-term emergency.

For communities with multiple sources of supply such as the City of Zillah, DOH's 2019 *Water System Design Manual* recommends the volume of standby storage should be calculated based upon the following equation:

$$SB = (N)(SB_i)(T_d)$$ *2019 Water System Design Manual*, Equation 7-2

Where:
SB = Total standby storage component in gallons.
N = Number of ERUs based on the ERU_{MDD} value (GPD).
$\mathbf{SB_i}$ = Locally adopted unit SB volume in GPD/ERU_{MDD}
$\mathbf{T_d}$ = Number of days selected to meet water system-determined standard of reliability (T_d = 1).

Standby storage (SB) volume in systems with multiple sources is recommended to equal MDD unless a reduction in SB volume is justified with mechanical, electrical, treatment, and transmission redundancy to provide resilience during an outage or contamination event. A reduction in SB volume may be justified if one or more of the following is provided:

- The water system and local fire authority allow for nesting SB and fire suppression storage (FSS) volumes, where the FSS volume is greater than the SB volume.

- Two or more sources have permanent on-site auxiliary power that starts automatically when the primary power feed is disrupted. With the largest of these sources out of service, the remaining sources plus SB volume can maintain at least 20 psi throughout the distribution system under PHD conditions.

- Two or more sources receive power from two electrical substations, so that failure of one substation will not interrupt the power supply to the source as documented in writing by the power utility. With the largest of these sources out of service, the remaining sources plus SB volume can maintain at least 20 psi throughout the distribution system under PHD conditions.

- Sources are in different watersheds, wellhead protection areas, or aquifers.

- Converting dead storage to standby storage by providing mechanically redundant booster pumping capacity with permanent on-site auxiliary power that starts automatically when the primary power feed is disrupted.

As described in Section 3.3.1, the City of Zillah has a receptacle at each of its primary source wells (Rainier Avenue Well and WIPPCO Well) to connect a portable generator and provide auxiliary power during an outage. Though not a permanent on-site auxiliary power source, the City is able to quickly connect the mobile generator they own to either source well in an emergency. With this resiliency and the addition of permanent on-site auxiliary power source to the proposed future source well, the City can justify a reduction in SB volume equal to the minimum recommended volume 200 gallons/ERU instead of the current MDD volume of 235 GPD/ERU$_{MDD}$. Provided in Table 3-21 is a summary of the calculated current and future total system required SB volumes based on 200 GPD/ERU$_{MDD}$.

TABLE 3-21 STANDBY STORAGE REQUIREMENTS

	2021	2031	2041
N **SB$_i$** x **T$_d$**	4,414 ERUs 200 GPD/ERU$_{MDD}$ x 1 Day	5,292 ERUs 200 GPD/ERU$_{MDD}$ x 1 Day	6,226 ERUs 200 GPD/ERU$_{MDD}$ x 1 Day
Total Standby Storage Required	882,800 Gallons	1,058,400 Gallons	1,245,200 Gallons

Fire Suppression Storage: DOH defines fire suppression storage as the volume of stored water available during fire suppression activities to satisfy minimum pressure requirements per WAC 246-290-230. A volume of storage for fire suppression has been established based on fire flow ratings of various structures within Zillah. The storage required is 240,000 gallons, which will allow a demand of 2,000 gpm for a 2-hour duration. The fire suppression demand was established by the Zillah Fire Department. Fire suppression storage shall be provided at an elevation to maintain 20 psi pressure throughout the distribution system. Fire suppression and standby storage will be "nested" to reduce the total system storage required, as approved by the Zillah Fire Department. Fire suppression storage for the City of Zillah will be as shown in Table 3-23.

Equalizing Storage: DOH defines equalizing storage as the volume of storage needed to supplement supply to consumers when the peak hourly demand exceeds the total source pumping capacity. The DOH design method for calculating equalizing storage is 150 times the difference between the system's peak hour demand (PHD) in gpm and the total source production rate in gpm. Based on this method, the current and future equalizing storage requirements for Zillah are as shown in Table 3-22.

TABLE 3-22 EQUALIZING STORAGE REQUIREMENTS			
	Year 2021	Year 2031	Year 2041
Peak Hour Demand	1,256 gpm	1,505 gpm	1,771 gpm
- Total Source Capacity	- 1,500 gpm	- 2,550 gpm	- 2,550 gpm
Subtotal	<0	<0	<0
DOH Multiplier	x 150 gal/gpm	x 150 gal/gpm	x 150 gal/gpm
Equalizing Storage Total	0 Gallons	0 Gallons	0 Gallons
[a] Assumes construction of a new 1,050 gpm source well by year 2031 to maximize instantaneous water rights (Q_i) and eliminate the need for equalizing storage.			

Operational Storage: DOH defines operational storage as the volume of distribution storage associated with source or booster pump normal cycling times under normal operating conditions and is additive to the equalizing and standby storage components, and to fire flow storage if this storage component exists for any given tank. Currently, the City of Zillah operates its lead source within the upper two feet of the water level in each reservoir. This corresponds to a volume of approximately 20,700 gallons, or 6.5 gallons per ERU_{MDD} (2021). The operational storage volume required to avoid excessive pump cycling only needs to be enough to limit the number of pump starts to six per hour. Under year 2021 MDD the source pumps would turn on 1.6 times per hour under PHD conditions. The same operational storage levels will be sufficient to meet 20-year MDD, while keeping source pump cycle time within an appropriate range.

Total Storage: Current and future storage requirements for the water system are summarized in Table 3-23. Figure 3-4 shows a schematic representation of existing storage components shown in Table 3-23, and discussed above. Figure 3-5 shows a schematic representation of the 2041 projected storage component requirements.

TABLE 3-23 STORAGE VOLUME REQUIREMENTS SUMMARY (all storage values are in gallons)			
	Year 2021 Requirements	Year 2031 Requirements	Year 2041 Requirements
Standby Storage (SB)	882,800	1,058,400	1,245,200
Fire Suppression Storage (FSS)[a]	240,000	240,000	240,000
Equalizing Storage (ES)	0	0	0
Operational Storage (OS)	20,700	20,700	20,700
Total Storage Required (above 20 psi)[b]	903,500	1,079,100	1,265,900
Total Storage Required (above 30 psi)	20,700	20,700	20,700
Total Storage Capacity (above 20 psi)	1,046,000	1,046,000	1,046,000
Total Storage Capacity (above 30 psi)	872,000	872,000	872,000
Storage Excess (Deficiency)	142,500	(33,100)	(219,900)
[a] FSS volume is nested within SB volume. [b] Total required storage volume includes 10% contingency.			

Table 3-23 shows the current storage capacity is adequate to meet existing needs but will be deficient by year 2031. The required future storage volumes provided in Table 3-23 are based on demand projections provided in CHAPTER 2, and include a 10% contingency in the number of future ERUs used to calculate the required future volumes. It should also be noted that the storage volumes were calculated based on construction of a new source well with a capacity of at least 1,050 gpm by year 2031 for improved redundancy, system reliability and to eliminate the need for equalizing storage.

Zone 2 Storage

The supply and storage of Zone 2 must be analyzed separately from the total system due to its dependence on a booster pump station for water supply. All the system's source wells and storage reservoirs are located in Zone 1. However, Zone 2 is a closed system without a storage component, so the booster pump station must supply the entire flow and pressure required by the service area and a storage analysis is not required.

3.4.4 Fire Flow

The demand fire flows placed upon a water system is typically the most significant element when analyzing the piping network. Every water system which is required to have a Water System Plan must address fire flow. At a minimum, a water utility must comply with fire flow standards shown in Table 3-24, established by DOH. A community may, however, develop its own standards if they exceed the DOH minimum requirements.

TABLE 3-24 DOH MINIMUM FIRE FLOW REQUIREMENTS

Land Use Type	Flow Requirement
Residential	500 gpm for 30 minutes
Commercial and Multi-Family	750 gpm for 60 minutes
Industrial	1,000 gpm for 60 minutes

Source: *WAC 246-293-640*

The City of Zillah Fire Department has developed a list of minimum fire flow capacities required for many structures throughout the City, consistent with International Fire Code (IFC) standards. These fire flow capacities were used to develop Figure 3-6, which shows the areas of required minimum fire flow and the actual calculated fire flow capacity at selected locations within those areas. All areas that do not have a specified minimum fire flow range are required to have a minimum fire flow capacity of 500 gpm.

A computer hydraulic analysis was used to determine the existing fire flow capacities at certain locations shown on Figure 3-6. The hydraulic analysis parameters are discussed later in this chapter. As can be seen in Figure 3-6, the greatest fire flow requirements are within the industrially and commercially zoned areas and at some of the public schools. Figure 3-6 shows that most locations throughout the distribution system are able to provide the required minimum fire flow capacities. Recommended system improvements to correct any fire flow deficiencies are discussed further in this chapter.

CITY OF ZILLAH

Water System Plan Update

EXISTING FIRE FLOW CAPACITIES MAP

N
W E
S

0 400 800 1600

LEGEND

ZILLAH CITY LIMITS

ZILLAH UGA BOUNDARY

FIRE FLOW RANGE	EXISTING CAPACITY
> 6000 GPM	
5000 - 6000 GPM	
4000 - 5000 GPM	
3000 - 4000 GPM	
2000 - 3000 GPM	
1000 - 2000 GPM	
500 - 1000 GPM	
< 500 GPM	

FIRE DEPT. REQUESTED FLOW CAPACITIES

MINIMUM 500 GPM

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

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R:\Hydraulic Analysis\Zillah\19202\19202 Zillah Hydraulic Analysis.dwg

FIGURE 3-6

3.4.5 Hydraulic Analysis

A hydraulic analysis of a water utility system is a method of calculating pressures and flows throughout the distribution network under various conditions of demand at a given instant. Since the advent of personal computers, hydraulic analyses are typically performed by utilizing computer programs which model the piping, reservoir, pumps, and specialty valves of a given water system.

Numerous computer programs have been developed for performing network analyses. The program utilized for the modeling and analysis of the City of Zillah water system is called WaterCAD, distributed by Bentley Systems, Inc. WaterCAD can perform instantaneous and extended period simulations of complete distribution networks, including reservoirs, source pumps, booster pumps, pressure reducing valves, and up to 1,000 pipes and 1,000 nodes (pipe junctions).

The program utilizes Genetic Algorithm calculations (Darwin modules) to solve the pressure networks. All water system components are entered into the computer, supply rates and user demands input, and reservoir water levels are established. Once this base information has been loaded, various options such as increasing system demand, lowering reservoir levels, shutting off source pumps, adding system improvements, and simulating fire flow conditions can be analyzed for their impact on the system.

3.4.6 Assumptions

To analyze the water system at a given moment in time, it is necessary to assume certain existing conditions and to program the status of key system components. The following general assumptions have been made for the hydraulic analysis of the City of Zillah water system:

- Roughness coefficients (C values) for most eight-inch or larger pipes were assumed to be 120. Pipes six-inch or smaller were assumed to have a C value equal to 110. Known old or poor condition pipes were assumed at C=100.
- Nominal pipe diameters were input for inside pipe diameters.
- Node elevations are based on available contour and topographic survey elevations.

Table 3-25 identifies the specific parameters used in the hydraulic analysis performed for existing and future peak hour demand (PHD) and for existing and future fire flow capacities at 20 psi residual pressure during maximum day demand (MDD) conditions. The PHD hydraulic analysis assumes that all primary source wells are operating and that the equalizing storage volume has been depleted from all tanks. The fire flow analysis, during MDD, assumes that the starting elevation in all tanks is with equalizing and fire suppression storage depleted. The fire flow analysis also assumes that all source wells are operating.

Initial elevations for the hydraulic analysis are calculated from the current and future reservoir pump-off elevations to represent current and future maximum storage conditions. The operational storage range and volume can be operator-adjusted based upon current demand, but the elevations (volumes) used represent normal operating conditions. Lower or higher initial water elevations could affect the calculated results provided in this Plan.

TABLE 3-25 HYDRAULIC ANALYSIS PARAMETERS

Water System Feature	Hydraulic Analysis Scenario			
	Year 2021 Peak Hour Demand	Year 2021 Fire Flow w/ MDD	Year 2041 Peak Hour Demand	Year 2041 Fire Flow w/ MDD
	1,256 gpm	722 gpm	1,771 gpm	1,019 gpm
Reservoir No. 1 Levels				
Maximum Elevation	976.9	976.9	976.9	976.9
Initial Elevation	970.0 [a]	952.5 [b]	952.5 [b]	970.0 [a]
Minimum Elevation [c]	921.2	921.2	921.2	921.2
Floor Elevation	950.5	950.5	950.5	950.5
Ground Elevation	873.9	873.9	873.9	873.9
Reservoir No. 2 Levels				
Maximum Elevation	972.6	972.6	972.6	972.6
Initial Elevation	970.0 [a]	947.5 [b]	947.5 [b]	970.0 [a]
Minimum Elevation [c]	921.2	921.2	921.2	921.2
Floor Elevation	868.6	868.6	868.6	868.6
Ground Elevation	868.6	868.6	868.6	868.6
Reservoir No. 3 Levels				
Maximum Elevation	850.0	850.0	850.0	850.0
Initial Elevation	849.5 [a]	849.5 [b]	849.5 [b]	849.5 [a]
Minimum Elevation [d]	NA	NA	NA	NA
Floor Elevation	821.0	821.0	821.0	821.0
Ground Elevation	821.0	821.0	821.0	821.0
Source Well Status				
Rainier Ave Well (S01)	550 gpm	550 gpm	550 gpm	550 gpm
Third Ave Well (S02)	300 gpm	300 gpm	300 gpm	300 gpm
WIPPCO Well (S03)	650 gpm	650 gpm	650 gpm	650 gpm
New Source Well	0 gpm	0 gpm	1,050 gpm	1,050 gpm
Total Supply	1,500 gpm	1,500 gpm	2,550 gpm	2,550 gpm

[a] Equalizing Storage depleted.
[b] Equalizing and Fire Suppression Storage depleted.
[c] Minimum reservoir level to provide 20 psi service pressure to all services.
[d] Minimum reservoir level not applicable, volume is provided by constant pressure booster pump station.

3.4.7 Analysis Scenarios

The existing water system was first analyzed considering a current peak hour demand of 1,256 gpm, based on the total calculated peak hourly flow as described in CHAPTER 2. A minimum residual pressure of 30 psi was maintained at all nodes where domestic service is provided and with all source pumps in operation. Pipe velocities remained below the eight feet per second (FPS) maximum velocity design parameter. A copy of the computer printouts of this scenario and all other hydraulic analyses results discussed in this section are provided in CHAPTER 10. Also included in CHAPTER 10 is Map B which shows the computer model layout with the pipe and node numbers for identification.

A future PHD analysis was run on the system using the PHD for the year 2041 of 1,771 gpm. All service pressures were greater than 30 psi and pipe velocities were below seven fps with all source pumps in operation.

Fire flows were considered at all hydrant locations throughout the pipe network while assuming an existing system maximum day demand of 722 gpm, based on the total calculated MDD on July 1, 2015. The computer hydraulic model was used to calculate the maximum flow attainable at designated hydrant nodes while providing a positive pressure of 20 psi. The resulting fire flow capacities are shown in, along with the fire district requested fire flow capacities as previously discussed. Several locations were calculated to be deficient in meeting the specified fire flow capacities, as shown in Figure 3-6. A future fire flow analysis was performed on the system with the 2041 maximum day demands to verify adequate fire flow capacity is available. Again, the same locations were calculated to be deficient in meeting the current fire flow requirements. A summary of the improvements in fire flow capacity at deficient locations from proposed water system improvements is shown in Figure 3-7.

3.4.8 Zone 2 Hydraulic Analysis

As discussed previously, Zone 2 is a closed system without a storage component, therefore the booster pump station must supply the entire flow and pressure required for the service area. Zone 1 water pressure is increased to Zone 2 pressure through the Zone 2 Booster Pump Station. The Zone 2 Booster Pump Station includes a 3 HP, 15 HP, and 60 HP pump, providing a constant pressure of 50 psi with the use of a pressure tank and VFD pump control. Refer to Section 3.3.3 for additional information. The pump station has a fire pump capacity of 1,500 gpm (2.16 MGD), and a service pump capacity of 300 gpm (0.432 MGD), which exceeds the current Zone 2 peak hour demand of about 9.2 gpm.

The Zone 2 pressure zone currently includes about 30 single-family residential services and one church service. Future supply requirements will be based on the anticipated growth in Zone 2, as discussed in CHAPTER 2.

In accordance with DOH recommendations, a closed system booster pump station should meet the following requirements:

- Provide PHD at no less than 30 psi at all services connections.
- Meet fire suppression requirements plus MDD while maintaining 20 psi at all service connections.
- During fire flow, assume the largest capacity booster pump routinely used is out of service.

Additionally, due to the booster pump station reliance on the Zone 1 supply system, the following conditions must be met within the Zone 1 system:

- Maintain 20 psi at all points in Zone 1 under fire flow plus MDD rate conditions in Zone 1 while supplying PHD to Zone 2.
- Maintain 20 psi at all points in Zone 1 under PHD within Zone 1 while supplying fire flow plus MDD to Zone 2.

To analyze the above conditions and scenarios, Zone 2 existing and future demands were calculated as shown in Table 3-26. A summary of the current and future available ERU capacity of Zone 2 is also included in Table 3-26.

TABLE 3-26 ZONE 2 CURRENT AND FUTURE DEMANDS

	2021	2031	2041
Zone 2 Total ERUs (MDD)	30.7	36.7	43.5
Peak Hour Demand (gpm)	9.2	11.0	13.1
Maximum Day Demand (gpm)	5.0	6.0	7.1
Max. Fire Flow Requirement (gpm)	2,000	2,000	2,000
Service Pump Capacity (gpm)	10-300	10-300	10-300
Fire Pump Capacity (gpm)	1,500	3,000	3,000
Zone 2 ERU_{MDD} Capacity	90	90	90
Zone 2 ERU_{MDD} Capacity Available	59.3	53.3	46.5

[a] Assumes Zone 2 growth as discussed in CHAPTER 2 and installation of a second fire pump.

CITY OF ZILLAH

Water System Plan Update

FIRE FLOW CAPACITY IMPROVEMENT MAP

N
W E
S
0 400 800 1600

LEGEND

ZILLAH CITY LIMITS

ZILLAH UGA BOUNDARY

950 GPM WELL ADDED

LOCATION 1
EXIST. < 500 GPM
IMPR. 1,700 GPM
REQ. > 500 GPM

LOCATION 2
EXIST. 1,800 GPM
IMPR. 3,350 GPM
REQ. 2,000-3,000 GPM

LOCATION 3
EXIST. 650 GPM
IMPR. > 4,000 GPM
REQ. 1,000-2,000 GPM

LOCATION 4
EXIST. 2,450 GPM
IMPR. > 4,000 GPM
REQ. 3,000-4,000 GPM

LOCATION 5
EXIST. 1,300 GPM
IMPR. 3,200 GPM
REQ. 3,000-4,000 GPM

LOCATION 6
EXIST. 1,450 GPM
IMPR. 2,050 GPM
REQ. 2,000-3,000 GPM

LOCATION 7
EXIST. 1,200 GPM
IMPR. > 4,000 GPM
REQ. 3,000-4,000 GPM

LOCATION 8
EXIST. 700 GPM
IMPR. > 4,000 GPM
REQ. 1,000-2,000 GPM

LOCATION 9
EXIST. < 500 GPM
IMPR. 1,800 GPM
REQ. >500 GPM

LOCATION 10
EXIST. 1,750 GPM
IMPR. 3,100 GPM
REQ. 3,000-4,000 GPM

FIRE FLOW CAPACITY INCREASE

LOCATION X
EXIST. 1,700 GPM
IMPR. 3,050 GPM
REQ. 3,000 GPM

LOCATION NUMBER
EXISTING WATER SYSTEM CAPACITY
CAPACITY WITH IMPROVEMENTS IN PLACE
REQUIRED CAPACITY

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

4/2/21
P:\Projects\2019\19202\2021 WSP FIGURES.dwg

FIGURE 3-7

The smallest 3 HP pump within the Zone 2 Booster Pump Station is capable of 10 to 60 gpm at 50 to 55 psi and can meet existing and future demands for the zone. The 15 HP, 50 to 300 gpm pump is available to meet flows exceeding the calculated PHD, or if Zone 2 grows faster than currently projected. With regards to fire flow, DOH recommends that that fire flow be met when the largest pump is out of service. Currently, only one of the 1,500 gpm fire pumps is installed. Therefore, to meet DOH reliability requirements and the required fire flow, it is recommended that the second fire pump be installed. Currently, the largest fire flow demand is the church, which the Zillah Fire Department has requested 2,000 gpm of available fire flow at 20 psi.

To evaluate the impact of the Zone 2 Booster Pump Station on Zone 1, the PHD and Fire Flow scenarios were evaluated with the pump station in operation. Copies of the hydraulic analysis used to analyze these scenarios are include in CHAPTER 10.

3.4.9 Model Calibration

Fire flow tests throughout the distribution system were performed by the Zillah Fire Department and Public Works staff in December 2013. The results of the flow tests were compared to the system hydraulic model. In general, differences between the results are likely due to several factors including, but not limited to, the reservoir elevation and well operation status were not documented during testing, elevation differences between the actual hydrant and the modeled node, distribution system valves may be closed, partially closed, or leaking. Additionally, it is important to understand fundamental differences expected between the results; the fire flow analysis is used to calculate the available fire flow at 20 psi within the water main, whereas the field test is an instantaneous free-discharge hydrant flow.

When comparing the results, the static pressures are generally within 5%. The residual pressures at field measured flows are more variable, with the model generally reporting higher residual pressures. As discussed, several factors are involved which may result in differences. A copy of the 2013 hydrant flow tests is provided in CHAPTER 10.

3.5 SYSTEM CAPACITY ANALYSIS SUMMARY

Provided in Table 3-27 is a summary of the year 2021, 2031, and 2041 projected water system demands for the City of Zillah, including ERUs for ADD and MDD. The values in Table 3-27 are calculated from the forecasted future water system demands provided in Section 2.4. All values include a 10% contingency.

TABLE 3-27 FUTURE WATER SYSTEM DEMAND SUMMARY

Year	$ERUs_{ADD}$	$ERUs_{MDD}$	Total Annual Demand (MG/Year)	ADD (MGD)	MDD (MGD)	PHD (gpm)
2021	2,767	4,414	171.01	0.469	1.040	1,256
2031	3,332	5,292	205.95	0.564	1.247	1,505
2041	3,927	6,226	242.71	0.665	1.467	1,771

The system's current and future physical capacity (ERUs), in terms of water rights, source capacity, and storage capacity is summarized in Table 3-28.

The water rights physical capacity in Table 3-28 is based on comparing the ADD per ERU to the current and/or future total annual (Q_a) water right quantity and the MDD per ERU to the current and/or future total instantaneous (Q_i) water right quantity. Similarly, source physical capacity is based on comparison of the MDD per ERU to the current well pump capacity.

The storage physical capacity in Table 3-28 is based on two of the primary storage components, equalizing storage (ES) and standby storage (SB). Physical capacity of the City's reservoirs is not based upon operational storage (OS) or fire suppression storage (FSS) because these normally do not change with the number of ERUs. The DOH equations for determining ERU capacity based on storage were calculated from the following equations:

Equalizing Storage

$$N = \left(\frac{\mathrm{ES}}{150} + \mathrm{Q_S}\right) / PHD$$ (*2019 Water System Design Manual*, Equation 7-1, solved for N)

Where,
N = Number of ERUs based on the ERU_{PHD} value (1.7 time ERU_{MDD} value)
Q_s = Total flow of all permanent sources (gpm)
PHD = Peak Hour Demand per ERU_{PHD} (gpm)

Standby Storage

$$N = \frac{SB}{200\ \mathrm{gallons}}$$ (*2019 Water System Design Manual*, Equation 4-7)

Where,
SB = Standby Storage (gallons), minimum recommended
N = Number of ERUs

Table 3-28 summarizes the water system capacity, in ERUs, based on current water right, source, and storage capacity. Projected system demands and calculated system capacities shown in other tables of this Plan are based on demand per service and do not directly correlate to the calculated demand per ERU for all service categories under different demand conditions (e.g. ADD, MDD, PHD). Values shown in Table 3-28 are therefore, only estimates based upon calculated demands per ERU for ADD and MDD from historical source and supply meter records.

TABLE 3-28 ERU CAPACITY SUMMARY (DOH WORKSHEET 4-1)			
Water System Connections Correlated to ERUs			
Service Classification	**Total MDD for the classification (gpd)**	**Total # Connections in the classification**	**$ERUs_{MDD}$**
Residential			
Single-Family Residential	244,635	1,041	1,041
Multi-Family Residential	46,740	114	194
Nonresidential			
Commercial	104,339	103	443
Industrial	299,136	8	1,271
Churches	1,376	8	6
City	3,249	9	13
Parks	214,740	6	913
WWTP Utility	31,109	1	132
DSL (6.23% 3-Yr Avg.)	58,894	N/A	251
Total existing ERUs (Residential + Nonresidential) =			4,264

Physical Capacity as ERUs					
Water System Component (Facility)	**Current System Capacity**	**Required Capacity**			**Calculated ERU Capacity for Each Component**
		2021	**2031**	**2041**	
Sources	2.160 MGD	1.040 MGD	1.247 MGD	1.467 MGD	9,191 ERU_{MDD}
Equalizing Storage (ES)	N/A	N/A	N/A	N/A	N/A
Standby Storage (SB)	1.025 MG[a]	0.883 MG	1.058 MG	1.245 MG	5,125 ERU_{MDD}
Water Rights Q_a = 1,458.1 ac-ft Qi = 2,550 gpm	475.1 MG 3.672 MGD	171 MG 1.040 MGD	206 MG 1.247 MGD	243 MG 1.467 MGD	7,702 ERU_{ADD} 15,625 ERU_{MDD}
Water System Physical Capacity (ERU_{MDD}) = 5,125 ERUs, limited by Standby Storage (SB)[b]					

[a] Current SB volume is calculated as 1.046 MG – 0.021 MG operational storage = 1.025 MG. Fire suppression storage is nested within SB storage volume.
[b] Recommended storage improvements increase SB volume by 0.400 MG, increasing the water system physical capacity to 7,125 ERUs.

It can be seen from Table 3-28 that of the existing system components, storage volume is currently the limiting factor in physical capacity for the City of Zillah water system.

Based on the calculated ERU physical capacity of the City's existing system, the number of service connections the City can serve now and, in the future, can be summarized and compared to the current active connections provide in the DOH Water Facilities Inventory (WFI) Form. Provided in Table 3-29 is a summary of current and future calculated DOH active service connections. Corresponding DOH WFI form box numbers are included for reference.

TABLE 3-29 DOH ACTIVE SERVICE CONNECTION CALCULATION SUMMARY

Service Classification (DOH WFI Form Box #)	Current Active Service Connections	Calculated 2031 Service Connections	Calculated 2041 Service Connections	Calculated Service Connections at Maximum Physical ERU Capacity*
Residential Connections				
Single-Family Residential				
Full Time (25. A.)	924	1,247	1,476	1,344
Part Time (25. B.)	0	0	0	0
Multi-Family Residential				
Multi-Family Buildings (26. A.)	102	137	163	147
Full Time Units (26. B.)	197	265	315	284
Part Time Units (26. C.)	0	0	0	0
Total Residential	1,121	1,512	1,791	1,628
Non-Residential Connections				
Recreational and/or Transient (27. A.)	0	0	0	0
Other Non-Residential (27. B.)				
Commercial	91	123	146	132
Industrial	7	9	11	10
Churches	7	9	11	10
City	8	11	13	12
Parks	6	8	9	8
WWTP Utility	1	1	1	1
Total Non-residential	120	161	190	173
TOTAL SERVICE CONNECTIONS (28.)	1,241	1,673	1,981	1,801

* Current maximum water system physical capacity is 5,125 ERUs, limited by reservoir storage volume. Calculated service connections at maximum physical ERU capacity assumes multi-family residential and non-residential $ERUs_{MDD}$ are equal to about 3,781 (320 services) and balance is single-family residential connections (ERUs). Calculated service connections at maximum ERU capacity does not include contingency or DSL.

3.6 SUMMARY OF SYSTEM DEFICIENCIES

The following is a listing and brief description of deficiencies which have been identified in the present water system. The deficiencies have been grouped within three system categories (supply, storage, and distribution) and are generally placed in order of their importance. The deficiencies may be operational in nature (which have been identified by the City's Water Department personnel) or maintenance related, inadequate present or future capacities, and/or system hydraulics problems.

3.6.1 Supply

Water Rights – The City's current water rights are adequate to satisfy existing and projected 20-year demands, however, additional source well capacity will be needed to fully utilize the City's total authorized instantaneous water right (Q_i) of 2,550 gpm. No water right deficiency exists unless a change application is needed to provide additional source well capacity.

Source Well Capacity – Source well capacity is not currently deficient but will need to be increased by year 2031. Additional source well capacity will provide supply redundancy, improve system reliability, maximize existing instantaneous water rights, and eliminate the need for equalizing storage in the future by meeting peak hourly demands. Construction of a new source well to increase capacity will need to be coordinated with existing water rights.

Source Well Water Quality – The Third Ave Well (S02) has a history of aesthetic/water quality issues due to elevated manganese levels and is typically used as the last pump called. The City receives an increased number of customer complaints when this well is running. Elevated levels of manganese are not a significant health risk but can cause substantial aesthetic water quality issues, especially when oxidation and precipitation occur. Treatment for reduction of manganese levels may become necessary in the future if levels continue to rise or regular source water disinfection is needed.

The Rainier Well (S01) and WIPPCO Well (S03) have a history of elevated nitrate levels, although no exceedances have occurred. Historical levels have risen some but appear to be stable, so no deficiency exists at this time. The City will continue to track nitrate levels to address any changes in water quality before they become an issue.

Source Well Protective Covenants – The City currently does not have protective covenants at Rainier Ave Well and Third Ave Well. These covenants are necessary to provide the required 100-foot sanitary protective radius around the wells.

System Disinfection/Chlorination – Water system disinfection/chlorination is not a required improvement nor an existing deficiency, but as the City's water system continues to grow it may become one. Chlorination is used to ensure consistent, safe water quality throughout the distribution system. To begin initial planning for this future improvement the impacts of chlorination are discussed in CHAPTER 3 and the estimated cost is provided in CHAPTER 8.

3.6.2 Storage

Reservoir Cleaning, Inspection, and Coating – The City's elevated reservoir and standpipe reservoir were last painted in 1991 and need to be cleaned, inspected, and re-coated to maintain water quality, prevent corrosion and structural damage, and reduce the potential for leakage. It is recommended that steel reservoirs are recoated every 20 to 25 years. The frequency of cleaning and inspections is variable depending on several characteristics (water quality, mixing, water age and turnover, etc.) but it is recommended that the reservoirs be inspected and cleaned approximately every five (5) years. The City's ground level storage tank, constructed in 2009, is also in need of cleaning and inspection.

Storage Capacity – Storage capacity is currently the City's limiting system component based on standby storage requirements, as discussed in Section 3.4.3 and Section 3.5 . Additional storage capacity will be needed by year 2031 based on population and service projections.

3.6.3 Distribution

Service Meters – There are approximately 400 old, manual-read meters that are planned to be replaced. The City has budgeted annually to replace approximately 30 meters per year throughout the City. They will replace old manual-read or leaking meters with new radio-read style meters.

Booster Pump Stations – Cutler Way Booster Station and Zone 2 Constant Pressure Booster Station were constructed without the designed spare pump due to budget constraints. The booster station capacity is impacted when the primary pump is out of service due to maintenance or repairs unless a spare pump is available.

Fire Flow Capacity – Several locations throughout the City's distribution system were identified in Section 3.4.7 as having insufficient fire flow capacities. Fire flow deficiencies will require pipeline upsizing or looping in the future. The City will construct system improvements to increase fire flow capacities at key locations as shown in Figure 3-7.

3.7 SELECTION AND JUSTIFICATION OF PROPOSED IMPROVEMENT PROJECTS

The following discussion identifies recommended system improvements proposed to eliminate or reduce deficiencies described in the previous section. References to prioritized improvements specified in Section 8.2 and Section 8.3 of this Report are provided. Further description of the water system improvements is provided in CHAPTER 8.

3.7.1 Supply

Protective Covenants – Protective covenants will be created and executed for source wells owned by the City of Zillah that currently do not have a protective covenant, providing the necessary 100-foot sanitary protective radius around the wells. **[O&M Improvement No. 1]**

New Source Well – The City will need to provide an additional source of supply to meet future peak water system demands, remove the need for future equalization storage, maximize their existing instantaneous water rights, and provide greater redundancy and system reliability. The City purchased the Joseph Well as part of the 0.6 MG storage reservoir and booster pump station improvement and plans to either rehabilitate the existing well or drill a new well at the Joseph Well site or another property owned by the City to supply an additional 1,050 gpm of water. The location of the new well will need to be coordinated with existing water rights, otherwise alternate locations may need to be evaluated. **[Capital Improvement No. 2]**

Source Well Treatment – Though not required at this time, the City's Third Ave Well has historically exceeded the secondary MCL for manganese, which causes aesthetic water quality issues. Treatment to reduce manganese levels may become necessary in the future if levels begin to increase or chlorine disinfection becomes necessary. It is anticipated that a high-rate inline pressure filter system will need to be installed for removal of manganese from the source water. **[Capital Improvement No. 7]**

System Disinfection/Chlorination – Though not required at this time, system disinfection/chlorination at the City's source wells may become necessary in the future as the City's water system continues to grow. Chlorination is used to ensure consistent, safe water quality throughout the distribution system. Disinfection improvements will include installation of chlorination equipment at the City's source wells and booster pump stations and control system upgrades to manage and monitor system disinfection. **[Capital Improvement No. 6]**

3.7.2 Storage

Reservoir Cleaning, Inspection, and Coating – The elevated reservoir and standpipe reservoir were last coated in 1991 and should be recoated approximately every 20 to 25 years to maintain water quality and prevent corrosion. To determine the existing condition of Reservoirs No. 1 and 2, it is recommended that the City contract with a certified diver to inspect and clean the existing reservoirs. If any mechanical or structural deficiencies are discovered, they can be planned for correction when the reservoirs are offline for re-painting. It is also recommended that the City's ground level storage reservoir (Reservoir No. 3), constructed in 2009, be cleaned and inspected. **[O&M Improvement No. 4]**

Given the age of the existing elevated tank and standpipe reservoir (Reservoirs No. 1 and 2) most recent recoating, it is anticipated that the existing tanks will have to be recoated immediately following cleaning and inspection. Recoating is necessary to maintain water quality, prevent corrosion, and extend the service life of the existing tanks. Repainting of the tanks will have to be timed with other improvements to ensure sufficient storage is available for system operation during completion of the improvements. **[Capital Improvement No. 1]**

Storage Capacity – Additional storage capacity will need to be constructed by year 2031 to provide sufficient standby storage volume to meet projected future water system demands. As described in Section 3.3.4 the City's ground level storage reservoir (Reservoir No. 3) was designed to allow for future expansion to provide an additional 400,000 gallons of storage. Increasing the Reservoir No. 3 storage capacity to one million gallons will provide sufficient storage to meeting 20-year demand projections. **[Capital Improvement No. 3]**

3.7.3 Distribution

Service Meters – Approximately 400 service meters require replacement. The City is planning to continue replacing approximately 30 meters per year with new radio-read meters. **[O&M Improvement No. 2]**

Backup Booster Pump Installation – The City's existing booster pump stations at Cutler Way and Zone 2 were designed to accommodate redundant backup booster pumps. At the time of construction, funds were not available for these pumps. However, to provide greater system reliability during routine maintenance and repairs, it is recommended that these backup pumps be installed. **[Capital Improvement Nos. 4 and 5]**

Water Main Upsizing, Replacement and Looping – Upsizing existing water mains or providing new connections and loops will increase system flows and pressure to areas identified as deficient in Figure 3-7. Installation of water main loops, main upsizing, and replacing old leaking mains will improve overall system capacity, reliability, and water loss. A summary of the improvements is below:

- Additional 8-inch water main loop in the Alteejen Road area of Zone 2 will improve fire flow to this residential area. **[Capital Improvement No. 8]**

- Looping the water main at the end of Schoentrup Lane to the existing standpipe reservoir (Reservoir No. 2) outlet piping will increase fire flow in this neighborhood from below 1,000 gpm to over 4,000 gpm. This improvement will also include a water main loop from the standpipe reservoir outlet piping to the 6-inch water main at the end of Reo Drive, along the SVID canal, which will also raise fire flow around Reo Drive from below 500 gpm to over 1,000 gpm. **[Capital Improvement No. 9]**

- Installation of an 8-inch water main loop from the south end of Miles Drive to First Avenue will improve fire flow at the commercial and industrial property along First Avenue and improve fire flow to the church property on Miles Drive. **[Capital Improvement No. 10]**

- Installation of an 8-inch water main loop from Meade Street to First Avenue will improve fire flow capacity to hydrants in this area. **[Capital Improvement No. 11]**

- Upsizing a portion of the water main in Moritz Street and Pollock Avenue to the existing fire hydrant will improve fire flow to over 1,000 gpm. **[Capital Improvement No. 12]**

- Replace the aging and undersized 6-inch steel water main in First Avenue from Cheyne Road to Fourth Avenue. **[Capital Improvement No. 13]**

- Replace the aging and undersized 4-inch water main in Edson Street and loop the main to Fourth Avenue. **[Capital Improvement No. 14]**

- Replace the 6-inch water main in Collins Place with an 8-inch water main to meet required fire flow capacity. **[Capital Improvement No. 15]**

- Replace the 6-inch water main in Zone 2 to the Catholic Church with an 8-inch water main to meet required fire flow capacity. **[Capital Improvement No. 16]**

- Replace the 6-inch water main in South First Avenue from Meade Street to Glen Drive with an 8-inch water main to meet required fire flow capacity. **[Capital Improvement No. 17]**

- Installation of an 8-inch water main loop from Pearson Street to South Industrial Area Loop along I-82 right of way to meet required fire flow capacity. **[Capital Improvement No. 18]**

- Upsize the 6-inch PVC water main in Fifth Street from Glennwood Drive to Third Avenue. **[Capital Improvement No. 19]**

CHAPTER 4 -

WATER USE EFFICIENCY (WUE) PROGRAM

HLA
Engineering and Land Surveying, Inc.

4.1 WATER USE EFFICIENCY PROGRAM (WUE)

4.1.1 Planning Requirements

In 2003, the Washington State Legislature passed the Municipal Water Supply-Efficiency Requirements Act (commonly called the Municipal Water Law) as part of a multi-year effort to reform the state's water laws. The act requires all municipal water suppliers to use water more efficiently in exchange for water right certainty and flexibility to meet future water demands. The Legislature directed DOH to adopt a rule that establishes water use efficiency requirements for all municipal suppliers. The Water Use Efficiency (WUE) Rule, which became effective on January 22, 2007, includes the following key items:

- WUE Program – This element of the rule requires the collection of water production and consumption data, forecast of future water demands, evaluation of system leakage, evaluation of water rate structures, and the implementation of WUE measures. This Program is a required element of all Water System Plans prepared after January 22, 2008.

- Distribution System Leakage (DSL) Standard – Municipal water suppliers with 1,000 or more connections are required to satisfy a DSL standard equal to 10% or less of total production by July 1, 2010.

- WUE Goal Setting and Performance Reporting – Municipal water suppliers are required to set WUE goals through a public process and report annually on their performance to customers and DOH. For water systems with 1,000 or more connections, the deadline for establishing systems goals is July 1, 2009. WUE goals must be established through a public process for a six-year period and should be re-evaluated each cycle.

The following items are required to be included in the WUE program in accordance with WAC 246-290-810(4):

- Description of the current water conservation program, including an estimation of water saved through program implementation over the last six years;

- Description of the chosen WUE goals;

- Evaluation and implementation of WUE measures;

- Projected water savings;

- Customer education;

- WUE program effectiveness; and

- DSL evaluation.

4.1.2 Current Water Use Efficiency Program

Zillah's current Water Use Efficiency (WUE) Program was prepared as part of the *2014 Water System Plan Update*, and included the following elements:

- WUE Goals;
- Evaluation and Implementation of WUE Measures;
- WUE Measure Implementation;
- Customer Education;
- WUE Program Effectiveness; and
- Distribution System Leakage (DSL) Evaluation.

Provided in Table 4-1 is a summary of the City population, number of water services, water consumption, and consumption per single-family residential service from 2014 to 2019. Further information on historical water use is provided in CHAPTER 2. Since 2014, annual residential average day consumption per service has steadily been decreasing except for 2018.

TABLE 4-1 WATER CONSUMPTION INFORMATION 2014-2019

Year	Population*	Total Water Services	Annual Water Consumption (MG)	Annual Single-Family Residential Consumption (MG)	Single-Family Residential Water Services	Single-Family Residential Avg. Day Consumption Per Service (gal/service/day)
2014	3,140	1,079	140.62	53.71	870	169
2015	3,140	1,075	139.53	53.88	867	170
2016	3,145	1,086	139.28	54.94	876	172
2017	3,150	1,016	137.34	55.22	804	188
2018	3,165	1,149	138.35	54.03	932	159
2019	3,185	1,145	125.85	52.95	924	157

* From Washington State OFM population estimates.

The City's *2014 Water Use Efficiency Program* included a goal to reduce the average ERU annual water consumption by a minimum of 1% across all user classes within six years. Since 2014, the City has reduced single-family residential water consumption by 12 gallons per service per day as shown in Table 4-1. This is equivalent to about a 7% reduction in consumption per single-family residential service/ERU since 2014. There has also been a 10.5% reduction in annual consumption since 2014.

Since 2014, the City has replaced water service lines, valves, and distribution mains that were leaking. They also completed a major well rehabilitation project that included installation of new service meters in 2018. These efforts have assisted in reducing the difference between water production and consumption volumes.

4.1.3 Water Use Efficiency Goals

WUE goals are an integral component of the WUE program, setting the groundwork for more efficient use of water. The City of Zillah has observed reductions in residential consumption per service through past conservation measures. Establishing a measurable goal for reducing water demand is essential to an effective WUE program. The City of Zillah plans to further promote water use efficiency over the next planning period and has established the following WUE goal for their water system:

> Reduce residential and commercial water consumption per service by 1% over the next 10-year period.

It is anticipated that the reduction in residential and commercial consumption per service could save about 828,000 gallons of water annually over the next 10-year period.

4.1.4 Evaluation and Implementation of Water Use Efficiency Measures

Water use efficiency (WUE) measures are necessary actions taken to attain a water system's established efficiency goals. Measures are intended to support the WUE program and should address both supply and demand efficiencies. For this reason, the WUE measures that have been evaluated and/or implemented are separated into two primary categories, demand side and supply side measures.

Demand Side Measures

Municipal water systems are required to evaluate or implement a specified number of demand side water use efficiency (WUE) measures based upon the size of the water system. Table 4-2 shows the minimum number of measures required to be evaluated or implemented by the City of Zillah.

TABLE 4-2 WATER USE EFFICIENCY MEASURES

Number of Service Connections	Number of Water Use Efficiency Measures to be Evaluated
Less than 500	1
500 - 999	4
1,000 – 2,499	5 (Zillah's current requirement)
2,500 – 9,999	6
10,000 – 49,999	9
Greater than 50,000	12

A discussion of the demand side measures the City of Zillah has evaluated to achieve its specified efficiency goal are provided below, along with the estimated costs to implement the measures and the projected water savings. Evaluation of the following measures for cost-effectiveness is primarily based upon the overall implementation costs as compared to the amount of potential water savings.

It should be noted that water savings attributable to public information activities are difficult to quantify because they are not directly linked to physically saving water. Although these measures cannot be specifically quantified, they are an integral part of the WUE Program, raising awareness of the importance of water conservation and increasing community participation in other conservation activities.

Consumer Consumption History – The monthly utility statements that the City sends out to its customers indicate monthly water consumption. Customers may request a more detailed breakdown of water consumption history, allowing customers to track and compare their usage. Citizens can be informed of their own water use trends. The City normally contacts a customer that has had a couple of months of higher-than-normal bills. The awareness can allow them to evaluate their individual water conservation needs and alert them of potential leaks. This measure is implemented across all user categories.

WUE Measure Cost Estimate: $500 total, already part of billing process.

Estimated Water Savings: Unknown but anticipated to continue reducing consumption through customer awareness.

WUE Measure Action Status: Already implemented.

Bi-monthly Educational Seasonal Conservation Information – City of Zillah will evaluate offering more frequent educational information outlining more efficient indoor and outdoor water use during each billing cycle. Bi-monthly educational tips would target the high users of water in the area. City of Zillah may educate the public about why water conservation is important and why there is a particular need to lower water usage, especially during the peak months of June, July, and August. Conservation tips would address seasonal topics such as outdoor water reduction in the yard, and during the winter months will focus on indoor leak prevention tips. This measure will be implemented across all user categories.

WUE Measure Cost Estimate: $500, funded through existing budget.

Estimated Water Savings: Unknown but anticipated to reduce consumption through awareness.

WUE Measure Action Status: City to schedule implementation.

A summary of the estimated costs to implement the selected measures, their estimated water savings, and overall cost-effectiveness are provided in Table 4-3.

TABLE 4-3 SUMMARY OF DEMAND SIDE WUE MEASURES

Measure Description	Implementation Cost	Implemented	Projected Water Savings
Customer Consumption History – Single-Family Residential	$500	Yes	Unknown
Customer Consumption History – Mult-Family Residential	$500	Yes	Unknown
Customer Consumption History - Commercial	$500	Yes	Unknown
Bi-Monthly Educational Seasonal Conservation Information – Single-Family Residential	$500	No	Unknown
Bi-Monthly Educational Seasonal Conservation Information – Multi-Family Residential	$500	No	Unknown

Supply Side Measures

Supply side measures are essential to control distribution system leakage (DSL), improve supply efficiency, and overall system performance. The following are discussions of supply side WUE measures that have already or will be implemented within the next plan approval period to maintain the City's DSL percentage below the 10% standard. The estimated cost of these measures and anticipated water savings are also provided.

Source Meter Calibration – The City must calibrate and maintain source meters and large service meters (4-inch and larger) based on generally accepted industry standards and manufacturer information. Compliance will be maintained by the City by performing maintenance on the source and service meters every two (2) years as recommended by DOH. Actual water savings from meter calibration is unknown, but if the accuracy of all source meters is improved by 0.5%, the resulting water savings could be as much as 825,000 gallons, considering that approximately 165 million gallons were pumped into the system in 2015. It should be noted that the opposite of water savings could result, therefore, it is unknown if distribution system leakage (DSL) will be reduced or how much water could be saved through meter calibration.

WUE Measure Cost Estimate: $1,500 annually for calibration of one source meter and half of the larger service meters.

Estimated Water Savings: Unknown, could potentially reduce DSL by 0.5%.

WUE Measure Action Status: Already implemented.

Reservoir Cleaning and Inspection – The City periodically cleans and inspects its reservoirs for cracking and any other deficiencies. Cracking causes unnecessary leakage directly contributing to distribution system losses (DSL). The City's reservoirs should be cleaned and inspected every five (5) years to identify any cracking and potential DSL. The approximate cost of inspecting and cleaning each reservoir is generally $8,000, assuming no significant repairs are necessary.

WUE Measure Cost Estimate: Approximately $8,000 per reservoir.

Estimated Water Savings: Unknown.

WUE Measure Action Status: Annual budgeting and inspection schedule.

Leak Detection and Water Accounting Leak Detection – As leaks are discovered, they are repaired, or mains are reconstructed as needed. One way the City watches for system leaks is through a meter reading program. The City's Finance Department uses software that tracks the consumption history of each meter. If a meter shows a higher-than-average consumption level during any given billing cycle a maintenance worker is sent to the site to verify the reading. If the reading is accurate, the location is then investigated for potential leaks to prevent further water loss.

WUE Measure Cost Estimate: $500. Already in annual operating budget.

Estimated Water Savings: Unknown, but potentially significant reduction in DSL if leak detected.

WUE Measure Action Status: Already implemented.

TABLE 4-4 SUMMARY OF SUPPLY SIDE WUE MEASURES

Measure Description	Implementation Cost	Implemented	Projected Water Savings
Source Meter Calibration	$1,500 annually	Yes	825,000 gallons
Reservoir Cleaning and Inspection	$8,000 per reservoir	Yes	Unknown
Leak Detection and Water Accounting Leak Detection	$500	Yes	Unknown

4.1.5 WUE Measure Implementation

A summary of the WUE program measures that are planned for implementation is provided in Table 4-5, including measure description, implementation cost, and year of implementation. All the implemented measures support the system's WUE goals to reduce distribution system leakage (DSL).

TABLE 4-5 SUMMARY AND PROJECTED SAVINGS OF WATER USE EFFICIENCY MEASURES

Measure Description	Implementation Cost	Implemented	Projected Water Savings
Customer Consumption History – Single-Family Residential	$500	Yes	Unknown
Customer Consumption History – Mult-Family Residential	$500	Yes	Unknown
Customer Consumption History - Commercial	$500	Yes	Unknown
Bi-Monthly Educational Seasonal Conservation Information – Single-Family Residential	$500	Not scheduled at this time	Unknown
Bi-Monthly Educational Seasonal Conservation Information – Multi-Family Residential	$500	Not scheduled at this time	Unknown
Source Meter Calibration	$1,500 annually	Yes	825,000 gallons
Reservoir Cleaning and Inspection	$5,000 per reservoir	Yes	Unknown
Leak Detection and Water Accounting Leak Detection	$500	Yes	Unknown

The City plans to budget funds each year for the next ten-year period to fund the WUE measures listed above in Table 4-5. These budget amounts are reflected in the proposed City of Zillah financial plan in CHAPTER 9 as part of the general operational budget and/or O&M improvement costs.

4.1.6 Customer Education

Customer education is intended to inform citizens about the need for, and the methods to achieve water conservation. Customer education involves publicizing and promoting the need for water conservation to all classes of customers. Zillah currently provides informational materials aimed at water use efficiency for customers on the City's website (www.cityofzillah.us) and at City Hall. Additionally, the City sends out seasonal water conservation tips to their customers in each *Consumer Confidence Report* to help prepare customers for the changing season. In the future, the City plans to provide bi-monthly seasonal conservation information to customers during each billing cycle to further educate the public on the purpose of using water more efficiently. In 2011, the City implemented a new customer billing format to provide customers with a consumption history on their monthly bills along with a message box for water conservation tips and announcements.

Customer education programs that Zillah has considered for further evaluation include the following:

- Program Promotion – Program promotion can include public service announcements, news articles, information provided in the City's annual Consumer Confidence Report, bill inserts, providing water use history as part of utility bills, and distribution of inexpensive, easily installed water-saving devices such as shower flow restrictors, toilet tank water displacement bags, and leak detection dye tablets.

- Speakers Bureaus – Speakers bureaus involve identifying water conservation speaking opportunities appropriate to various civic, service, community, and other groups. Such speaking opportunities focus on increasing public awareness of water resource and conservation issues and may involve the use of audio and visual aids.

- School Outreach – School outreach involves preparation of educational programs for school children targeted to increase awareness of local water resources and encourage water conservation practices. These may include school presentations, preparation of curriculum material, and tours of water system facilities.

- Theme Shows and Fairs – This activity involves preparation of a portable display of water conservation devices and selected written material and making this display available at local area theme festivals and activities.

Zillah has identified some of these customer education programs as evaluated WUE measures that may be implemented in the future, as discussed previously.

4.1.7 Water Use Efficiency Program Effectiveness

The Water Use Efficiency Rule requires the completion of annual performance reporting to system customers and to DOH. The City will use preparation of the Annual WUE Performance Report as an opportunity to review the effectiveness of the WUE measures and determine if established goals require revision. The annual effectiveness evaluation and the Annual WUE Performance Report will include the following elements:

- Calculation of DSL in terms of volume and percent of total water production;

- Identification of WUE goals;

- Evaluation of established WUE goals, including estimating water savings achieved through implemented measures and progress towards satisfying goals.

Zillah will submit its Annual WUE Performance Report to DOH by July 1st of each year. Information contained in the Annual WUE Performance Report will also be included in the City's *Consumer Confidence Report*, which will be published on the City's website. WUE Program effectiveness will also be evaluated every six years when the Water System Plan is updated again. At this time both goals and measures will be reevaluated to determine the most cost-effective method to achieve the updated goals.

4.1.8 Water Use Efficiency Savings

To quantify the reduction in water supply requirements expected due to implementing WUE measures identified in Section 4.1.5, estimates of water use savings have been calculated. Provided in Table 4-6 is a summary of the water demand projections for years 2031 and 2041, with and without WUE measures implemented.

TABLE 4-6 DEMAND FORECAST WITH AND WITHOUT PROJECTED WUE SAVINGS

Year	Total Annual Demand (MG/Year)		ADD (MGD)		MDD (MGD)	
	Without WUE	With WUE	Without WUE	With WUE	Without WUE	With WUE
2031	205.95	205.12	0.564	0.561	1.247	1.244
2041	242.71	241.88	0.665	0.662	1.467	1.464

CHAPTER 5 -

SOURCE WATER PROTECTION

HLA
Engineering and Land Surveying, Inc.

5.1 WELLHEAD PROTECTION PROGRAM

In 2000, Zillah completed and implemented a wellhead protection plan. The purpose of the plan was to:

- Identify potential sources of contamination near the City's ground water supplies;
- Implement management strategies to prevent contamination of those supplies; and
- Develop a contingency plan for contamination mitigation if ground water does become contaminated.

The City of Zillah's Wellhead Protection Plan, prepared in accordance with DOH requirements, consists of the following sections:

- Introduction
- Hydrology
- Identification of the wellhead protection areas
- An inventory of potential contamination sources
- A management strategy
- A contingency plan
- A list of figures
- An appendix
- Well logs
- A resource contact list

The City's Wellhead Protection Plan is considered a companion document to the City's Water System Plan and should be consulted for specific details and information regarding Zillah's wellhead protection program. A copy of Zillah's Wellhead Protection Plan is included in CHAPTER 10. As part of this *Water System Plan*, the Potential Contaminant Source and Notification List has been updated and is presented in Section 5.3. Location of these potential contaminant sources are shown on Figure 5-1.

The City's wells are located in fenced well sites and are enclosed in secured well houses or have protective outdoor covers. Of the City's three well sites, only WIPPCO Well (S03) has a recorded protective covenant, establishing the required 100-foot sanitary protective radius around the well. Protective covenants are required at Zillah's other two source wells. Protective well covenants will be created and executed for the remaining two wells owned by the City of Zillah to provide the necessary 100-foot sanitary protective radius around the wells as described in Section 8.2.1.

5.2 EXEMPT WELLS

The City of Zillah allows drilling and use of exempt wells within its service area only if the property to be served is located outside of the existing area served by the City's water system. Exempt wells are defined in state law (RCW 90.44.050) as:

> "*. . . any withdrawal of public ground waters for stock-watering purposes, or for the watering of a lawn or of a noncommercial garden not exceeding one-half acre in area, or for a single or group domestic uses in the amount not exceeding five thousand gallons a day, or for an industrial purpose in the amount not exceeding five thousand gallons a day, is and shall be exempt from the provisions of this section . . .*"

The City requires those areas served by exempt wells to connect to the City's water system when it extends to the property. At that time, any exempt wells on the property shall either be decommissioned in accordance with the applicable Washington Administrative Code (WAC) requirements or taken over by the City to become part of the City's water system.

CITY OF ZILLAH

Water System Plan Update

POTENTIAL GROUNDWATER CONTAMINANT SOURCES

LEGEND

- ZILLAH CITY LIMITS
- ZILLAH UGA BOUNDARY
- SOURCE WELL
- WELLHEAD PROTECTION AREA
- POTENTIAL CONTAMINANT SOURCE (#)

No. Potential Source

1. Bleyhl Farm Service
2. Borton Fruit
3. Circle K East
4. Cherry Patch
5. Zillah School District Bus Garage
6. Zillah Wastewater Treatment Facility
7. Zillah Public Works Department
8. Circle K West
9. Stadelman Fruit Warehouse
10. Stadelman Fruit Warehouse
11. Shawn Hyatt Construction
12. Circle L Minimart / Texaco
13. RSI
14. Stadelman Bin Storage
15. Community Dental Care
16. Benjamin Weege Dentist
17. Valley Hills Funeral Home
18. Davita Zillah Dialysis Center
19. Fire District #5
20. City of Zillah Fire Department

N W E S

0 250 500 1000

Possible Future Well (Joseph Well Site)

WIPPCO Well

200' R (1-YEAR)

140' R (6-MONTH)

620' R (10-YEAR)

440' R (5-YEAR)

Third Ave. Well

200' R (1-YEAR)

140' R (6-MONTH)

Rainier Well

980' R (1-YEAR)

800' R (6-MONTH)

2,550' R (5-YEAR)

3,590' R (10-YEAR)

YAKIMA VALLEY HIGHWAY

CUTLER WAY

CHEYNE ROAD

ROZA DRIVE

W. CENTENNIAL RD.

E. CENTENNIAL RD.

SCHOOLEY RD.

ALTEEJEN ROAD

HAMILTON DRIVE

CANAL ROAD

YAKIMA VALLEY HIGHWAY (OLD S.R. 12)

NORTHSTONE PARKWAY

MERCLYN LANE

COLLINS PL

CARLSONIA ROAD

FOURTH AVE.

FIRST AVE.

THIRD AVENUE

ELLEN LANE

MEADOWLARK LANE

ZILLAH HEIGHTS ROAD

REQ DRIVE

SCHOENTRUP LANE

E. ZILLAH DR.

SVID CANAL

MORTZ DR.

POLLOCK AVE

SECOND AVENUE

BIRCH

WALNUT

CHENAUR DR.

SHARON AVE.

KAGELY WAY

BARTLETT AVE

NOB HILL AVE

RAILROAD AVENUE

MEADE DRIVE

GLEN DRIVE

MILES DRIVE

ANN STREET

LINDA STREET

PEARSON STREET

ADAMS PARK DR.

SUNSET WAY

ANN ST.

CONCORD STREET

BAKER DR.

CHERRY HILL DR.

GLENWOOD DRIVE

WESTWIND DRIVE

VALLEY VIEW DR.

MT. VIEW LANE

COLE DRIVE

VINTAGE VALLEY PARKWAY

ZILLAH WEST DR.

EXIT 52

EXIT 54

N. MEYERS RD.

INTERSTATE 82

YAKIMA RIVER

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

2-12-21
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FIGURE 5-1

5.3 UPDATES AND MODIFICATIONS TO THE WELLHEAD PROTECTION PLAN

When completed, information regarding the City's new source well will be added to the City's Wellhead Protection Plan. In addition, the Potential Contaminant Source and Notification List, originally developed in 2000 and updated in 2006 and 2014, has been updated again as part of this *Water System Plan* as shown in Table 5-1.

TABLE 5-1 POTENTIAL CONTAMINANT SOURCE AND NOTIFICATION LIST

Potential Source	Location
Bleyhl Farm Service	1404 First Avenue
Borton Fruit	1511 Cutler Way
Circle K East	824 Zillah West Road
Cherry Patch	101 First Avenue
Zillah School District Bus Garage	205 Second Avenue
Zillah Wastewater Treatment Facility	740 Railroad Avenue
Zillah Public Works Department	130 First Avenue
Circle K West	900 Vintage Valley
Stadelman Fruit Warehouse	100 Cheyne Road
Stadelman Fruit Warehouse	111 Meade Drive (First Avenue & Meade Drive)
Shawn Hyatt Construction	1420 Gilbert Road / 300 Golden Drive
Circle L Minimart / Texaco	723 First Avenue
RSI	504 First Avenue
Stadelman Bin Storage	W. Northstone Parkway
Community Dental Care	812 Zillah West Road
Benjamin Weege Dentist	111 First Avenue
Valley Hills Funeral Home	607 Second Avenue
Davita Zillah Dialysis Center	823 Zillah West Road
Fire District #5	90 7th Street
City of Zillah Fire Department	717 First Avenue

CHAPTER 6 -

OPERATION AND MAINTENANCE PROGRAM

HLA
Engineering and Land Surveying, Inc.

6.1 WATER SYSTEM MANAGEMENT AND PERSONNEL

The purpose of this section is to identify personnel responsible for the day-to-day operation of the water system and those positions responsible for development and/or approval of the operating budget and capital improvement program.

Water System Management Structure

Provided in Figure 6-1 is a flow chart which depicts the management hierarchy of Zillah's water system. Brief descriptions of the general responsibilities of each position identified in Figure 6-1 are listed below:

Mayor and City Council: Responsible for establishing all water system policies, including service area boundaries, user rate structures, water system personnel salaries, water department budget, and capital improvements. Approves all expenditures.

Public Works Director: Responsible for the direct coordination of all day-to-day water system operation and maintenance tasks. Reports on the status and needs of the water system to the Mayor and City Council. Prepares annual water department budget. Reviews all water system policy changes and expenditures. Establishes staff job descriptions and requirements and recommends hiring of personnel. Serves as public and press contact regarding water system information.

City Clerk-Treasurer: Responsible for supervision of utility billings and budgeting preparation. Allocates funds for approved expenditures.

Utility Billing Clerk: Responsible for entering water meter reading data into the computer, generating monthly water billings, and maintaining water consumption records.

Consulting Engineer: Assists City in long-range planning; aids Public Works Director in technical aspects of water system; and provides design engineering and construction services for capital improvements.

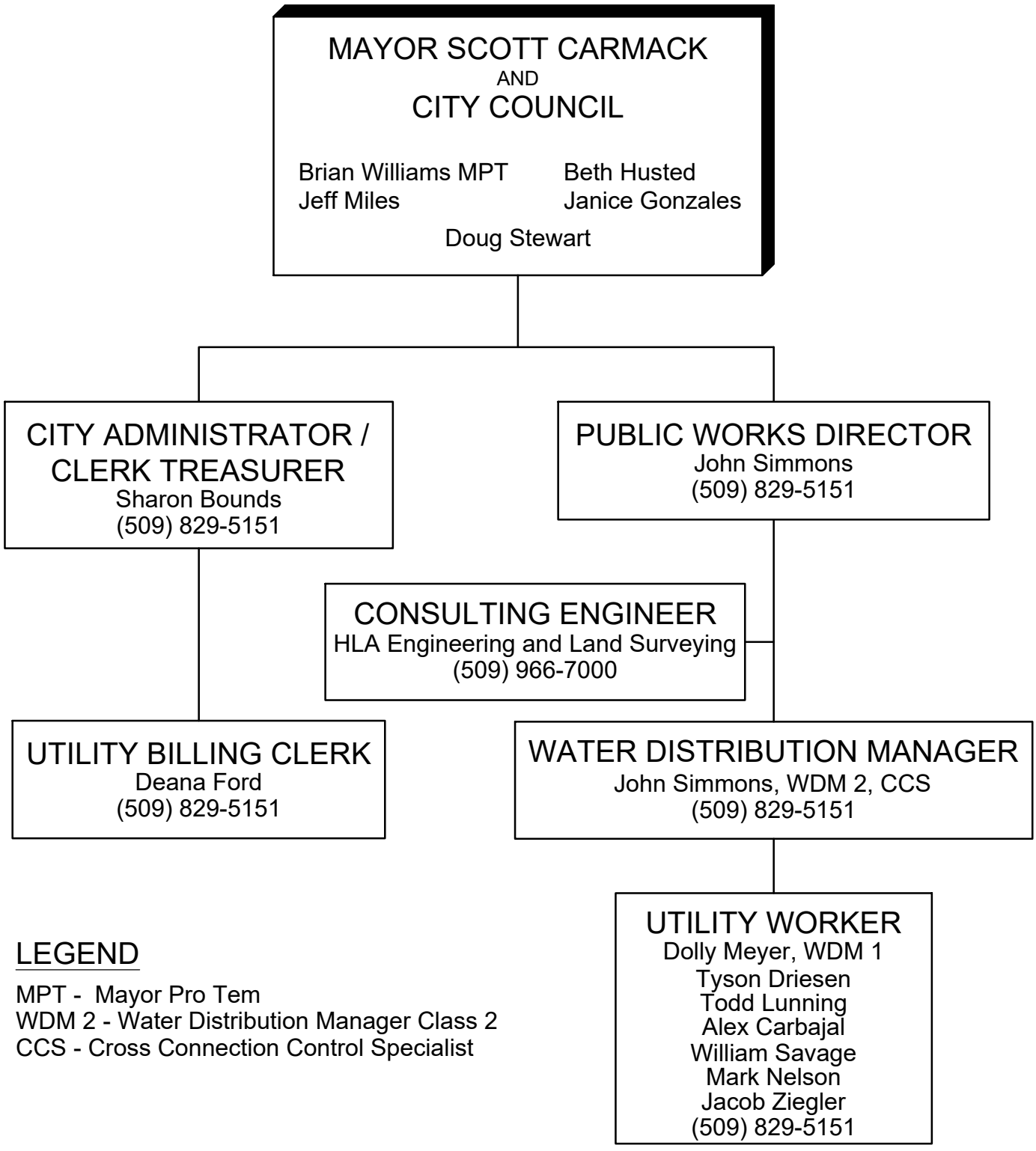
Water Distribution Manager: Under the direction of the Public Works Director, is responsible for supervising subordinate field personnel; managing the operation, maintenance and preventive maintenance of water system facilities; providing supportive recommendations for policies, procedures, and improvements to the department, budget preparation, and future facilities; and training subordinate employees in aspects and functions of field operations. Must be capable of operating or learning to operate every tool, piece of machinery, and equipment within the Water Department and must have a working knowledge of all types of materials, i.e., pipes, valves, and pumps. Must maintain a valid Class II, or better, Washington State Water Distribution Manager Certificate.

Utility Workers: Responsible for having knowledge of all aspects of the general operations, maintenance, and preventive maintenance, policies, and safety procedures of the water system facilities. Must be capable of performing duties required with a minimum of supervision or direction.

6.2 OPERATOR CERTIFICATION

All Group A water systems within the State of Washington are classified according to the population they serve and are required by state regulation to have a certified operator in charge of system operation. Operators are required to be certified at or above the certification level of the distribution system. Zillah's water distribution system, which serves between 1,501 and 15,000 persons, is classified as a Group 2 system and is, therefore, required to have a Class 2 (or greater) Water Distribution Manager (WDM) responsible for system operation. Zillah is also required to have a Cross-connection Control Specialist (CCS) responsible for the systems cross-connection control program.

Included within Figure 6-1 are the water certifications of the various public works employees responsible for the operation and maintenance of Zillah's water system. Zillah currently has one employee with a Water Distribution Manager 2 certification, and one employee with Cross-Connection Control Specialist certifications. Figure 6-1 provides the current certifications of all of Zillah's water system employees who work in and have water system responsibilities.



CITY OF ZILLAH

Water System Organizational Chart

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FIGURE 6-1

6.3 SYSTEM OPERATION AND CONTROL

CHAPTER 3 provides a detailed look at the various water system components and their interrelationship. This interrelationship is depicted in Figure 3-1, and a map of the existing water system (Map A) in CHAPTER 10. It is important that water department personnel fully understand the system to evaluate its operation and maintenance requirements.

Routine System Operation and Preventative Maintenance

An outline of routine operational tasks for the various major system components is provided below:

A. Source Wells and Pumps

1. Daily Tasks

   a. Check all well facilities visually.
   b. Check telemetry system.
   c. Manually record flow meter totalized readings as a backup to telemetry.

2. Weekly Tasks

   a. Maintain oil levels in well pumps.

3. Monthly Tasks

   a. Check static and draw down levels in wells and record them at the first of each month.
   b. Check floor drains and clean, if necessary.
   c. Clean pumphouse floors.

4. Quarterly Tasks

   a. Grease seal bearings on pump motors.

5. Seasonal Tasks

   a. Winterize or de-winterize pumphouse facilities.
   b. Check heating equipment and thermostats.
   c. Monitor and record well levels from ground level to the static water level during low (winter) demand and high (summer) demand periods.

6. Yearly Tasks

   a. Summarize flow meter totalizer records.
   b. Change oil in turbine pumps at Rainier Ave Well, Third Ave Well, and WIPPCO Well.
   c. Take sample of raw water from each well and submit to DOH Lab for Nitrate analysis.

7. Every Three Years Tasks

    a. Take sample of raw water from each well and submit to the DOH Lab for an Inorganic Chemical and Physical Analysis (IOC), for Volatile Organic Chemical (VOC) Analysis, and for Synthetic Organic Chemical (SOC) analysis, unless sources have been granted a waiver under the susceptibility waiver program.
    b. Lead and Copper - sample as directed by DOH.

8. As Needed

    a. Conduct sampling as directed in the current DOH Water Quality Monitoring Report.

B. Reservoirs

1. Daily Tasks

    a. Visually check reservoirs.

2. Yearly Tasks

    a. Visually inspect reservoir exteriors.
    b. Inspect reservoir interiors without removing them from service.

3. As Required Tasks

    a. Inspect and video record reservoir interior using diver, and vacuum remove accumulated debris.

C. Distribution System

1. Monthly Tasks

    a. Take required number of water samples from various representative sites within the distribution system and submit them to a certified laboratory for bacteriological analysis in accordance with the Coliform Monitoring Plan.
    b. Collect and record service meter readings.

2. Seasonal Tasks

    a. Insulate service meters.

3. Yearly Tasks

    a. Operate all valves through their full range and listen for leaks.
    b. Operate and flush all fire hydrants. Lubricate hydrant caps and threads. Touch-up paint as required.
    c. Inspect all cross-connection control devices.

4. As Required Tasks

    a. Flush low velocity water mains as required to remove sedimentation.
    b. Review plans for installation of cross-connection control devices on proposed new construction.
    c. Inspect installation of required devices on new construction.
    d. Repair and/or replace service meters.

D. Telemetry System

1. Daily Tasks

    a. Observe telemetry system operation.

2. Weekly Tasks

    a. Check automatic dialer status.

3. Monthly Tasks

    a. Check telemetry system alarms.

6.4 SAFETY PROCEDURES

All City personnel are instructed to exercise the utmost care when working on any water system facility. Safety of City staff and the public is the number one priority. Provided below is an outline of safety procedures to be followed when working on water system facilities:

A. Pumping Equipment

1. Removing Pump

    a. Shut off power to the pump, use lockout, tagout policy and procedures.
    b. Close valves.
    c. Ensure power is disconnected and then remove electrical cables.
    d. Lift pump with proper equipment.

2. Installing Pump

    a. Lift pump with proper equipment.
    b. Ensure all pipe connections are properly installed and tightened.
    c. Employ an electrician to properly connect power cables.
    d. Check pump rotation.
    e. Open valves.
    f. Ensure pump control valve (if present) is operating properly.
    g. Turn on power to the pump and remove lockout, tagout tag.

B. Reservoirs

1. Interior Inspection

a. All work conducted within confined spaces shall be done in accordance with the procedures specified in the City's Confined Space Entry Safety Program.
b. Inspection to be conducted by a minimum of two workers, one worker to stay outside the reservoir.
c. Ensure the reservoir interior is properly ventilated and illuminated.
d. Properly set and secure ladder (if required) before climbing into reservoir.

C. Distribution System

1. Pipeline Installation

a. All construction work requiring excavation, trenching, and shoring shall be conducted in accordance with the Department of Labor and Industries Safety Standards for Construction Work.
b. Close all valves connecting to pipe segment.
c. Properly set traffic control signing, barricades, and cones.
d. Install shoring or cribbing in all trenches over 48 inches in depth.
e. Construct thrust blocking, if required, and partially backfill the trench at a minimum prior to charging the pipeline.
f. Flush, disinfect pipe, and conduct bacteriological testing prior to putting new line into service.

6.5 SERVICE AND SUPPLY REPRESENTATIVES

Provided below is a list of service and supply representatives for the various system components:

A. Pipe, Valves, and Fittings

1. H.D. Fowler Co.
1100 River Road
Yakima, WA 98902
Phone: (509) 248-8400

B. Water Service Materials

1. H.D. Fowler Co.
1100 River Road
Yakima, WA 98902
Phone: (509) 248-8400

C. Service Meters

1. General Pacific, Inc.
P.O. Box 70
22414 NE Townsend Way
Fairview, OR 97024
Phone: (503) 907-2900

D. Water Main Tapping

1. Spear Taps, Inc.
   P.O Box 1135
   Carnation, WA 98014
   Phone: (425) 485-4764

2. GK Mechanical & Construction, Inc.
   8306 Midvale Road
   Yakima, WA 98908
   Phone: (509) 965-0599
   Contact: Gene Killioin
   Phone: (509) 454-6829

E. Electrical

1. Tolman Electric
   Grandview, WA 98930
   Phone: (509) 830-1164
   On call: (509) 831-2808
   Contact: Jason Tolman

2. Waymire Electric
   630 Zillah Heights Road
   Zillah, WA 98953
   Phone: (509) 829-3799
   Contact: John Waymire
   Cell: (509) 945-1101

3. Hutchinson Electric Inc.
   3660 Washout Road
   Sunnyside, WA 98944
   Phone: (509) 837-6551

4. H&N Electric, Inc.
   4224 East “B” Street
   Pasco, WA 99301
   Phone: (509) 547-1691

F. Pumps

1. Akland Pump & Irrigation
   3701 Fruitvale Blvd.
   Yakima, WA 98902
   Phone: (509) 452-7867

2. Picatti Brothers
   105 South Third Avenue
   Yakima, WA 98902
   Phone: (509) 248-2540

3. H&N Electric, Inc.
   4224 East "B" Street
   Pasco, WA 99301
   Phone: (509) 547-1691

G. Pressure Reducing Valves

1. GC Systems
   P.O. Box 848
   Sumner, WA 98390
   Phone: 1-800-525-9425

H. Telemetry System

1. Technical Systems, Inc.
   2303 - 196th SW, #B
   Lynnwood, WA 98036
   Phone: (206) 775-7309

I. Pump and Motor Oil

1. Wondrack Distributing, Inc.
   North Front & East First
   Yakima, WA 98901
   Phone: (509) 453-3147

J. Bearing Grease

1. NAPA Auto Parts
   717 West First Street
   Wapato, WA 98942
   Phone: (509) 877-6156

2. Zillah Pro Hardware
   605 First Avenue
   Zillah, WA 98953
   Phone: (509) 829-6888

3. Zillah Auto Parts
   104 7th Street
   Zillah, WA 98953
   Phone: (509) 829-6655

6.6 COMPREHENSIVE MONITORING PLAN

The City of Zillah monitors its system's water quality in accordance with the requirements of WAC 246-290-300, 246-290-310, and 246-290-320, which define the minimum monitoring requirements, maximum contaminant levels (MCL), and follow-up action requirements for public water systems. The following summarizes the requirements as they pertain to the City of Zillah:

6.6.1 Monitoring Requirements, Location, and Frequency

Bacteriological Analysis: Bacteriological analysis is conducted in accordance with the procedures and locations specified in Zillah's Coliform Monitoring Plan, a copy of which is provided in CHAPTER 10 of this Plan. The minimum number of bacteriological samples required per month within the distribution system is based upon the population served and is shown in part on Table 6-1 below:

TABLE 6-1 MINIMUM MONTHLY COLIFORM SAMPLING REQUIREMENTS

Permanent Population Served	Minimum Number of Samples per Month
1 - 1,000	1
1,001 - 2,500	2
2,501 - 3,300	3 (Zillah's current requirement)
3,301 - 4,100	4
4,101 - 4,900	5
4,901 - 5,800	6
5,801 - 6,700	7
6,701 - 7,600	8
7,601 - 8,500	9
8,501 - 12,900	10

Inorganic Chemical and Physical Analyses: A minimum of one sample every three years from each source well is required. The samples shall be collected from a point representative of the source, after treatment (if treated), and prior to entry into the distribution system.

Radionuclides: Radionuclide samples from each source are required once every three years. The samples shall be collected from a point representative of the source, after treatment (if treated), and prior to entry into the distribution system.

Volatile Organic Chemicals (VOCs): VOC samples shall be taken at each source once every 3 months for the first 12 months of operation, or as directed by the Department of Health (DOH). If no VOCs are detected in the first sample from a ground water source, only one additional sample will be required during the first 12 months. If no VOCs are above the specified MCLs after the initial 12 months of monitoring, the water system shall monitor each source at least once every three years. The samples shall be collected from a point representative of the source, after treatment (if treated), and prior to entry into the distribution system.

Synthetic Organic Chemicals (SOCs): SOC samples shall be taken at each source once every 3 months for the first 12 months of operation, or as directed by DOH. If no SOCs are detected in the first sample from a ground water source, only one additional sample will be required during the first 12 months. If no SOCs are above the specified MCLs after the initial 12 months of monitoring, the water system shall monitor each source at least once every three years. The samples shall be collected from a point representative of the source, after treatment (if treated), and prior to entry into the distribution system.

Lead and Copper: 10 samples at targeted sample tap locations throughout the distribution system are required every three years for lead and copper monitoring in accordance with the *Water Quality Monitoring Report* (CHAPTER 10). The water system must provide individual sampling results to the persons at each sample location no later than 30 days after learning the results. Additionally, the water system must complete and submit the signed *Lead and Copper Consumer Notice Certification Form* (CHAPTER 10) and a sample copy of one consumer notice to DOH within 90 days after the end of the monitoring period.

Other Substances: No other substances are required to be monitored at this time. Monitoring of other substances in the future will be as required by DOH.

6.6.1.1 Sanitary Survey

The most recent sanitary survey was conducted on September 11, 2018. No major compliance issues were observed at the time of the sanitary survey and all prior deficiencies were addressed. A copy of the most recent sanitary survey report is provided in Chapter 10

6.6.2 Testing Laboratories

Samples which have been collected must be transported and analyzed in accordance with Department of Health requirements. The analyses must be done by a state public health laboratory or a state certified private laboratory.

The City of Zillah routinely delivers bacteriological samples to Cascade Analytical on the same day they are taken. Sample bottles are obtained from the laboratory.

Samples for other required tests, e.g., Inorganic Chemical and Physical Analysis, are delivered to state certified laboratory on the same day they are taken. As with the bacteriological samples, sample bottles are obtained from the laboratory.

6.6.3 Violation Procedures

The City of Zillah is responsible for complying with the standards of water quality identified in WAC 246-290-310. If any substance exceeds its maximum contaminant level (MCL), the City shall take follow-up action as outlined under WAC 246-290-320.

A. Maximum Contaminant Levels (MCLs)

1. Bacteriological – If any coliform bacteria are present in any sample, follow-up action as described under WAC 246-290-320(2) shall be taken in accordance with the City's Coliform Monitoring Plan and the Groundwater Rule (GWR) requirements.

2. Inorganic Chemical and Physical (IOC) – MCLs for inorganic chemical and physical properties are as shown in Table 6-2.

TABLE 6-2 INORGANIC CHEMICAL MCLs

Chemical or Physical Property	MCL (mg/l)
Primary Substances	
Antimony (Sb)	0.006
Arsenic (As)	0.05
Asbestos	7 million fibers/liter (> 10 microns)
Barium (Ba)	2.0
Beryllium (Be)	0.004
Cadmium (Cd)	0.005
Chromium (Cr)	0.1
Copper (Cu)*	1.3
Cyanide (HCN)	0.2
Fluoride (F)	4.0
Lead (Pb)*	0.015
Mercury (Hg)	0.002
Nickel (Ni)	0.1
Nitrate (as N)	10.0
Nitrite (as N)	1.0
Selenium (Se)	0.05
Sodium (Na)*	20
Thallium (Tl)	0.002
Secondary Substances	
Chloride (Cl)	250.0
Fluoride (F)	2.0
Iron (Fe)	0.3
Manganese (Mn)	0.05
Silver (Ag)	0.1
Sulfate (SO_4)	250
Zinc (Zn)	5.0
Color	15 Units
Hardness	None
Specific Conductivity	700 umhos/cm
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.	

3. Radionuclides – MCLs for Radionuclides are as shown in Table 6-3.

TABLE 6-3 RADIONUCLIDE MCLS

RADIONUCLIDE	MCL
Radium-226	3 pCi/l
Combined Radium-226 and Radium-228	5 pCi/l
Gross alpha particle activity (excluding uranium)	15 pCi/l
Beta particle and photon radioactivity	4 milliren/year

4. Volatile Organic Chemicals (VOCs) – MCLs for VOCs are as shown in Table 6-4.

TABLE 6-4 VOLATILE ORGANIC CHEMICAL MCLS

VOLATILE ORGANIC CHEMICAL	MCL (mg/l)
Benzene	0.005
Carbon Tetrachloride	0.005
para-Dichlorobenzene	0.075
Trichloroethylene	0.005
Vinyl Chloride	0.002
1,1,1-Trichloroethane	0.2
1,1-Dichloroethylene	0.007
1,2-Dichloroethane	0.005
cis-1,2-Dichloroethylene	0.07
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
Trans-1,2-Dichloroethylene	0.1
Xylenes	10
1,2-Dichloropropane	0.005
Dichloromethane	0.005
1,1,2-Trichloroethane	0.005
1,2,4-Trichlorobenzene	0.07

5. Synthetic Organic Chemicals (SOCs) – MCLs for SOCs are as shown in Table 6-5.

TABLE 6-5 SYNTHETIC ORGANIC CHEMICAL MCLS

SYNTHETIC ORGANIC CHEMICAL	MCL (mg/l)
Alachlor	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
EDB	0
DBCP	0.0002
Heptachlor	0.0004
Heptachlor Epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
Toxaphene	0.0003
PCBs	0.0005
Pentachlorophenol	0.001
2,4-D	0.07
2,4,5-TP	0.05
PAHs (Benzo(a)pyrene)	0.0002
Dalapon	0.2
Di(ethylhexyl)-Adipate	0.4
Di(ethylhexyl)-Phthalate	0.006
Dinoseb	0.007
Diquat	0.1
Endothall	0.1
Endrin	0.002
Glyphosate	0.7
Hexachlorobenzene	0.001
Hexachlorocyclo-Pentadiene	0.05
Oxymal	0.2
Picloram	0.5
Simazine	0.004
2,3,7,8-TCDD (Dioxin)	0

B. Follow-up Action

1. General:

a. If water quality exceeds any MCLs listed in WAC 246-290-310, the purveyor shall notify the State Regional Health Department and take follow-up action as described in this section.

b. When a primary MCL violation occurs, the purveyor shall:

i. Notify the Department within 48 hours in accordance with WAC 246-290-480;
ii. Notify the public according to the procedures outlined under WAC 246-290-71001;
iii. Determine the cause of the contamination; and
iv. Take corrective action as required by the Department.

c. When a secondary MCL violation occurs, the purveyor shall notify the State Regional Health Department and take corrective action as directed by the Department.

2. Bacteriological:

a. When coliform bacteria are present in any sample and the sample is not invalidated under e. of this subsection, the purveyor shall ensure the following actions are taken:

i. The sample is analyzed for fecal coliform or E.coli. When a sample with a coliform presence is not analyzed for E.coli or fecal coliforms, the sample shall be considered as having a fecal coliform presence for MCL compliance purposes;
ii. Repeat samples are collected in accordance with b. of this subsection;
iii. Collect triggered source samples in accordance with c. of this subsection and have them tested for E. coli.
iv. The Department is notified in accordance with WAC 246-290-480; and
v. The cause of the coliform presence is determined and corrected.

b. Repeat samples: The purveyor shall collect and submit for analysis a set of repeat samples for every sample in which the presence of coliforms is detected in accordance with the following:

i. A set of three (3) repeat coliform samples is required for Group A systems and shall be collected at the following locations:

(1) At the site of the previous sample with a coliform presence.
(2) Within five active services upstream of the site of the sample with a coliform presence.
(3) Within five active services downstream of the site of the sample with a coliform presence.
(4) Per ground water rule, sample needs to also be taken at source or sources.

ii. For Group A systems, all samples in a set of repeat samples shall be collected on the same day and submitted for analysis within 24 hours after notification by the laboratory of a coliform presence. If the purveyor can demonstrate to the satisfaction of the Department that logistical problems beyond the purveyor's control make analysis of the samples in the repeat sample set impractical because the time between sample collection and analysis will exceed 30 hours, then the purveyor shall collect the required set of repeat samples as directed by the Department.

iii. When repeat samples have coliform presence, the purveyor shall:

(1) Contact the Department and collect a minimum of one additional set of repeat samples as directed by the Department; or
(2) Collect one additional set of repeat samples for each sample where coliform presence was detected.

iv. If a sample with a coliform presence was collected from the first two or last two active services, the purveyor shall monitor as directed by the Department.

v. The purveyor may change a previously submitted routine sample to a sample in a set of repeat samples when the purveyor:

(1) Collects the sample within five adjacent service connections of the location from which the initial sample with a coliform presence was collected;
(2) Collects the sample after the initial sample with a coliform presence was submitted for analysis;
(3) Collects the sample on the same day as other samples in the set of repeat samples, except under b.vi. of this subsection; and
(4) Notifies the Department of the change.

vi. The Department may waive the requirement to collect sets of repeat samples under this subsection during a month when a non-acute coliform MCL violation is determined for the system.

c. Triggered Source Sampling: In accordance with the Groundwater Rule (GWR) requirements, triggered source samples must be collected and tested for E. coli when coliform bacteria are present in any routine distribution sample. Triggered source sampling shall be conducted as follows:

i. Triggered source samples must be collected within 24 hours of notification of the total coliform positive result.
ii. Each source that was in operation at the time the routine sample was collected must be tested prior to treatment.
iii. If one of the triggered source samples is E. coli positive, corrective action shall be taken as directed by the DOH, or five additional source samples must be taken within 24 hours.
iv. If any of the five additional source samples is E. coli positive, one or more of the following corrective actions may need to be taken, as directed by the DOH:

(1) Provide an alternate source of water.
(2) Eliminate the source of contamination.
(3) Provide 4-log treatment.

v. Customers must be notified within 24 hours of receiving an E. coli positive triggered source sample.

d. Monitoring frequency following a coliform presence: Group A systems having one or more coliform presence samples that were not invalidated during the previous month shall collect and submit for analysis the minimum number of routine samples shown in Table 6-1.

i. The Department may waive the monitoring frequency requirement when one or more samples with a coliform presence were collected during the previous month, if the purveyor proves to the satisfaction of the Department:

(1) The cause of the sample with a coliform presence; and
(2) The problem is corrected before the end of the next month the system provides water to the public.

ii. If the Department waives this monitoring frequency requirement:

(1) The purveyor shall collect and submit at least the minimum number of samples required when no samples with a coliform presence were collected during the previous month; and
(2) The Department shall make available a written description explaining:

(a) The specific cause of the coliform presence; and
(b) Action taken by the purveyor to correct the cause of coliform presence.

e. Invalid samples.

i. The Department shall consider coliform samples with no coliform presence detected invalid when:

(1) Multiple tube technique cultures are turbid without appropriate gas production.
(2) Presence-Absence technique cultures are turbid in the absence of an acid reaction.
(3) There are confluent growth patterns or growth of TNTC (too numerous to count) colonies without a surface sheen using a membrane filter analytic technique; or
(4) There is excess debris in the sample.

ii. The Department may also invalidate a coliform sample when:

(1) The analyzing laboratory establishes that improper sample analysis occurred.
(2) The Department determines a domestic or non distribution system problem is indicated by:

(a) All samples in the set of repeat samples collected at the same location as the original coliform presence sample also have coliform presence; and
(b) All other samples in the set of repeat samples are free of coliform.

(3) The Department determines a coliform presence result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, when the Department invalidates a sample:

(a) The purveyor shall collect a set of repeat samples following the sample invalidation in accordance with 2.b. above; and
(b) The Department's rationale for invalidating the sample shall be documented in writing and made available to the public. The documentation shall state the specific cause of the coliform presence and what action the purveyor has taken or will take.

iii. When a coliform sample is determined invalid, the purveyor shall collect and submit for analysis:

(1) An additional coliform sample from the same location as each invalid sample within 24 hours of notification of the invalid sample; or
(2) Additional coliform samples as directed by the Department.

iv. When the Department or laboratory invalidates a sample, the sample shall not count towards the purveyor's minimum coliform monitoring requirements.

3. Inorganic Chemical and Physical (IOC): When an initial analysis of any substance exceeds the MCL, the purveyor shall take the following action:

a. For nitrate, immediately take one additional sample from the same sampling point. If the average of the two samples exceeds the MCL, a violation is confirmed: or
b. For all other inorganic chemical and physical substances, within 30 days take three additional samples from the same sample point. If the average of all four samples exceeds the MCL, a violation is confirmed.

4. Volatile Organic Chemicals (VOCs): The purveyor shall be responsible for the following follow-up actions:

a. After the purveyor's receipt of the first VOC analysis results from the laboratory, the purveyor shall provide notice to persons served by the system as described under WAC 246-290-71001.
b. When a List 1 VOC is verified at a concentration above the detection limit, the purveyor shall, at a minimum:

i. Sample the source once every three months for at least three years; and
ii. Make analysis results available to consumers within three months of receipt from the laboratory as described under WAC 246-290-71006.

c. When a List 1 VOC is verified at a concentration greater than an MCL, and the level will not cause the running annual average to exceed the MCL, the purveyor shall repeat sample the source as soon as possible. If a concentration greater than an MCL is confirmed, the purveyor shall:

i. Notify the Department within seven days of receipt of the repeat sample analysis results.
ii. Provide consumer information in accordance with WAC 246-290-71006.
iii. Submit documentation to the Department describing the water system's strategy for gathering and analyzing additional data, and identify plans for keeping the public informed; and
iv. Sample the source a minimum of once every three months for at least three years.

d. When the running annual average of a List 1 VOC is greater than an MCL, or one sample analysis result causes the annual average to exceed an MCL, the purveyor shall:

   i. Notify the Department within seven days of receipt of analysis results.
   ii. Notify the public as described under WAC 246-920-71006, including mandatory health effects language.
   iii. Submit an action plan to the Department for approval addressing follow-up activities, including corrective action. The purveyor shall submit the action plan within four months of receipt of Department notice that the annual average exceeds the MCL. The purveyor's action plan shall, at a minimum, contain:

      (1) Tabulation of VOC sample analysis results, including the location where VOCs were detected.
      (2) Description of monitoring plans for system sources.
      (3) Strategy for informing the public of monitoring results and investigations; and
      (4) Description of short and long-term plans to minimize exposure and/or eliminate the source of contamination.

   iv. Implement the action plan within one year of the Department's approval. The Department may require the purveyor's earlier compliance, if necessary, to eliminate an immediate health threat, or may require a revision of the action plan based upon additional sample results. The Department may extend the purveyor's period of compliance when the Department determines:

      (1) Substantial construction is required; and
      (2) The purveyor has taken all appropriate measures to protect the health of consumers served by the public water system.

      If the Department grants the purveyor an extension, the purveyor shall issue a notice identifying the MCL exceeded and the amount by which the repeat sample analysis results exceeded the MCL. The purveyor shall include the notice in all bills mailed to affected customers until the Department determines that the purveyor complies with the MCL.
   v. Sample the source a minimum of once every three months for at least three years.

e. When a List 2 or List 3 VOC is verified at a concentration above the detection limit, the purveyor shall:

   i. Submit the sample analysis results to the Department within seven days of receipt from the laboratory: and
   ii. Sample the source a minimum of once every three months for one year, and then annually thereafter during the three-month period when the highest previous measurement occurred.

f. If the Department determines that a List 2 or List 3 VOC is verified at a level greater than a state advisory level (SAL), the Department shall notify the purveyor in writing. The purveyor shall repeat sample the source as soon as possible after initial Department notice that an SAL has been exceeded. The purveyor shall submit the analysis results to the Department within seven days of receipt from the laboratory. If any repeat sample confirms that an SAL has been exceeded, the purveyor shall:

   i. Provide consumer information in accordance with WAC 246-290-71006.
   ii. Sample the source a minimum of once every three months for at least three years; and
   iii. Submit documentation to the Department listing VOC analysis results, describing the water system's strategy for gathering and analyzing additional data, and identifying plans for keeping the public informed. The purveyor shall submit this information to the Department within six months of the date of the first notice from the Department that an SAL has been exceeded.

g. The Department may reduce the purveyor's monitoring requirement for a source detecting a List 1 VOC if, after three years of quarterly monitoring, all analysis results are less than the MCL. The purveyor's reduced monitoring frequency shall be no less than one sample per year.
h. The Department may reduce the purveyor's monitoring requirement for a source detecting a List 2 or List 3 VOC if the source has been monitored annually for at least three years, and all analysis results are less than the SAL.
i. In establishing SAL's for List 2 and List 3 VOCs, the Department shall use the most recent edition of the Department document titled "Procedures and References for Determination of State Advisory Levels for Drinking Water Contaminants" which has been approved by the State Board of Health. Copies are available from the Department upon request.
j. When List 1, List 2 (exclusive of THMs), or List 3 VOCs are verified in well fields, the purveyor shall repeat sample individual wells within the well field.
k. When the sum of all trihalomethanes detected exceeds 0.100 mg/L, the purveyor shall sample within three months for total trihalomethanes as required under WAC 246-290-300(5).
l. The Department may collect samples from a water system or may require that specified quality assurance techniques be used to collect samples.

5. For any additional substance exceeded, follow-up action shall be determined by the Department when the MCL violation occurs.

C. Public Notification

1. Responsibility: The purveyor of a Group A water system shall notify the water system users and the Department for any of the following conditions:

   a. Exceedances of maximum contaminant levels (MCLs) or maximum residual disinfectant levels (MRDLs);
   b. Violation of treatment techniques.
   c. Monitoring and testing procedure violations.
   d. Failure to comply with the schedule of a variance or exemption.
   e. Operation under a variance or exemption.
   f. Occurrence of a waterborne disease outbreak or other waterborne emergency.
   g. Exceedance of the secondary maximum contaminant level for fluoride; and
   h. Availability of unregulated contaminant monitoring results.

These conditions are grouped into three categories, and require public notification in English and in Spanish within different time periods as described below:

a. Tier 1 Conditions require public notification within 24 hours. Such conditions include:

   i. Violation of the MCL for E. coli. An E. coli MCL violation can occur in one of the following four ways:
      (1) A total coliform-present repeat sample follows and E. coli-present routine sample.
      (2) An E. coli-present repeat sample follow a total coliform-present routine sample.
      (3) The lab fails to test a total coliform-present repeat sample for E. coli.
      (4) The system fails to take three repeat samples following an E. coli-present routine sample.
   ii. An E. coli positive groundwater source sample.
   iii. Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite; or when a confirmation sample is not taken within 24 hours of the system's receipt of the first sample showing exceedance of the nitrate or nitrite MCL.
   iv. Violation of the turbidity MCL of 5 NTU, where the primary agency determines after consultation that a Tier 1 notice is required or where consultation does not occur in 24 hours after the system learns of violation.
   v. Violation of the treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit, where the primary agency determines after consultation that a Tier 1 notice is required or where consultation does not take place in 24 hours after the system learns of violation.
   vi. Occurrence of a waterborne disease outbreak, as defined in 40 CFR 141.2, or another waterborne emergency; and
   vii. Other violations or situations with significant potential to have serious adverse effects on human health because of short-term exposure, as determined by the primary agency, either in its regulations or on a case-by-case basis.

b. Tier 2 conditions require public notification within 30 days. Such conditions include:

   i. All violations of the MCL, MRDL, and treatment technique requirements except where Tier 1 notice is required.
   ii. Violations of the monitoring requirements where the primary agency determines that a Tier 2 public notice is required, considering potential health impacts and persistence of the violation: and
   iii. Failure to comply with the terms and conditions of any variance or exemption in place.

c. Tier 3 conditions require public notification within one year. Such conditions include:

   i. Monitoring violations, except where Tier 1 notice is required, or the primary agency determines that the violation requires a Tier 2 notice.
   ii. Failure to comply with an established testing procedure, except where Tier 1 notice is required, or the primary agency determines that the violation requires a Tier 2 notice.
   iii. Operation under variance granted under §1415 or exemption granted under §1416 of the Safe Drinking Water Act.
   iv. Availability of unregulated contaminant monitoring results; and
   v. Exceedance of the secondary maximum contaminant level for fluoride.

2. Content: Notices in English and in Spanish shall provide:

   a. A clear, concise, and simple explanation of the violation.
   b. Discussion of any potential adverse health effects and any segment of the population which may be at higher risk.
   c. Mandatory health effects information in accordance with subsection (4) of this section.
   d. A list of steps the purveyor has taken or is planning to take to remedy the situation.
   e. A list of steps the consumer should take including advice on seeking an alternative water supply if necessary; and
   f. The purveyor's name and phone number.

   The purveyor may provide additional information to further explain the situation.

3. Distribution:

   a. Public notice of a Tier 1 condition shall occur within 24 hours after learning of the condition by placing notices on the front door of every system user. The public notice shall be written in both English and in Spanish.
   b. Public notice of a Tier 2 condition shall occur within 30 days after learning of the condition and shall be provided in both English and in Spanish.
   c. Public notice of a Tier 3 condition shall occur within 1 year after learning of the condition and shall be provided in both English and in Spanish.
   d. The purveyor of a COMMUNITY water system shall give a copy of the most recent public notice for all outstanding violations to all new billing units or new hookups before or at the time water service begins.
   e. The purveyor shall provide the Department with a copy of the public notification at the time the purveyor notifies the public.

4. Mandatory Language:

   a. The purveyor shall provide specific health effects language in English and Spanish in the notice when a violation involves:

      i. A primary VOC MCL.
      ii. A secondary fluoride MCL.
      iii. An acute coliform MCL.
      iv. A non-acute coliform MCL.
      v. Granting or continuation of exemption or variance; or
      vi. Failure to comply with a variance or exemption schedule.

   b. Required specific language is contained in the Department guideline titled "Health Effects Language for Drinking Water Public Notification."

5. VOC Notification Procedure:

   a. Availability of results: After receipt of the first analysis results, the purveyor of a COMMUNITY or NTNC water system shall notify persons served by the system of the availability of results and shall supply the name and telephone number of a contact person.

      i. The purveyor shall initiate notification within three months of the purveyor's receipt of the first VOC analysis results. This notification is only required one time.
      ii. Notification shall occur by:

(1) Inclusion in the first set of water bills issued after receipt of the results.
(2) Newspaper notices which shall run at least one day each month for three consecutive months.
(3) Direct mail.
(4) Posting if NTNC system; or
(5) Any other method approved by the Department.

iii. Within three months of receipt of analysis results, purveyors selling water to other public water systems shall provide copies of the analysis results to the purchasing system.
iv. Within 30 days of receipt of analysis results, purveyors purchasing water shall make results available to their customers. The purveyor's notification shall occur by the method outlined under a. i. of this subsection.
7

b. Consumer information:

i. The purveyor shall provide consumer information within 21 days of receipt of confirmation sample results when:

(1) A List 1 VOC is confirmed at a concentration greater than an MCL, and the level will not cause the running annual average to exceed the MCL; or
(2) The Department determines a List 2 or List 3 VOC is confirmed at a level greater than an SAL.

ii. Consumer information shall include:

(1) Name and level of VOC detected.
(2) Location where the VOC was detected.
(3) Any health effects the VOC could cause at its present concentration.
(4) Plans for follow-up activities; and
(5) Phone number to call for further information.

iii. Consumer information shall be distributed by any of the following methods:

(1) Notice placed in the major newspaper in the affected area.
(2) Direct mail to customers.
(3) Posting if NTNC system; or
(4) Any other method approved by the Department.

6. Fluoride Notification Procedure: When a secondary MCL violation occurs, the purveyor of a COMMUNITY water system shall send notice to:

a. The Department annually.
b. Water system users annually; and
c. New billing units added while the violation exists.

7. When circumstances dictate the purveyor give a broader or more immediate notice to protect public health, the Department may require the purveyor's notification by whatever means necessary.

8. When the State Board of Health grants a public water system a waiver, the purveyor shall notify customers and new billing units or new hookups before water service begins. The purveyor shall provide a notice annually and send a copy to the Department.

9. The Department may give notice to the water system users as required by this section on behalf of the water purveyor. However, the purveyor remains responsible for ensuring the Department's requirements are met.

6.7 EMERGENCY RESPONSE PROGRAM

Zillah's Emergency Response Program is a plan addressing the City's response to and operation of the water system during unplanned emergency events. The Emergency Response Program consists of the following elements:

- System Information
- Chain of Command
- Emergency Notification
- Water Quality Sampling
- Response Actions for Specific Events
- Alternative Water Sources
- Returning to Normal Operations

System Information

The following is current information pertinent to the Zillah Water System:

System Name:	City of Zillah Water System
System Identification Number:	99800W
System Address:	503 First Avenue; Zillah, WA 98953
System Phone Number:	(509) 829-5151
City Mayor:	Scott Carmack
Public Works Director/Water System Manager:	John Simmons
System Consulting Engineer:	HLA Engineering and Land Surveying, Inc. 2803 River Road Yakima, WA 98902 (509) 966-7000 Justin L. Bellamy, PE
System Service Population:	3,161
System Service Connections:	1,077
Emergency Plan Responsible Party:	John Simmons (509) 829-5151

Chain of Command

When an emergency occurs, there can be confusion, lack of coordination, and poor communication. Timely and effective response can minimize the effects of an emergency. Often, the initial response sets the tone for how the entire emergency is handled.

Having a chain of command that defines clear lines of authority and responsibilities for system personnel during an emergency speeds up response time and helps eliminate confusion. Water system personnel need to know who to report the emergency to, who manages the emergency, who makes decisions, and what their own responsibilities are.

The first step in any emergency is to notify the person at the top of the chain of command - the person responsible for managing the emergency and making key decisions. This lead person will assess the situation and initiate a series of response actions based on the type and severity of emergency. In addition to an individual having the lead responsibility, other key duties that should be assigned to system personnel include the following:

- Handling incoming phone calls and administrative support.
- Providing information to the public and the media.
- Contacting and providing information to system customers.
- Assessing the water system's facilities, condition, and ability to operate.
- Organizing and completing system repairs.

Table 6-6 shows the Zillah Water System's emergency chain of command, and responsibilities of individuals during water system emergencies:

TABLE 6-6 EMERGENCY CHAIN-OF-COMMAND AND RESPONSIBILITIES

Name / Title	Responsibilities	Contact Numbers (Area Code 509)
Scott Carmack Mayor	Lead for providing information to the public and the media.	Phone: 829-5151 Cell: 949-0164
John Simmons Public Works Director (PWD) Water System Manager (WSM)	Overall management and decision-making for the water system. Lead for managing the emergency, providing information to regulatory agencies. Operation of the water system, performing inspections, maintenance and sampling, relaying critical information, and assessing facilities.	Phone: 829-5151 Cell: 221-8493
Sharon Bounds City Clerk-Treasurer	Administrative functions including receiving phone calls and keeping a log of events.	Phone: 829-5151 Cell: 949-1266
Dolly Meyer Utility Worker	Perform duties, functions, and activities as directed by the WSM.	Cell: 945-8364 Pager: 576-4136
Mark Nelson Utility Worker	Perform duties, functions, and activities as directed by the WSM.	Phone: 962-9166 Pager: 576-4136

Events that Cause Emergencies

Emergencies happen for a variety of reasons including:

- Natural disasters including high winds, excessive snowfall and ice storms, floods, drought, well contamination, landslides and earthquakes, and volcanic eruptions.
- Accidents.
- Deliberate acts of vandalism or terrorism.
- System neglect, poor operation, or deferred maintenance.

Severity of Emergencies

Emergencies usually have a wide range of severity. Defining categories of severity can significantly aid in determining appropriate response actions. Knowing the severity of the emergency and being able to communicate it to others will help system personnel keep their response balanced and effective.

Deciding on severity should be collaborative among system personnel but is ultimately made by the person in charge of the emergency. The person in charge may also choose to coordinate with external parties, especially if partnerships have been formed in advance of the event. The information for making the decision will accumulate over time and may result in the level of severity being changed.

An assessment of severity, once determined, must be communicated immediately to all those dealing with the emergency. Make sure staff have cell phones, pagers, and/or radios when they are in the field. Remember to have an alternate method of communicating if cell phones and pagers will not work.

The following is a four-level emergency severity classification system for the Zillah Water System.

A. Level 1 - Routine Emergencies

Routine emergencies are normally resolved within 24 hours, and with minimal outside assistance. The Zillah Water System considers the following to be Level 1 emergencies:

- Short power outages.
- Minor mechanical problems in pumphouses.
- Distribution line breaks.
- Other minor situations where it is not likely that public health will be jeopardized.

B. Level 2 - Minor Emergencies

Minor emergencies are those where the water system experiences minor disruption in supply or has indications of possible contamination. In these types of emergencies, public health may be jeopardized, and the system may need to coordinate with DOH and may consider issuing a health advisory to customers. It is important for water system personnel to be on alert and to initiate a quick response. Minor emergencies can usually be resolved within 72 hours. The Zillah Water System considers the following to be Level 2 emergencies:

- Disruption of supply such as a transmission line break, pump failure with a potential for backflow, and loss of pressure.
- Storage is not adequate to handle disruption in supply.
- An initial positive coliform or E. coli sample test result.
- An initial primary chemical sample test result above the DOH standard.
- A minor act of vandalism.

C. Level 3 - Significant Emergencies

The system experiences a significant mechanical or contamination problem where disruption in supply is inevitable, and issuance of a health advisory is necessary to protect public health. Significant emergencies should be reported to DOH as soon as possible to determine the best available means to protect the health of the system users. Resolution of the emergency may require the aid and assistance of outside entities and may take longer than 72 hours to resolve. The Zillah Water System considers the following to be Level 3 emergencies:

- A verified sample test result above a DOH standard requiring immediate consideration of a health advisory notice to customers.
- A loss or failure of a major water system component resulting in a water shortage or requiring system shutdown.
- An act of vandalism or terrorist threat such as intrusion or damage to a major water system component.

D. Level 4 - Catastrophic Disasters/Major Emergencies

The water system experiences major damage or contamination from a natural disaster, an accident, or an act of terrorism. Such incidents usually require immediate notification of local law enforcement and local emergency management services. Immediate issuance of health advisories and declaration of water supply emergencies are critical to protect public health. These events often take several days or weeks to resolve before the system returns to normal operation. The Zillah Water System considers the following to be Level 4 emergencies:

- An earthquake or landslide that shuts down the system or impacts sources, lines, etc.
- An act of terrorism possibly contaminating the water system with biological or chemical agents.
- A significant chemical spill near one of the system's sources.
- A storm that significantly damages system facilities.

Emergency Notification

During most emergencies, it will be necessary to quickly notify a variety of parties. Preparation for such notification has the following three essential components:

- Assigning responsibility to oversee and carry out the notifications.
- Assembling comprehensive call-up lists with names and contact numbers.
- Writing out procedures for quickly disseminating information to appropriate parties.

Valuable response time can be lost without readily available notification information or the means to deliver it. Having well-formed partnerships will help during these times.

In addition to phone, email, and media (radio, television, newspaper) for notification, the water system may consider forming partnerships with local community groups to assist in delivering information to customers when needed.

Call-up lists should be comprehensive, including local law enforcement, Yakima County Emergency Management, Yakima County Health District, DOH Drinking Water, Ecology, county and neighboring city officials, service and repair providers, and water testing laboratories. A list of priority customers, such as nursing homes, medical clinics, and schools should also be maintained for immediate notification. Provided on Table 6-7, Table 6-8, Table 6-9, and Table 6-10 are notification lists to be used during emergency situations.

TABLE 6-7 LOCAL NOTIFICATION LIST	
Entity	Contact Numbers
Zillah Public Works (Water) Department	daytime phone: 829-5151 shop phone: 829-5676
Zillah Police Department	daytime phone: 829-6100 24-hour phone: 911
Yakima County Sheriff's Office	daytime phone: 574-2500 24-hour phone: 574-2500
Yakima County Office of Emergency Management	daytime phone: 574-1900 24-hour phone: 574-2500
Yakima Health District	daytime phone: 575-4040 24-hour phone: 575-4040
Yakima County Public Works Department	daytime phone: 574-2300 24-hour phone: 574-2300
City of Yakima Water Department	daytime phone: 575-6154 24-hour phone: 575-6154
City of Toppenish Water Department	daytime phone: 865-2080
Water Testing Laboratory: Cascade Analytical, Inc.	daytime phone: 452-7707
Newspaper: Yakima Herald Republic	daytime phone: 248-1251
Radio Stations: KIT - 1280 AM	daytime phone: 972-5481
Television Stations: KAPP KNDO KIMA	daytime phone: 453-0351 daytime phone: 225-2300 daytime phone: 575-0029

TABLE 6-8 STATE NOTIFICATION LIST	
Entity	Contact Numbers
Department of Health (DOH)	daytime phone: (509) 329-2100 24-hour phone: 1 (877) 481-4901
Washington Department of Ecology (Ecology)	daytime phone: (509) 575-2490 24-hour phone: (509) 575-2490
DOH Drinking Water After-Hours Emergency Hotline	1 (877) 481-4901

TABLE 6-9 SERVICE / REPAIR NOTIFICATION LIST	
Entity	Contact Numbers
Electrical:	
Jason Tolman	daytime phone: 830-1164
Waymire Electric	daytime phone: 829-3799
Hutchinson Electric	daytime phone: 837-6551
Pumps:	
Akland	daytime phone: 452-7867
Picatti Brothers	daytime phone: 248-2540
Ponderosa Pump Systems, Inc.	daytime phone: 457-6018
Telemetry System:	
Technical Systems, Inc. (service)	daytime phone: (206) 775-7309
Crown Control (supplies)	daytime phone: (206) 775-5696
Water System Materials:	
H.D. Fowler Co.	daytime phone: 952-7751
Pacific Waterworks	daytime phone: (800) 422-0057
Western Utilities	daytime phone: 535-1396

TABLE 6-10 SENSITIVE USERS NOTIFICATION LIST	
Entity	Contact Numbers
Schools:	
Zillah School District	daytime phone: 829-5911
Medical / Dental Facilities:	
Zillah Medical Center	daytime phone: 829-5699
Valley Medical Clinic	daytime phone: 829-5221
Craig Hisey Dental Office	daytime phone: 829-6611
Stephen Harrison Dental	daytime phone: 829-5466
Daycare Facilities:	
Santana's Playhouse	daytime phone: 829-6813
A Child's Place	daytime phone: 865-5100
Red Cross:	daytime phone: 457-1690

Notification procedures describe who is responsible for conducting notifications, who assists in the notifications, how to make notifications to specific parties, and what methods are used to complete the notifications. Notification procedures include how to issue a health advisory in the event the water supply is unsafe for drinking or use.

Other procedures include:

- Notifying water system personnel who are on-call and/or off-duty.
- Notifying customers, priority customers, and industrial users.
- Alerting local law enforcement, local emergency management, local health officials, drinking water officials, and water testing laboratories when appropriate.
- Contacting service and repair contractors.
- Contacting neighboring water systems for assistance, if necessary.
- Arranging for alternative water supplies.

Table 6-11, Table 6-12, Table 6-13, Table 6-14, and Table 6-15 provide notification procedures for the Zillah Water System.

TABLE 6-11 CUSTOMER NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director / Water System Manager should consult with the Mayor, as part of the decision-making process, whether to notify customers regarding a potential water shortage, water contamination, or other situation that results in water use restrictions. Once the decision is made to notify customers, procedures for notification should be initiated.
Procedures:	The Mayor and the PWD/WSM develop the message to be delivered to the customers and to the media. PWD/WSM consults with Department of Health regarding the problem and response alternatives. PWD/WSM continues to investigate problem and make repairs/take action as necessary. Notice to customers will be distributed by: Water System staff placing water notices on customers' doors and on signs posted on travel routes throughout the City. PWD/WSM contacts media requesting issuance of notice and information on the problem. Administrative support person will provide a pre-scripted message to phone callers and log in each phone call. PWD/WSM continuously updates the Mayor on the current condition of the problem. Once the problem is resolved: Water System staff re-notify customers through signs on doors. PWD/WSM notifies media regarding problem resolution.

TABLE 6-12 LAW ENFORCEMENT, EMERGENCY MANAGEMENT, COUNTY HEALTH, DOH, AND ECOLOGY NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director / Water System Manager is responsible for notifying law enforcement, emergency management, county health, DOH, and Ecology.
Procedures:	PWD/WSM consults with the Mayor regarding when to notify law enforcement, emergency management, county health, DOH, and Ecology. PWD/WSM consults with DOH regarding the problem and response alternatives. PWD/WSM informs law enforcement, emergency management, county health, and Ecology, and requests assistance as appropriate.

TABLE 6-13 SERVICE AND REPAIR CONTRACTOR NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director / Water System Manager is responsible for contacting service and repair contractors.
Procedures:	WSM determines what repairs and/or services are needed to return the water system to normal operation. PDM/WSM determines what repairs and/or services are needed to return the water system to normal operation, contacts service and repair contractors, and monitors the progress of the work.

TABLE 6-14 NEIGHBORING WATER SYSTEM NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director / Water Systems Manager is responsible for contacting neighboring water systems.
Procedures:	PWD/WSM consults with the Mayor regarding when a neighboring water system will be contacted, and what assistance will be requested. PWD/WSM contacts neighboring water system and requests appropriate assistance.

TABLE 6-15 HEALTH ADVISORY ISSUANCE NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director / Water Systems Manager is responsible for issuing a health advisory.
Procedures:	PWD/WSM consults with DOH regarding problem and response procedures.

Water Quality Sampling

Many types of emergencies can jeopardize the quality of water and potentially sicken those using the water. Because the most important goal for any water system is to protect human health, the system must know how to act quickly and make decisions on whether to issue a health advisory.

Contamination of drinking water, whether intentional or unintentional, comes in many forms, and are classified in the following four general categories:

- Bacteriological organisms.
- Inorganic substances such as metals or cyanide.
- Organic substances such as pesticides or volatile compounds.
- Radionuclides.

The Zillah Water System monitors its system's water quality in accordance with DOH requirements. Zillah's regular water testing program was described earlier in this Chapter.

If there is reason to believe that the water has been contaminated, the Public Works Director / Water System Manager should consult with DOH and consider issuing a health advisory as soon as possible - often before conducting water quality sampling.

If Zillah determines that water quality sampling and testing should be conducted, the City should immediately contact the laboratory that will be performing the analysis to obtain appropriate sampling bottles, and sampling and chain-of-custody procedures. Zillah typically uses Cascade Analytical for its water quality analysis.

Cascade Analytical, Inc.
1008 West Ahtanum Road
Yakima, WA 98903
Phone: (509) 452-7707

Bacteriological testing should be conducted in accordance with the City's current Coliform Monitoring Plan. A copy of that document is included in CHAPTER 10 of this Plan.

Response Actions for Specific Events

For any emergency, there are a series of general steps that a water system should take:

- Confirm and analyze the type and severity of the emergency.
- Take immediate action to save lives.
- Take action to reduce injuries and system damage.
- Prioritize and accomplish system repairs.
- Return the system to normal operation.

Table 6-16, Table 6-17, Table 6-18, Table 6-19, Table 6-20, Table 6-21, Table 6-22, and Table 6-23 identify the assessment, response actions, notifications, and follow-up actions required for various emergency situations.

TABLE 6-16 RESPONSE ACTIONS FOR POWER OUTAGES	
Assessment	The Zillah Water System experiences an average of 2 outages per year that last 20 minutes to several hours. None of the system's source wells are equipped with emergency electrical generators. Historically, power outages have been of short duration such that reservoir storage has been able to supply the City with water until power is restored.
Immediate Actions	Assess whether the outage is likely to last more than 2 hours. If not, be on alert for changing conditions and monitor reservoir levels. If so, implement water shortage response actions to inform customers to cut back on water usage until power is restored.
Notifications	1. Pacific Power (power company) – Let them know that a public water system is experiencing an outage. 2. Implement water shortage response actions to inform customers to cut back on water usage until power is restored.
Follow-Up Actions	1. Return system to general power supply. 2. Inspect reservoirs and pumping facilities to ensure proper operation and to assess any damages.

TABLE 6-17 RESPONSE ACTIONS FOR WATER MAIN BREAK	
Assessment	Visually determine the physical nature of the problem.
Immediate Actions	Visually assess the problem. Return to the area if the water needs to be turned off to effect repairs.
Notifications	Notify customers prior to shutting off water.
Follow-Up Actions	Check with all customers to ensure water has been returned to normal service. Take water samples for bacteriological testing.

TABLE 6-18 RESPONSE ACTIONS FOR MICROBIAL CONTAMINATION	
Assessment	Collect repeat samples to confirm contamination. If confirmed, determine cause or source and the locations of the contamination.
Immediate Actions	Inform the Public Works Director / Water Systems Manager, who will review the assessment with the appropriate personnel. Immediately take corrective actions.
Notifications	Contact DOH to discuss public notification, follow-up requirements, and additional steps to resolve the problem. Acute maximum containment levels (MCL) violations require public notification within 24 hours, and a boil water order will almost always be issued.
Follow-Up Actions	If contamination was accidental due to construction or a repair procedure, then those procedures need to be reviewed. If the cause was intentional, then new or existing safeguards need to be implemented or reviewed.

TABLE 6-19 RESPONSE ACTIONS FOR CHEMICAL CONTAMINATION	
Assessment	Collect repeat samples to confirm contamination. If confirmed, determine the cause or source and location(s) of the contamination.
Immediate Actions	Inform the Public Works Director / Water Systems Manager, who will review the assessment with appropriate personnel. Immediately take corrective action.
Notifications	Contact DOH to discuss public notification, follow-up requirements, and steps to resolve the problem. Maximum containment levels (MCL) violations require public notification within 24 hours.
Follow-Up Actions	Follow-up actions for chemical contamination monitoring and sampling frequency will be conducted under the procedures listed in WAC 246-290-320 and the Code of Federal Regulation 141.24. If contamination was accidental due to construction or a repair procedure, then those procedures need to be reviewed. If the cause was intentional, then new or existing safeguards need to be implemented or reviewed.

TABLE 6-20 RESPONSE ACTIONS FOR EARTHQUAKE	
Assessment	Visually determine the nature and extent of damage to the water system.
Immediate Actions	Inform the Mayor and the Public Works Director / Water System Manager of the nature and extent of damage/disruption to the water system.
Notifications	Notify affected customers.
Follow-Up Actions	Provide customers with estimated length of service disruption.

TABLE 6-21 RESPONSE ACTIONS FOR HAZARDOUS MATERIAL SPILL IN THE VICINITY OF A WATER SOURCE	
Assessment	Assess the nature and extent of the spill.
Immediate Actions	Contact local agencies including DOH, Ecology, Zillah Police, Yakima County Sheriff, and Yakima County Office of Emergency Management.
Notifications	Notify all affected customers.
Follow-Up Actions	Provide customers with estimated length of service disruption.

TABLE 6-22 RESPONSE ACTIONS FOR ELECTRONIC EQUIPMENT FAILURE	
Assessment	Assess the nature and extent of the failure.
Immediate Actions	Contact certified electrician.
Notifications	Notify all affected customers.
Follow-Up Actions	Provide customers with estimated length of service disruption.

TABLE 6-23 RESPONSE ACTIONS FOR VANDALISM OR TERRORIST ATTACK	
Assessment	Assess the nature and extent of the situation/condition.
Immediate Actions	Contact Zillah Police Department.
Notifications	Notify all affected customers.
Follow-Up Actions	Repair all known problems.

Alternative Water Sources

Water contamination or disruption of supply may require that the water system obtain water from another source to meet basic community needs, and water systems should plan ahead to provide safe water during an emergency. It is important to evaluate potential alternative water supplies ahead of time to ensure the water is safe and the supply is available.

Table 6-24 provides information regarding alternative water sources.

TABLE 6-24 ALTERNATIVE WATER SOURCES

Alternative Source	Name	Phone	Availability	Safe for Drinking?
City of Yakima in conjunction with tanker trucks	City of Yakima Dave Brown	575-6204	yes	yes
City of Toppenish in conjunction with tanker trucks	City of Toppenish Lance Hoyt	865-6319	yes	yes
Bottled Water	Central Vending	248-1212	yes	yes
	Crystal Springs Water Co.	1-(800) 728-5508	yes	yes
	Culligan Water Conditioning	1-(866) 964-4826	yes	yes
	Independent Water Service	457-3631	yes	yes

Returning to Normal Operations

As the emergency passes, the system must prepare to return to normal operation. This may be a very simple or very complex process, depending on the type and severity of the emergency. Returning to normal operation may simply mean the system restores power and the portable generator is disconnected, or it could mean the system has to be repeatedly disinfected to obtain the proper number of satisfactory coliform tests necessary to lift a health advisory.

Many factors may need to be considered before a water system is returned to normal operation. Examples include:

- Has the system been repaired to the point that it can meet demand?
- Has the system manager made a safety and operational inspection of all system components?
- Has the system been properly flushed, disinfected, and pressure tested?
- Has the water been adequately tested in accordance with sampling regulations?
- Does the water meet drinking water standards?
- Is there adequate staff to operate and manage the system?
- Do federal, state, and local agencies support returning the system to normal operation?
- Have the proper public messages and notifications been developed?

Table 6-25 presents a guide of actions and activities for returning the system to normal operation.

TABLE 6-25 ACTIONS FOR RETURNING THE SYSTEM TO NORMAL OPERATION

Action / Activity	Description
Inspect, flush, and disinfect the system	Public Works Director / Water System Manager and support staff inspect all system facilities and verify the system has been flushed and disinfected and that all water quality tests have been done.
Verification of water quality	PWD/WSM verify water quality sampling results.
Coordinate with DOH	PWD/WSM coordinates with DOH regarding system condition and water quality results.
Notify customers	PWD/WSM meets with communications lead to write and distribute notice to customers.

6.8 CROSS-CONNECTION CONTROL PROGRAM

In 1988, Zillah developed a cross-connection control program intended to protect the City's water distribution system from the possibility of contamination due to existing or potential cross-connections. Zillah's cross-connection program includes the following elements:

1. Adoption (by City Ordinance No. 635) of a cross-connection control program.

2. A written Cross-Connection Control Manual.

3. Identification of a staff position delegated for organization and implementation of the cross-connection control program, and the qualifications required of personnel working in the cross-connection control program.

4. Detailed procedures for conducting surveys of new and existing facilities to identify all existing and potential cross-connections.

5. A list of approved backflow assemblies;

6. A procedure to ensure all required backflow assemblies are tested upon installation, after a repair or relocation, and on a routine basis as established by State regulation.

7. A record system which includes a list identifying the location of all required cross-connection control devices, the type of device, the testing schedule, the performance results, a description of repairs and/or repair recommendations, the tester's name, and certification number; and

8. A description of the process which will provide cross-connection control information to existing and future system users.

All backflow assemblies are tested annually by an outside contractor. A copy of Zillah's Cross- Connection Control Manual is included in CHAPTER 10 of this Plan.

6.9 CUSTOMER COMPLAINT RESPONSE PROGRAM

The City of Zillah's complaint response program is designed to formally receive, track and record complaints received regarding the City's water system. Water system complaints typically include cloudy and/or discolored, odor, taste, or low or excessive pressure, or leaky or broken service connections or water mains.

Complaints received by the City are routed to the Public Works Department, where the information is recorded onto a Public Works Department Work Order form. The complaint information and form are routed to the Public Works staff for investigation and to resolve the problem. Actions taken to resolve the problem are recorded on the form and kept on file by the Public Works Department. A copy of the Water Department Work Order form is included in CHAPTER 10 of this Plan.

For future tracking of complaints, the City plans to implement a web-based work order program in 2014. It is anticipated that the web-based process will work as follows: A customer calls in with a complaint, City Hall staff logs the complaint into the new system which notifies the public works director, the director assigns the work to a public works crew member, the crew member completes the task or investigates the complaint and records it in the system. The program will have reporting capabilities to assist with tracking customer complaint history.

6.10 RECORD KEEPING AND REPORTING

The City of Zillah keeps and maintains records on its water system as shown in Table 6-26.

TABLE 6-26 TABLE ZILLAH WATER SYSTEM RECORDS

Record Type	Location of Records	Retained For:
Water Consumption (by user category)	City Hall	10 Years
Water Production (by well)	City Hall	10 Years
Water Quality Chemical Analysis Results	Public Works Department	Lifetime of System
Water Quality Bacteriological Analysis Results	Public Works Department	5 Years
Equipment Maintenance	Public Works Department	6 Years
Water System Complaints	Public Works Department	6 Years
Backflow Assembly Testing	Public Works Department	6 Years
* Does not include chemical analysis results, which shall be kept as long as the system is in operation.		

Water quality monitoring results are reported to DOH as required.

6.11 O&M IMPROVEMENTS

Improvements required for operation of the existing water system, including routine sanitary surveys by the DOH, planning document updates, and other miscellaneous operational improvements are discussed in CHAPTER 8 of this Plan. System operational costs associated with water quality testing and administrative tasks are included in the City's general operational budget and have not been identified or estimated separately.

Recommended improvements necessary for maintenance of the existing system, such as meter replacement and calibration, hydrant replacement, well rehabilitation, reservoir cleaning and inspection, and other miscellaneous maintenance related improvements, are also discussed in detail in CHAPTER 8 of this Plan. CHAPTER 8 also includes a schedule for completion of both routine and individual O&M improvements, including their estimated costs.

CHAPTER 7 -

DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

HLA
Engineering and Land Surveying, Inc.

7.1 PROJECT REVIEW PROCEDURES

The City of Zillah requires that all water system improvements proposed by others (e.g., developers, industries, etc.) be designed and appropriate construction documents prepared by a professional engineer licensed to practice in the State of Washington. The City may require a project report prior to design and document preparation if the proposed work includes pumps, reservoirs, and/or other unique characteristics.

Project reports and/or construction plans and specifications for water distribution main improvements shall be submitted to the City for review. Review of said documents is undertaken by the City's Public Works Department, Fire District, and engineering consultant under the provisions of WAC 246-290-125(2). Comments and/or required changes are then forwarded to the proponent. Resubmittal of the revised documents, review, and City approval are required before construction may proceed. Following completion of construction and acceptance by the City, a completed DOH Construction Completion Report form shall be submitted to the City.

In addition to being reviewed and approved by the City Public Works Department, City Fire Department, and engineering consultant, project design reports and/or construction plans and documents for all projects with the exception of distribution-related projects, as defined in WAC 246-290-010, must be submitted to and approved by DOH as specified in WAC 246-290-120 before construction may proceed. Required documents shall be submitted by the proponent to the following address:

Washington State Department of Health
Office of Drinking Water
Eastern Drinking Water Operations
16201 East Indiana Avenue, Suite #1500
Spokane Valley, WA 99216

7.2 POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

Zillah will provide water service to properties outside the City Limits and within its Retail Service Area in accordance with the service area policies of Section 1.6 and Chapter 13.18 of the City's Municipal Code, a copy of which is provided in CHAPTER 10. Extensions of water mains outside the City Limits will only be made after approval by the City Council. Customers outside the City Limits will be assessed water rates which are higher than those charged to customers within the City Limits per the rate schedule provided in City Code Chapter 13.08.065.

All costs associated with extending water mains to unimproved properties are the responsibility of the developer, including any required inspection fees by the City. Requirements to be met by developers when extending the City's water system are addressed in City Code Chapters 13.08, 13.18, and 15.10 copies of which are provided in CHAPTER 10.

7.3 DESIGN STANDARDS AND CONSTRUCTION STANDARDS

All water system improvements must conform to Zillah's most current design and construction standards (Water Developer Standards). A copy Zillah's Water Developer Standards are provided in CHAPTER 10.

7.4 CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

Zillah confirms that water system extensions are constructed in accordance with City requirements through construction inspection by City Public Works staff and observation of pressure testing of new water lines by the developer. Construction inspection procedures are addressed in City Code Chapter 15.10 and specified in the City's Water Developer Standards, both of which are provided in CHAPTER 10. The City may reject construction for which it has not had ample opportunity for inspection.

CHAPTER 8 -

CAPITAL IMPROVEMENT PROGRAM

HLA
Engineering and Land Surveying, Inc.

8.1 IMPROVEMENT PROGRAM OBJECTIVE

The development of a water system improvement program is a primary goal of this Water System Plan. Through the analysis of existing system demands, capabilities, and deficiencies, and by projecting future system growth, improvements have been identified throughout the Plan.

In previous sections of this Plan, deficiencies in the existing City of Zillah water system have been identified and specific improvements have been recommended. The costs of such improvements often prohibit their completion within a short time without seriously impacting budgets and user rates. It is prudent, therefore, to group improvements so they might be reasonably accomplished over several years.

Recommended system improvements have been categorized into three main categories: 1) Operational and Maintenance (O&M) Improvements, 2) Major Capital Improvements, and 3) Future Capital Improvements (Planning). The O&M improvements are system operation and maintenance of existing facilities, including meter calibration and replacement, hydrant, and valve replacements, well and reservoir rehabilitation, water use efficiency (WUE) measure implementation, and other miscellaneous improvements. Major capital improvements are those necessary to improve a system deficiency such as fire flow, source and/or storage capacity, water quality, or replacement of aging and/or undersized system components. The future planning improvements category includes improvements that would be necessary to accommodate system expansion to serve the future service area because of new development.

Included in each improvement category section, except for the future planning improvements section, is a prioritized listing of the recommended system improvements, together with a brief description of the need, anticipated construction elements, and estimated project costs (based on 2021 construction costs). Actual costs will vary from those shown in the following estimates because of changes in the construction industry, the competitive bid process, the availability of materials and equipment, and the timing of the improvements. The estimated improvement costs should be increased by the rate of inflation (assumed 3% per year) for each subsequent year after 2021.

8.2 OPERATIONAL AND MAINTENANCE (O&M) IMPROVEMENTS

The following is a prioritized listing of the required and/or recommended O&M improvements, including a brief description of the need for each improvement.

8.2.1 Year 2022 Through Year 2031 Prioritized Improvements

1. SOURCE WELL PROTECTIVE COVENANTS

Of the City's three wells, only WIPPCO Well was found to have a recorded protective covenant establishing a 100-foot sanitary radius in accordance with DOH requirements. The City plans to execute and file a "Declaration of Covenant" with the Yakima County Auditor's Office, for their two remaining source wells without recorded protective covenants. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Survey of Well Location	LS	–	–	$6,000
Legal Description Preparation	LS	–	–	$10,000
Covenant Preparation and Filing	LS	–	–	$4,000
			TOTAL ESTIMATED COST	**$20,000**

2. METER REPLACEMENT PROJECT

The City of Zillah has budgeted annually to replace approximately 30 meters throughout the City. The new meters will be radio-read style meters. This improvement project will take place over the next ten-year period. The estimated cost for this improvement project is $12,000 annually for 2021 and increase with inflation each year.

3. DOH SANITARY SURVEY

The DOH conducts sanitary surveys for community water systems approximately every five (5) years. The anticipated date of the next sanitary survey for Zillah is 2025. The approximate cost of this required improvement is $5,000, including any minor repairs.

4. RESERVOIR CLEANING AND INSPECTION

Prior to re-painting the existing elevated reservoirs, it is recommended that the City contract with professional divers certified for operation in potable water to clean the tank and determine the existing interior condition. If structural or mechanical deficiencies are discovered, the necessary remedial work can be coordinated and completed at the time of the re-painting work to avoid having the reservoir offline longer than required. The approximate inspection cost is $8,000 per reservoir for a total of $24,000. This does not include costs for repairs. It is recommended the City routinely have its reservoirs cleaned and inspected approximately every five (5) years.

5. RAINIER AVE WELL (S01) REHABILITATION

The Rainier Ave Well was recently rebuilt but is likely the well and new well pump and motor will need to be serviced within the next 10-15 years to prevent premature failure and maintain the current capacity of this source well. This improvement will include removal and inspection of the well pump, video inspection of the well, general cleaning and redevelopment of the well casing and screen, repair of pump and motor wear parts, and reinstallation of the well pump and well pump testing. This improvement project does not include more extensive cleaning and well redevelopment work that may be needed depending on conditions observed, such as chemical cleaning, induced resonance/impulse generation treatment, repair of existing well screen and casing, replenishment of filter pack material, replacement of well pump and motor, etc. Provided below are the estimated costs of this improvement:

Item	Unit	Qty.	Unit Cost	Total Cost
Mobilization	LS	–	–	$10,000
Remove and Inspect Well Pump/Motor	LS	–	–	$15,000
Video Inspection	EA	2	$1,000	$2,000
Clean and Bail Existing Well	LS	–	–	$30,000
Repair Existing Well Pump and Motor	LS	–	–	$10,000
Reinstall Well Pump/Motor and Testing	LS	–	–	$15,000

Construction Cost Subtotal	$82,000
Sales Tax (8.0%)	$6,600
Subtotal	$88,600
Contingency (15%)	$13,300
Subtotal	$101,900
Engineering & Administration (15%)	$15,300
Construction Engineering (15%)	$15,300
TOTAL ESTIMATED COST	$132,500

If cleaning of the well is found to be unnecessary after initial video inspection, the cost of rehabilitation will be reduced significantly. The estimated total cost without cleaning and bailing the existing well (pump rehab only) is $74,000.

6. THIRD AVE WELL (S02) PUMP REHABILITATION

The Third Ave Well was recently rebuilt but is likely the well and new well pump and motor will need to be serviced within the next 10-15 years to prevent premature failure and maintain the current capacity of this source well. This improvement will include removal and inspection of the well pump, repair of pump and motor wear parts, and reinstallation of the well pump and well pump testing. This improvement project does not include cleaning and well redevelopment work that may be needed or replacement of well pump and motor. The approximate cost of this improvement is $50,000.

7. WIPPCO WELL (S03) REHABILITATION

The WIPPCO Well was recently rebuilt but is likely the well and new well pump and motor will need to be serviced within the next 10-15 years to prevent premature failure and maintain the current capacity of this source well. This improvement will include removal and inspection of the well pump, video inspection of the well, general cleaning and redevelopment of the well casing and screen, repair of pump and motor wear parts, and reinstallation of the well pump and well pump testing. This improvement project does not include more extensive cleaning and well redevelopment work that may be needed depending on conditions observed, such as chemical cleaning, induced resonance/impulse generation treatment, repair of existing casing, replacement of well pump and motor, etc. Provided below are the estimated costs of this improvement:

Item	Unit	Qty.	Unit Cost	Total Cost
Mobilization	LS	–	–	$10,000
Remove and Inspect Well Pump/Motor	LS	–	–	$15,000
Video Inspection	EA	2	$1,000	$2,000
Clean and Bail Existing Well	LS	–	–	$30,000
Repair Existing Well Pump and Motor	LS	–	–	$10,000
Reinstall Well Pump/Motor and Testing	LS	–	–	$15,000

Construction Cost Subtotal	$82,000
Sales Tax (8.0%)	$6,600
Subtotal	$88,600
Contingency (15%)	$13,300
Subtotal	$101,900
Engineering & Administration (15%)	$15,300
Construction Engineering (15%)	$15,300
TOTAL ESTIMATED COST	$132,500

If cleaning of the well is found to be unnecessary after initial video inspection, the cost of rehabilitation will be reduced significantly. The estimated total cost without cleaning and bailing the existing well (pump rehab only) is $74,000.

8. WATER SYSTEM PLAN UPDATE

The DOH requires Water System Plans to be reviewed and updated every ten years. The next Water System Plan update is planned for 2031. The approximate cost of this improvement project is $95,000.

8.2.2 Schedule of Recommended O&M Improvements

A ten-year schedule for completion of the recommended O&M improvements is provided at the end of this Section, in Table 8-1. The estimated improvement costs are also provided in Table 8-1, as well as the total projected yearly cost. The estimated costs in Table 8-1 have been inflated for each year after 2021 to reflect the possible future costs, based upon the projected year the improvement will be completed. Improvements that are projected to take place after year 2031 have been inflated to reflect year 2032 costs, although some of these improvements may take place after the year 2032.

TABLE 8-1 SCHEDULE OF RECOMMENDED O&M IMPROVEMENTS

Priority No.	Improvement Description	Estimated Cost in 2021 Dollars	Completion Year											Funding Source
			2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032 to 2041	
1	Source Well Protective Covenants	20,000			21,800								0	City
2	Meter Replacement Project	12,000	12,400	12,800	13,200	13,600	14,000	14,400	14,800	15,200	15,700	16,100	16,600	City
3	DOH Sanitary Survey	5,000				5,600					6,500		6,900	City
4	Reservoir Cleaning and Inspection	24,000	24,700					28,600					33,200	City
5A	Rainier Ave Well Rehabilitation (Pump Rehab Only)	74,000								91,000			102,400	City
5B	Rainier Ave Well Rehabilitation	132,500											183,400	City
6	Third Ave Well Rehabilitation	50,000									65,200		69,200	City
7A	WIPPCO Well Rehabilitation (Pump Rehab Only)	74,000										99,400	102,400	City
7B	WIPPCO Well Rehabilitation	132,500											183,400	City
8	Water System Plan Update	95,000										128,000	131,800	City
	TOTAL COSTS	619,000	37,100	12,800	35,000	19,200	14,000	43,000	14,800	106,200	87,400	243,500	829,300	
Note: Improvement costs for years following 2021 include 3% inflation per year.														

8.3 MAJOR CAPITAL IMPROVEMENTS

The following listing of recommended major capital improvements has been sub-divided into two categories: 1) year 2022 through year 2031 prioritized improvements and 2) year 2032 through year 2041 prioritized improvements, since not all the recommended improvements can be completed within the next ten years. The recommended improvements from both categories are identified in Figure 8-1.

8.3.1 Year 2022 Through Year 2031 Prioritized Improvements

1. RECOAT EXISTING RESERVOIRS NO. 1 AND NO. 2

The existing standpipe and elevated tank reservoirs were last coated in 1991 and it is recommended that they be recoated approximately every twenty years. It is assumed that only spot repairs will be made to the existing interior and exterior coating and that no structural or mechanical are needed. The estimated project cost will have to be reevaluated if more extensive coating repairs, complete coating removal, or structural or mechanical repairs are needed. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$20,000
Mobilization	LS	–	–	$35,000
Interior/Exterior Existing Coating Repairs (Approx. 20% of Total Surface Area)	SF	7,200	$18	$129,600
Pressure Wash and Overcoat Interior and Exterior	SY	36,000	$6	$216,000
Tank Disinfection	LS	1	$15,000	$15,000
			Construction Cost Subtotal	$415,600
			Sales Tax (8.0%)	$33,200
			Subtotal	$448,800
			Contingency (15%)	$67,300
			Subtotal	$516,100
			Engineering & Administration (15%)	$77,400
			Construction Engineering (15%)	$77,400
			TOTAL ESTIMATED COST	**$670,900**

CITY OF ZILLAH

Water System Plan Update

RECOMMENDED WATER SYSTEM IMPROVEMENTS MAP

N
W E
S

0 400 800 1600

LEGEND

ZILLAH CITY LIMITS

ZILLAH UGA BOUNDARY

Year 2024 Improvements

1. Recoat Existing Reservoirs No. 1 and No. 2

Year 2026 Improvements

2. Construct New Source Well

Year 2029 Improvements

3. Reservoir Storage Expansion
4. Cutler Way Booster Station Pump No. 3

Year 2032-2041 Improvements

5. Zone 2 Booster Station Pump No. 4
6. System Disinfection/Chlorination (All Wells, Not Shown)
7. Third Ave Well Filtration Improvements
8. Zone 2 8-Inch Water Main Loops
9. Schoentrup Drive to Reo Drive, 8-Inch Water Main Loop
10. South First Avenue to Miles Drive, 8-Inch Water Main Loop
11. Meade Street to S. First Avenue Water Main Loop
12. Pollock Avenue Upsize 4-Inch Water Main
13. Replace 6-Inch Steel Line in First Avenue from Cheyne Road to Fourth Street
14. Replace Existing 4-Inch Water Main in Edson Street and Loop New Piping to Fourth Avenue 8-Inch Water Main
15. Collin's Place Water Main Upsize
16. Zone 2 Catholic Church Water Main Upsize
17. First Avenue 6-Inch Steel Line Replacement
18. Industrial Area Water Main Loop
19. Fifth Street from Glenwood Dr. to Third Avenue Water Main Upsize

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

4/5/21
P:\Projects\2019\19202\2021 WSP FIGURES.dwg

FIGURE 8-1

2. CONSTRUCT NEW SOURCE WELL

Additional source well capacity is needed by year 2031 to meet future peak water system demands, remove the need for future equalization storage, maximize existing instantaneous water rights, and provide greater redundancy and system reliability. In 2009 the City purchased the Joseph Well property when Reservoir No. 3 was constructed in anticipation of being able to rehab or reuse the existing source. The City plans to further evaluate and test the existing well to determine if it can be utilized and at what capacity. The estimated cost to evaluate and test the existing well is $60,000. Reconstruction of the existing well is unlikely to be cost-effective due to its history of sand production and years of non-use. If the existing well is found to be useable, it will likely be at a reduced flow rate and an additional new well will also be needed in the future. A new well can be constructed on the Joseph Well site and the existing wellhouse can be reused for the new well. The estimated costs for this improvement are based on constructing a new source well with a 1,050 gpm minimum capacity. This improvement is based on the ability to use existing well rights by withdrawing groundwater from the same aquifer as the existing wells. Additional investigation and verification of this is required prior to design and construction. If water rights will not extend to the Joseph Well site area, alternate sites near WIPPCO and Third Ave wells will need to be investigated for a new well. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$20,000
Mobilization	LS	–	–	$60,000
Drill New Well (Approx. 500 ft deep)	LF	500	$600	$300,000
New Submersible Well Pump and Motor	LS	1	$80,000	$80,000
Site Piping and Connections	LS	1	$30,000	$30,000
Well Building Modification and Piping	LS	1	$60,000	$60,000
Chlorination Equipment	LS	1	$30,000	$30,000
Electrical and Control Improvements	LS	1	$120,000	$120,000
Engine Generator and Transfer Switch	LS	1	$60,000	$60,000
Site Grading and Drainage	LS	1	$30,000	$30,000
			Construction Cost Subtotal	$790,000
			Sales Tax (8.0%)	$63,200
			Subtotal	$853,200
			Contingency (15%)	$128,000
			Subtotal	$981,200
			Engineering & Administration (15%)	$147,200
			Construction Engineering (15%)	$147,200
			TOTAL ESTIMATED COST	**$1,275,600**

3. RESERVOIR STORAGE EXPANSION

Additional storage capacity is needed by year 2031 to provide sufficient standby storage volume to meet projected future water system demands. The City's existing ground level storage tank (Reservoir No. 3) on Cutler Way was designed to allow for future expansion to provide an additional 400,000 gallons of storage. Increasing the Reservoir No. 3 storage capacity to one million gallons will provide sufficient storage to meeting 20-year demand projections. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$20,000
Mobilization	LS	–	–	$60,000
Reconstruct and Expand Existing Storage Tank	LS	1	$600,000	$600,000
			Construction Cost Subtotal	$680,000
			Sales Tax (8.0%)	$54,400
			Subtotal	$734,400
			Contingency (15%)	$110,200
			Subtotal	$844,600
			Engineering & Administration (15%)	$126,700
			Construction Engineering (15%)	$126,700
			TOTAL ESTIMATED COST	**$1,098,000**

4. CUTLER WAY BOOSTER STATION PUMP NO. 3

At the time of construction, available funds did not permit the installation of the third 1,500 gpm booster pump. However, to provide greater reliability when one pump is out of service, the third pump is recommended as designed. It is also recommended that this work be completed as part of the storage expansion project at the existing site. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$15,000
Pump, Piping, Valves, and Electrical Controls	LS	1	$120,000	$120,000
			Construction Cost Subtotal	$145,000
			Sales Tax (8.0%)	$11,600
			Subtotal	$156,600
			Contingency (15%)	$23,500
			Subtotal	$180,100
			Engineering & Administration (15%)	$27,000
			Construction Engineering (15%)	$27,000
			TOTAL ESTIMATED COST	**$234,100**

8.3.2 Year 2032 Through Year 2041 Prioritized Improvements

5. ZONE 2 BOOSTER STATION PUMP NO. 4

At the time of construction, available funds did not permit the installation of the second 1,500 gpm booster pump (pump No 4 in the station). However, to meet DOH reliability requirements, assuming one pump is out of service, the second fire pump is necessary. The cost is based on the City contracting directly with a Contractor to install a second fire pump matching the installed fire pump. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$15,000
Pump, Piping, Valves, and Electrical Controls	LS	1	120000	120000
			Construction Cost Subtotal	$145,000
			Sales Tax (8.0%)	$11,600
			Subtotal	$156,600
			Contingency (15%)	$23,500
			Subtotal	$180,100
			Engineering & Administration (15%)	$27,000
			Construction Engineering (15%)	$27,000
			TOTAL ESTIMATED COST	**$234,100**

6. SYSTEM DISINFECTION/CHLORINATION

The City does not currently provide chlorine disinfection of any of its source wells. All existing wells and booster stations, except for the Third Ave Well have space available for future installation of chlorination equipment. This improvement project will include improvements necessary to install chlorination equipment and controls at each of the well and booster station sites. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$25,000
Well Chlorination Equipment and Misc. Piping	EA	3	$30,000	$90,000
Booster Station Chlorination Equipment and Misc. Piping	EA	2	$30,000	$60,000
Electrical and Controls System Improvements	EA	5	$25,000	$125,000
			Construction Cost Subtotal	$310,000
			Sales Tax (8.0%)	$24,800
			Subtotal	$334,800
			Contingency (15%)	$50,200
			Subtotal	$385,000
			Engineering & Administration (15%)	$57,800
			Construction Engineering (15%)	$57,800
			TOTAL ESTIMATED COST	**$500,600**

7. THIRD AVE WELL FILTRATION IMPROVEMENTS

The Third Ave Well (S02) has a history of elevated manganese levels. This project will involve construction of a new high-rate inline pressure filter system to reduce manganese levels. A new building or building addition will need to be constructed to house the new pressure filters. Also included in this improvement is all required site grading, interconnecting piping, electrical and control system improvements. A pilot study will be necessary to determine the effectiveness of the proposed filter system and verify sizing requirements. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$40,000
Filter Building Improvements, Complete	LS	–	–	$150,000
Pressure Filter Units, Complete	LS	–	–	$150,000
Site Piping, Fittings, and Valves, Complete	LS	–	–	$40,000
Site Grading and Drainage, Complete	LS	–	–	$20,000
Electrical and Control System, Complete	LS	–	–	$90,000
			Construction Cost Subtotal	$500,000
			Sales Tax (8.0%)	$40,000
			Subtotal	$540,000
			Contingency (15%)	$81,000
			Subtotal	$621,000
			Engineering & Administration (15%)	$93,200
			Construction Engineering (15%)	$93,200
			TOTAL ESTIMATED COST	**$807,400**

8. ZONE 2 8-INCH WATER MAIN LOOPS

Additional 8-inch water main will be installed from the new 8-inch booster pump supply line east to Alteejen Road, where a connection will be made to the existing 6-inch water main. This improvement will significantly increase fire flow to hydrants in Zone 2. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$12,000
Project Temporary Traffic Control	LS	–	–	$10,000
HMA Surface Repair	SY	130	$45	$5,850
Shoring or Extra Excavation	LF	1,100	$1	$1,100
Select Backfill, as Directed	CY	25	$40	$1,000
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	1,100	$65	$71,500
Gate Valve 8 In.	EA	4	$1,600	$6,400
Hydrant Assembly	EA	2	$5,000	$10,000
			Construction Cost Subtotal	$127,850
			Sales Tax (8.0%)	$10,230
			Subtotal	$138,080
			Contingency (15%)	$20,700
			Subtotal	$158,780
			Engineering & Administration (15%)	$23,800
			Construction Engineering (15%)	$23,800
			TOTAL ESTIMATED COST	**$206,380**

9. SCHOENTRUP DRIVE TO REO DRIVE, 8-INCH WATER MAIN LOOP

Approximately 200 linear feet of 8-inch water main will be installed from the end of Schoentrup Drive to the existing 10-inch reservoir outlet piping. Approximately 1,400 linear feet of 8-inch water main will be installed from the new 8-inch water main to the end of Reo Drive, northeast of the existing standpipe reservoir, within S.V.I.D. canal right-of-way. This new 8-inch water main loop and connection to the existing reservoir outlet piping will increase fire flow to these residential areas and the northern half of Zillah's system. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$12,000
Project Temporary Traffic Control	LS	–	–	$10,000
Gravel Surface Repair	SY	900	$20	$18,000
Shoring or Extra Excavation	LF	1,400	$1	$1,400
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	1,400	$65	$91,000
Gate Valve 8 In.	EA	6	$1,600	$9,600
			Construction Cost Subtotal	$152,000
			Sales Tax (8.0%)	$12,160
			Subtotal	$164,160
			Contingency (15%)	$24,600
			Subtotal	$188,760
			Engineering & Administration (15%)	$28,300
			Construction Engineering (15%)	$28,300
			TOTAL ESTIMATED COST	**$245,360**

10. SOUTH FIRST AVENUE TO MILES DRIVE, 8-INCH WATER MAIN LOOP

This improvement will include the construction of approximately 850 linear feet of 8-inch water main from the corner of Miles Drive and Kagley Way to South First Avenue, which will improve fire flow to residences and the church along Miles Drive, as well as greatly increasing fire flow to businesses along South First Avenue. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$10,000
Project Temporary Traffic Control	LS	–	–	$10,000
Gravel Surface Repair	SY	400	$20	$10,000
HMA Surface Repair	SY	30	$45	$1,350
Shoring or Extra Excavation	LF	850	$1	$850
Select Backfill, as Directed	CY	25	$40	$1,000
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	850	$65	$55,250
Gate Valve 8 In.	EA	5	$1,600	$8,000
			Construction Cost Subtotal	$106,450
			Sales Tax (8.0%)	$8,520
			Subtotal	$114,970
			Contingency (15%)	$17,200
			Subtotal	$132,170
			Engineering & Administration (15%)	$19,800
			Construction Engineering (15%)	$19,800
			TOTAL ESTIMATED COST	**$171,770**

11. MEADE STREET TO S. FIRST AVENUE WATER MAIN LOOP

Looping from the 8-inch water main at the end of Meade Street to the 6-inch water main in South First Avenue, as shown in Figure 8-1, will improve fire flow to this area to be above the 3,000 gpm minimum requirement established in Figure 8-1. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$5,000
Mobilization	LS	–	–	$5,000
Project Temporary Traffic Control	LS	–	–	$5,000
Gravel Surface Repair	SY	80	$20	$10,000
HMA Surface Repair	SY	20	$45	$900
Shoring or Extra Excavation	LF	150	$1	$150
Select Backfill, as Directed	CY	15	$40	$600
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	150	$65	$9,750
Gate Valve 8 In.	EA	2	$1,600	$3,200
			Construction Cost Subtotal	$39,600
			Sales Tax (8.0%)	$3,170
			Subtotal	$42,770
			Contingency (15%)	$6,400
			Subtotal	$49,170
			Engineering & Administration (15%)	$7,400
			Construction Engineering (15%)	$7,400
			TOTAL ESTIMATED COST	**$63,970**

12. POLLOCK AVENUE UPSIZE 4-INCH WATER MAIN

The 4-inch water main in Moritz Street and Pollock Avenue provides insufficient fire flow to the hydrant at the end of this dead-end street. Upsizing the existing main to a new 8-inch water main and replacing the existing fire hydrant will improve fire flow. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$12,000
Project Temporary Traffic Control	LS	–	–	$10,000
HMA Surface Repair	SY	160	$45	$7,200
Shoring or Extra Excavation	LF	700	$1	$700
Select Backfill, as Directed	CY	10	$40	$400
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	700	$65	$45,500
Gate Valve 8 In.	EA	3	$1,600	$4,800
Hydrant Assembly	EA	2	$5,000	$10,000
Service Connection	EA	14	$1,600	$22,400
			Construction Cost Subtotal	$123,000
			Sales Tax (8.0%)	$9,840
			Subtotal	$132,840
			Contingency (15%)	$19,900
			Subtotal	$152,740
			Engineering & Administration (15%)	$22,900
			Construction Engineering (15%)	$22,900
			TOTAL ESTIMATED COST	**$198,540**

13. REPLACE 6-INCH STEEL LINE IN FIRST AVENUE FROM CHEYNE ROAD TO FOURTH STREET

The existing 6-inch steel water main in First Avenue was installed in the 1940's and leaks in many locations. Leaks up to ¼-inch in diameter have been found in the existing steel pipe. This improvement project will replace the existing, leaking 6-inch steel pipe with a new 8-inch diameter water main, reducing water losses and significantly improving fire flow to the central commercial district of Zillah, where the highest fire flow is required. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$40,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	900	$45	$40,500
Shoring or Extra Excavation	LF	2,400	$1	$2,400
Select Backfill, as Directed	CY	25	$40	$1,000
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	2,400	$65	$156,000
Gate Valve 8 In.	EA	6	$1,600	$9,600
Hydrant Assembly	EA	6	$5,000	$30,000
Service Connection	EA	14	$1,600	$22,400
Cement Concrete Curb and Gutter	LF	2,300	$40	$92,000
Cement Concrete Sidewalk, 4-Inch Thick	SY	1,280	$60	$76,800
Concrete Sidewalk Ramp	EA	4	$2,500	$10,000
			Construction Cost Subtotal	$510,700
			Sales Tax (8.0%)	$40,860
			Subtotal	$551,560
			Contingency (15%)	$82,700
			Subtotal	$634,260
			Engineering & Administration (15%)	$95,100
			Construction Engineering (15%)	$95,100
			TOTAL ESTIMATED COST	**$824,460**

14. REPLACE EXISTING 4-INCH WATER MAIN IN EDSON STREET AND LOOP NEW PIPING TO FOURTH AVENUE 8-INCH WATER MAIN

The existing 4-inch water main in Edson Street is old, undersized, and there are no fire hydrants. This improvement project will upsize the existing undersized water main to a new 8-inch water main and provide additional looping to the Fourth Avenue 8-inch water main. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$10,000
Project Temporary Traffic Control	LS	–	–	$10,000
HMA Surface Repair	SY	280	$45	$12,600
Shoring or Extra Excavation	LF	420	$1	$420
Select Backfill, as Directed	CY	15	$40	$600
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	420	$65	$27,300
Gate Valve 8 In.	EA	5	$1,600	$8,000
Hydrant Assembly	EA	1	$5,000	$5,000
Service Connection	EA	15	$1,600	$24,000
			Construction Cost Subtotal	$107,920
			Sales Tax (8.0%)	$8,630
			Subtotal	$116,550
			Contingency (15%)	$17,500
			Subtotal	$134,050
			Engineering & Administration (15%)	$20,100
			Construction Engineering (15%)	$20,100
			TOTAL ESTIMATED COST	**$174,250**

15. COLLIN'S PLACE WATER MAIN UPSIZE

The existing 6-inch water main in Collins Place is undersized to meet fire flow requirements. This improvement project will include the replacement of the existing 6-inch water main with a new 8-inch water main. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$5,000
Mobilization	LS	–	–	$7,000
Project Temporary Traffic Control	LS	–	–	$10,000
HMA Surface Repair	SY	280	$45	$12,600
Shoring or Extra Excavation	LF	400	$1	$400
Select Backfill, as Directed	CY	15	$40	$600
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	400	$65	$26,000
Gate Valve 8 In.	EA	2	$1,600	$3,200
Service Connection	EA	6	$1,600	$9,600
			Construction Cost Subtotal	$74,400
			Sales Tax (8.0%)	$5,950
			Subtotal	$80,350
			Contingency (15%)	$12,100
			Subtotal	$92,450
			Engineering & Administration (15%)	$13,900
			Construction Engineering (15%)	$13,900
			TOTAL ESTIMATED COST	**$120,250**

16. ZONE 2 CATHOLIC CHURCH WATER MAIN UPSIZE

The existing 6-inch water main serving the Catholic Church in Zone 2 is undersized to meet fire flow requirements. This improvement project will include the replacement of the existing 6-inch water main with a new 8-inch water main. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$5,000
Mobilization	LS	–	–	$6,000
Project Temporary Traffic Control	LS	–	–	$10,000
HMA Surface Repair	SY	240	$45	$10,800
Shoring or Extra Excavation	LF	350	$1	$350
Select Backfill, as Directed	CY	15	$40	$600
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	350	$65	$22,750
Gate Valve 8 In.	EA	2	$1,600	$3,200
Service Connection	EA	2	$1,600	$3,200
			Construction Cost Subtotal	$61,900
			Sales Tax (8.0%)	$4,950
			Subtotal	$66,850
			Contingency (15%)	$10,000
			Subtotal	$76,850
			Engineering & Administration (15%)	$11,500
			Construction Engineering (15%)	$11,500
			TOTAL ESTIMATED COST	**$99,850**

17. FIRST AVENUE 6-INCH STEEL LINE REPLACEMENT

The existing 6-inch water main in South First Avenue is old and undersized to meet fire flow requirements. This improvement project will upsize the existing undersized water main to a new 8-inch water main. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$13,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	250	$45	$11,250
Shoring or Extra Excavation	LF	700	$1	$700
Select Backfill, as Directed	CY	260	$40	$10,400
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	700	$65	$45,500
Gate Valve 8 In.	EA	4	$1,600	$6,400
Hydrant Assembly	EA	4	$5,000	$20,000
Service Connection	EA	8	$1,600	$12,800
			Construction Cost Subtotal	$150,050
			Sales Tax (8.0%)	$12,000
			Subtotal	$162,050
			Contingency (15%)	$24,300
			Subtotal	$186,350
			Engineering & Administration (15%)	$28,000
			Construction Engineering (15%)	$28,000
			TOTAL ESTIMATED COST	**$242,350**

18. INDUSTRIAL AREA WATER MAIN LOOP

To improve fire flow within the South Industrial area, a new 8" water main loop is proposed. This improvement project will construct a new 8-inch water main loop in the existing industrial area from Pearson Street to the South Industrial Area along I-82 right of way. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$12,000
Project Temporary Traffic Control	LS	–	–	$10,000
HMA Surface Repair	SY	550	$45	$24,750
Shoring or Extra Excavation	LF	800	$1	$800
Select Backfill, as Directed	CY	60	$40	$2,400
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	800	$65	$52,000
Gate Valve 8 In.	EA	4	$1,600	$6,400
Hydrant Assembly	EA	2	$5,000	$10,000
Service Connection	EA	4	$1,600	$6,400
			Construction Cost Subtotal	$134,750
			Sales Tax (8.0%)	$10,780
			Subtotal	$145,530
			Contingency (15%)	$21,800
			Subtotal	$167,330
			Engineering & Administration (15%)	$25,100
			Construction Engineering (15%)	$25,100
			TOTAL ESTIMATED COST	**$217,530**

19. FIFTH STREET FROM GLENWOOD DR. TO THIRD AVENUE WATER MAIN UPSIZE

The existing 6-inch PVC water main in Fifth Street from Glennwood Drive to Third Avenue is old and in need of replacement. This improvement project will include the replacement of the existing 6-inch water main with a new 8-inch water main, which will replace the dated pipe and also improve fire flow. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$9,000
Project Temporary Traffic Control	LS	–	–	$10,000
Gravel Surface Repair	SY	280	$20	$10,000
HMA Surface Repair	SY	40	$45	$1,800
Shoring or Extra Excavation	LF	460	$1	$460
Select Backfill, as Directed	CY	45	$40	$1,800
C-900 PVC Pipe for Water Main 8 In. Diam.	LF	460	$65	$29,900
Gate Valve 8 In.	EA	7	$1,600	$11,200
Hydrant Assembly	EA	2	$5,000	$10,000
Service Connection	EA	6	$1,600	$9,600
			Construction Cost Subtotal	$103,760
			Sales Tax (8.0%)	$8,300
			Subtotal	$112,060
			Contingency (15%)	$16,800
			Subtotal	$128,860
			Engineering & Administration (15%)	$19,300
			Construction Engineering (15%)	$19,300
			TOTAL ESTIMATED COST	**$167,460**

8.3.3 Schedule of Recommended Major Capital Improvements

Table 8-2 provides a 10-year schedule for completion of some of the recommended major capital improvements. Scheduling of the remaining improvements beyond this 10-year planning period should be reviewed annually as priorities and City growth patterns change and progress. The estimated improvement costs are provided in Table 8-2, as well as the total projected yearly cost. Estimated costs in Table 8-2 have been inflated for each year after 2021 to reflect the possible future costs based upon the projected year the improvement will be completed. Improvements that are projected to take place after year 2031 have been inflated to reflect year 2032 costs although many of these improvements will take place after the year 2032.

TABLE 8-2 SCHEDULE OF RECOMMENDED MAJOR CAPITAL IMPROVEMENTS

Priority No.	Improvement Description	Estimated Cost in 2021 Dollars	Completion Year											Funding Source
			2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032 to 2041	
1	Recoat Existing Reservoirs No. 1 and No. 2	670,900			733,100									DWSRF Loan/City
2A	Joseph Well Evaluation/Feasibility Study	60,000		63,700										City
2B	Construct New Source Well	1,275,600					1,478,800							DWSRF Loan/City
3	Reservoir Storage Expansion	1,098,000								1,390,900				DWSRF Loan/City
4	Cutler Way Booster Station Pump No. 3	234,100								296,600				DWSRF Loan/City
5	Zone 2 Booster Station Pump No. 4	234,100											324,000	DWSRF Loan/City
6	System Disinfection/Chlorination	500,600											693,000	DWSRF Loan/City
7	Third Ave Well Filtration Improvements	807,400											1,117,600	DWSRF Loan/City
8	Zone 2 8-Inch Water Main Loops	206,380											360,400	DWSRF Loan/City
9	Schoentrup Drive to Reo Drive, 8-Inch Water Main Loop	245,360											339,600	DWSRF Loan/City
10	South First Avenue to Miles Drive, 8-Inch Water Main Loop	171,770											237,800	DWSRF Loan/City
11	Meade Street to S. First Avenue Water Main Loop	63,970											88,500	DWSRF Loan/City
12	Pollock Avenue Upsize 4-Inch Water Main	198,540											274,800	DWSRF Loan/City
13	Replace 6-Inch Steel Line in First Avenue from Cheyne Road to Fourth Street	824,460											1,141,200	DWSRF Loan/City
14	Replace Existing 4-Inch Water Main in Edson Street and Loop New Piping to Fourth Avenue 8-Inch Water Main	174,250											241,200	DWSRF Loan/City
15	Collin's Place Water Main Upsize	120,250											166,400	DWSRF Loan/City
16	Zone 2 Catholic Church Water Main Upsize	99,850											138,200	DWSRF Loan/City
17	First Avenue 6-Inch Steel Line Replacement	242,350											335,500	DWSRF Loan/City
18	Industrial Area Water Main Loop	99,850											138,200	DWSRF Loan/City
19	Fifth Street from Glenwood Dr. to Third Avenue Water Main Upsize	167,460											231,800	DWSRF Loan/City
	TOTAL COSTS	7,495,190	0	63,700	733,100	0	1,478,800	0	0	1,687,500	0	0	5,828,200	

Note: Improvement costs for years following 2021 include 3% inflation per year. DWSRF cannot fund future growth or fire flow improvements.

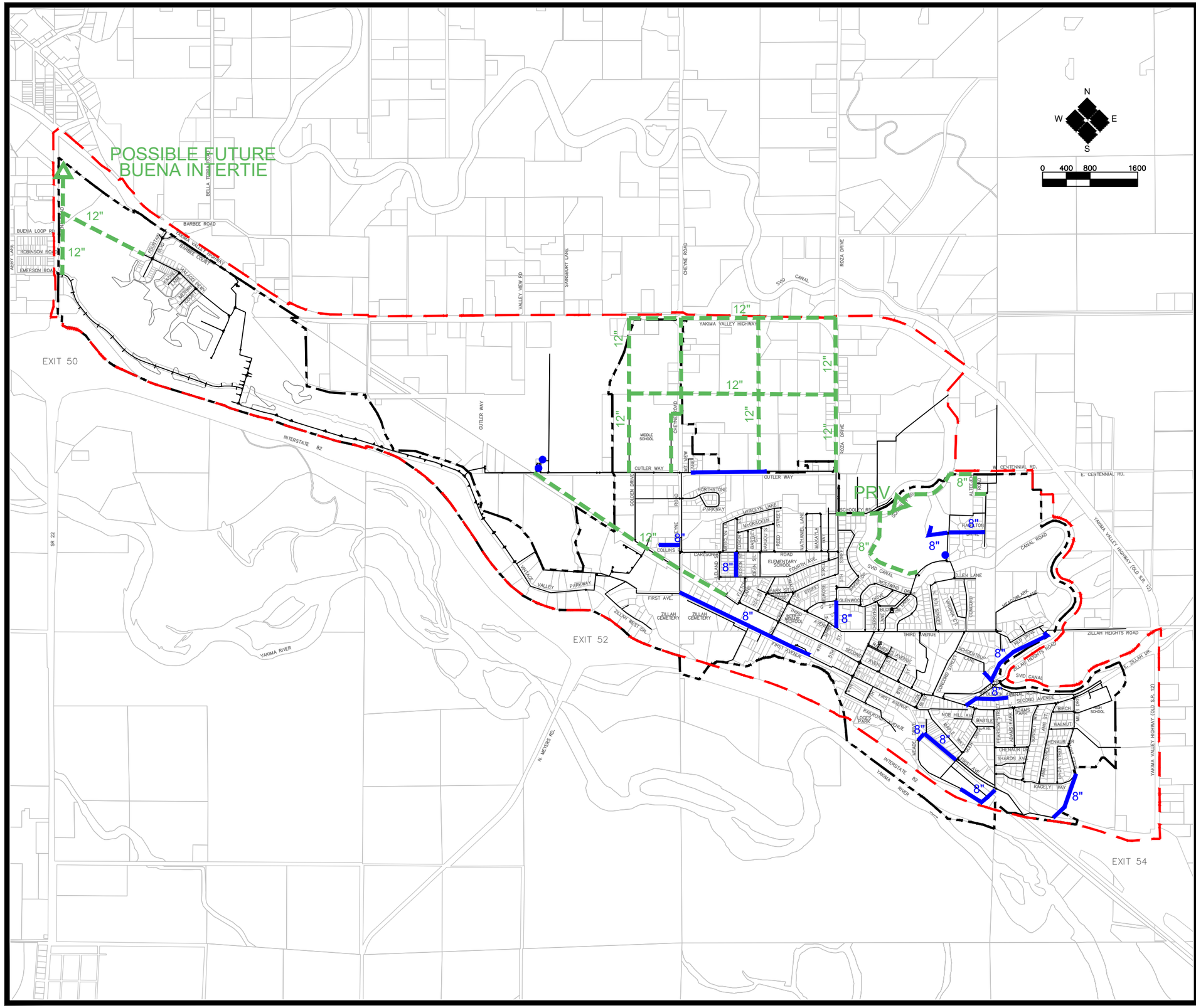
8.4 FUTURE MAJOR CAPITAL IMPROVEMENTS (PLANNING)

A general plan for future major capital improvements that would be a result of system expansion is shown in Figure 8-2. This Plan represents the projected water mains/structures, including estimated sizes, required as development expands beyond what the existing system serves within the City's current and future service area boundaries. Although conditions and circumstances in the City's water system may change the exact location and/or configuration of needed improvements, the general plan shown in Figure 8-2 allows the City to review proposed development with respect to system expansion. Also, as new development is proposed and/or occurs, the City will need to further evaluate the improvements required and review effects the system expansion plans will have on the existing distribution system.

CITY OF ZILLAH

Water System Plan Update

FUTURE MAJOR IMPROVEMENTS MAP



LEGEND

- ZILLAH CITY LIMITS
- ZILLAH UGA BOUNDARY
- POSSIBLE FUTURE MAJOR SYSTEM IMPROVEMENTS
- RECOMMENDED CAPITAL IMPROVEMENT

HLA Engineering and Land Surveying, Inc.
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FIGURE 8-2

CHAPTER 9 -

FINANCIAL PROGRAM

HLA
Engineering and Land Surveying, Inc.

9.1 PAST AND PRESENT FINANCIAL STATUS

Development of a comprehensive financial program requires an understanding of the water system's current financial status and past budgetary trends. Presented below in Table 9-1 of the City's Water Operating Fund (Fund 402) revenue and expenditure history for the five-year period, 2014 through 2019. A summary of the City's Water Reserve Fund (Fund 420) revenue and expenditure history for the last five years is provided in Table 9-2.

TABLE 9-1 WATER OPERATING FUND (FUND 402) HISTORY

Year	2015	2016	2017	2018	2019
BEGINNING FUND BALANCE	$565,197.49	$535,231.70	$557,878.16	$613,713.55	$319,182.05
REVENUES					
Water Sales	$357,157.23	$400,601.77	$423,666.91	$476,523.83	$494,260.57
Irrigation Sales	$100,467.10	$107,637.40	$112,786.92	$142,399.91	$155,319.19
Fees and Penalties	$46,773.26	$58,166.59	$49,506.96	$51,745.14	$45,018.58
Utility Tax – 26.3% - Water	$105,898.36	$109,904.54	$110,480.17	$125,247.07	$128,430.74
Misc. Water Revenues	$24,655.10	$24,681.44	$34,893.48	$38,079.15	$53,616.59
DWSRF Grant Proceeds		$12,944.74	$10,995.93		
Interfund Loan Proceeds					$403,609.41
Transfers In		$1,219.61			
TOTAL – REVENUES	$634,951.05	$715,156.09	$742,330.37	$833,995.10	$1,280,255.08
EXPENDITURES					
Water Operating - General	$510,954.17	$559,745.44	$561,124.67	$589,452.21	$639,530.99
Irrigation Operating - General	$153,962.67	$130,668.73	$121,665.17	$139,074.39	$156,787.86
Interfund Loan				$400,000.00	$400,000.00
Capital Outlay					
Other Improvements		$2,095.46	$3,705.14		
TOTAL – EXPENDITURES	$664,916.84	$692,509.63	$686,494.98	$1,128,526.60	$1,196,318.85
ENDING FUND BALANCE	$535,231.70	$557,878.16	$613,713.55	$319,182.05	$403,118.28
Net Increase (Decrease) in Fund Balance	$(29,965.79)	$22,646.46	$55,835.39	$(294,531.50)	$83,936.23

TABLE 9-2 WATER RESERVE FUND (FUND 420) HISTORY					
Year	2015	2016	2017	2018	2019
BEGINNING FUND BALANCE	$417,100.73	$326,925.48	$374,410.14	$394,419.90	$687,437.71
REVENUES					
Investment Interest	$2,040.56	$798.28	$2,328.37	$3,627.58	$4,991.89
Water Imp. – Ord 906	$130,852.12	$132,058.73	$132,641.55	$135,346.95	$135,873.14
Cost Recovery	$3,300.00	$4,900.00	$5,350.00	$11,390.00	$4,950.00
Utility Hookup Fees - Water	$8,000.00	$70,600.00	$16,000.00	$25,200.00	$14,000.00
Loan Proceeds					
Interfund Loan				$400,000.00	$210,346.38
DWSRF Loan – Source Well				$1,441,988.44	$562,219.84
Miscellaneous				$3,818.07	
TOTAL – REVENUES	$144,192.68	$208,357.01	$156,319.92	$2,021,371.04	$932,381.25
EXPENDITURES					
Water Utilities	$100,265.24	$25,826.79	$645.88	$7,832.49	$5,898.94
Interfund Loan Repayment – to 402					$403,609.41
Debt Service					
PWTF Loan - Telemetry	$5,784.65	$5,772.99	$5,744.95	$5,716.94	$5,688.90
PWTF Loan – Water Tower	$128,318.04	$128,215.79	$127,602.32	$126,988.85	$126,375.38
DWSRF Loan – Source Well					$72,461.73
DWSRF Loan - Forgiveness					$562,219.84
Capital Outlay					
Misc./O&M Capital Improvements		$1,056.78	$2,317.01	$17,638.36	$472.60
Major Capital Improvements				$1,570,176.59	$96,348.13
TOTAL – EXPENDITURES	$234,367.93	$160,872.35	$136,310.16	$1,728,353.23	$1,273,074.93
ENDING FUND BALANCE	$326,925.48	$374,410.14	$394,419.90	$687,437.71	$346,744.03
Net Increase (Decrease) in Fund Balance	$(90,175.25)	$47,484.66	$20,009.76	$293,017.81	$(340,693.68)

It can be seen from Table 9-1and Table 9-2 that both account balances have remained positive in the past five years. Although account balances have remained positive, a close examination of the City's future financial plan, including necessary revenue increases and their rate structure, will be crucial to keep a positive account balance and construct the system improvements recommended in this Plan.

9.2 AVAILABLE REVENUE SOURCE

Recommended system improvements are scheduled for completion in annual increments for the next six years. In addition, as areas outside the current service area develop, extension of the City's water system will be necessary. Future transmission mains, sources of supply, and reservoirs will undoubtedly require major local bond funding and/or outside funding participation to offset the high costs of the improvements.

There are five basic categories of potential financing for domestic water-related improvements:

1. Local Public Enterprise Funds
2. Use of Local Public Powers
3. State Assisted or Guaranteed Resources
4. Federally Assisted or Guaranteed Resources
5. Private Development

Current availability of funding is limited with several the sources within these categories. Many also restrict the use of funds to certain projects and others limit their participation to a percentage of the total cost. Each of these categories is described briefly below.

1. Local Public Enterprise Funds

   Reserves in the Enterprise Fund are accumulated from available revenues from water user fees. The amount of the reserves will depend on the balance of operation and maintenance costs of the system versus total revenue generated by the fees. These reserves may be used to finance any water system related project allocated by the City Council.

   Funds for future projects may be generated by increases in user fees, thus building the reserves in the Enterprise Fund. With this method of financing, often called the "pay-as-you-go" approach, the City is collecting interest on the reserves as opposed to paying interest on a loan balance. One method used by some communities to accumulate reserves is through the development of a capital recovery charge system. This approach is similar to assessing connection fees, except the amount is based on the capital costs of constructing collection system trunk lines and treatment facilities, and the collected funds are usually set aside as capital reserves for future projects.

2. Use of Local Public Powers

   In this section, three primary bonding techniques will be presented: general obligation bonds, revenue bonds, and special assessment bonds. There are advantages and disadvantages to each. The type of bond issued to finance a community improvement depends in part on custom and in part on the circumstances of a particular offering. General information about the three principal types of municipal bonds follow.

   General Obligation Bonds: These bonds pledge the unlimited taxing power and the full faith and credit of the issuing government to meet the required principal and interest payments.

Special Assessment Bonds (LID Bonds): LID bonds are used to finance improvements where the property specially benefited can be identified. Special assessment bonds are frequently used to make capital improvements in a particular neighborhood. Principal and interest payments for these bonds are made by special assessment on the property benefiting from the improvement. Before special assessment bonds are issued, estimated costs are mailed to property owners, a public hearing is held to allow the affected property owners to say whether or not they want the improvement, and a 30-day protest period elapses during which property owners may protest the improvements prior to City Council action formally establishing the project. Debt financed by special assessment bonds is not subject to debt limitations.

Revenue Bonds: Revenue bonds are frequently used to finance City-owned utilities, industrial parks, and other municipal public facilities. The bonds pledge the revenue from a particular revenue source to meet the principal and interest payments. Revenue bonds are appropriate debt instruments when the enterprise fund can be expected to generate sufficient revenue to meet both operating and debt service cost. Revenue bonds generally do not become a general obligation of the government issuing them. Communities may have to pay higher rates of interest on these bonds than on general obligation bonds, because revenue bonds are considered less secure. But revenue bonds also have an important advantage over general obligation bonds in that the amount of the revenue bonds is not included in the amount of indebtedness subject to state debt limitations. The legal requirements for issuing revenue bonds are more complex than those for issuing general obligation bonds. When revenue bonds are issued, a special authority (Water Fund) operates the facility, and a special revenue fund receives and disburses all funds. A trust agreement to provide for the monthly reimbursement of revenues and containing provisions to protect the bond holders must be formulated.

3. State Assisted or Guaranteed Resources

Public Works Trust Fund (PWTF): This fund was created in 1985 to provide loans for replacement of public works facilities. Applications for construction funds may be submitted once each year (in May), and applications for pre-construction funds (for such items as engineering design, bid document preparation, right of way acquisition and environmental studies) may be submitted once each month. Projects are evaluated based on:

a. Merits of the project as to need;
b. Degree of capital improvement planning;
c. Adequacy of existing rate structure;
d. Degree of local participation in financing project; and
e. Whether the area is economically distressed.

Current allocations of funds have been allowed for a wide variety of projects, including domestic water system replacement projects. The interest rates on PWTF loans generally range from 0.5% to 2% depending on the amount of matching money provided by the City.

Drinking Water State Revolving Fund (DWSRF): This fund provides low-interest loans to publicly and privately owned water systems for projects which improve water systems and ensure public health. Up to 100% of eligible project costs are fundable through this program. Applications are accepted once a year between October 1st and November 30th.

4. Federally Assisted or Guaranteed Resources

   Three federally financed funding sources are available for domestic water system construction: 1) the USDA's Rural Development, Rural Utilities Service (RUS) Program; 2) the Economic Development Administration's (EDA) Public Works Grants and Loans Program; and 3) the Department of Housing and Urban Development's (HUD) Community Development Block Grants administered by the State Department of Community Planning and Development.

   Rural Utilities Service Water & Waste Disposal Direct Loans and Grants Program: This program is one of several programs established by the USDA to provide public works assistance to small communities in rural areas. Public entities such as municipalities, counties, special purpose districts or authorities, Indian tribes, and nonprofit corporations or cooperatives are eligible in areas with a population under 10,000. Priority will be given to public entities in areas smaller than 5,500 people to restore a deteriorating water supply, or to improve, enlarge, or modify a water facility. Preference will also be given to requests which involve the merging of small facilities and those serving low-income communities. Loans and grant funds may be used to construct, repair, improve, expand, or otherwise modify rural water supply and distribution, including reservoirs, pipelines, wells, and pumping stations. Targeted at the neediest communities, grants are designed to keep costs economical. Grants are limited to reducing the facility per user costs for debt service to a minimum of 1% of the area's family income. Loans in the past have also been available at a 5% interest rate for the useful life of the facility, or the statutory limit on the applicant's borrowing authority, or for a maximum of 40 years.

   Public Works Grants and Loans Program: This program is funded by the Economic Development Administration (EDA) and is used to encourage long-range development gains in jurisdictions where economic growth is lagging, or where the economic base is shifting. The program provides public works and development facilities needed to attract new industry and provide business expansion. Financial aid may be used to acquire and develop land and improvements for public works, and to acquire, construct, rehabilitate, alter, expand, or improve such facilities, including related machinery and equipment. When completed, such projects are expected to bring additional private investment to the area.

   U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant Program: This program is administered by the State Department of Community Development. Communities with a population under 50,000 can apply for grants to undertake activities in providing adequate housing, expanded economic opportunities, and correcting deficiencies in public facilities which affect public safety and health of an area or community of residents. The program is designed to aid low- and moderate-income people and is also directed to have a maximum impact on stated community problems. Its primary focus is to assist blighted communities, or communities suffering a particular community or economic development problem.

5. Private Development

   Expansion of domestic water facilities to newly developing areas outside the existing service area is a common requirement of the private developer. Installation of public utilities within housing subdivisions is normally financed entirely by the developer. The City may participate by paying the cost of over-sizing the water main for possible extension later.

Although funding has been curtailed in several programs within the last few years, projects are still receiving financing statewide. Competition for available funds, however, has increased significantly. Projects which show the greatest need and have the largest local funding participation or benefit to low-income families are receiving most of the financing from these programs. Careful planning and packaging of the project is necessary so that the most effective dollar use, including local participation, may obtain the maximum benefit for the greatest number of people.

Table 9-3 provides a summary of funding sources and projects which are eligible under each program.

TABLE 9-3 FUNDING SOURCE SUMMARY

FUNDING SOURCE	ELIGIBLE PROJECTS
Domestic Water Enterprise Fund	All water system projects
General Obligation Bond	All water system projects
Revenue Bond	All water system projects
Special Assessment Bond	Local Improvement District projects
Public Works Trust Fund	Replacement of existing water system facilities
Drinking Water State Revolving Fund (DWSRF)	All water system projects, except for the sole purpose of fire flow or growth.
USDA RUS Rural Water Grant	All water system projects
USDA RUS Rural Water Loan	All water system projects
EDA Public Works Grant	Water system projects to attract new industries and provide for business expansion
EDA Public Works Loan	Water system projects to attract new industries and provide for business expansion
HUD Community Development Block Grant	Water system projects which directly benefit low and moderate-income families
Private Development	All water system projects necessary for new housing and/or commercial developments

9.3 RECOMMENDED FINANCING STRATEGY

Provided in Table 9-4 and Table 9-5 is a financial program for the City's Water Operating Fund (Fund 402) and Water Reserve Fund (Fund 420), which incorporates projected water service fees, operating costs, improvements, and loan costs for the next 10-year period. The values for year 2020 and year 2021 are budgeted figures used by the City.

The projected water department revenue from water service fees after 2021 includes additional revenue from a combination of projected increases in the number of services and rate increases at the beginning of the year. These projected revenue increases are necessary to complete the recommended system improvements, while maintaining a positive balance in the water fund. If conditions change that reduce the projected future revenue or increase future water department expenses, the financial program shown in Table 9-4 and Table 9-5 should be revised to account for the reduced revenue, or modifications to successive year rate increases will have to be made.

Future water department expenses were estimated based upon an average inflation rate of 4% per year, as shown in Table 9-4.

Funding for major capital improvements scheduled to be completed after 2021 has not been obtained and will be required to complete those recommended system improvements. Further evaluation and research of available funding sources may be necessary in the future to ensure a funding package will be established to meet the requirements of the proposed financial plan. If loan and/or grant funding is not available for major capital improvements, project construction will most likely need to be delayed until funds become available or sufficient local funds are saved. For this reason, it is critical that the City actively seek and apply for available grants and low interest loans whenever possible. Funding for most O&M improvements is based upon using City funds unless otherwise noted.

The City has three active loans from past water system improvement projects that are being repaid as shown in Table 9-5. The two PWTF loans are set to expire in 2021 and 2025, respectively. This will allow the City to take on additional debt service, to complete recommended water system improvements, with annual payments of around $125,000 after year 2025 without significant impact to rate payers. The current DWSRF loan will not expire until the year 2039.

As discussed in Chapter 4, the City owns and maintains its own irrigation system that serves a portion of irrigation water users within the City's existing service area. Projected irrigation revenues and expenditures have been included in Table 9-4 and Table 9-5 because they are currently part of the City's water system fund balances. No analysis of the irrigation department rate structure or financial viability were conducted as part of this Plan.

The City of Zillah will continue annual reviews of the water system's financial program during their budget preparation process. The financial program will also be reviewed and revised as needed during the next *Water System Plan* update. This continued review will allow for modifications to the proposed rate and revenue increases, should financial conditions change.

TABLE 9-4 PROPOSED WATER OPERATING FUND (FUND 402) FINANCIAL PROGRAM

Year	2020[a]	2021[a]	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
BEGINNING FUND BALANCE	$403,118.28	$403,530.96	$405,320.50	$408,803.62	$391,970.07	$385,962.03	$392,121.41	$411,925.62	$427,000.30	$429,133.32	$450,290.00	$462,629.73
REVENUES												
Water Sales	$490,000.00	$500,000.00	$550,000.00	$605,000.00	$629,200.00	$654,368.00	$680,542.72	$707,764.43	$736,075.01	$765,518.01	$796,138.73	$827,984.28
Irrigation Sales	$164,000.00	$170,000.00	$185,300.00	$201,977.00	$220,154.93	$239,968.87	$261,566.07	$285,107.02	$310,766.65	$338,735.65	$369,221.86	$402,451.83
Fees and Penalties	$57,800.00	$45,200.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00
Utility Tax – 26.3% - Water	$130,000.00	$135,000.00	$144,650.00	$159,115.00	$165,479.60	$172,098.78	$178,982.74	$186,142.05	$193,587.73	$201,331.24	$209,384.49	$217,759.87
Misc. Water Revenues	$31,491.00	$28,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00
TOTAL – REVENUES	$873,291.00	$878,200.00	$944,950.00	$1,031,092.00	$1,079,834.53	$1,131,435.65	$1,186,091.53	$1,244,013.50	$1,305,429.39	$1,370,584.90	$1,439,745.08	$1,513,195.98
EXPENDITURES												
Water Operating – General[b]	$702,158.32	$699,908.46	$727,904.80	$757,020.99	$787,301.83	$818,793.90	$851,545.66	$885,607.49	$921,031.79	$957,873.06	$996,187.98	$1,036,035.50
Irrigation Operating – General[b]	$169,470.00	$176,502.00	$183,562.08	$190,904.56	$198,540.74	$206,482.37	$214,741.66	$223,331.33	$232,264.58	$241,555.16	$251,217.37	$261,266.06
Interfund Loan/Transfers Out (to Fund 420)			$30,000.00	$100,000.00	$100,000.00	$100,000.00	$100,000.00	$120,000.00	$150,000.00	$150,000.00	$180,000.00	$220,000.00
Capital Outlay												
Other Improvements	$1,250.00											
TOTAL – EXPENDITURES	$872,878.32	$876,410.46	$941,466.88	$1,047,925.55	$1,085,842.57	$1,125,276.27	$1,166,287.32	$1,228,938.82	$1,303,296.37	$1,349,428.22	$1,427,405.35	$1,517,301.56
ENDING FUND BALANCE	$403,530.96	$405,320.50	$408,803.62	$391,970.07	$385,962.03	$392,121.41	$411,925.62	$427,000.30	$429,133.32	$450,290.00	$462,629.73	$458,524.15
Net Increase (Decrease) in Fund Balance	$412.68	$1,789.54	$3,483.12	$(16,833.55)	$(6,008.04)	$6,159.38	$19,804.21	$15,074.68	$2,133.02	$21,156.68	$12,339.73	$(4,105.58)
Projected Water Revenue Increase at Start of Year[c]	-0.9%	2.0%	10.0%	10.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Projected Irrigation Revenue Increase at Start of Year[c]	5.6%	3.7%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%

[a] Year 2020 and 2021 values are budgeted numbers.
[b] Operating expenditures for years after 2021 include 4% inflation per year for water and irrigation.
[c] Projected revenue increases are a combination of growth and rate increases. Approximately 2% annual growth is assumed after year 2021.

TABLE 9-5 PROPOSED WATER RESERVE FUND (FUND 420) FINANCIAL PROGRAM												
Year	2020[a]	2021[a]	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
BEGINNING FUND BALANCE	$346,744.03	$210,177.65	$129,089.80	$90,484.80	$86,581.20	$128,336.53	$140,700.22	$285,907.83	$326,676.41	$431,381.19	$450,485.67	$410,348.39
REVENUES												
Investment Interest	$3,000.00	$-	$-	$-	$-	$-	$-	$-	$-	$-	$-	$-
Water Imp. – Ord 906	$140,000.00	$141,000.00	$143,820.00	$146,696.40	$149,630.33	$152,622.94	$155,675.40	$158,788.91	$161,964.69	$165,203.98	$168,508.06	$171,878.22
Cost Recovery	$11,025.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00
Utility Hookup Fees - Water	$36,000.00	$24,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00
Loan Proceeds												
Interfund Loan/Transfers In (from Fund 402)			$30,000.00	$100,000.00	$100,000.00	$100,000.00	$100,000.00	$120,000.00	$150,000.00	$150,000.00	$180,000.00	$220,000.00
Future Loan Proceeds					$733,100.00		$1,478,800.00			$1,687,500.00		
Miscellaneous												
TOTAL – REVENUES	$190,025.00	$173,000.00	$201,820.00	$274,696.40	$1,010,730.33	$280,622.94	$1,762,475.40	$306,788.91	$339,964.69	$2,030,703.98	$376,508.06	$419,878.22
EXPENDITURES												
Water Utilities	$22,180.00	$1,660.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00
Interfund Loan Repayment – to 402												
Debt Service												
PWTF Loan - Telemetry	$5,660.89	$5,660.87	$-	$-	$-	$-	$-	$-	$-	$-	$-	$-
PWTF Loan – Water Tower	$125,761.91	$127,602.32	$125,200.00	$124,600.00	$124,000.00	$123,325.00	$-	$-	$-	$-	$-	$-
DWSRF Loan – Source Well	$71,862.88	$74,491.66	$73,125.00	$72,500.00	$71,875.00	$71,250.00	$70,625.00	$70,000.00	$69,375.00	$68,750.00	$68,125.00	$67,500.00
Future Debt Service						$49,484.25	$48,842.79	$148,020.33	$146,084.91	$144,149.50	$256,120.34	$252,708.36
Capital Outlay												
Misc./O&M Capital Improvements[b]	$101,125.70	$44,673.00	$37,100.00	$12,800.00	$35,000.00	$19,200.00	$14,000.00	$43,000.00	$14,800.00	$106,200.00	$87,400.00	$243,500.00
Major Capital Improvements[b]				$63,700.00	$733,100.00		$1,478,800.00			$1,687,500.00		
TOTAL – EXPENDITURES	$326,591.38	$254,087.85	$240,425.00	$278,600.00	$968,975.00	$268,259.25	$1,617,267.79	$266,020.33	$235,259.91	$2,011,599.50	$416,645.34	$568,708.36
ENDING FUND BALANCE	$210,177.65	$129,089.80	$90,484.80	$86,581.20	$128,336.53	$140,700.22	$285,907.83	$326,676.41	$431,381.19	$450,485.67	$410,348.39	$261,518.25
Net Increase (Decrease) in Fund Balance	$(136,566.38)	$(81,087.85)	($38,605.00)	($3,903.60)	$41,755.33	$12,363.69	$145,207.61	$40,768.58	$104,704.78	$19,104.48	($40,137.28)	($148,830.14)

[a] Year 2020 and 2021 values are budgeted numbers.
[b] Refer to Chapter 8 for schedule of recommended improvements after year 2021.

9.4 WATER RATES

Zillah's current water rates and rate structure were adopted in 2020 and are based on a monthly base rate charge, and additional charge, plus a per cubic foot charge for volumes over 300 cubic feet. A summary of the current water rates for services within the City Limits is provided below in Table 9-6. The complete list of the City's current water rates is provided in Chapter 13.08.050 of the City's municipal code, a copy of which is provided in CHAPTER 10.

TABLE 9-6 SUMMARY OF CURRENT WATER RATES

Year	2021
Base Rate per Metered Hookup (In City)[a]	$16.44
Surcharge for Users Outside City in Addition to Base Rate	$8.22
300 – 1,000 cu. ft.	$0.0414/cu. ft.
1,001 – 2,000 cu. ft.	$0.0380/cu. ft.
2,001 – 3,000 cu. ft.	$0.0207/cu. ft.
More than 3,000 cu. ft.	$0.0121/cu. ft.

[a] Base rate per month for up to 300 cubic feet (2,244 gallons) of water.
[b] 50% of base rate.
[c] Rates per cubic feet (cu. ft.) of water used more than 300-cubic-foot minimum in one calendar month.

Based on the above rates, the typical monthly charge for a single-family residential customer inside the City that uses 678 cubic feet of water in a month (approximately 169 gallons per day) would be equal to $32.09. Utility rate discounts are available to qualifying low income and disabled customers in accordance with Ordinance 1428. A copy of this ordinance is provided in Chapter 10.

The City's current rates and/or total revenue will need to be increased in future years to maintain a positive operating fund balance, pay for rising O&M costs, fund necessary improvement projects, and make the necessary debt service payments for prior and future improvement projects. Due to the proposed improvements and financial projections, it is recommended that the City consider increasing the revenue as proposed in Table 9-4, which will require additional rate increases.

A more detailed rate analysis will be necessary in the future to determine the rate structure required to achieve the recommended revenue increases as shown in the financial plan in Table 9-4 and Table 9-5. Following the proposed rate analysis, annual review of the proposed rates and revenue increases will be necessary to determine required adjustments to either base rates, usage charges, or both.

With the City's current rate structure, customers pay more with increased water usage but the rate per cubic foot decreases as use increases. Further conservation may be possible by changing to an inclining-block rate or similar structure. This type of rate structure would penalize customers that use excessive amounts of water, potentially encouraging more efficient use of water. Since the City's current rate structure primarily only effects large water users, such as industrial customers, the City may also want to consider different rate structures for different user classes.

CHAPTER 10 -

MISCELLANEOUS DOCUMENTS

HLA
Engineering and Land Surveying, Inc.

10.1 MISCELLANEOUS DOCUMENTS INDEX

1. State Environmental Policy Act (SEPA) Documentation
2. Water Facility Inventory (WFI) Form
3. WSP Comments and Responses
4. Consumer Meeting & Water System Plan Adoption
5. WUE Program Goal Adoption
6. Local Government Consistency Review Checklist(s)
7. City of Zillah Fire Department Letter
8. City of Zillah Municipal Code
   - Chapter 13.08 Water Systems
   - Chapter 13.18 Utility Standards for Urban Growth Areas
   - Chapter 13.28 Reductions in Water Billings Due to Leaks
   - Chapter 13.30 Utility Reimbursement Agreements
   - Chapter 13.34 Utility Tax Discount
   - Chapter 13.38 Infrastructure Improvement Program
9. Extension by Developers Policy
10. Water Rights
    - Rainier Ave Well
    - Rainier Ave Well Application
    - Third Ave Well
    - WIPPCO Well
    - Third Ave Well and WIPPCO Well
    - Superseding Permit G4-29702P
    - Permit G4-29702P Aquifer Designation Memorandum
11. Well Logs
    - Rainier Ave Well
    - Third Ave Well
12. Protective Covenants
    - WIPPCO Well
13. Susceptibility Assessment Survey Forms
    - Rainier Ave Well
    - Third Ave Well
    - WIPPCO Well
14. City of Zillah Wellhead Protection Plan
15. Cross-Connection Control Manual
16. Consumer Confidence Report
17. Coliform Monitoring Plan
18. Water Quality Monitoring Schedule
19. Source Sample Chemical Analysis Results (IOC, Nitrate, VOC, SOC, and Radionuclide)
20. Distribution System Chemical Analysis Results (Bacteriological, Lead, and Copper)
21. Lead and Copper Certification Form and Consumer Notice Example
22. Department of Health Sanitary Survey
23. Computer Printout of Hydraulic Analysis Results

24. City of Zillah Design and Construction Standards
25. City of Zillah Utility Connect Order Form
26. City of Zillah Work Order Form
27. City of Zillah Fire Department Hydrant Flow Test 2013

Map A - Existing Water System
Map B - Hydraulic Analysis Nodes and Pipes

1.
STATE ENVIRONMENTAL POLICY ACT (SEPA) DOCUMENTATION

HLA
Engineering and Land Surveying, Inc.

CITY OF ZILLAH
Yakima County, Washington

CITY OF ZILLAH
2021 WATER SYSTEM PLAN UPDATE

STATE ENVIRONMENTAL POLICY ACT

ENVIRONMENTAL CHECKLIST

Prepared by

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

HLA Project No. 19202E
March 2021

STATE ENVIRONMENTAL POLICY ACT

ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. *Name of Proposal, if Applicable:* 2021 Water System Plan Update

2. *Name of Proponent:* City of Zillah
   Phone Number: (509) 829-5151
   Address of Proponent: 503 First Avenue
   Zillah, WA 98953

3. *Person Completing Form:* Justin Bellamy, PE
   Phone Number: (509) 966-7000
   Address: HLA Engineering and Land Surveying, Inc.
   2803 River Road
   Yakima, WA 98902

4. *Date Checklist Prepared:* March 2021

5. *Agency Requesting Checklist:* City of Zillah

6. *Proposed timing or schedule (including phasing, if applicable):*
   Water System Plan Update adoption in November 2021.

7. *Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.*
   The water system plan update identifies on-going maintenance activities and replacement and growth-related improvements for the City's municipal water system.

8. *List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.*
   None.

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 at this time.

10. *List any governmental approvals or permits that will be needed for your proposal, if known.*
    - Department of Health – Approval of water system plan.

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.*
    Adoption of the Water System Plan (WSP) for the City of Zillah Urban Growth Area. The WSP identifies recommended maintenance- and growth-related improvements to the City's water system. Construction, with potential construction-related impacts, will be necessary to implement the WSP recommendations. Further environmental review

is required for all non-exempt construction activities, and project specific checklist responses will be provided at that time.

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 application related to this checklist.*

    The proposed water system improvements are located throughout the incorporated and unincorporated areas within the City of Zillah Growth Area boundary and are shown on maps within the Water System Plan.

B. ENVIRONMENTAL ELEMENTS

1. EARTH

a. *General description of the site (underline one): Flat, rolling, hilly, steep slopes, mountainous, other*.

    The area can be generally described as slightly rolling from the north-northeast to the south-southwest.

b. *What is the steepest slope on the site (approximate percent slope)?*

    The majority of the City sits on slopes from 0% to 10%, but slopes along the Zillah Bluffs can be *near vertical.*

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.*

    Several different soil groups are present within Zillah's water service area, but most contain silt, sand, and loam. Some of the soils within the City service area are classified by the U.S. Department of Agriculture Natural Resource Conservation Service as Prime Farmland. Future construction of the water system improvements to serve areas within the City's Urban Growth Area may cross some of these prime farmland areas.

d. *Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.*

    There has been no recent indications of unstable soils or earth movement in the Zillah area. The City of Zillah does recognize (Ordinance 760) the Zillah Bluff area along the south section of the City as an "unstable soil area" due to its slope and soil makeup.

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.*

    None proposed.

f. *Could erosion occur as a result of clearing, construction, or use? If so, generally describe.*

    Not applicable.

g. *About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or building)?*

Not applicable.

h. *Proposed measures to reduce or control erosion, or other impacts to the earth, if any:*

None.

2. AIR

a. *What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.*

None.

b. *Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.*

No.

c. *Proposed measures to reduce or control emissions or other impacts to air, if any:*

None.

3. WATER

a. *Surface Water:*

1. *Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.*

The Yakima River, and irrigation canals and drains lie within or immediately adjacent to the current and future water service areas.

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.*

No.

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.*

None.

4. *Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.*

No.

5. *Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.*

The City of Zillah Urban Growth Area boundary contains lands located within the 100-year floodplain of the Yakima River.

6. *Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.*

No.

b. *Ground Water:*

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.*

   Approximately 404 acre-feet of ground water is currently being withdrawn for water supply to the Zillah water system. Groundwater withdrawals are projected to increase to 745 acre-feet annually by year 2041.

2. *Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage, industrial, containing the following chemicals...; agricultural, etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.*

   None.

c. *Water Runoff (including storm water):*

1. *Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will the water flow? Will this water flow into other waters? If so, describe.*

   Not applicable.

2. *Could waste materials enter ground or surface waters? If so, generally describe.*

   No.

3. *Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.*

   No.

d. *Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:*

   Not applicable.

4. PLANTS

a. *Check or underline type of vegetation found on the site:*

__X__ deciduous tree: alder, maple, aspen, other
__X__ evergreen tree: fir, cedar, pine, other
__X__ shrubs
__X__ grass
__X__ pasture
__X__ crop or grain
__X__ Orchards, vineyards, or other permanent crops
__X__ wet soil plants; cattail, buttercup, bullrush, skunk cabbage, other
____ water plants: water lily, eelgrass, milfoil, other
__X__ other types of vegetation

b. *What kind and amount of vegetation will be removed or altered?*

   None.

c. *List threatened or endangered species known to be on or near the site.*

The U.S. Fish & Wildlife Service lists two endangered plants that may occur within Yakima County, these being:

Ute ladies'-tresses (Spiranthes diluvialis); and
Basalt Daisy (Erigeron basalticus).

Neither of these two plants are known to exist within the City of Zillah or it's Urban Growth Area.

d. *Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:*

None.

e. *List all noxious weeds and invasive species known to be on or near the site.*

None.

5. ANIMALS

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:*

Bird: hawk, heron, eagle, songbird, other
Mammals: deer, bear, elk, beaver, other
Fish: bass, salmon, trout, herring, shellfish, other

b. *List any threatened or endangered species known to be on or near the site*.

Bald eagles (Haliaeetus leucocephalus) listed by the U.S. Fish & Wildlife Service as "Species of Concern," are present along the Yakima River in the Zillah vicinity. Steelhead (Oncorhynchus mykiss), currently listed by National Marine Fisheries Service as "Threatened," and the Bull Trout (Salvelinus confluentus), currently listed by the U.S. Fish & Wildlife Service as "Threatened," are present in the Yakima River. Sandhill Cranes (Grus Canadensis) are listed by the State of Washington as "Endangered".

c. *Is this site part of a migration route? If so, explain.*

The City of Zillah Urban Growth Area boundary may be within a migratory route for some bird species. The Yakima River is a migratory route for Mid-Columbia River Steelhead (Oncorhynchus mykiss).

d. *Proposed measures to preserve or enhance wildlife, if any:*

None.

e. *List any invasive animal species known to be on or near the site.*

None.

6. ENERGY AND NATURAL RESOURCES

a. *What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.*

None.

b. *Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.*

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None.

7. ENVIRONMENTAL HEALTH

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No.

1. Describe any known or possible contamination at the site from present or past uses.

None.

2. Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmissions pipelines located within the project area and in the vicinity.

None.

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.

None.

4. Describe special emergency services that might be required.

None.

5. Proposed measures to reduce or control environmental health hazards, if any:

None.

b. Noise

1. What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None.

2. What types 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.

None.

3. Proposed measures to reduce or control noise impacts, if any:

None.

8. LAND AND SHORELINE USE

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.

The City of Zillah Urban Growth Area is a combination of agricultural, residential, commercial, industrial, and public land uses.

b. Has the project site been used as working farmlands or working forest land? 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 non-forest use?

Historically, land within the City of Zillah Urban Growth Area has been used for agriculture. However, some of the land area has been converted to non-agricultural urban uses.

1. 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:

No.

c. Describe any structures on the site.

Not applicable.

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

The incorporated and unincorporated City of Zillah Urban Growth Area consists of a range of zoning classifications including residential, commercial, light manufacturing, commercial tourism, public lands/church, and suburban.

f. What is the current comprehensive plan designation of the site?

Not applicable.

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Yes. There are areas classified as “unstable slopes” along the southern section of the City (the Zillah Bluffs area), and there are also wetland areas present within the City and its urban growth area.

i. Approximately how many people would reside or work in the completed project?

Not applicable.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not applicable.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

None.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

Not applicable.

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

Not applicable.

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Not applicable.

b. What views in the immediate vicinity would be altered or obstructed?

None.

c. Proposed measures to reduce or control aesthetic impacts, if any:

None.

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

None.

12. RECREATION

a. What designated and informal recreational opportunities are in the immediate vicinity?

The City of Zillah Urban Growth Area contains numerous municipal parks and school playgrounds. Numerous informal recreational opportunities such as fishing, bird watching, walking, jogging, bicycling, etc., exist within the Urban Growth Area.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

None.

13. HISTORIC AND CULTURAL PRESERVATION

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 located on or near the site? If so, specifically describe.

No.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Is 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.

None.

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.

None.

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.

None.

14. TRANSPORTATION

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.

The City of Zillah Urban Growth Area contains numerous City of Zillah, Yakima County, and Washington Department of Transportation streets and highways. Public streets are shown on maps in the Water System Plan.

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?

No public transit service is provided within the City of Zillah Urban Growth Area.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

Not applicable.

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).

No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project 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?

None.

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.

No.

h. Proposed measures to reduce or control transportation impacts, if any:

None.

15. PUBLIC SERVICES

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other?) If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any.

None.

16. UTILITIES

a. *Underline the utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, irrigation, cable TV, drains, other.*

Available at numerous locations within the City of Zillah Urban Growth Area.

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.

None.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Digitally signed by Justin Bellamy
Date: 2021.03.30 11:10:27 -07'00'

March 30, 2021

Justin Bellamy, PE — Date
Project Engineer
HLA Engineering and Land Surveying, Inc.

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

1. *How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?*

   This Water System Plan addresses and identifies improvements to and expansion of the City of Zillah's water system necessary to accommodate projected growth within the City and its Urban Growth Area over the next 20-year period. The Water System Plan document itself will not increase or produce any of the environmental effects listed above.

   Proposed measures to avoid or reduce such increases are:

   Future project specific design and associated SEPA processes will address proposed measures for projects identified in the Water System Plan.

2. *How would the proposal be likely to affect plants, animals, fish, or marine life?*

   No effects are likely because of this proposal.

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

   Not applicable.

3. *How would the proposal be likely to deplete energy of natural resources?*

   Because some water system components operate electrically, this proposal may result in a minor increase in energy requirements to operate electrical equipment over current amounts.

   Proposed measures to protect or conserve energy and natural resources are:

   The increase of electrical energy requirements will be reduced to the extent possible through use of high-efficiency electrical motors and equipment.

4. *How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?*

   The proposal in not likely to use or affect environmentally sensitive areas. As stated above, future identified maintenance or improvement projects should be evaluated at the time of project initiation and design to minimize use or effect on environmentally sensitive areas.

   Proposed measures to protect such resources or to avoid or reduce impacts are:

   Environmentally sensitive areas were identified during the development of Zillah's GMA Comprehensive Plan. These areas will be avoided when detailed plans are prepared, and pipeline alignments selected.

5. *How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?*

   The proposal will not affect land or shoreline use in ways incompatible with existing plans.

   Proposed measures to avoid or reduce shoreline and land use impacts are:

   None.

6. *How would the proposal be likely to increase demands on transportation or public services and utilities?*

This proposal identifies the future demand upon the Zillah water system and identifies the measures the City will take to accommodate that future demand.

Proposed measures to reduce or respond to such demand(s) are:

Proposed measures include expansion of the water system to serve lands within the City's Urban Growth Area.

7. *Identify, if possible whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.*

This proposal does not conflict with laws or requirements for the protection of the environment. Improvements identified within this proposal will allow the City to comply with public health requirements.

The City Of Zillah
THE HEART OF WINE COUNTRY

STATE ENVIRONMENTAL POLICY ACT

DATE: June 28, 2021
TO: Interested Agencies and Interested Parties
FROM: Ardele Steele, Planning Official / SEPA Responsible Official
ASteele@cityofzillah.us , 509-829-5151 ext. 227

SUBJ: **FILE NOS.: ER 2021-05 Water Use Efficiency Program (WUE) - Goals and plan & City of Zillah Comprehensive Water Plan;**
Notice of Environmental Review – Determination of Non-Significance

Description of Proposal
On June 2, 2021, the City of Zillah submitted an Environmental checklist application for processing. City of Zillah is proposing to update its Comprehensive Water Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. Information on this proposal can be obtained on the city website https://www.cityofzillah.us/government/notice_of_public_hearings.php and at Zillah City Hall located at 503 First Ave., Zillah, Washington 98953. These applications were deemed complete for further processing on June 25, 2021

Location: City of Zillah

Environmental Review and Determination:
The City of Zillah, as lead agency for this proposal, has determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). The Draft Determination of Non-Significance (DNS) is issued under WAC 197-11-340(2). The lead agency will not act on this proposal for at least 15 days from the date of issuance. This decision was made after a careful review of the completed environmental checklist, the Comprehensive Water System Plan and other information on file with the lead agency. This information is available to the public on request and can be examined in our offices during regular business hours, 8:00 am – 4:30 pm.

REQUEST FOR WRITTEN COMMENTS
Your views on this proposal are welcome. You may provide written comments concerning the impacts of this proposal during the fourteen (14) -day comment period which ends at **4:00 p.m. on July 15, 2021**. All written comments will be considered prior to issuing a recommendation and final decision. The applications and other information on file with the City of Zillah are available to the public upon request. Please submit your comments in writing to the City of Zillah, P.O. Box 475, Zillah, Washington 98953. Be sure to reference **Water Use Efficiency (WUE) Program and/or File Nos. ER 2021-05.**

Signature: Ardele M. Steele Date: 6/28/2021
(electronic signature or name of signor is sufficient)

Appeal process: Unless modified by the City, this determination will become final following the comment deadline. Any person aggrieved of the City's final determination may file an appeal, along with the appropriate filing fee, within fourteen (14) days of the date of the determination, provided that if there are any state statutory requirements for appeals specified therein, such requirements shall control.

For information on the comment process, or on other issues relating to this proposal, please contact Ardele Steele, Planning & Community Development Director at the number listed above.

CITY OF ZILLAH
PLANNING DEPARTMENT
NOTICE OF APPLICATION & ENVIRONMENTAL REVIEW
FILE NOS.: ER 2021-05 Water Use Efficiency Program (WUE) - Goals and plan & City of Zillah Comprehensive Water Plan;
Notice of Environmental Review – Determination of Non-Significance

Description of Proposal
On June 2, 2021, the City of Zillah submitted an Environmental checklist application for processing. City of Zillah is proposing to update its Comprehensive Water Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. Information on this proposal can be obtained on the city website https://www.cityofzillah.us/government/notice_of_public_hearings.php and at Zillah City Hall located at 503 First Ave., Zillah, Washington 98953. These applications were deemed complete for further processing on June 25, 2021

Location: City of Zillah

Environmental Review and Determination:
The City of Zillah, as lead agency for this proposal, has determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). The Draft Determination of Non-Significance (DNS) is issued under WAC 197-11-340(2). The lead agency will not act on this proposal for at least 15 days from the date of issuance. This decision was made after a careful review of the completed environmental checklist, the Comprehensive Water System Plan and other information on file with the lead agency. This information is available to the public on request and can be examined in our offices during regular business hours, 8:00 am – 4:30 pm.

REQUEST FOR WRITTEN COMMENTS
Your views on this proposal are welcome. You may provide written comments concerning the impacts of this proposal during the fourteen (14) -day comment period which ends **at 4:00 p.m. on July 15, 2021.** All written comments will be considered prior to issuing a recommendation and final decision. The applications and other information on file with the City of Zillah are available to the public upon request. Please submit your comments in writing to the City of Zillah, P.O. Box 475, Zillah, Washington 98953. Be sure to reference **Water Use Efficiency (WUE) Program and/or File Nos. ER 2021-05.**

If you have any questions about this issue, please call Ardele Steele at (509) 829-5151. /s/ Sharon Bounds, City Administrator dated this 30th day of June, 2021

The City Of Zillah
THE HEART OF WINE COUNTRY

STATE ENVIRONMENTAL POLICY ACT

DATE: February 25, 2022
TO: Interested Agencies and Interested Parties
FROM: Ardele Steele, Planning Official / SEPA Responsible Official
ASteele@cityofzillah.us , 509-829-5151 ext. 227

SUBJ: **FILE NOS.: ER 2021-05 Water Use Efficiency Program (WUE) - Goals and plan & City of Zillah Comprehensive Water Plan;**
Notice of Final Decision Environmental Review – Determination of Non-Significance Retained

Description of Proposal
On June 2, 2021, the City of Zillah submitted an Environmental checklist application for processing. City of Zillah is proposing to update its Comprehensive Water Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. Information on this proposal can be obtained on the city website https://www.cityofzillah.us/government/notice_of_public_hearings.php and at Zillah City Hall located at 503 First Ave., Zillah, Washington 98953. These applications were deemed complete for further processing on June 25, 2021

Location: City of Zillah

Environmental Review and Determination:
The City of Zillah, as lead agency for this proposal, has determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). The Determination of non-significance (DNS) was issued under WAC 197-11-340(2).

REQUEST FOR WRITTEN COMMENTS
The comment period on the environmental impacts of this proposal was between June 28th and July 15, 2021. There is no further comment period for this DNS. There is no administrative appeal of the final threshold determination.

Signature: Ardele M. Steele Date: 2/25/2022
(electronic signature or name of signor is sufficient)

For information on the comment process, or on other issues relating to this proposal, please contact Ardele Steele, Planning & Community Development Director at the number listed above.

To: **Sunnyside Sun**
From: **City of Zillah**
Dates: **September 30, 2022**
Email: **Sunnyside Sun Legal Notices <legals@sunnysidesun.com>**
******************************Please do not publish above this line*******************************

CITY OF ZILLAH
PLANNING DEPARTMENT
NOTICE OF APPLICATION & ENVIRONMENTAL REVIEW
FILE NOS.: ER 2021-05 Water Use Efficiency Program (WUE) - Goals and plan &
City of Zillah Comprehensive Water Plan;
Notice of Public Hearings

Description of Proposal
On June 2, 2021, the City of Zillah submitted an Environmental checklist application for processing. City of Zillah is proposing to update its Comprehensive Water Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. Information on this proposal can be obtained on the city website https://www.cityofzillah.us/government/notice_of_public_hearings.php and at Zillah City Hall located at 503 First Ave., Zillah, Washington 98953. A Notice Final Decision on Environmental Review was issued February 25, 2022.

Location: City of Zillah

Environmental Review and Determination:
The City of Zillah, as lead agency for this proposal, has determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). The Determination of Non-Significance (DNS) was issued under WAC 197-11-340(2). The lead agency will not act on this proposal for at least 15 days from the date of issuance. This decision was made after a careful review of the completed environmental checklist, the Comprehensive Water System Plan and other information on file with the lead agency. This information is available to the public on request and can be examined in our offices during regular business hours, 8:00 am – 4:30 pm.

NOTICE OF PUBLIC HEARINGS
An Open Record Public Hearing on both of these projects is scheduled before the Zillah Planning Commission on **November 8, 2022, at 6:00 p.m. or sometime thereabouts** in the Zillah Council Chambers, 111 7th Street, Zillah, WA 98953 or via ZOOM for those that request the link. All members of the public are welcome to attend this meeting and offer testimony regarding the proposal. At the close of the hearing, the Planning Commission may issue a recommendation on these applications.

A Closed Record Public Hearing on both of these projects is scheduled before the Zillah City Council on **November 21, 2022 at 6:30 p.m. or sometime thereabouts** in the Zillah Council Chambers, 111 7th Street, Zillah, WA 98953 or via ZOOM for those that request the link. All members of the public are welcome to attend this meeting and offer testimony regarding the proposal. At the close of the hearing, the Zillah City Council may issue a final decision on these applications.

If you have any questions about this issue, please call Ardele Steele at (509) 829-5151.

Dated this 5th day of October, 2022

******************************Please do not publish below this line*******************************

Publish: **Sunnyside Sun**
October 5, 2022
(One Time)
Legal

ATTN: **PLEASE CALL AND CONFIRM RECEIVING THIS NOTICE. THANK YOU.**

Contact Person: **Ardele Steele**
City of Zillah
509-829-5151

2.
WATER FACILITY INVENTORY (WFI) FORM

HLA
Engineering and Land Surveying, Inc.

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: 10/28/2020
Printed: 11/18/2020
WFI Printed For: On-Demand
Submission Reason: Pop/Connect Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
99800 W	ZILLAH CITY OF	YAKIMA	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS
JOHN T. SIMMONS [PW DIRECTOR] CITY OF ZILLAH PO BOX 475 ZILLAH, WA 98953	ZILLAH, CITY OF JOHN T. SIMMONS PO BOX 475 ZILLAH, WA 98953 PW DIRECTOR
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (509) 829-5151		Owner Daytime Phone: (509) 829-5151	
Primary Contact Mobile/Cell Phone: (509) 221-8493		Owner Mobile/Cell Phone: (509) 949-0380	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax:	E-mail: xxxxxxxxxxxxxxxxxxx	Fax: (509) 829-5457	E-mail: xxxxxxxxxxxxxxxxxxx

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)

- [ ] 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
- [ ] Licensed Residential Facility
- [x] Lodging
- [ ] Recreational / RV Park
- [x] Residential
- [x] 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)

1,225,000

15	16	17	18 SOURCE CATEGORY									19 USE			20	21 TREATMENT					22	23	24 SOURCE LOCATION			
Source Number	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	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN TERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	Rainier Ave		X										X			X	X					238 ~~280~~	550	NW NE	36	11N	20E
S02	Third Ave		X										X			X	X					146 ~~950~~	~~400~~ 300	SE SW	25	11N	20E
S03	WIPPCO Well		X										X			X	X					128 ~~260~~	650	SW SW	25	11N	20E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
99800 W	ZILLAH CITY OF	YAKIMA	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?)		1121	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	924		
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	~~96~~ 102		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	197		
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.	~~97~~ 120	~~97~~ 120	
28. TOTAL SERVICE CONNECTIONS		~~1218~~ 1,241	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 3200

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?												
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: Digitally signed by Justin Bellamy Date: 2023.06.05 17:59:14-07'00' DATE: June 5, 2023

PRINT NAME: Justin Bellamy, PE TITLE: Consulting Engineer

3.
WSP COMMENTS AND RESPONSES

HLA
Engineering and Land Surveying, Inc.

DOH Comment Response Form

DOH Comment No.	DOH Comment	Water System Response	Page Number of Response	Other Water System Comments
Chapter 1				
1	The WSP must be stamped, signed, and dated by a: Professional Engineer licensed in the State of Washington.	The final draft plan has been stamped, signed, and dated.	N/A	
Chapter 2				
2	In Table 2-3, the population projections go out to 2030. The remainder of the WSP contains projections through 2031. In order to receive a WSP approval date through 2031, please add 2031 to this table.	Table 2-3 contains population projections out to year 2041. Projections for year 2031 through 2041 start in the fourth column.	2-2	
Chapter 3				
3	Expand the asset management Table 3-18 to include smaller assets, including pipes, meters, etc. and include rough estimated replacement costs. Also, rephrase the third column to say, "Remaining useful life," as this appears to be the case based on the year ranges provided in this column.	Table 3-18 was expanded to include water system piping and meters. A single line was added for these items as the City does not have a complete inventory of all pipe materials and ages. A column for the critical number was also added to Table 3-18. The third column of the table (expected useful life) was intended to only represent the pumping equipment. Additional lines have been added to the table to clarify the expected useful life of the well, wellhouse, pump, etc., separately.	3-23	
4	Identify the Limiting Factor for growth for each of the zones identified in the analysis. Each facility / component of the water system should have the total number of Equivalent Residential Units (ERU), it can sustain.	A summary of the Zone 2 ERU capacity has been added to Table 3-26.	3-36	
5	The Department of Ecology issued a comment letter regarding this submittal dated May 21, 2021. Please address the issues, if any, contained in the letter in the second draft submittal.	Revisions have been made to the water right self-assessment table (Table 3-20) to address Ecology comments. The City submitted an extension request for Water Right Permit G4-29702P on July 23, 2021. The City's request was approved by Ecology on August 5, 2022. The new permit deadline is July 31, 2031. A copy of the extension request and approval letter have been added to Chapter 10.	3-27, Chapter 10	
Chapter 4				
6	Provide documentation of the public adoption process for the Water Use Efficiency (WUE) goals. Include the public notice, signed meeting minutes, and signed resolution.	WUE goal adoption public notice, signed meeting minutes, and signed resolution have been added to Chapter 10, Section 5.	Chapter 10	
7	Provide water demand projections with WUE savings for the 10- and 20-year projections (2031/2041).	Section 4.1.8 has been added to the WUE program to show water demand projections with and without WUE savings.	4-7	
8	Provide a discussion of already implemented or possible reclaimed water uses.	Section 3.4.1.1 regarding alternative sources of water supply has been added to the plan and includes discussion of reclaimed water opportunities.	3-25	

DOH Comment No.	DOH Comment	Water System Response	Page Number of Response	Other Water System Comments
Chapter 5				
9	Provide a text discussion section for Sanitary Control Area (SCA). Include the information provided on page iii and elaborate on the date anticipated for the new covenants. Additionally, please provide discussion on any additional protections to the SCAs, such as fencing, locks, signage, etc.	A Sanitary Control Area (SCA) discussion has been added to Chapter 5. Preparation of protective covenant documents establishing a 100-foot SCA for the Rainier Well and 3rd Avenue Well are scheduled for completion as show in Table 8-1.	5-1	
Chapter 6				
10	Provide a copy of the latest Cross Connection Control Annual Summary Report form. Include any Table 9 hazards served by the system and whether any waivers were provided.	A copy of the Cross-Connection Control (CCC) Annual Summary Report (ASR) forms, including a listing the 12 Table 9 hazards, has been added to Chapter 10, Section 15.	Chapter 10	
11	Review the information provided on the Coliform Monitoring Plan. The sample locations when placed on the map, indicate much of the sample sites are located within the central section of the water system. There appears to be some areas to the East and West of town that may not be represented by the existing sample locations.	Two routine and one repeat sample site locations have been added by the City to represent the extents of the distribution system more accurately. The Coliform Monitoring Plan and sample site map have been updated to reflect these additions. The updated plan and map have been added to Chapter 10, Section 17.	Chapter 10	
12	Provide a discussion of the latest Sanitary Survey and a copy of the survey letter in Chapter 10.	Discussion of the latest Sanitary Survey has been added to Chapter 6 as Section 6.6.1.1. A copy of the Sanitary Survey letter has been added Chapter 10, Section 22.	6-11 Chapter 10	
Chapter 7				
13	No comment.	N/A		
Chapter 8				
14	Note at the bottom of Table 8-2 that DWSRF cannot fund growth or fire flow.	A note has been added to Table 8-2.	8-27	
Chapter 9				
15	On page 9-10, in the paragraph following Table 9-6, second sentence, please remove the sentence or add to it that the comparison of water rates to neighboring cities is to illustrate customer rate affordability only. Rates cannot and should not be established based on similarities to neighboring cities. Each and every water system has a unique financial situation based on the number of customers, age and condition of infrastructure, treatment and operational needs, etc.	The second sentence in the paragraph following Table 9-6 has been removed.	9-10	
16	Provide a discussion of outstanding debt and the city's ability to take on additional debts listed in Chapter 8.	A discussion on outstanding debt and the City's ability to take on additional debt has been added to Section 9.3.	9-7	
17	Provide information on the city's customer assistance program. How does the city accommodate low income customers or customers that have fallen behind on their water bill?	The City aids qualifying low income and disabled customers through utility rate discounts per Ordinance 1428. A reference to this discount has been added to the discussion in Section 9.4. A copy of Ordinance 1428 has been added to Chapter 10.	9-10	

DOH Comment No.	DOH Comment	Water System Response	Page Number of Response	Other Water System Comments
Chapter 10				
18	Provide a signed SEPA Threshold Determination	A signed threshold determination has been added to Chapter 10, Section 1.	Chapter 10	
19	The provided Water Facilities Inventory (WFI) was redlined but not signed. In order to update the WFI in our system, please provide a signed copy.	A signed copy of the redlined WFI has been added to Chapter 10, Section 2.	Chapter 10	
20	The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the Water System Plan prior to its approval, including public notice and signed meeting minutes.	A copy of the consumer input process documentation has been added to Chapter 10, Section 4.	Chapter 10	
21	Provide signed and dated Local Government Consistency Determination forms from the City of Zillah and Yakima County planning departments.	Signed and dated local government consistency determination forms have been added to Chapter 10, Section 6.	Chapter 10	
Other				
22	When DOH is ready to approve the document, we will notify you. At that time the governing body will need to officially approve the Water System Plan and send DOH documentation of plan approval by the governing body, such as a copy of the signed meeting minutes or a copy of the signed resolution. When the documentation is received, we will send a letter documenting DOH approval.	Noted.	N/A	

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
EASTERN DRINKING WATER REGIONAL OPERATIONS
16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830
711 Washington Relay Service

October 13, 2021

RECEIVED
OCT 15 2021
HLA, Inc.

Dr. Scott Carmack, Mayor
City of Zillah
PO Box 475
Zillah, WA 98953

Subject: Zillah City of; PWS ID #99800; Yakima County
Water System Plan; Submittal #21-0409; DOH Comments

Dear Mayor Carmack:

Thank you for providing the draft Water System Plan (WSP) for the City of Zillah received in this office on April 14, 2021. The following comments will need to be addressed before the Department of Health (DOH) can approve the document:

Chapter 1

1) The WSP must be stamped, signed, and dated by a Professional Engineer licensed in the State of Washington.

Chapter 2

2) In Table 2-3, the population projections go out to 2030. The remainder of the WSP contains projections through 2031. In order to receive a WSP approval date through 2031, please add 2031 to this table.

Chapter 3

3) Expand the asset management Table 3-18 to include smaller assets, including pipes, meters, etc. and include rough estimated replacement costs. Also, rephrase the third column to say, "Remaining useful life," as this appears to be the case based on the year ranges provided in this column.

4) Identify the Limiting Factor for growth for each of the zones identified in the analysis. Each facility / component of the water system should have the total number of Equivalent Residential Units (ERU), it can sustain.

5) The Department of Ecology issued a comment letter regarding this submittal dated May 21, 2021. Please address the issues, if any, contained in the letter in the second draft submittal.

Chapter 4

6) Provide documentation of the public adoption process for the Water Use Efficiency (WUE) goals. Include the public notice, signed meeting minutes, and signed resolution.

7) Provide water demand projections with WUE savings for the 10- and 20-year projections (2031/2041).

8) Provide a discussion of already implemented or possible reclaimed water uses.

Chapter 5

9) Provide a text discussion section for Sanitary Control Area (SCA). Include the information provided on page iii and elaborate on the date anticipated for the new covenants. Additionally, please provide discussion on any additional protections to the SCAs, such as fencing, locks, signage, etc.

Chapter 6

10) Provide a copy of the latest Cross Connection Control Annual Summary Report form. Include any Table 9 hazards served by the system and whether any waivers were provided.

11) Review the information provided on the Coliform Monitoring Plan. The sample locations when placed on the map, indicate much of the sample sites are located within the central section of the water system. There appears to be some areas to the East and West of town that may not be represented by the existing sample locations.

12) Provide a discussion of the latest Sanitary Survey and a copy of the survey letter in Chapter 10.

Chapter 7

13) No Comment

Chapter 8

14) Note at the bottom of Table 8-2 that DWSRF cannot fund growth or fire flow.

Chapter 9

15) On page 9-10, in the paragraph following Table 9-6, second sentence, please remove the sentence or add to it that the comparison of water rates to neighboring cities is to illustrate

customer rate affordability only. Rates cannot and should not be established based on similarities to neighboring cities. Each and every water system has a unique financial situation based on the number of customers, age and condition of infrastructure, treatment and operational needs, etc.

16) Provide a discussion of outstanding debt and the city's ability to take on additional debts listed in Chapter 8.

17) Provide information on the city's customer assistance program. How does the city accommodate low income customers or customers that have fallen behind on their water bill?

Chapter 10

18) Provide a signed SEPA Threshold Determination.

19) The provided Water Facilities Inventory (WFI) was redlined but not signed. In order to update the WFI in our system, please provide a signed copy.

20) The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the Water System Plan prior to its approval, including public notice and signed meeting minutes.

21) Provide signed and dated Local Government Consistency Determination forms from the City of Zillah and Yakima County planning departments.

Other

22) When DOH is ready to approve the document, we will notify you. At that time the governing body will need to officially approve the Water System Plan and send DOH documentation of plan approval by the governing body, such as a copy of the signed meeting minutes or a copy of the signed resolution. When the documentation is received, we will send a letter documenting DOH approval.

END OF COMMENTS

The department's review of your water system plan does not confer or guarantee any right to a specific quantity of water. Our review is based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

We hope that you have found these comments to be clear, constructive, and helpful in the development of your final WSP. We ask that you submit **two copies** (one paper, one electronic) of the revised WSP **on or before December 30, 2021.** In order to expedite the review of your

revised submittal, please complete the enclosed DOH Comment Response Form summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.)

Regulations establishing a schedule for fees for review of planning, engineering, and construction documents have been adopted (WAC 246-290-990). Please note that we have included an invoice for **$3,705.00** for the review of the Water System Plan. This fee covers our cost for review of the initial submittal, plus the review of one revised document. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: DOH, Revenue Section, P.O. Box 1099, Olympia, WA 98507-1099.

Thank you again for submitting your draft Water System Plan for our review. If you have any comments or questions concerning our review please contact either of us at (509) 329-2120 or (509) 329-2137, respectively.

Sincerely,

Andres Cervantes, PE
Regional Engineer
Office of Drinking Water
Division of Environmental Public Health

for

Jamie Gardipe
Regional Planner
Office of Drinking Water
Division of Environmental Public Health

Enclosures: Invoice
Comment Response Form
Department of Ecology correspondence

cc: Yakima Health District
Yakima County Planning Department
Justin Bellamy, PE, HLA Engineering & Land Surveying
Ying Fu, Department of Ecology, Eastern Regional Office
Katrina McLaughlin, DOH Compliance Program Manager
Sarita Pruess, DOH Regional Specialist

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N Monroe Street • Spokane, WA 99205-1295 • 509-329-3400

RECEIVED
MAY 24 2021
BY:

May 21, 2021

Dr. Scott Carmack, Mayor
City of Zillah
PO Box 475
Zillah, WA 98953

Re: City of Zillah; PWS ID # 99800; Yakima County
Water System Plan; DOI-I Project #21-0409

Dear Mr. Carmack:

I have reviewed the above referenced document in accordance with the *2007 Memorandum of Understanding* between Department of Health (DOH) and Department of Ecology (DOE), and in accordance with RCW 90.03.386. Ecology's review is focused only on the subject water system's water rights legitimacy, adequacy and related issues affecting the submitted report.

City of Zillah Water System has 4 water rights: 606-D; 3350-A; Claim # 007086 and G4-29702P. They are listed in Water Right Self-Assessment Table 3-20 in the report. They appear to be current and correct. However the total annual water right quantity Qa of 1,754.1 (Table 3-20) is questionable.

City of Zillah last issued water right permit was G4-29702P and was authorized Qi of 2,000 gpm and Qa of 1,458.1 ac-ft. The portion of 848.1 ac-ft is for municipal use and is non-additive, based on the Qa of Claim #007086. The portion of 600 ac-ft was additive and authorized for non-agriculture irrigation of 150 acres. Therefore the City's total Qa is 1,904.1 ac-ft (4 water rights add up together), in which 1,304.1 is for municipal purpose of use and 600 ac-ft for irrigation. The city has adequate water right quantity for current operation and future forecasted 20 growth.

On page 1-7, the report indicates that the City has 33 cfs water right for irrigation districts, but water right numbers are not provided.

These are my comments at this time. Please don't hesitate to contact me should you have any questions regarding this letter. I can be reached at (509) 209-3551 or by email at yifu461@ecy.wa.gov.

Sincerely,

Ying.Fu@ecy.wa.gov

Ying Fu
Water Resources Program

YF:em
cc: Jamie Gardipe, DOH/ERO
Scott Turner, DOE/CRO

4.
CONSUMER MEETING & WATER SYSTEM PLAN ADOPTION

HLA
Engineering and Land Surveying, Inc.

RESOLUTION 2022-51

A RESOLUTION OF THE CITY OF ZILLAH, WASHINGTON, APPROVING THE 2021 WATER SYSTEM PLAN AS DEVELOPED FOR THE CITY OF ZILLAH, WASHINGTON.

WHEREAS, a 2021 Water System Plan has been developed for the City of Zillah, Washington by City staff and City engineers and;

WHEREAS, a Determination of Non-Significance has been issued and no appeal has been made to it and;

WHEREAS, the Department of Ecology has provided comment and their input has been incorporated within the plan and;

WHEREAS, a duly published open record public hearing was held before the Zillah Planning Commission on November 8, 2022, and;

WHEREAS, a duly published closed record public hearing was held before the Zillah City Council on November 21, 2022, and;

NOW THEREFORE BE IT RESOLVED by the City Council for the City of Zillah, Washington as follows:

Section 1. Approval of 2021 Comprehensive Water Plan: The 2021 Water System Plan as developed for the City of Zillah, Washington, is hereby approved and adopted subject to final comments from Department of Health and from and after the effective date of this Resolution, shall be the Water System Plan for the City of Zillah until such time as the Plan is amended, repealed, or otherwise changed.

Section 2. Effective Date: This Resolution shall be effective from and after its passage and approval and other notice requirements as required by law.

PASSED BY THE CITY COUNCIL OF THE CITY OF ZILLAH, WASHINGTON this 21st day of November 2022.

Dr. Scott Carmack, Mayor

ATTEST:

Michael Grayum, City Administrator

APPROVED AS TO FORM:

James C. Carmody, City Attorney
Date passed by Council:

The City Of Zillah
THE HEART OF WINE COUNTRY

City of Zillah Planning Commission
Findings & Recommendation
File No.: ER 2021-05
November 8, 2022

THIS MATTER having come for public hearing before the *City of Zillah Planning Commission* on November 8, 2022 for the purpose of considering the City of Zillah's Comprehensive Water Plan.

Description of Proposal

City of Zillah is proposing to update its Comprehensive Water System Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The 2021 Comprehensive Water Plan outlines the current and future consumption rates as well as outlines the future upgrades to the City of Zillah's water system.

Jurisdiction

ZMC 17.06.030 indicates that Comprehensive Plan Amendments are processed as a Class 3 Review. Class 3 Reviews are held before the Zillah City Council with recommendations presented from Zillah Planning Commission. Decisions of City Council are final, unless a request for reconsideration is filed. An appeal of a City Council decision can be filed in Superior Court.

Environmental Review and Determination

The City of Zillah, as lead agency for this proposal, had determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) was not required under *RCW 43.21C.030(2)(c)*. The Determination of Non-significance (DNS) was issued under WAC 197-11-340(2) on February 25, 2022.

RECOMMENDATION

Upon holding a public hearing on this matter, in which there was opportunity for persons to speak in favor or against the Comprehensive Water Plan, the Planning Commission deliberated on this matter and recommends to the Zillah City Council that the 2021 Comprehensive Water Plan be adopted by the City of Zillah.

MOTION TO RECOMMEND ADOPTION OF CITY OF ZILLAH WATER USE EFFICIENCY (WUE) PROGRAM- GOALS & POLICIES, AND ADOPT FINDINGS OF FACT BY **Mrs. *Cathy Woodyard***, SECONDED BY **Mr. *Russ Redfield***: VOTE: **4-0**

MOTION TO RECOMMEND ADOPTION OF CITY OF ZILLAH 2021 COMPREHENSIVE WATER PLAN AND ADOPT FINDINGS OF FACT BY ***Mr. Russ Redfield***, SECONDED BY ***Mrs. Cathy Woodyard***: VOTE: **4-0**

As Chairman of the City of Zillah Planning Commission, I hereby attest to the Planning Commission Recommendation as stated above:

Jay Spurlock
Zillah Planning Commission Chairman

Date: 11-8-22

The City Of Zillah
THE HEART OF WINE COUNTRY

CITY OF ZILLAH
PUBLIC HEARING
November 8, 2022
6:00 P.M.

Findings of Fact

STAFF REPORT
2021 Water System Plan & Water Use Efficiency Program
File No.: ER 2021-05

INTRODUCTION

The City of Zillah recognizes the need to improve and expand its water system if it is to meet the demands of its system users and to keep pace with other growth-oriented improvements. HLA Engineering and Land Surveying, Inc. was authorized by the City of Zillah to prepare the 2021 Water System Plan (WSP), which represents the culmination of planning and data collection efforts.

Description of Proposal

City of Zillah is proposing to update its Water System Plan includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. This document is being adopted to allow the City of Zillah to comply with state law. The 2021 Water System Plan outlines the current and future consumption rates as well as outlines the future upgrades to the City of Zillah's water system.

Jurisdiction

ZMC 17.06.030 indicates that Comprehensive Plan Amendments are processed as a Class 3 Review. Class 3 Reviews are held before the Zillah City Council with recommendations presented from Zillah Planning Commission. Decisions of City Council are final, unless a request for reconsideration is filed. An appeal of a City Council decision can be filed in Superior Court.

Environmental Review and Determination

The City of Zillah, as lead agency for this proposal, had determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) was not required under *RCW 43.21C.030(2)(c)*. The Determination of non-significance (DNS) was issued under WAC 197-11-340(2) on February 25, 2022.

Comments

The comment period on the environmental impacts of this proposal was between September 18th and October 6, 2021. No comments were received.

Staff Recommendation

Based on the above findings of fact, a review of the 2021 Water System Plan, staff recommends **approval** of the Water System Plan.

To: **Sunnyside Sun**
From: **City of Zillah**
Dates: **September 30, 2022**
Email: **Sunnyside Sun Legal Notices <legals@sunnysidesun.com>**
******************************Please do not publish above this line*******************************

CITY OF ZILLAH
PLANNING DEPARTMENT
NOTICE OF APPLICATION & ENVIRONMENTAL REVIEW
FILE NOS.: ER 2021-05 Water Use Efficiency Program (WUE) - Goals and plan &
City of Zillah Comprehensive Water Plan;
Notice of Public Hearings

Description of Proposal
On June 2, 2021, the City of Zillah submitted an Environmental checklist application for processing. City of Zillah is proposing to update its Comprehensive Water Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. Information on this proposal can be obtained on the city website https://www.cityofzillah.us/government/notice_of_public_hearings.php and at Zillah City Hall located at 503 First Ave., Zillah, Washington 98953. A Notice Final Decision on Environmental Review was issued February 25, 2022.

Location: City of Zillah

Environmental Review and Determination:
The City of Zillah, as lead agency for this proposal, has determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). The Determination of Non-Significance (DNS) was issued under WAC 197-11-340(2). The lead agency will not act on this proposal for at least 15 days from the date of issuance. This decision was made after a careful review of the completed environmental checklist, the Comprehensive Water System Plan and other information on file with the lead agency. This information is available to the public on request and can be examined in our offices during regular business hours, 8:00 am – 4:30 pm.

NOTICE OF PUBLIC HEARINGS
An Open Record Public Hearing on both of these projects is scheduled before the Zillah Planning Commission on **November 8, 2022, at 6:00 p.m. or sometime thereabouts** in the Zillah Council Chambers, 111 7th Street, Zillah, WA 98953 or via ZOOM for those that request the link. All members of the public are welcome to attend this meeting and offer testimony regarding the proposal. At the close of the hearing, the Planning Commission may issue a recommendation on these applications.

A Closed Record Public Hearing on both of these projects is scheduled before the Zillah City Council on **November 21, 2022 at 6:30 p.m. or sometime thereabouts** in the Zillah Council Chambers, 111 7th Street, Zillah, WA 98953 or via ZOOM for those that request the link. All members of the public are welcome to attend this meeting and offer testimony regarding the proposal. At the close of the hearing, the Zillah City Council may issue a final decision on these applications.

If you have any questions about this issue, please call Ardele Steele at (509) 829-5151.

Dated this 5th day of October, 2022

******************************Please do not publish below this line*******************************

Publish: **Sunnyside Sun**
October 5, 2022
(One Time)
Legal

ATTN: **PLEASE CALL AND CONFIRM RECEIVING THIS NOTICE. THANK YOU.**

Contact Person: **Ardele Steele**
City of Zillah
509-829-5151

5.
WUE PROGRAM GOAL ADOPTION

HLA
Engineering and Land Surveying, Inc.

RESOLUTION 2022-50

A RESOLUTION OF THE CITY OF ZILLAH, WASHINGTON, APPROVING THE WATER USE EFFICIENCY PROGRAM (WUE) GOALS & POLICIES AS DEVELOPED FOR THE CITY OF ZILLAH, WASHINGTON.

WHEREAS, a Water Use Efficiency Program (WUE)- Goals & Policies has been developed for the City of Zillah, Washington by City staff and City engineers, and;

WHEREAS, a Determination of Non-Significance has been issued and no appeal has been made to it, and;

WHEREAS, the Department of Ecology has provided comment and their input has been incorporated within the plan, and;

WHEREAS, a duly published open record public hearing was held before the Zillah Planning Commission on November 8, 2022, and;

WHEREAS, a duly published closed record public hearing was held before the Zillah City Council on November 21, 2022, and;

NOW THEREFORE BE IT RESOLVED by the City Council for the City of Zillah, Washington as follows:

Section 1. Approval of Water Use Efficiency Program (WUE)- Goals & Policies: The Water Use Efficiency Program (WUE)- Goals & Policies as developed for the City of Zillah, Washington, is hereby approved and adopted subject to final comments from Department of Health and from and after the effective date of this Resolution, shall be the Water System Plan for the City of Zillah until such time as the Plan is amended, repealed, or otherwise changed.

Section 2. Effective Date: This Resolution shall be effective from and after its passage and approval and other notice requirements as required by law.

PASSED BY THE CITY COUNCIL OF THE CITY OF ZILLAH, WASHINGTON this 21st day of November 2022.

Dr. Scott Carmack, Mayor

ATTEST:

Michael Grayum, City Administrator

APPROVED AS TO FORM:

James C. Carmody, City Attorney
Date passed by Council:

The City Of Zillah
THE HEART OF WINE COUNTRY

City of Zillah Planning Commission
Findings & Recommendation
File No.: ER 2021-05
November 8, 2022

THIS MATTER having come for public hearing before the *City of Zillah Planning Commission* on November 8, 2022 for the purpose of considering the City of Zillah's Comprehensive Water Plan.

Description of Proposal

City of Zillah is proposing to update its Comprehensive Water System Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The 2021 Comprehensive Water Plan outlines the current and future consumption rates as well as outlines the future upgrades to the City of Zillah's water system.

Jurisdiction

ZMC 17.06.030 indicates that Comprehensive Plan Amendments are processed as a Class 3 Review. Class 3 Reviews are held before the Zillah City Council with recommendations presented from Zillah Planning Commission. Decisions of City Council are final, unless a request for reconsideration is filed. An appeal of a City Council decision can be filed in Superior Court.

Environmental Review and Determination

The City of Zillah, as lead agency for this proposal, had determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) was not required under *RCW 43.21C.030(2)(c)*. The Determination of Non-significance (DNS) was issued under WAC 197-11-340(2) on February 25, 2022.

RECOMMENDATION

Upon holding a public hearing on this matter, in which there was opportunity for persons to speak in favor or against the Comprehensive Water Plan, the Planning Commission deliberated on this matter and recommends to the Zillah City Council that the 2021 Comprehensive Water Plan be adopted by the City of Zillah.

MOTION TO RECOMMEND ADOPTION OF CITY OF ZILLAH WATER USE EFFICIENCY (WUE) PROGRAM- GOALS & POLICIES, AND ADOPT FINDINGS OF FACT BY **Mrs. *Cathy Woodyard***, SECONDED BY **Mr. *Russ Redfield***: VOTE: **4-0**

MOTION TO RECOMMEND ADOPTION OF CITY OF ZILLAH 2021 COMPREHENSIVE WATER PLAN AND ADOPT FINDINGS OF FACT BY ***Mr. Russ Redfield***, SECONDED BY ***Mrs. Cathy Woodyard***: VOTE: **4-0**

As Chairman of the City of Zillah Planning Commission, I hereby attest to the Planning Commission Recommendation as stated above:

Jay Spurlock
Zillah Planning Commission Chairman

Date: 11-8-22

The City Of Zillah
THE HEART OF WINE COUNTRY

CITY OF ZILLAH
PUBLIC HEARING
November 8, 2022
6:00 P.M.

Findings of Fact

STAFF REPORT
2021 Water System Plan & Water Use Efficiency Program
File No.: ER 2021-05

INTRODUCTION

The City of Zillah recognizes the need to improve and expand its water system if it is to meet the demands of its system users and to keep pace with other growth-oriented improvements. HLA Engineering and Land Surveying, Inc. was authorized by the City of Zillah to prepare the 2021 Water System Plan (WSP), which represents the culmination of planning and data collection efforts.

Description of Proposal

City of Zillah is proposing to update its Water System Plan includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. This document is being adopted to allow the City of Zillah to comply with state law. The 2021 Water System Plan outlines the current and future consumption rates as well as outlines the future upgrades to the City of Zillah's water system.

Jurisdiction

ZMC 17.06.030 indicates that Comprehensive Plan Amendments are processed as a Class 3 Review. Class 3 Reviews are held before the Zillah City Council with recommendations presented from Zillah Planning Commission. Decisions of City Council are final, unless a request for reconsideration is filed. An appeal of a City Council decision can be filed in Superior Court.

Environmental Review and Determination

The City of Zillah, as lead agency for this proposal, had determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) was not required under *RCW 43.21C.030(2)(c)*. The Determination of non-significance (DNS) was issued under WAC 197-11-340(2) on February 25, 2022.

Comments

The comment period on the environmental impacts of this proposal was between September 18th and October 6, 2021. No comments were received.

Staff Recommendation

Based on the above findings of fact, a review of the 2021 Water System Plan, staff recommends **approval** of the Water System Plan.

To: **Sunnyside Sun**
From: **City of Zillah**
Dates: **September 30, 2022**
Email: **Sunnyside Sun Legal Notices <legals@sunnysidesun.com>**
******************************Please do not publish above this line*******************************

CITY OF ZILLAH
PLANNING DEPARTMENT
NOTICE OF APPLICATION & ENVIRONMENTAL REVIEW
FILE NOS.: ER 2021-05 Water Use Efficiency Program (WUE) - Goals and plan &
City of Zillah Comprehensive Water Plan;
Notice of Public Hearings

Description of Proposal
On June 2, 2021, the City of Zillah submitted an Environmental checklist application for processing. City of Zillah is proposing to update its Comprehensive Water Plan which includes the Water Use Efficiency (WUE) Program in Chapter 4 of the CWP. These documents are being adopted to allow the City of Zillah to comply with state law. The Comprehensive Water System Plan outlines the current and future impacts as well as the future upgrades to the City of Zillah's water system. Information on this proposal can be obtained on the city website https://www.cityofzillah.us/government/notice_of_public_hearings.php and at Zillah City Hall located at 503 First Ave., Zillah, Washington 98953. A Notice Final Decision on Environmental Review was issued February 25, 2022.

Location: City of Zillah

Environmental Review and Determination:
The City of Zillah, as lead agency for this proposal, has determined that it will not have a probable significant adverse impact on the environment and an Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). The Determination of Non-Significance (DNS) was issued under WAC 197-11-340(2). The lead agency will not act on this proposal for at least 15 days from the date of issuance. This decision was made after a careful review of the completed environmental checklist, the Comprehensive Water System Plan and other information on file with the lead agency. This information is available to the public on request and can be examined in our offices during regular business hours, 8:00 am – 4:30 pm.

NOTICE OF PUBLIC HEARINGS
An Open Record Public Hearing on both of these projects is scheduled before the Zillah Planning Commission on **November 8, 2022, at 6:00 p.m. or sometime thereabouts** in the Zillah Council Chambers, 111 7th Street, Zillah, WA 98953 or via ZOOM for those that request the link. All members of the public are welcome to attend this meeting and offer testimony regarding the proposal. At the close of the hearing, the Planning Commission may issue a recommendation on these applications.

A Closed Record Public Hearing on both of these projects is scheduled before the Zillah City Council on **November 21, 2022 at 6:30 p.m. or sometime thereabouts** in the Zillah Council Chambers, 111 7th Street, Zillah, WA 98953 or via ZOOM for those that request the link. All members of the public are welcome to attend this meeting and offer testimony regarding the proposal. At the close of the hearing, the Zillah City Council may issue a final decision on these applications.

If you have any questions about this issue, please call Ardele Steele at (509) 829-5151.

Dated this 5th day of October, 2022

******************************Please do not publish below this line*******************************

Publish: **Sunnyside Sun**
October 5, 2022
(One Time)
Legal

ATTN: **PLEASE CALL AND CONFIRM RECEIVING THIS NOTICE. THANK YOU.**

Contact Person: **Ardele Steele**
City of Zillah
509-829-5151

6.
LOCAL GOVERNMENT CONSISTENCY REVIEW CHECKLIST(S)

HLA
Engineering and Land Surveying, Inc.

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: CITY OF ZILLAH PWS ID: 99800 W

Planning/Engineering Document Title: WATER SYSTEM PLAN Plan Date: 2021

Local Government with Jurisdiction Conducting Review: CITY OF ZILLAH

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.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	1-4, 1-11, Fig. 1-2	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.	2-1 to 2-2	Yes
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.	1-15 to 1-17	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.	1-15 to 1-17	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.	1-9 to 1-11	Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Ardele M. Steele 5/18/2021

Signature Date

Ardele Steele, Planning & Community Dev. Director, City of Zillah

Printed Name, Title, & Jurisdiction

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

Local Government Consistency Determination Form

Water System Name: CITY OF ZILLAH PWS ID: 99800 W

Planning/Engineering Document Title: WATER SYSTEM PLAN Plan Date: 2021

Local Government with Jurisdiction Conducting Review: YAKIMA COUNTY

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.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	1-4, 1-11, Fig. 1-2	Not Applicable
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.	2-1 to 2-2	Yes
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.	1-15 to 1-17	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.	1-15 to 1-17	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.	1-9 to 1-11	Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Aman Walia 6/24/2021

Signature Date

Aman Walia , Planning Tech – Long Range, Yakima County Public Services

Printed Name, Title, & Jurisdiction

7.
CITY OF ZILLAH FIRE DEPARTMENT LETTER

HLA
Engineering and Land Surveying, Inc.

The City Of Zillah
THE HEART OF WINE COUNTRY
503 First Avenue, P.O. Box 475, Zillah, WA 98953 ● (509) 829-5151 ● Fax (509) 829-5457

January 27, 2021

John Simmons, Public Works Director
City of Zillah Public Works
503 First Avenue
Zillah, WA 98953

Re: ***City of Zillah***
Water System Plan
Fire Suppression Storage

Dear John:

The Zillah Fire Department has reviewed the storage analysis provided in the City of Zillah Water System Plan and approves nesting of standby and fire suppression storage volumes as described in the plan. The total fire suppression storage volume of 240,000 gallons (2,000 GPM for a 2-hour duration), is satisfactory to this Department. Should you have any questions regarding this matter, please contact me at (509) 945-5904.

Sincerely,

Chief Paul Stonemetz

Paul Stonemetz
Fire Chief

8.
CITY OF ZILLAH MUNICIPAL CODE, ORDINANCES, AND RESOLUTIONS

HLA
Engineering and Land Surveying, Inc.

Title 13
PUBLIC SERVICES

Chapters:

13.04 Joint Operation of Water, Sewer and Garbage Systems

13.08 Water Systems

13.10 Temporary Water Meters

13.12 Public Irrigation Water System

13.16 Sewer System

13.18 Utility Standards for Urban Growth Areas

13.20 Garbage Collection

13.22 Fats, Oil and Grease (FOG) Control Plans

13.24 Cemetery

13.28 Reduction in Utility Billings Due to Leaks

13.30 Utility Reimbursement Agreements

13.34 Utility Tax Discount

13.38 Infrastructure Improvement Program

13.40 Zillah Transportation Benefit District

Chapter 13.08
WATER SYSTEMS

Sections:

Article I. Domestic Water and Sewer Facilities

13.08.010 Intent.

13.08.020 Minimum standards.

13.08.030 Adoption of standard specifications.

13.08.040 Violation – Penalty.

Article II. Water Rates

13.08.045 Connection to domestic water system.

13.08.050 Minimum rates within city limits.

13.08.055 Rates in excess of minimum charge.

13.08.060 Rates within city limits when no meter exists.

13.08.065 Surcharge for users outside city limits.

13.08.070 Penalty provision.

13.08.075 Governmental entity – Payment.

13.08.080 Lien provision.

13.08.090 Irrigation water.

13.08.092 Municipal irrigation water.

13.08.095 Capital recovery reimbursement costs.

13.08.100 Capital cost recovery areas.

13.08.115 Disconnections and reconnections.

13.08.116 Disconnections at rentals.

13.08.117 Definition of timely basis.

13.08.118 Additional charge for city water.

Article III. Prohibited Acts

13.08.120 Drawing water from another's pipes without city permission.

13.08.130 *Superseded.*

13.08.135 *Superseded.*

Article IV. Cross-Connections

13.08.140 Purpose of article.

13.08.150 Definition of cross-connection.

13.08.160 Cross-connections prohibited.

13.08.170 Existing cross-connections.

13.08.180 Duties of public works administrator.

13.08.190 Discovery of hazard – Abatement.

13.08.200 Violation – Penalty.

Article I. Domestic Water and Sewer Facilities

13.08.010 Intent.

This article is intended to provide minimum standards for the construction of domestic water and sewer facilities within the city. The city intends to use the Standard Specifications for Municipal Public Works Construction as the minimum required standards for future construction within the city. All future public works construction after the effective date of the ordinance codified in this article shall be in compliance with said standards. (Ord. 618 § 1, 1987; Ord. 557 § 1, 1985)

13.08.020 Minimum standards.

No person shall construct any domestic water or sewer facility within the city unless said construction has specifications which are at a minimum the Standard Specifications for Municipal Public Works Construction. (Ord. 618 § 2, 1987; Ord. 557 § 2, 1985)

13.08.030 Adoption of standard specifications.

The city adopts the Standard Specifications for Municipal Public Works Construction as prepared by the Washington State Chapter of American Public Works Association. This adoption by reference includes all future amendments and changes to said Standard Specifications for Municipal Public Works Construction which are prepared by and adopted in the future by the Washington State Chapter of American Public Works Association. A copy of said Standard Specifications for Municipal Public Works Construction can be obtained from the city public works superintendent at a cost to be determined. (Ord. 618 § 3, 1987; Ord. 557 § 3, 1985)

13.08.040 Violation – Penalty.

Any person who shall violate any provision of this article shall be guilty of a misdemeanor and on conviction thereof shall be fined in an amount of not more than $500.00 for each violation, or jailed for a period not to exceed 30 days, or both such fine and incarceration. In addition, any violation of this article shall be deemed to be a public nuisance, subject to prevention or abatement by injunction or other appropriate legal remedies in a court of competent jurisdiction. (Ord. 618 § 5, 1987; Ord. 557 § 5, 1985)

Article II. Water Rates

13.08.045 Connection to domestic water system.

A connection charge will be imposed for each unit on the property owner/applicant of any detached single-family, two-family dwellings, or multiple single-family dwellings (townhouses) with a separate means of egress, or facility to be connected to the domestic water system and has not paid a domestic water connection charge for such dwelling(s) or facility. The cost of a new service connection and separate water meter(s) shall be the responsibility of the property owner/applicant. No water service will be provided until the connection fee and general facility charge have been paid in full for each unit or facility. No subsequent service connection(s) will be allowed until all previous connection fees have been paid in full.

A. New Connections. City shall review and approve all new connections to the public domestic water system. Such connections shall be subject to the charges and requirements of this chapter.

1. Meter Size and Charge. The public works director shall determine appropriate meter size for proposed service, uses and facilities. A domestic charge shall be determined by the size of the water meter to be installed based upon the following chart:

3/4 inch	$600.00
1 inch	$780.00
1-1/2 inches	$1,080
2 inches	$1,440
3 inches	$1,800

4 inches	$2,160

City shall provide and install any required meters of one inch or less. The provisions shall include the cost of the meter, vault, backflow device and cost of installation.

B. Meters Greater Than One Inch. For connections requiring meters that are greater than one inch in size, the cost of the meter, vault, backflow device and installation shall be the responsibility of the property owner/applicant. For any facility to be served by a water meter that is larger than four inches in diameter, the public works director shall calculate a recommended domestic charge pursuant to this subsection. The recommended domestic charge shall be calculated in a manner consistent with the methodology utilized for calculation of rates set forth herein.

C. Replacement of Existing Meters. City shall provide meters for replacement of obsolete, defective and/or worn out meters caused by reasonable wear and tear and as determined reasonable and appropriate by the public works director. Replacement shall apply only to meters of one inch or less in size. City shall not, at its own expense, provide replacement meters in any other circumstance. Replacement of larger meters shall be the responsibility of the property owner. All costs for meter (i.e., larger than one inch), installation, supplies and labor shall be the sole responsibility of the property owner.

D. Standards for Installation. All new and/or replacement meters shall be installed by the city or under the supervision of the public works director or his/her designee. Plans and specifications may be further required by public works director as may be reasonable or appropriate for the installation.

E. General Facility Charge. A general facility charge (GFC) is based on equivalent residential units (ERUs). An ERU is a baseline number representing average residential household water consumption as defined in the most recent city of Zillah comprehensive water system plan. An ERU for standard residential connections shall be equal to $2,000. For nonresidential and nonstandard residential connections requiring more than one ERU, the following shall apply:

1. Estimate of Water Usage. An applicant/property owner for a nonresidential and/or nonstandard residential connection shall prepare an estimate of the required water service ERU for the proposed use and/or facility. Such estimate shall be reviewed by public works director (or his designee) and a final use estimate determined for the use and/or facility. The estimate may be based upon the Department of Health and Department of Ecology estimates (as defined in their most recent respective design guidelines), this comprehensive water plan, and/or assessment of similar connections and uses.

2. Payment of GFC. The property owner/applicant for the water service shall pay a GFC based upon the use evaluation (e.g., if a nonresidential or nonstandard residential customer uses 20 times the flow of the average household, this use would be expressed as 20 ERUs). This number shall be rounded to the nearest one-tenth ERU and the GFC based on a rate of $2,000/ERU.

3. Monitoring – Additional Charge. City shall have the right to evaluate and monitor metered water use for a period of 24 months to determine the actual number of water ERUs utilized by the use and/or facility. If it is determined that the actual ERUs are greater than the estimated ERUs, the city shall establish the amount of such excess use and charge property owner for the increased general facility charge (GFC).

4. Use Greater Than 20 ERUs. City reserves the right to negotiate GFCs for activities or uses that are determined to use greater than 20 ERUs that can clearly show a substantial increase in property value to the city's service area. The following criteria shall be used in determining a GFC reduction:

a. An applicant that proposes a use and estimates that more than 20 ERUs may be required shall submit, in writing, a request to the city to negotiate the GFC.

b. If the applicant chooses to negotiate the GFC, they shall submit relative and factual information in writing regarding the proposed property value increase. City shall verify the applicant's information and may also provide additional information on the proposed property value increase and set a date for city council review and consideration of the GFC.

c. City may at the same time use Yakima County tax assessor and building permit information to verify the subject property's value with those stated in the negotiated GFC. Assessor and building permit data may be determinative in the assessment of value for purposes of calculating and reduction in the negotiated GFC. If fair market property values or actual ERU data is different than the initial evaluation, city may make an appropriate adjustment in the GFC charge.

d. For every $1,000,000 of proposed property value increase, city may reduce the GFC by one ERU that is above the initial 20 ERUs. At no time shall an activity generating more than 20 ERUs be charged less than 20 ERUs.

5. Use Greater Than 50 ERUs. For activities that generate greater than 50 ERUs, city may also negotiate a reduction in GFC based on employment opportunities that the site would generate. In this case, in addition to other required information in this section, the applicant shall also submit any available information on number of potential employees and wages related to the site and its impact to the city. If a reduction in the GFC is granted through this subsection, it shall also be verified at 12 and 24 months. If true employment projections or actual ERU data is different than the initial evaluation, city may make an appropriate adjustment in the GFC charge.

Any such granting of reducing a determined GFC shall include a finding of fact that clearly indicates the reasons for such a reduction and is approved by the city council.

6. Material Change in Usage. In the event a material change in usage occurs which increases the number

of ERUs for a water service, the city may determine and issue an additional GFC based upon such increased usage. The determination may be based upon a monthly monitoring of water usage by the use and/or facility.

F. Change in Fees/Charges. The fees and charges established herein may be amended from time to time by ordinance of the city council. Any such amendments shall be based on changes in the city's cost of withdrawing, storing, distributing, planning, designing and/or maintaining domestic water service to the city's service area.

G. Schedule of Rates. The city shall maintain a schedule of current rates, fees and charges and make them available to all interested persons. (Ord. 1498 § 2, 2019; Ord. 1084 § 2, 2006; Ord. 946 § 2, 2001)

13.08.050 Minimum rates within city limits.

The minimum monthly charges for water supplied by city of Zillah shall be as follows:

	2021
WATER	**3%**
Base rate per metered hook-up	$16.44

Such charge shall be for all water supplied up to a maximum of 300 cubic feet per month. (Ord. 1511 § 3, 2020)

13.08.055 Rates in excess of minimum charge.

Water users shall be charged the following rates per cubic foot (cu. ft.) of water used in excess of 300-cubic-foot minimum in any one calendar month:

	2021
WATER	**3%**
300 – 1,000 cu. ft.	0.0414
1,001 – 2,000 cu. ft.	0.0380
2,001 – 3,000 cu. ft.	0.0207
More than 3,000 cu. ft.	0.0121

(Ord. 1511 § 4, 2020)

13.08.060 Rates within city limits when no meter exists.

In the event a water meter is unavailable to the property owner or water user for purposes of measurement, the property owner or water user shall be charged a minimum price of $26.50 per entity for each calendar month that water is supplied to said water user. (Ord. 1511 § 5, 2020)

13.08.065 Surcharge for users outside city limits.

All entities located outside the corporate limits of the city of Zillah, with or without a meter, shall be charged an additional fee as follows:

	2021
	3%
	50% x base rate
Surcharge for users outside city limits in addition to base rate	$8.22

(Ord. 1511 § 6, 2020)

13.08.070 Penalty provision.

A penalty of $15.00 shall be charged on bills that have not been paid by the fifteenth of the month. Nothing shall be credited or taken away from bills paid before the fifteenth of said month. (Ord. 1511 § 7, 2020)

13.08.075 Governmental entity – Payment.

In order to recognize billing cycles and timetables for governmental entities, any and all payments from governmental entities with respect to water charges shall be payable by the twentieth day of the month the bill is mailed. The penalty provisions shall not apply except in such instance as payment is not received by the identified due date. (Ord. 1511 § 8, 2020; Ord. 1075 § 7, 2005)

13.08.080 Lien provision.

In the event said bill is delinquent for more than three months, a lien shall be placed upon the property owner for said amount of delinquent charges and said service shall be disconnected until paid in full. (Ord. 1511 § 9, 2020)

13.08.090 Irrigation water.

All separate meters for irrigation water from domestic water shall be charged at the rate of $10.00 per 1,000 cubic feet or any portion thereof. (Ord. 1511 § 10, 2020)

13.08.092 Municipal irrigation water.

All separate meters for irrigation water from domestic water for municipal use shall be charged at the rate of $3.00 per 1,000 cubic feet or any portion thereof. (Ord. 1511 § 11, 2020)

13.08.095 Capital recovery reimbursement costs.

Anytime the city or an individual makes application for and complies with the provisions of Chapter 13.30 ZMC,

Utility Reimbursement Agreements, and the city council so authorizes, any person or agency connecting to the sewer system in a reimbursement area shall be responsible to pay for reimbursement costs associated with sewer system improvements to a particular geographic area. (Ord. 946 § 3, 2001)

13.08.100 Capital cost recovery areas.

A. Establishment of Capital Cost Recovery Areas. Capital cost recovery areas (as shown in Attachment A) are hereby established for the purpose of assessing fees to specially benefited properties for the purpose of recovering capital costs for provision of improved water storage, fire flow capacity, water service pressure and associated water service capabilities.

B. Establishment of New Water Connection Fees for Specific Benefit Districts. Fees shall be assessed for new water connections within the capital cost recovery areas established herein. Such fees have been calculated based on water system funds expended to construct the identified capital improvements. Benefit area assessment fees per equivalent residential service (ERU) for new connections to the city water system will be assessed as follows:

West Zillah ERUs	$825
Zone 2 ERUs	$1,250
All Other	$400

Such fees shall be in addition to any costs or fees already in existence. New non-single-family residential water service connections will be assessed fractional or multiple ERU benefit area assessment fees as per this chapter.

D. Expenditures of Funds. Monies collected from connection fees for new water connection for specific benefit districts shall be expended exclusively for costs associated with future water capital improvements. The city clerk/treasurer shall maintain an accurate accounting of said collections and expenditures.

(Ord. 1162 §§ 1 – 4, 2008)

13.08.115 Disconnections and reconnections.

A. In addition to other lawful remedies to the city, with regard to the collection of delinquent water charges, the public works director of the city is authorized to discontinue delivery of water to any residence when the occupant thereof has failed to pay the delinquent water charges within 10 days after the water charges become delinquent. Water charges are deemed to be delinquent if not paid by 5:00 p.m. on the fifteenth day of the month

following the month of billing. In the event the public works director discontinues water service and delivery to a residence, then delivery of water shall not be commenced until full payment of all delinquent amounts, including reconnection charges and penalties thereof, is made. Charges for connection shall be $25.00 if reconnection is requested between the hours of 9:00 a.m. and 4:30 p.m. on week days which are not holidays, or $50.00 if reconnection is requested at any other time.

B. Deposit Requirement. Prior to commencing utility service connection to any person not presently paying utility charges to the city of Zillah, Washington, said person requesting such delivery and service shall be required to deposit to the city the sum of $100.00. Said deposit shall be refunded to the person making the same after a one year period of time and on the condition that all utility charges billed by the city of Zillah to said person have been paid on a timely basis, as defined in ZMC 13.08.117. Said deposit, less any outstanding charges, may also be refunded and returned to said person upon a request that utility service be discontinued to said person.

Any person changing residences within the area served by Zillah utilities who request said services from the city will not be required to make a deposit if a deposit previously made is in the city's possession. Such deposits shall be returned 12 months after being made even though there has been a change in residence if all billings are paid timely.

Any person changing residences within the area served by Zillah utilities and who request said services from the city will not be required to make a deposit if said person has previously received utility service from the city and person has timely paid all billings for a period of one year. (Ord. 1050 § 1, 2005; Ord. 806 § 1, 1995; Ord. 742 § 1, 1993; Ord. 583 § 1, 1985; Ord. 502 § 1, 1983; Ord. 256[1] § 605, 1955)

13.08.116 Disconnections at rentals.

At any such time that a charge for domestic water imposed by the authority of this chapter has been delinquent for 10 days, the city public works director is authorized to discontinue delivery of domestic water to said residence. Said public works director shall discontinue water to said residence irrespective of whether persons other than those whose incurred the water charges now occupy the rental premises. The procedures for disconnections and reconnections set forth in ZMC 13.08.115 shall apply to a disconnection under the authority of this section. (Ord. 923 § 3, 2000)

13.08.117 Definition of timely basis.

"Timely basis" means prior to the assessment of penalty. (Ord. 706 § 2, 1991)

13.08.118 Additional charge for city water.

In addition to the rates per calendar month otherwise established by ordinance for city water supplied per entity to any person, firm, or corporation within the limits of the city, there shall be a rate increase of $1.25 to equal the sum of $9.00, effective January 1, 2005. (Ord. 1020 § 2, 2004)

Article III. Prohibited Acts

13.08.120 Drawing water from another's pipes without city permission.

A. A domestic water user shall not permit other user or users of water, whether the same is for domestic or other purposes, to draw or use water through his pipes without having obtained permission from the water superintendent. Any water user who violates the provisions of this subsection shall be guilty of a misdemeanor and the water to his property shall be turned off.

B. Any person who violates any provision of this section shall be guilty of a misdemeanor and upon conviction thereof shall be fined in an amount not to exceed $500.00, or shall be incarcerated for a period of time not to exceed six months, or both such fine and incarceration. (Ord. 571, 1985)

13.08.130 Groundwater well drilling – Prohibited – Statement of policy.[2]

Superseded by Ord. 1139. (Ord. 642 § 1, 1988)

13.08.135 Groundwater well drilling – Prohibited – Penalty.*

Superseded by Ord. 1139. (Ord. 642 §§ 2, 3, 1988)

Article IV. Cross-Connections

13.08.140 Purpose of article.

The control, including elimination, of cross-connections for all new and existing water service customers shall be in accordance with the city of Zillah's cross-connection control manual, attached to the ordinance codified in this article and incorporated in reference herein. In addition, applicable regulations of the Department of Health stated in the State of Washington Administrative Code (WAC 246-290-490) or subsequent revisions shall be complied with. Where, in a specific case, different materials, methods or other requirements apply, the more restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement the specific requirement shall govern. (Ord. 916 § 1, 2000; Ord. 635 § 1, 1988)

13.08.150 Definition of cross-connection.

Any actual or potential physical connection between a public water system and any source of nonpotable liquid, solid or gas that could contaminate the public water supply by backflow. (Ord. 916 § 1, 2000; Ord. 635 § 2, 1988)

13.08.160 Cross-connections prohibited.

It is unlawful for any person to allow any contaminants or pollutants to back feed from their facility and/or property into the city's municipal water distribution system, and shall ensure that there does not exist a cross-connection located within the facility and/or property to which said domestic water service is to be delivered. In making application to receive domestic water service from the city the applicant shall certify that no cross-connection exists or will exist within the facility and/or property to which water service delivery is sought. (Ord. 916 § 1, 2000; Ord. 635 § 3, 1988)

13.08.170 Existing cross-connections.

Should any person have within their facility and/or property an existing cross-connection with the city's domestic water system that cannot reasonably be eliminated a certified and approved backflow prevention device shall be installed at the property owner's expense. (Ord. 916 § 1, 2000; Ord. 635 § 4, 1988)

13.08.180 Duties of public works administrator.

It shall be the duty and responsibility of the public works director for the city to inspect for and regulate the provisions of this article. The public works director shall be responsible to determine circumstances under which existing cross-connections cannot be eliminated, and shall be responsible to ensure that backflow prevention devices are installed to protect the public domestic water system. (Ord. 635 § 5, 1988)

13.08.190 Discovery of hazard – Abatement.

If an immediate hazard to health is suspected by a located cross-connection, the public works supervisor shall take immediate steps to disconnect the public domestic water supply to the premises containing the cross-connection. (Ord. 635 § 6, 1988)

13.08.200 Violation – Penalty.

Violations of or failure to comply with the provisions of this article are declared to be unlawful and are declared to be a misdemeanor. Upon conviction for a violation of this article, a fine in the sum of $500.00, or incarceration of a period of not to exceed 30 days, or both said fine or imprisonment may be imposed. (Ord. 635 § 7, 1988)

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[1] Editor's Note: Ord. 256 sets out water system provisions not set out in this code. Rates have been codified as they have been amended regularly. Other water system ordinances not codified are as follows: Ords. 77, 95, 103, 133, 149, 151, 156, 166, 173, 224, 225, 245, 253, 278 and 422.

[2] Editor's note: Ord. 1139 consolidates and amends the provisions of Ords. 642 and 1045. Provisions covering the subject matter previously contained in these sections are now found at ZMC 13.18.065 and 13.18.095.

Chapter 13.10
TEMPORARY WATER METERS

Sections:

13.10.010 Statement of purpose.

13.10.020 Definitions.

13.10.030 Security deposit – Temporary water meters.

13.10.040 Utility deposit – Water use for temporary water meter.

13.10.010 Statement of purpose.

City of Zillah, Washington, has historically allowed nongovernmental person(s) to utilize a water meter on a temporary basis for the purposes of measuring and monitoring a temporary supply of water to a construction site or for other approved purposes. From time to time, the temporary hydrant meter has not been returned or such meters been returned in a damaged condition. Accordingly, a deposit should be required which covers the cost of the hydrant meter. It is also necessary for the city to establish guidelines for billing related to the temporary hydrant meters. (Ord. 1484 § 1, 2019)

13.10.020 Definitions.

“Nongovernmental persons” shall mean all persons or entities other than the city of Zillah and/or those persons or entities that are providing services to the city under contract or agreement with the city. (Ord. 1484 § 2, 2019)

13.10.030 Security deposit – Temporary water meters.

All nongovernment persons desiring to connect to city fire hydrants for temporary water supply must first apply for and receive permission from the city to do so. The application shall contain the information required by and shall be on a form provided by the city of Zillah. Said person(s) shall be required to pay an $800.00 cash deposit in order to use the water meter and obtain a temporary source of water. Said cash deposit will be refunded (in the next available check run) upon (A) the return of the water meter in the same condition as existed prior to its use by the nongovernmental person; and (B) payment of all charges for water/sewer use incurred by the nongovernmental person from the temporary source. In the event that the meter is not returned in satisfactory condition or charges/fees paid in full, city may apply such deposit to cost of replacement or repair of the meter or payment of delinquent charges/fees. If the deposit is insufficient to cover replacement or repair, the nongovernmental person shall also be responsible for such extra costs. (Ord. 1484 § 3, 2019)

13.10.040 Utility deposit – Water use for temporary water meter.

All nongovernmental persons using city fire hydrants for temporary water supply shall also deposit $200.00 for water use charges. The deposit shall be applied to the temporary utility account established at the time the temporary water utility account is closed. Any fees or charges not covered by the deposit must be paid within 30 days of the billing. The city is authorized to use any remedies allowed by law to collect unpaid fees and charges

on temporary utility accounts. Any amount remaining will be refunded to the customer. All nongovernmental persons using city fire hydrants for temporary water supply shall pay a base rate fee, water improvement fee, water utility tax on the water usage, and actual usage charges (per cubic foot) for all water obtained from city fire hydrants at the same rate as is charged by the city for domestic water. This billing will be calculated after the temporary water utility account is closed and will be processed in the next available billing cycle. (Ord. 1484 § 4, 2019)

Chapter 13.18
UTILITY STANDARDS FOR URBAN GROWTH AREAS[1]

Sections:

Article I. Water Service

13.18.010 Statement of purpose.

13.18.020 Water connection application/requirement.

13.18.030 New development and substantial improvements.

13.18.040 Availability of service/deferral of connection.

13.18.050 Service outside city limits.

13.18.060 Surcharge for users outside city limits.

13.18.065 Drilling prohibited – Exceptions.

13.18.070 Irrigation water.

13.18.080 Municipal irrigation water.

13.18.090 Penalty provision.

13.18.095 Unlawful well drilling.

13.18.100 Lien provision.

Article II. Sewer and Garbage

13.18.110 Statement of purpose.

13.18.120 On-site sewage disposal systems.

13.18.130 Connection to public sewer system.

13.18.140 New development and substantial improvements.

13.18.150 Deferral of connection obligation.

13.18.160 Service outside city limits.

13.18.170 Solid waste service.

Article I. Water Service

13.18.010 Statement of purpose.

The city council for the city of Zillah, Washington has determined that it is in the best interest of the citizens and the municipality to establish and develop a uniform source of domestic water supply for its citizens and residents. A public water system has been developed and will continue to be extended to serve the residential needs of its citizens for potable water. It is important to establish the requirements for connection to the public water supply within the designated urban growth area and/or newly annexed properties. It is of further importance that no additional wells be drilled or put to use within the corporate limits. The ordinance codified in this article amends prior legislative actions with regard to the subject matter as set forth in Ordinances 642 and 1045. (Ord. 1139 § 1, 2007)

13.18.020 Water connection application/requirement.

All structures, facilities and properties utilizing or requiring domestic and/or irrigation waters and located within the municipal boundaries of the city of Zillah shall connect to the public water system upon the failure or replacement of any on-site well; provided, that public water service is available to the property. (Ord. 1139 § 2, 2007)

13.18.030 New development and substantial improvements.

A property, structure or facility shall be required to connect to the public water system as a condition to any proposed development or material change in usage or occupancy of the subject property. Any development, project proposal or material alteration of use is expressly conditioned upon property owner extending at its sole cost and expense public water service to the subject development and/or property. The city may, however, waive the connection requirement in the event that the cost of line extension is more than twice the cost of an approved on-site system. (Ord. 1139 § 3, 2007)

13.18.040 Availability of service/deferral of connection.

Public water service shall be deemed available to a structure, facility or property when such service is located at any point within 300 feet of the property perimeter boundary. The city of Zillah may defer connections to the public water system in the event that (A) the existing well or water supply is adequate for intended purposes and does not present an issue with regard to public health, safety or welfare, or (B) the structure, facility or property being served is not within 300 feet of the public water service line and connection would be uneconomic (as based on consideration of well installation and associated cost) or otherwise infeasible or unduly burdensome under circumstances applicable to proposed use, location or other factor determined reasonable under circumstances. Any person requesting deferral shall make such request in writing with cost information and/or estimates, description and documentation to establish infeasibility or undue burden, and such other material as may be reasonably required with regard to evaluation of the deferral request. Any request for deferral shall be

submitted to city council for final determination; provided, however, that a deferral request may be combined with any contemporaneous or related land use application. (Ord. 1139 § 4, 2007)

13.18.050 Service outside city limits.

The city of Zillah may further provide public water service to structures, facilities and properties outside the municipal boundaries but within the designated urban growth area (UGA). Any area served must be within the established boundaries established for such service and the designated urban growth area (UGA). An extension of public water lines to unincorporated areas shall be at the sole cost and expense of the property owner with system improvements reviewed and approved by the director of public works and city engineer. City may require execution of an outside utility agreement (OUA) as a condition to line extension. (Ord. 1139 § 5, 2007)

13.18.060 Surcharge for users outside city limits.

The charges for all entities outside the corporate limits of the city of Zillah, shall be charged the sum of $3.25 in excess of all corresponding rate charges inside the corporate limits of said city. (Ord. 1139 § 6, 2007)

13.18.065 Drilling prohibited – Exceptions.

It is unlawful for any person, firm or entity to drill a domestic, irrigation or other ground water well within the limits of the city of Zillah, Washington, except where public water service is not available to the property (as set forth in ZMC 13.18.040) or the city has authorized a deferral in connection with the public water service. Well drilling shall be authorized only for the purpose of replacing a failed on-site well where public water service is not available or for deferral authorized by municipality. (Ord. 1139 § 7, 2007)

13.18.070 Irrigation water.

All separate meters for irrigation water from domestic water shall be charged at the rate of $10.00 per 1,000 cubic feet or any portion thereof. (Ord. 1139 § 8, 2007)

13.18.080 Municipal irrigation water.

All separate meters for irrigation water from domestic water for municipal use shall be charged at the rate of $5.00 per 1,000 cubic feet or any portion thereof. (Ord. 1139 § 9, 2007)

13.18.090 Penalty provision.

A penalty of $10.00 shall be levied in the event that the said charges are not paid by the fifteenth of the month the bill is mailed. Nothing shall be credited or taken away from bills paid before the fifteenth of said month. (Ord. 1139 § 10, 2007)

13.18.095 Unlawful well drilling.

Any person, firm, or entity which shall violate the provisions prohibiting unauthorized well drilling shall be guilty of a misdemeanor, and upon conviction of, may be fined an amount up to $1,000. In addition to criminal penalties, the city attorney, on behalf of the city, is authorized to seek to enjoin or restrain violations of this chapter, in addition to statutory costs of suit, should the city obtain an injunction or restraining order against a

person or entity violating the terms of this chapter. Said person or entity shall be further liable for reasonable attorney's fees and costs incurred in said civil action. (Ord. 1139 § 11, 2007)

13.18.100 Lien provision.

In the event said bill is delinquent for over three months, a lien shall be placed upon the property owner for said amount of delinquent charges and said service shall be disconnected until paid in full. (Ord. 1139 § 12, 2007)

Article II. Sewer and Garbage

13.18.110 Statement of purpose.

City council for the city of Zillah, Washington, has determined that it is important to establish requirements for residents requesting or obtaining public sewer and garbage services for properties located within the designated urban growth area and/or newly annexed properties. It is further recognized that on-site sewage disposal should be limited and discouraged and, except where specifically authorized by permit, prohibited in all urban areas and that all sewage should be discharged to the public wastewater system. (Ord. 1046 § 1, 2005)

13.18.120 On-site sewage disposal systems.

No on-site sewage disposal system may be constructed, used, or maintained in the city of Zillah without a written permit from the health officer certifying that it meets the requirements of the Health District. On-site sewage disposal systems must also meet the requirements of the public works director and city engineer. It is recognized, however, that existing permitted systems will be allowed to continue upon annexation in accordance with the provisions of this code. (Ord. 1046 § 2, 2005)

13.18.130 Connection to public sewer system.

All structures and land uses which contain facilities for the disposal of sewage shall connect to the public sewer system at such time as there is a failure of the on-site system; provided, that public sewer service is available to the property. The wastewater system is available to serve a property when such service is located in a street, highway, alley or easement located within 300 feet from the perimeter boundaries of the subject property. The property must also be included in the design area for the public sewer. (Ord. 1046 § 3, 2005)

13.18.140 New development and substantial improvements.

A property and structure shall be required to connect to the public sewer system as a condition to any proposed development or material change in usage or occupancy of the subject property. Any development, project proposal or material alteration of use is expressly conditioned upon property owner extending at its sole cost and expense public sewer service to the subject development and/or property. City may, however, waive or defer the connection requirement as provided herein. (Ord. 1046 § 4, 2005)

13.18.150 Deferral of connection obligation.

City may defer connection to the public sewer system for any property or new development.

Deferral of connection is authorized in the following instances: (A) an existing on-site sewage disposal system is adequate for intended purposes and does not present an issue with regard to public health, safety or welfare; or (B) the structure, use or facility to be served is not within 300 feet of the public sewer line and connection would be economically infeasible or practically uneconomical under circumstances applicable to proposed use, location or other factor determined reasonable under circumstances. Any person requesting deferral shall make such request in writing with reasonable and appropriate supporting documentation. Any request for deferral shall be submitted to city council for final determination. (Ord. 1046 § 5, 2005)

13.18.160 Service outside city limits.

City of Zillah may further provide public sewer service to structures, facilities and properties outside the municipal boundaries but within the designated urban growth area (UGA). Any area served must be within the established boundaries established for such service and the designated urban growth area (UGA). An extension of public sewer lines to unincorporated areas shall be at the sole cost and expense of the property owner with system improvements reviewed and approved by the director of public works and city engineer. City may require execution of an outside utility agreement (OUA) as a condition to line extension. (Ord. 1046 § 6, 2005)

13.18.170 Solid waste service.

All structures, facilities and properties located within the municipal boundaries of the city of Zillah shall be served by public garbage service. (Ord. 1046 § 7, 2005)

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[1] Prior legislation: Ords. 642 and 1045.

Chapter 13.28
REDUCTION IN UTILITY BILLINGS DUE TO LEAKS

Sections:

13.28.010 Purpose.

13.28.020 Procedure to reduce utility billings.

13.28.030 City responsibility.

13.28.040 Appeals to city council.

13.28.010 Purpose.

The purpose of this chapter is to provide a policy and procedure for the reduction and abatement of utility (water and sewer only) charges to persons or businesses receiving city services within the city of Zillah. The city council is of the view that under certain circumstances, the water and/or sewer consumption charges imposed by meter readings should be reduced for a break or leak in water lines which existed and was repaired. This chapter shall set forth the city's policy and procedure for determining the reduction in the utility billings. (Ord. 1501 § 1, 2020; Ord. 708 § 1, 1991)

13.28.020 Procedure to reduce utility billings.

In order for a city utility user to make application for a reduction or abatement of a city water and/or sewer consumption charge, the applicant must apply and provide their name, address and reason for the request, and the applicant must establish the following factors:

A. That during any given billing period, the amount of water for which the user was billed was double the average use during a comparable billing period. That information will be pulled from the city utility billing system and included on a form provided by the city, attached to the ordinance codified in this chapter as Exhibit A (or as amended).

B. That the increased water usage was due to a break or leak in the water lines, which break or leak has been fixed or remedied. The leak or break and the repair will be verified by a city employee, or a receipt of repair will be collected from the applicant and attached to the form provided by the city, attached to the ordinance codified in this chapter as Exhibit A (or as amended).

When any user of city utility services establishes said factors, the city administrator shall be authorized to reduce the water and/or sewer consumption charges on the utility bill in question, to an amount equivalent to 50 percent of the consumption-based charges for water and/or sewer usage which exceed an amount considered to be normal usage. (Ord. 1501 § 1, 2020; Ord. 708 § 2, 1991)

13.28.030 City responsibility.

Should a city water user establish by competent proof that any increased water usage was due to the fault of the city or due to the failure of pipes or other water facilities for which the city is responsible, the entire amount of charges exceeding charges for the average or normal amount of water consumption as established by consumption during comparable periods of time shall be abated. (Ord. 1501 § 1, 2020; Ord. 708 § 3, 1991)

13.28.040 Appeals to city council.

Should any utility user make a presentation to the city administrator pursuant to the provisions of this chapter seeking a reduction or abatement of water and/or sewer consumption charges, and should any such user be dissatisfied with the decision of the city administrator, the matter may be appealed to the city council for consideration at a regularly scheduled meeting of the city council within 30 days of receipt of appeal. The city council shall hear from the utility user and the city administrator. The city council shall render a decision after consideration. The decision of the city council shall be final subject only to review under the provisions of the Washington Administrative Procedure Act, RCW Title 34. (Ord. 1501 § 1, 2020; Ord. 708 § 4, 1991)

Chapter 13.30
UTILITY REIMBURSEMENT AGREEMENTS

Sections:

13.30.010 Purpose.

13.30.020 Definitions.

13.30.030 Minimum project size.

13.30.040 Length of reimbursement provision.

13.30.050 Application.

13.30.060 Determination of reimbursement area boundary and reimbursement fee.

13.30.070 Written agreement – Payment of city costs in excess of application fee city council approval.

13.30.080 Reimbursement agreement must be recorded.

13.30.090 Construction and acceptance of improvements – Recording of final fees.

13.30.100 Collection of reimbursement fees – No liability for failure to collect.

13.30.110 Segregation of reimbursement fees.

13.30.120 Disposition of undeliverable reimbursement fees.

13.30.130 Failure to comply with this chapter.

13.30.140 Existing facilities with reimbursement agreement pending.

13.30.010 Purpose.

The purpose of this chapter is to prescribe rules and regulations for exercise of the authority to enter into a utility reimbursement agreement granted to the city by Chapter 35.91 RCW. (Ord. 913 § 2, 2000)

13.30.020 Definitions.

As used in this chapter, the terms listed below shall be defined as follows:

“Administrator” means the public works director or his/her designated representative.

“Cost of construction” means those costs (excluding interest charges or other financing costs) incurred for design, acquisition for right-of-way and or easements, construction, materials and installation required to create

an improvement which complies with city standards.

“Direct benefit area” generally means property or properties that lay within 200 feet of the utility improvement seeking reimbursement. The administrator may modify the direct benefit area boundary if the criterion in ZMC 13.30.060(B)(1) is met.

“Indirect benefit area” generally means property or properties that lay beyond 200 feet but within 500 feet of the utility improvement seeking reimbursement.

“Reimbursement agreement” means a written contract between the city and one or more parties providing both for construction of sewer or water facilities and for reimbursement to the party or parties constructing the facilities for part of the costs of the facilities by owners of property benefited by the improvements.

“Sewer or water facilities” has the meaning specified in RCW 35.91.020 as it now reads, or as hereafter amended. The word utility shall have the identical meaning within this chapter as sewer or water facilities. (Ord. 913 § 2, 2000)

13.30.030 Minimum project size.

To be eligible for a reimbursement agreement, the estimated cost of the proposed improvement must be not less than $5,000. The estimated costs of the improvement shall be determined by the administrator, based upon a construction contract for the project, bids, engineering or architectural estimates or other information deemed by the administrator to be a reliable basis for estimating costs. (Ord. 913 § 2, 2000)

13.30.040 Length of reimbursement provision.

All reimbursement agreements shall provide for reimbursement for a period not to exceed 15 years from the date of final acceptance of the improvements by the city. The city council has the sole discretion to shorten the length of time of a reimbursement agreement prior to final city council decision. (Ord. 913 § 2, 2000)

13.30.050 Application.

A. An application for a reimbursement agreement shall be made on a form provided by the city. An application fee of $250.00 shall be submitted to the city with the written application and shall be accompanied by:

1. Preliminary utility design drawings;

2. Itemized estimate of construction costs prepared and signed by a licensed civil engineer or in the form of a bid submitted by a qualified contractor. If more than one bid has been obtained, all bids must be submitted to the city;

3. A scaled vicinity drawing, stamped by a licensed civil engineer or licensed land surveyor depicting the proposed improvements, the location, the proposed benefited area, dimensions and county assessor’s numbers for each tax parcel, size of parcels, and evaluations where necessary for determining benefits.

The applicant has the right to exclude or remove certain properties within the proposed benefit area but will not be allowed to include the additional costs of such exclusions onto others properties within the proposed benefit area; and

4. A separate legal description for each tax parcel within the benefited area; and

5. Such other information as the administrator determines is necessary to properly review the application.

B. The administrator shall review all applications and shall approve the application for completeness only if the following requirements are met:

1. All information contained above is submitted; and

2. The project satisfies the minimum size requirement in ZMC 13.30.030 and complies with city sewer or water standards; and

3. The proposed improvements fall within the description of water or sewer main line facility as those terms described in Chapter 35.91 RCW and city utility standards; and

4. The proposed improvements are not constructed or currently under construction. (Ord. 913 § 2, 2000)

13.30.060 Determination of reimbursement area boundary and reimbursement fee.

The administrator shall prepare a written determination for each completed reimbursement agreement application. Until the city council determines a standard calculation methodology for reimbursement agreements, the administrator shall calculate reimbursement agreement areas by one of the two following methods of calculation:

A. Using an approved calculation method approved by the city's water and sewer engineer that is in accordance with the city's utility design standards.

B. Using a pro-rata share utility improvement method to include the following calculation considerations:

1. Direct or indirect benefit to surrounding properties, which parcels did not contribute to the original cost of the improvement, elevation and topology of the area, logical service area, city utility design standards, and future utility plans in the surrounding area. If both direct and indirect benefits are calculated the direct benefit area shall have at least a two to one weight ratio in the final reimbursement cost calculation. The administrator shall have the option to define a complete property lying partially, but not wholly, within 200 feet of the utility improvement as a direct benefit area if the written findings in this section can show justification. At no time can a property lying wholly outside 200 feet of the utility improvement be defined as a direct benefit area.

2. Determining the pro-rata share of the utility improvement cost shall include eligible reimbursement costs that are evenly distributed on a square foot, front foot, or combination of square/front foot calculation. The administrator will remove any properties that the applicant has requested in writing to be removed from consideration from the reimbursement area. If the applicant has requested specific properties to be removed from the reimbursement area the costs that would have been associated with the removed properties shall not be redistributed to other properties in the reimbursement area.

C. A copy of the administrators' reimbursement determination shall be mailed to the applicant at the address listed on the application for review, approval, and signature. (Ord. 913 § 2, 2000)

13.30.070 Written agreement – Payment of city costs in excess of application fee city council approval.

A. Upon the applicant's approval of the administrator's determination of a reimbursement agreement that include the estimated costs of construction, the reimbursement benefit area, legal descriptions, and estimated fees to be reimbursed the applicant shall sign a reimbursement agreement in the form supplied by the city and return it to the city.

B. The signed agreement, the application and supporting documents, together with the estimate of cost of construction, determination of reimbursement area and estimated fees shall be presented to the city council with a request that the city council authorize the mayor to sign the reimbursement agreement on behalf of the city.

C. In the event costs incurred by the city for engineering or other professional consultant services required in processing the application exceed the amount of the application fee, the administrator shall so advise the city council and the reimbursement agreement approval may be conditioned upon receipt of payment by the applicant of an additional amount sufficient to compensate the city for its actual costs in excess of the application fee. (Ord. 913 § 2, 2000)

13.30.080 Reimbursement agreement must be recorded.

A. In order to become effective, a reimbursement agreement must be recorded with the Yakima County auditor within 30 days of approval by the city. It shall be the sole responsibility of the applicant to record the reimbursement agreement.

B. Within 30 days after receipt of evidence that the reimbursement agreement has been recorded the administrator shall record a notice of additional tap or connection charges with the Yakima County auditor's office as required by RCW 65.08.170. (Ord. 913 § 2, 2000)

13.30.090 Construction and acceptance of improvements – Recording of final fees.

A. After the reimbursement agreement has been signed by both parties, and all necessary permits and approvals have been obtained, the applicant shall construct the improvements, and upon completion, request final inspection and acceptance of the improvements by the city, subject to any required obligation to repair defects. An appropriate bill of sale, easement and any other document needed to convey the improvements to the city

and to ensure right-of-access for maintenance and replacement shall be provided, along with documentation of the actual costs of the improvements and a certification by the applicant that all of such costs have been paid.

B. The applicant shall submit final costs of the utility improvement used for the reimbursement agreement. In the event that actual costs have a greater than 10 percent difference, either more than or less than the estimate, then the estimate used in calculating the reimbursement agreement fees shall be recalculated by the administrator, reducing or increasing them accordingly, and shall cause the reimbursement agreement to be rerecorded with the county auditor. If the final utility costs are within 10 percent of the estimate used in ZMC 13.30.060 to determine the reimbursement agreement fees, the estimate shall stand and no recalculation of the fees shall occur.

C. The reimbursement agreement shall be considered nonenforceable until the items mentioned in subsections (A) and (B) of this section have been submitted to the city. (Ord. 913 § 2, 2000)

13.30.100 Collection of reimbursement fees – No liability for failure to collect.

A. Subsequent to the recording of a reimbursement agreement, the city shall not permit connection of any property within the reimbursement area to any sewer or water facility constructed pursuant to the reimbursement agreement, unless the share of the costs of such facilities required by the recorded agreement is first paid to the city.

B. Upon receipt of any reimbursement fees, the city shall deduct a five percent administrative fee and remit the balance of the reimbursement fees to the party entitled to the fees pursuant to the agreement. In the event that through error, the city fails to collect a required reimbursement fee prior to approval of connection to a sewer or water facility, the city shall make diligent efforts to collect such fee, but shall under no circumstances be obligated to make payment to the party entitled to reimbursement, or in any other way be liable to such party, unless such reimbursement fee has actually been paid to the city. (Ord. 913 § 2, 2000)

13.30.110 Segregation of reimbursement fees.

The reimbursement agreement shall provide that the city is authorized to make segregation or adjustments to reimbursement fees because of subdivision or boundary line adjustment of the benefited properties. The segregation or adjustment shall generally be made in accordance with the method used to establish the original reimbursement fees to be paid. (Ord. 913 § 2, 2000)

13.30.120 Disposition of undeliverable reimbursement fees.

In the event that, after reasonable effort, the party to which reimbursement fees are to be paid pursuant to a reimbursement agreement cannot be located, and upon the expiration of 180 days from the date fees were collected by the city, the fees shall become the property for the city and shall be revenue to the city sewer and water utility. (Ord. 913 § 2, 2000)

13.30.130 Failure to comply with this chapter.

No reimbursement cost or fee shall be collected, nor shall any person be obligated to pay a reimbursement cost or fee with respect to any sewer or water facilities constructed after the adoption of this chapter, unless there has been full compliance with this chapter. (Ord. 913 § 2, 2000)

13.30.140 Existing facilities with reimbursement agreement pending.

Water and sewer facilities constructed prior to the adoption of this chapter for which reimbursement costs may be pending by agreement or otherwise shall be governed by the agreement to be negotiated and not by the requirements of this chapter. (Ord. 913 § 2, 2000)

Chapter 13.34
UTILITY TAX DISCOUNT

Sections:

13.34.010 Program for discounts established.

13.34.020 Low-income senior citizen qualifications.

13.34.030 Disabled citizen qualifications.

13.34.040 Application.

13.34.050 Discount rate.

13.34.060 Procedure.

13.34.070 False/incorrect information.

13.34.010 Program for discounts established.

City council has previously determined that it is in the best interest of the city to establish discounts for residential utility services, water, sewer and garbage charged to low-income senior citizens and qualified disabled citizens in order to provide necessary support for the disadvantaged. Such reductions are intended to offset rate increases and relate to the applicable utility tax rate. City administrator/clerk-treasurer is authorized and directed to administer the program and may establish administrative processes and procedures to implement the intent and purpose of the ordinance codified in this chapter. (Ord. 1428 § 2, 2017; Ord. 1024 § 1, 2004)

13.34.020 Low-income senior citizen qualifications.

A low-income senior citizen may establish eligibility for the discount program by submitting the following information to the city administrator/clerk-treasurer:

A. Is 65 years of age or older; and

B. Has a maximum annual household income at or below 125 percent of federal poverty guidelines; and

C. Is a single occupant or the head of a household or the spouse of the head of the household; and

D. Resides in the dwelling unit served by the solid waste, sewer, and water utility; and

E. Is billed or is the spouse of a person billed by the water, sewer and garbage utility.

Applicants shall provide such verification and shall provide such other data as is deemed appropriate upon forms

provided by city and in the manner determined by the city. (Ord. 1428 § 3, 2017; Ord. 1024 § 2, 2004)

13.34.030 Disabled citizen qualifications.

A disabled citizen may establish eligibility for the discount program by submitting the following information to the city administrator/clerk-treasurer:

A. Is disabled; and

B. Has a maximum annual household income at or below 125 percent of federal poverty guidelines; and

C. Is a single occupant or the head of a household or the spouse of the head of the household; and

D. Resides in the dwelling unit served by the solid waste, sewer and water utility; and

E. Is billed or is the spouse of a person billed by the garbage, sewer and water utility.

Applicants shall provide such verification and shall provide such other data as is deemed appropriate upon forms provided by city and in the manner determined by the city. (Ord. 1428 § 4, 2017; Ord. 1024 § 3, 2004)

13.34.040 Application.

Discount applies to the utility tax rate applicable to residential water, sewer and garbage utility services. Persons qualified by the city as eligible recipients of a low-income senior citizen discount or disabled citizen discount provided for in this chapter shall be charged a discounted utility tax rate for charges assessed for residential water, sewer and garbage utility services. Such discount shall be applicable for the first month following submission of a complete application and city approval of the application. (Ord. 1428 § 5, 2017; Ord. 1024 § 4, 2004)

13.34.050 Discount rate.

City administrator/clerk-treasurer is authorized to reduce the most current/applicable utility tax rate on charges for residential water, sewer and garbage utility services to qualified low-income senior citizens or qualified disabled citizens by 25 basis points. For example, if the sewer utility tax rate is assessed at 32 percent, it will be reduced from 32 percent to seven percent. (32 percent minus 25 percent equals seven percent.) (Ord. 1428 § 6, 2017; Ord. 1088 § 2, 2006; Ord. 1024 § 5, 2004)

13.34.060 Procedure.

All persons claiming the discount provided for in this chapter shall first be required to file an application at City Hall in Zillah to initiate the reduction. The application shall be on forms prescribed by the city administrator/clerk-treasurer and shall provide information by which the city administrator/clerk-treasurer may verify the applicant's eligibility to participate. Applicants shall be required to submit such additional information as may be required by the city administrator/clerk-treasurer to verify eligibility. In order to remain eligible for the program, an applicant must verify to the city that they are still eligible and reapply for the discount every 12 months by filing a new

application. If the city determines that the applicant is ineligible for the reduction, the applicant will be notified by the city. If applicant moves from the residence to which the service is provided or otherwise becomes ineligible for the reduced rate, the applicant shall be required to notify Zillah City Hall immediately and the applicable discount rate shall be terminated. (Ord. 1428 § 7, 2017; Ord. 1024 § 6, 2004)

13.34.070 False/incorrect information.

If false, incorrect or misleading information is submitted to the city in connection with any application for a reduced utility tax rate, the applicant will automatically become ineligible to receive any future discounts and any discounts or reductions already given shall be fully repaid to the city, together with a penalty in the amount of 100 percent of the repayment amount. This remedy shall be in addition to any other remedies the city may have for the provision of false, incorrect or misleading information. (Ord. 1428 § 8, 2017; Ord. 1024 § 7, 2004)

Chapter 13.38
INFRASTRUCTURE IMPROVEMENT PROGRAM

Sections:

13.38.010 Purpose of chapter.

13.38.020 Establishment of Zillah infrastructure improvement program.

13.38.030 Use of development fees.

13.38.040 Applicability.

13.38.045 Deferral of development fees.

13.38.050 Exemptions and credits.

13.38.060 Segregation of development fees from general fund.

13.38.070 Appeals.

13.38.080 Refund of development fees.

13.38.090 Mandatory review.

13.38.010 Purpose of chapter.

The city council for the city of Zillah, Washington, has studied the impact of development within the city of Zillah, Washington. The city of Zillah finds that construction and development of dwelling units, commercial, industrial manufacturing buildings and structures (referred to herein as “development”) places demands on municipal government to provide new services and expand and improve public facilities. In order to provide an equitable source of funding for public facilities, it is necessary for the city of Zillah to establish a city of Zillah infrastructure improvement program which charges a proportionate share of the costs of new services and facility improvements to those projects and improvements creating the demand for additional services and improvements. (Ord. 1251 § 1, 2011)

13.38.020 Establishment of Zillah infrastructure improvement program.

A. The city of Zillah hereby establishes the Zillah infrastructure improvement program (“program”) for partial financing of identified public facility and system improvements. System improvements and public facilities included in the program are:

1. Publicly owned parks, open space and recreational areas;

2. Public streets and roads; and

3. Fire protection facilities.

B. Development fees will be assessed and collected at time of building permit issuance unless developer requests and is granted a deferral in payment under ZMC 13.38.040(A)(1)(b) and 13.38.045. The development fee shall be based on the gross square footage of the building or improvement. All development fees collected through the Zillah infrastructure improvement program shall be allocated among the three areas as follows:

1. Parks and open space will receive 15 percent;

2. Streets and roads will receive 60 percent; and

3. Fire protection will receive 25 percent of the total amount collected.

C. The program may identify system improvements to be financed, the anticipated schedule of construction, and the characteristics of new development as shown in the following attachments to the ordinance codified in this chapter:

1. Attachment A, General parks and open space plan, or as amended.

2. Attachment B, Streets/road plan including most recently adopted six-year STIP.

3. Attachment C, Fire improvement plan, or as amended. (Ord. 1476 § 1, 2018; Ord. 1417 § 1, 2016; Ord. 1251 § 2, 2011)

13.38.030 Use of development fees.

A. Development fees may only be used for financing system improvements identified in the Zillah infrastructure improvement program. Funding of system improvements shall be balanced with development fees and other sources of public funds. Costs of system improvements may not rely solely on development fees.

B. Development fees may not be used for:

1. Operations and maintenance. Development fees may not be used to pay salaries or to pay for regular maintenance or simple replacement of existing equipment;

2. Facilities not needed to serve new development or which do not benefit new development. Development fees may be applied only to new facilities needed to serve new growth and development. There shall be a reasonable connection between the anticipated need for additional facilities with such fees representing a proportionate share of system costs with due consideration given to the cost of facilities funding sources, and availability and methods of other public financing.

C. Development fees may be utilized for municipal improvements, including, but not limited to, facility planning,

land acquisition, site improvements, necessary off-site improvements, construction, engineering, architectural, permitting, financing, and administrative expenses, facility construction and improvements, and other costs reasonably associated with such system improvements.

D. The city council shall, by motion or resolution, budget and approve application of development fees to system improvements. (Ord. 1251 § 3, 2011)

13.38.040 Applicability.

A. The building official shall assess an applicant for a building permit a development fee at the established rate determined at time of complete application and based on calculated square footage of building structure or improvement. The total development fee shall be paid separately from any other fees and shall be paid prior to the issuance of a building permit or final inspection as elected by applicant.

1. New Single-Family Detached and Attached Residential Construction. Development fees for new single-family detached and attached residential construction shall be paid, at the option of applicant, under either of the following options:

a. Full payment of development fees upon issuance of building permit; or

b. Deferral of payment of development fees until time of final inspection.

B. The city council shall establish the development fee schedule and shall review and revise, if necessary, periodically to reflect changes in planned improvements, current budget levels, and compliance to the city of Zillah comprehensive plan and the city's capital improvement plan. Prior to the establishment or revision of the development fee schedule, the city council shall hold a public hearing on the proposed fees.

C. The development fee schedule is as follows or herein amended for the following uses:[1]

	2019	2020	2021
Residential	$0.66/ sq. ft.	$0.67/ sq. ft.	$0.68/ sq. ft.
Commercial	$0.66/ sq. ft.	$0.67/ sq. ft.	$0.68/ sq. ft.
Light Manufacturing	$0.66/ sq. ft.	$0.67/ sq. ft.	$0.68/ sq. ft.

D. The calculation of the development fee is premised upon anticipated costs of system improvements, proportionate impact of new development, the cost of existing public facility improvements and other available means and methods of public financing. The amount of the development fee shall be reasonably related to the

development's share of the cost of the facilities improvements made necessary by the development or if the improvements were previously constructed at municipal expense prior to the development. (Ord. 1476 § 2, 2018; Ord. 1417 § 2, 2016; Ord. 1251 § 4, 2011)

13.38.045 Deferral of development fees.

A. An applicant for a building permit may request a deferral in payment of development fees under ZMC 13.38.040(A)(1)(b). Any deferral of payment of a development fee must be secured by the grant and recordation of a deferred development fee lien against the property in favor of the city in the amount of the deferred development fee. The deferred development fee lien must include the legal description, tax parcel number, and address of the property.

In addition, the deferred development fee lien shall be:

1. In a form approved by the city; and

2. Signed by all owners of the property, with all signatures acknowledged as required for a deed, and recorded in the real property records for Yakima County; and

3. A covenant that shall run with the land and be binding on all successors and assigns; and

4. Junior and subordinate only to one mortgage for the purpose of construction upon the same real property and granted by the person who applied for the deferral of development fees.

B. Upon receipt of final payment of development fees, the city shall execute a release of the deferred development fee lien for the property. The property owner at the time of the release, at his or her expense, is responsible for recording the lien release.

C. In the event that development fees are not paid in a timely manner as required herein or through a deferral authorization, the city may institute foreclosure proceedings in accordance with Chapter 61.12 RCW. The extinguishment of a deferred impact fee lien by the foreclosure of the lien having priority does not affect the obligation to pay the impact fees as a condition of final inspection, certificate of occupancy, or equivalent certification, or at the time of closing the first sale.

D. Each applicant for a single-family residential construction permit, in accordance with his or her contractor registration number or other unique identification number, is entitled to annually receive deferrals under ZMC 13.38.040(A)(1)(b) for the first 20 single-family residential construction building permits within the city.

E. Each applicant seeking a deferral under ZMC 13.38.040(A)(1)(b) will be subject to an administrative deferment fee of $50.00 per associated building permit plus payment of costs for document preparation and applicable recording fees and costs.

F. Final payment of all development fees is due in full within 18 months of issuance of building permit.

G. Upon receipt of final payment of all deferred development fees for a property, the city shall release the deferred development fee lien for the property. (Ord. 1417 § 3, 2016)

13.38.050 Exemptions and credits.

A. The following shall be exempt from payment of development fees:

1. Replacement to a similar intensity of a residential structure or mobile home having been actively occupied for the three previous years with a new residential structure or manufactured home at the same site or lot when such replacement occurs within 12 months of the demolition or destruction of the prior structure or the removal of the mobile/manufactured home;

2. Minor alterations, expansion, enlargement, remodeling or rehabilitation or conversion of an existing dwelling unit or units where no additional units are created and the use is not changed;

3. The construction of accessory structures to a residential use that will not create additional developments on public facilities;

4. Miscellaneous improvements, including, but not limited to, fences, walls, swimming pools, and signs;

5. Demolition or removal of a structure.

B. A credit for the value of any off-site dedication of land for, improvement to, or new construction of a system improvement, provided by a developer that is required as a condition of approval of a development activity and where a developer and the city have entered into a voluntary agreement pursuant to RCW 82.02.020, which provides for the credit against the development. The right and extent of such credit shall be established solely by city after consideration of relevant factors including, but not limited to, type of improvement, proportionate share, amount and nexus with the project.

No credit shall be allowed if the voluntary agreement, SEPA mitigation condition, or land division or project condition requires the payment of development fees. Additionally, no credit shall be allowed until the developer has provided the city with documentation demonstrating compliance with the terms of the voluntary agreement, SEPA mitigation condition, or land division project condition.

C. The mayor or his/her designee(s) shall be authorized to determine whether a particular development activity falls within an identified exemption or is eligible for a credit against the development fees. Determinations of the city shall be in writing and shall be subject to appeal procedures set forth herein.

D. The payment of development fees under this chapter is further subject to the following exemptions:

1. A person required to pay mitigation or similar fee pursuant to RCW 43.21C.060 for system improvements shall not be required to pay a development fee under RCW 82.02.050 through 82.02.090 for those same system improvements.

2. A person installing a residential fire sprinkler system in a single-family home shall not be required to pay the fire operations portion of the development fee. The exempted fire operations development fee shall not include the proportionate share related to the delivery of emergency medical services. (Ord. 1417 § 4, 2016; Ord. 1251 § 5, 2011)

13.38.060 Segregation of development fees from general fund.

A. The building official shall record the name of the individual paying the development fee, the assessor's map and lot number(s) of the property for which the development fee is being paid, the amount of the fee paid for each facility for which fees are collected, and the date the development fee was paid on forms provided by the finance department.

B. Upon collection of the development fee, the clerk/treasurer shall transfer the funds into special interest-bearing account(s) dedicated for funding the improvements for which the fee is collected.

C. An annual report of each development fee account shall be prepared which shows (1) the source and amount of fees collected, earned or received, and (2) system improvements that were financed in part by development fees. (Ord. 1251 § 6, 2011)

13.38.070 Appeals.

A. Any developer or property owner may pay development fees imposed under protest in order to obtain a project development approval. An appeal is authorized with regard to the imposition of development fees on any development activity, but no appeal shall be permitted unless and until the development fees have been paid under protest.

B. A municipal determination with respect to the applicability of development fees to a given development activity and/or building permit, the availability and/or extent of any exemption, the calculation of applicable development fee, or any other determination with respect to a development fee may be appealed to the city council. An appeal shall include applicable appeal fees established by the municipality.

C. The determination of a municipal official making the determination on the applicable development fee is entitled to substantial weight and the city council may approve, reject or modify such determination on appeal. (Ord. 1251 § 7, 2011)

13.38.080 Refund of development fees.

A. The city shall refund such development fees that have not been spent or encumbered within six years of the date on which such fees were paid. Such fees may be retained in the event of extraordinary or compelling

reasons determined by city council. Unexpended or unencumbered fees shall be returned to the owner of record at the time a refund is warranted.

B. If the collection of development fees is deferred under ZMC 13.38.040(A)(1)(b), the six-year period for expenditure or encumbrance shall commence upon full payment of all development fees to the city. (Ord. 1417 § 5, 2016; Ord. 1251 § 8, 2011)

13.38.090 Mandatory review.

The city council for the city of Zillah, Washington, shall be responsible to review the provisions of this chapter at least once every two years. The mitigation of the environmental impacts that this chapter is designed to accomplish requires constant review and study. The need for adequate facilities will continue to become more acute and more costly as development continues to occur. Accordingly, the cost of mitigating environmental impacts may increase and must be reviewed in order that the city of Zillah is utilizing its best efforts to address these issues and concerns. (Ord. 1251 § 9, 2011)

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[1] Unless changed by Zillah city council, the development fee schedule will hold at the amount listed in 2021 for all future years.

Chapter 15.10
DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS

FOR PUBLIC WORKS IMPROVEMENTS

Sections:

15.10.010 General.

15.10.020 General plan requirements.

15.10.030 General requirements for all projects.

15.10.040 Water system improvements.

15.10.050 Sanitary sewer system improvements.

15.10.060 Stormwater improvements.

15.10.070 Street improvements.

15.10.010 General.

A. Enacting Authority. These design and construction standards are enacted by the city of Zillah, in accordance with state law, to protect and preserve the public health, safety, and general welfare.

B. Purpose. The purpose of these design and construction standards is to provide consistent requirements, standards, and specifications for the design and construction of public works infrastructure improvements by the city and by private developers.

C. State Environmental Policy Act (SEPA). These standards will not affect any considerations involving issues under the State Environmental Policy Act (SEPA). The city's responsible official will continue to make all necessary SEPA decisions when individual proposals are submitted.[1]

D. Conflicting Provisions. The standards, procedures, and requirements of these standards are the minimum necessary to promote the health, safety, and welfare of the residents of the city of Zillah. The city may adopt more rigorous or different standards, procedures, and requirements whenever necessary. If the provisions of these standards conflict with one another, or if a provision of these standards conflicts with the provisions of the city code or another ordinance of the city, the most restrictive provision or the provision imposing the highest standard shall prevail.

E. Severance. If any provision of these standards or its application to any person or circumstance is for any reason held to be invalid, the remainder of these standards or the application of the provisions is not affected.

F. Process.

1. Design Phase. Any person, firm, or corporation (the “developer”) who intends to plat land in accordance with the city of Zillah code and construct a public works improvement shall apply to the city director of public works. The request by the developer shall include a map showing the area to be served, the number and type of proposed units, or the type and size of the proposed facility and a general layout of the development.

Upon receipt of the design requirements from the director of public works, the developer shall employ a consulting engineer to prepare plans and specifications for the public works improvements in accordance with these construction standards and the Zillah Municipal Code. The developer or its consulting engineer shall submit three paper sets of plans and specifications for review by the city and/or the city’s engineer.

The city shall review the initial submittal and indicate corrections or additions or request additional information and return one “red lined” set to the developer. The developer shall make the required corrections and resubmit two paper sets and one electronic copy of revised plans and specifications to the city public works department.

When it has been determined the plans and specifications indicate compliance with city of Zillah standards, the developer shall submit the original plan tracings and specifications for final approval to the city. The cover sheet of the original plans shall contain an “APPROVED FOR CONSTRUCTION BY THE CITY OF ZILLAH” signature block. The city’s responsible official will sign the plans. Such approved plans and specifications shall not be changed, modified, or altered without authorization from the city public works director. The developer shall provide the city with a minimum of three copies of the approved plan set and specifications for use by city inspectors and city departments as required.

Upon receipt by the director of public works of the plan review fee, as discussed in subsection (H) of this section, the approved original plans and specifications will be returned to the developer.

2. Construction Phase. Before the developer’s contractor commences any work, he shall be required to attend a preconstruction conference with the city public works department, the city’s engineer, and utility companies as determined by the city of Zillah. The contractor will submit his insurance and construction schedule at this meeting.

All construction shall be inspected by the city of Zillah or its authorized agent. The contractor shall give a minimum of 10 days’ prior notice to the director of public works before the start of any construction activities.

After cleanup by the contractor and final inspection by the city, the city will calculate the inspection fees and submit them to the developer. The developer will pay the inspection fee, as discussed in subsection

(H) of this section, to the public works department.

G. Engineering Design Plan Requirements. All plans, specifications, engineering calculations, diagrams, and other relevant data shall be designed and prepared by a civil engineer licensed by the state of Washington (consultant), in accordance with ZMC 15.10.020, General plan requirements.

H. Plan Review and Inspection Fee. Plan review and inspection fees are hereby established to defray the administrative expense of plan review and inspection costs incurred by the city of Zillah.

The plan review and inspection fee shall be the total actual costs incurred by the city of Zillah, its agents, employees, and elected or appointed officials, for review and approval of the plans and specifications and for inspection of construction of the public works improvements. The fee shall include, but not be limited to, initial plan review, subsequent meetings with the developer, explanations to the developer's engineering consultant, reviews of revised plans, construction inspection, reinspections, and a final inspection prior to the expiration of the maintenance period.

The plan review fee shall be tabulated and sent to the developer and paid by the developer in full prior to the city releasing the approved original plans and specifications for construction or the issuance of a building permit.

The construction inspection fee shall be tabulated and sent to the developer and paid by the developer in full prior to the city issuing a certificate of occupancy or final acceptance of the public works improvements.

I. Record Drawings. The developer's consulting engineer shall maintain a neatly marked, full-sized print set of record drawings showing the final location and layout of all new construction of the public facilities. Prior to final acceptance by the city of Zillah, one set of reproducible record drawings and two sets of prints prepared by the developer's engineer and clearly marked "Record Drawings" shall be delivered to the director of public works for review and approval.

J. Transfer of Ownership. The developer shall complete a transfer of ownership form upon completion of the construction of the public works improvements and pending acceptance by the city. This form may be found in Appendix A. Appendix A is available at Zillah City Hall or on the city web site at www.cityofzillah.us.

K. Easements. Public utility easements shall be established for the location of new and future public improvements serving new land divisions and land developments. Easements shall also be granted across the front of new lots and existing lots to provide future utility access as required.

All easements required shall be prepared by the developer on the proper form and format for recording at the Yakima County auditor's office. The easement legal description shall be prepared by a land surveyor licensed in the state of Washington. The executed and notarized easement document shall be submitted to the director of public works for recording.

Ten-foot-wide utility easements shall be dedicated along the front of each lot in subdivisions and short subdivisions. Easements for new and/or future utility lines shall be a minimum of 16 feet wide, provided the width of the easements for buried utilities will be at least twice the depth of the planned excavation.

Utility easements shall be continuous and aligned from block to block within a subdivision and with easements in adjoining subdivisions to facilitate the extension and future extension of public utilities. (Ord. 1289 § 1 (Exh. A), 2011; Ord. 1213 § 1, 2009; Ord. 1202 § 2 (Exh. A), 2009)

15.10.020 General plan requirements.

All plans, specifications, engineering calculations, diagrams, and other relevant data shall be designed and prepared by a civil engineer licensed by the state of Washington.

A. General Plan Format.

1. Plan sheets and profile sheets or combined plan and profile sheets and detail sheets shall be on a sheet size of 24 inches by 36 inches or 22 inches by 34 inches.

2. Each sheet shall contain the following project information:

a. Project title and city project number, work order number, or LID number, if appropriate.

b. Quarter section, section, township, range.

c. Sheet title.

d. Page (of page) numbering.

e. Revision block.

f. Subdivision or short plat name.

3. The cover sheet shall contain the following:

a. Name, address, and phone number of the owner/developer;

b. Name, address, and phone number and stamp of the civil engineer preparing the plans (consultant);

c. “APPROVED FOR CONSTRUCTION BY THE CITY OF ZILLAH” signature block for city final approval of the plans;

d. “APPROVED FOR CONSTRUCTION BY THE CITY OF ZILLAH FIRE CHIEF” signature block;

e. Vicinity map showing the project site location;

f. An overall site plan with contours;

g. Table of contents;

h. Applicable project information; and

i. Utility locater: call 1-800-424-5555.

4. All plan sheets must have a north arrow preferably pointing to the top of the sheet or to the left, and must indicate the drawing scale. All engineering plans must be drawn to an appropriate engineer's scale. For profiles, the vertical scale shall be one inch equals two feet, one inch equals five feet, or one inch equals 10 feet. The horizontal scale shall be the same for both plan and profile and shall normally be one inch equals 20 feet. Plan and profile stationing shall generally read left to right.

5. The vertical datum for all plan submittals must be based on the city of Zillah datum. The benchmark used shall be referenced on the plans. An assumed datum will not be accepted.

6. Existing features and topography within the project construction limits must be shown on the plans. This shall include existing road width and surfacing, utility poles, existing underground utilities and surface appurtenances, significant trees, landscaping, and other elements that may affect design/construction.

7. Plan sheets shall indicate all adjacent property lines, right-of-way lines, and easements.

8. Plan sheets shall show all horizontal survey control as required to properly locate and tie the improvements in horizontal location.

B. Sanitary Sewer System Plan Requirements.

1. Show all existing and proposed sanitary sewer system features including, but not limited to, the following:

a. Sewer lines, gravity and force mains.

b. Side service, proposed locations.

c. Manholes.

d. Clean outs.

e. Pump stations.

2. Indicate all easements required for the sanitary sewer line extensions and laterals.

3. Provide an overall site plan of development with contours, to show that all lots/parcels will be served by the proposed sewer system at design depth for all new development.

4. Show the sanitary sewer system and water system on the same plan and profile for verification of minimum separation requirements. The design information for each may be on individual drawings for that system.

5. Slope, length, size, and pipe type shall be indicated for all lines and side sewers. Pipe length shall be measured from centerline of manholes. The minimum sewer line size allowed will be eight-inch diameter.

6. Provide a profile for each sanitary sewer line extension. Clearly indicate the vertical and horizontal scale. Show the profile on the same sheet with, and aligned underneath, the plan view as practical.

7. The plan and profile must show the location of all existing and proposed gas, water, irrigation, storm drain, and other utility crossings.

8. Generally show all vertical data in the profile view and all horizontal data in the plan view. It is not desirable to repeat the vertical data in the plan view unless it does not show in a profile.

9. Each manhole shall be uniquely numbered and shall be stationed off of a referenced centerline. Indicate rim and invert elevations in and out at all manholes. Indicate the length of each side sewer stub, the centerline stationing for each side sewer, and the size.

C. Water System Plan Requirements.

1. Show all existing and proposed water system features if known, including but not limited to:

a. Water mains.

b. Water valves.

c. Water meters.

d. Fire hydrants.

e. Blow offs.

f. Air and vacuum release valve assemblies.

g. Pressure reducing valves.

h. Fire sprinkler system lines.

i. Double check valves.

j. Post indicator valves.

k. Thrust blocking.

2. Indicate all easements required for the water main extensions and future extensions.

3. Show the water system and the sanitary sewer system on the same plan and profile view for verification of minimum separation requirements. The design information for each system may be on individual drawings for that system.

4. Show the length, size, and pipe type for all main extensions, fire sprinkler system services, and domestic services where applicable.

5. Identify all joint connections; provide detail of all nonstandard joints.

6. Show by station or dimension the location of all fire hydrants, tees, crosses, and services relative to centerlines or property lines.

7. A profile view shall be shown for all city water main extensions, aligned if practical with the plan view. Clearly indicate the horizontal and vertical scales.

8. Show the minimum cover and minimum separation on each sheet.

9. In the profile view, show all utilities crossing the proposed water main.

D. Stormwater System Plan Requirements.

1. Show all existing features if known and all proposed storm sewer (drain) system features, including but not limited to:

a. Storm drain mains and lines.

b. Catch basins.

c. Inlets.

d. Infiltration trenches.

e. Retention systems.

f. Biofiltration swales.

g. Culverts.

h. Streams.

i. Ditches.

j. Natural drainage swales.

k. Headwalls.

l. Oil/water separator assembly.

m. Other requirements of the Department of Ecology Stormwater Manual for Eastern Washington.

2. Indicate all easements required for the storm drainage system.

3. The plan shall clearly indicate the location of the storm drainage items stationed from a referenced centerline.

4. Show all horizontal measurements and control in the plan view.

5. Show slope, length, size, and pipe material for all storm drain mains and lines.

6. All catch basins and inlets shall be uniquely numbered and shall be clearly labeled. Stationing and offsets shall be indicated from referenced centerline. Show all proposed storm drain features within the right-of-way in a profile.

7. Indicate all grate, rim, and invert elevations in the profile view.

8. Provide stormwater runoff and drainage facilities sizing calculations as described in ZMC 15.10.060.

E. Street Plan Requirements.

1. Show all existing and proposed roadway improvements, including but not limited to:

a. Pavement.

b. Concrete curb and gutter.

c. Edge of pavement.

d. Sidewalk(s).

e. Utilities (manholes, power poles, pedestals, valves, water meters, etc.).

f. Sidewalk ramps.

g. Signs and barricades.

h. Driveways.

i. Rockery or retaining walls.

j. Mailboxes.

k. Monuments.

l. Streetlights, J-boxes and conduit runs.

m. Compliance with ADA requirements.

2. Show all right-of-way (R/W) lines, centerlines, and roadway widths for all rights-of-way.

3. Clearly differentiate between areas of existing pavement, areas of new pavement, and areas to be overlaid.

4. Provide a cross section or typical section of all rights-of-way indicating right-of-way width, centerline, pavement width, sidewalk, curb and gutter, pavement, and base thickness of proposed section.

5. Provide a plan and profile of all new public roadways or extensions of existing roadways. Provide topography within the R/W including utilities. Indicate all horizontal and vertical curve data, percent of grade, bearings, centerline stationing every 50 feet, finish grade elevations, and existing ground line. The profile of the existing centerline ground should extend a minimum of 100 feet before the beginning and at the end of the proposed improvements to show the gradient blend.

6. Align the profile view with the plan view, if practical. Clearly indicate the horizontal and the vertical scale.

7. Clearly label all profiles with respective street names and plan sheet reference numbers if drawn on separate sheets.

8. For developments where road work is required on an existing street, development plans are required to

include cross section of the existing street and spot elevations at proposed intersections and appurtenances to the project. (Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

15.10.030 General requirements for all projects.

A. Forward. The city of Zillah has adopted the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation (WSDOT), and the American Public Works Association (APWA) General Special Provisions (GSPs) for Division One General Requirements as the standard specifications governing all design and construction of public works improvements by the city and by private developers.[2]

All references hereinafter made to the "Standard Specifications" shall refer to the latest edition of the Standard Specifications described above. Except as may be amended, modified, or supplemented hereinafter, each section of the Standard Specifications shall be considered as much a part of these requirements as if they were actually set forth herein.

The Standard Specifications, general and project special provisions, and city standard plans and details contained in these city design and construction standards shall apply in their entirety to all city of Zillah public works projects. These standards have been prepared to form a compiled document intended to assist and inform developers, consultants, and contractors of the construction requirements to be used on proposed public works improvements.

The Standard Specifications, general and project special provisions, and city standard plans and details shall periodically be revised and updated. It shall be the responsibility of each user of this information to verify that he has the latest revisions prior to submitting any work covered by these specifications and details.

Developers and contractors are encouraged to contact the city of Zillah public works department to obtain a copy of these standards.

B. General. All work shall be done in accordance with the approved plans, the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation, latest edition, amendments, referenced codes and organizations, and these special provisions.

Note: The American Public Works Association (APWA) General Special Provisions (GSPs) to Division One of the WSDOT Standard Specifications amend Division One of the Standard Specifications for Road, Bridge, and Municipal Construction. These GSPs are available at www.wsdot.wa.gov/partners/apwa.

All materials incorporated into a proposed public works improvements project shall meet the requirements of Division Nine of the Standard Specifications or city of Zillah standards as shown in the standard plans and details and special provisions.

Any public works facility improvements or components that are not specifically addressed in these construction standards shall be designed by a professional engineer and provided to the city for review by the city engineer and city approval.

C. 1-01 Definitions and Terms – 1-01.3 Definitions. The terms defined in Section 1-01.3 of Division One of the Standard Specifications and the APWA GSPs shall be further described by the following:

This Section is supplemented with the following:

All references in the Standard Specifications to the terms “State”, “Department of Transportation”, “Washington State Transportation Commission”, “Commission”, “Secretary of Transportation”, “Secretary”, “Headquarters”, and “State Treasurer” shall be revised to read “Contracting Agency”.

All references to “State Materials Laboratory” shall be revised to read “Contracting Agency designated location”.

The venue of all causes of action arising from the advertisement, award, execution, and performance of the contract shall be in the Superior Court of the County where the Contracting Agency’s headquarters are located.

Additive: A supplemental unit of work or group of bid items, identified separately in the proposal, which may, at the discretion of the Contracting Agency, be awarded in addition to the base bid.

Alternate: One of two or more units of work or groups of bid items, identified separately in the proposal, from which the Contracting Agency may make a choice between different methods or material of construction for performing the same work.

City: Means the City of Zillah, a municipal corporation, as represented by its authorized officials, employees or agents.

Consultant: Means an engineer licensed in the State of Washington, employed by the Developer to design the improvement and prepare plans and specifications, perform construction staking, or similar services.

Contract Documents: Means the plans and specifications prepared by the Developer’s Consultant for the public works improvements contemplated and approved by the City.

Contractor: Means the person or firm employed by the Developer or under Contract with the City to do the construction of the public works improvements.

Contract Time: The period of time established by the terms and conditions of the contract within which the work must be physically completed.

Dates:

a. Bid Opening Date: The date on which the Contracting Agency publicly opens and reads the bids.

b. Award Date: The date of the formal decision of the Contracting Agency to accept the lowest responsible and responsive bidder for the work.

c. Contract Execution Date: The date the Contracting Agency officially binds the agency to the contract.

d. Notice to Proceed Date: The date stated in the Notice to Proceed on which the contract time begins.

e. Substantial Completion Date: The day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the operational and safety standpoint, and only minor incidental work, replacement of temporary substitute facilities, or correction or repair remains for the physical completion of the total contract.

f. Physical Completion Date: The day all of the work is physically completed on the project. All documentation required by the contract and required by law does not necessarily need to be furnished by the Contractor by this date.

g. Completion Date: The day all the work specified in the contract is completed and all the obligations of the Contractor under the contract are fulfilled by the Contractor. All documentation required by the contract and required by law must be furnished by the Contractor before establishment of this date.

h. Final Acceptance Date: The date on which the Contracting Agency accepts the work as complete.

Developer: Means the person or firm constructing the development and engaging the services of and employing consultants, and/or contractors and paying for the design and construction of the public works improvements to be transferred to the City.

Drawings: Means the construction plans prepared by the Developer's Consultant for the public works improvements contemplated. The terms "Contract Documents," "Plans," "Engineer's Plans," "Engineer's Drawings," "Working Drawings," and "Project Manual" are synonymous.

Engineer: Means the appointed City Engineer for the City of Zillah or his/her duly authorized agent or representative.

Notice of Award: The written notice from the Contracting Agency to the successful bidder signifying the Contracting Agency's acceptance of the bid.

Notice to Proceed: The written notice from the Contracting Agency or Engineer to the Contractor authorizing and directing the Contractor to proceed with the work and establishing the date on which

the contract time begins.

Owner: Means the City of Zillah acting through its legally established officials, boards, commissions, etc., as represented by its authorized officers, employees, or agents.

Public Works Director: Means an appointed planning official for the City per 17.06.010(E).

Standard Plans and Details: Means specific drawings adopted by the City of Zillah and revised from time to time which show frequently recurring components of work which have been standardized for use.

Standard Specifications: The Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation, and amendments, and the APWA GSP's for Division One that are, by this reference, made part of the Contract Documents. Except as may be amended, modified, or supplemented hereinafter, each section of the Standard Specifications shall be considered as much a part of these Contract Documents as if they were actually set forth herein.

Special Provisions: The Special Provisions supersede any conflicting provisions of the Standard Specifications for Road, Bridge, and Municipal Construction and the appended amendments to the Standard Specifications and are made a part of a Contract Document.

Traffic: Both vehicular and non-vehicular traffic, such as pedestrians, bicyclists, wheelchairs, and equestrian traffic.

Should any conflicts be encountered, the following interrelationships shall govern: The special provisions shall supersede the APWA GSPs, which shall supersede the WSDOT amendments, which shall supersede the Standard Specifications.

D. 1-04 Scope of the Work.

1. 1-04.4 Changes. The provisions of Section 1-04.4 of the Standard Specifications shall be modified as follows:

No changes in the work covered by the approved Contract Documents shall be made without having prior written approval of the Developer and the City.

2. 1-04.4(1) Minor Changes. The first sentence in the first paragraph is revised to read:

Payments or credits for changes amounting to $15,000 or less may be made under the bid item "Minor Change."

3. 1-04.11 Final Cleanup. The contractor shall perform final cleanup as provided in this section to the

developer's and city's satisfaction. The date of completion will not be established until this is done. The material sites and all ground the contractor occupied to do the work shall be left neat and presentable. The contractor shall:

a. Remove all rubbish, surplus materials, discarded materials, false work, temporary structures, equipment, and debris; and

b. Deposit in embankments, or remove from the project, all unneeded, over-sized rock left from grading, surfacing, or paving.

Partial cleanup shall be done by the contractor when he feels it is necessary or when, in the opinion of the city or developer, partial cleanup should be done prior to either major cleanup or final inspection.

4. 1-04.12 Waste Site (New Section). The following new section shall be added to the Standard Specifications:

Where there is additional waste excavation in excess of that needed for the project and in excess of that needed for compliance with requests of the Developer or City, the Contractor shall secure and operate his own waste site at his own expense. The Contractor shall also be required to secure and operate his own waste site at his own expense for the disposal of all unsuitable material, asphalt, concrete, debris, waste material, and any other objectionable material which is directed to waste.

The Contractor shall comply with the State of Washington's regulations regarding disposal of waste material as outlined in WAC 173-304-461.

E. 1-05 Control of Work.

1. 1-05.1 Authority of the Engineer. This section is supplemented with the following:

Unless otherwise expressly provided in the Contract Drawings, Specifications and Addenda, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Consultant and the City's right to reject the means and methods proposed by the Contractor which (1) will constitute or create a hazard to the work, or to persons or property; or (2) will not produce finished work in accordance with the terms of the approved Contract. Documented Approval of the Contractor's means and methods of construction or his failure to exercise his right to reject such means or methods shall not relieve the Contractor of the obligation to accomplish the result intended by the Contract Documents; nor shall the exercise of such right to reject create a cause for action for damages.

2. 1-05.3(1) Project Record Drawings (New Section). The following new section shall be added to the Standard Specifications:

The Contractor shall maintain a neatly marked, full-size set of as-built drawings showing the final location and layout of all new construction. Drawings shall be kept current weekly, with all field instruction, change orders, and construction adjustment.

Drawings shall be subject to the inspection of the Developer and the City at all times. Prior to acceptance of the work, the Contractor shall deliver to the Developer one set of neatly marked as-built drawings showing the information required above. The Developer shall have prepared and delivered to the City of Zillah the neatly marked Record Drawings in accordance with Section 9 of 15.10.010 Part 1 – General.

3. 1-05.5 Construction Staking (New Section). The following new section shall be added to the Standard Specifications:

The Consultant retained by the Developer will establish the line and grade of proposed construction by offset stakes. The Consultant will establish the centerline for minor structures and establish bench marks at convenient locations for use by the Contractor.

The Contractor shall establish grades from the Consultant's stakes at suitable intervals in accordance with good practice and acceptable to the City. Where new construction adjoins existing construction, the Contractor shall make such adjustments in grade as are necessary.

4. 1-05.6(1) Testing (New Section). The following new section shall be added to the Standard Specifications:

The Contractor/Developer shall be responsible for scheduling and paying for all material and compaction testing required by these Construction Standards for new public works improvements. All testing services shall be performed by an independent, certified testing firm and/or laboratory meeting the approval of the Engineer or City. The Contractor shall submit information relating to the qualifications of the proposed testing firm to the Engineer or City for review and approval prior to the preconstruction conference. The testing service shall provide copies of all test results to the Engineer or City immediately after completion. The testing frequencies listed below may be modified to assure compliance with the Specifications.

Trench Backfill

Copies of moisture-density curves for each type of material encountered and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency and at depths sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for each 100 linear feet of mainline pipeline trench and one (1) test for each street crossing. At alternating 100-foot

locations along the main trench line, tests shall be taken at 1-foot, 2-foot, and 3-foot depths below finish grade.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required trench backfill densities.

All trenches shall be backfilled and compacted to at least 95 percent of maximum density as determined by ASTM D 698 (Standard Proctor).

Roadway Subgrade (Embankment and Excavation Sections)

Copies of the moisture density curves for each type of material encountered and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of subgrade.

The Engineer or City may request additional tests be performed at the Contractor's expense, if test results do not meet the required subgrade densities. Subgrade compaction shall be as specified for Roadway Embankment in Section 2-03.3(14) Method "C."

Ballast and Crushed Surfacing

Copies of the moisture density curves and gradation for each type of material incorporated into the project and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of surface area for each lift of ballast or crushed surfacing.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required subgrade densities.

Compaction of ballast and crushed surfacing shall be as specified in SECTION 4-04.3(5).

Asphalt Paving

Copies of the reference maximum density test for each class of Hot Mix Asphalt pavement and copies of all test results shall be provided to the Engineer or City as construction progresses.

Density tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of surface

area for each lift of asphalt concrete pavement.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required subgrade densities.

Compaction of Hot Mix Asphalt pavement shall be as specified in SECTION 5-04.3(10) B.

Cement Concrete Curb, Gutter, and Sidewalk

A copy of the cement concrete design mix or certification from the concrete supplier that the concrete provided has been prepared to the strength requirement as specified elsewhere in these specifications.

Concrete strength cylinders shall be taken and tested for each truck load of concrete delivered to the job. All testing procedures shall be conducted in accordance with applicable Sections of Division 6-02 of the Standard Specifications.

Copies of all test results shall be provided to the Engineer or City as construction progresses.

5. 1-05.10 Guarantees (APWA). The following new section shall be added to the APWA GSP:

If, within two years (2) after the date of Final Acceptance of the Work, defective and unauthorized materials or work is discovered, the Developer/Contractor shall promptly, upon written request, return and in accordance with the instructions either correct such work, or if such work has been rejected, remove it from the Project Site and replace it with non-defective and authorized work, all without cost to the City. If the Contractor does not promptly comply with the written request to correct defective and unauthorized work, or if an emergency exists, the City reserves the right to have defective and unauthorized work corrected or rejected, removed, and replaced pursuant to the provisions of Section 1-05.7 of the APWA Division I GSP's of the Standard Specifications.

The Developer/Contractor agrees the above two-year limitation shall not exclude nor diminish any rights under any law to obtain damages and recover costs resulting from defective and unauthorized work discovered after two years.

The Developer shall post a bond for the successful operation and condition of all public improvements for a period of two (2) years following final inspection and acceptance in accordance with the Zillah Municipal Code. (17.26.090)

6. 1-05.16 Water and Power (APWA). Water shall be furnished and applied in accordance with the provisions of Sections 1-05.16 of the APWA Division One GSPs and 2-07 of the Standard Specifications modified as follows:

Water Supply: Water for use on the projects may be obtained/purchased from the City of Zillah and

the Contractor shall arrange for and convey the water from the nearest convenient hydrant or other source at his own expense. The hydrants shall be used in accordance with the City of Zillah Water Department regulations.

The City reserves the right to deny the use of fire hydrants where deemed inappropriate by the City.

F. 1-07 Legal Relation and Responsibilities to the Public.

1. 1-07.1 Laws to Be Observed. Amend the second sentence of the first paragraph to read:

The Contractor/Developer shall indemnify and save harmless the City of Zillah (including any agents, officers, employees, and representatives) against any claims that may arise because the Contractor (or any employee of the Contractor or subcontractor or material man) violated a legal requirement.

2. 1-07.5(3) State Department of Ecology. This section is supplemented with the following:

Comply with the requirements and special general conditions of the “General Permit for Storm Water Discharge Associated with Construction Activities” issued by the Washington State Department of Ecology to the Developer/Contractor for this project.

3. 1-07.5(4) Air Quality. In addition to the requirements of Section 1-07.5(4), the contractor shall comply with the environmental provisions of local air pollution authorities, Yakima regional clean air authority.

A method of dust control during construction shall be submitted to, and approved by, the Yakima regional clean air authority. A written copy of their approval shall be submitted to the public works director prior to commencement of construction. The contractor/developer shall designate a project coordinator for contact during construction regarding alleged air quality violations and other complaints.

4. 1-07.13 Contractor’s Responsibility for Work. The following shall be added to this section of the Standard Specifications:

The Contractor is responsible for constructing and completing all work included in the Contract Documents and any other work directed by the Developer in a professional manner with first-class workmanship.

The Contractor shall keep the City of Zillah, the Developer, and the Consultant informed in writing of the address to which official correspondence is to be directed, the address and phone number of the person in charge of his field personnel, and the address and telephone number of the Contractor’s representative who will be responsible and available outside of normal working hours for emergency repairs and the maintenance of traffic control and safety devices.

5. 1-07.17 Utilities and Similar Facilities. Section 1-07.17 is supplemented by the following:

It shall be the Contractor's responsibility to investigate and verify the presence and location of all utilities prior to construction.

The Contractor/Developer shall call for field location, not less than two nor more than ten business days before the scheduled date for commencement of excavation which may affect underground utility facilities, unless otherwise agreed upon by the parties involved. A business day is defined as any day other than Saturday, Sunday, or a legal local, state, or federal holiday. The phone number for the Northwest Utility Notification Center for Zillah is 1-800-424-5555. If no one-number locator service is available, notice shall be provided individually by the Contractor to those owners known to or suspected of having underground facilities within the area of proposed excavation.

The Contractor/Developer is alerted to the existence of RCW Chapter 19.122, a law relating to underground utilities. Any cost to the Contractor/Developer incurred as a result of this law shall be at the Contractor's/Developer's expense.

No excavation shall begin until all known facilities, in the vicinity of the excavation area, have been located and marked.

6. 1-07.18 Public Liability and Property Damage Insurance. The contractor shall obtain and maintain in full force and effect during the duration of this contract public liability and property damage insurance in accordance with Section 1-07.18 of the APWA Division One GSPs and as modified herein.

Prior to start of construction, the contractor/developer shall furnish the city of Zillah a certificate of insurance and the additional insured endorsements as evidence of compliance with these requirements. This certificate shall name the city of Zillah, its employees, agents, elected and appointed officials, engineering consultant, and all subcontractors as "additional insured" and shall stipulate that the policies named thereon cannot be canceled unless at least 45 days' written notice has been given to the city of Zillah. The certificate shall not contain the following or similar wording regarding cancellation notification: "Failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents, or representatives."

7. 1-07.23 Public Convenience and Safety. The provisions of Section 1-07.23 of the Standard Specifications are supplemented as follows:

At entrances to business properties and other private roads, driveways, bridges, or other such means as to provide access shall be provided by the Contractor. The Contractor shall maintain vehicular and pedestrian access to businesses at all times that businesses are open for business.

Upon failure of the Contractor to provide immediately and maintain adequate suitable access, when ordered to do so, the City shall be at liberty, without further notice to the Contractor or the Surety, to

provide the same and request payment for providing proper access, and the City assumes no liability connected therewith.

Any traffic restriction must have prior approval of the City of Zillah. Appropriate traffic control measures and signing are required during such temporary road closures.

It shall be the responsibility of the Contractor to secure the approval of and notify the Developer, City of Zillah, and the Police and Fire Departments at least 72 hours prior to closing any street, in addition to correlating the proposed closures with the City of Zillah to ensure proper detouring of traffic. When the street is re-opened, it shall again be the responsibility of the Contractor to notify the above named departments and persons.

8. 1-07.23(3) Notifying Property Owners (New Section). The following new section shall be added to the Standard Specifications:

When construction activities will affect ingress and egress to a property along the project alignment, the Contractor shall be responsible for notifying the occupant/occupants of the property 24 hours prior to the construction activity beginning. If personal contact with the occupant is not possible, the Contractor shall leave written notification.

9. 1-07.29 Safety Standards (New Section). The following new section shall be added to the Standard Specifications:

All work shall be performed in accordance with all applicable local, state, and federal health and safety codes, standards, regulations, and/or accepted industry standards. It shall be the responsibility of the Contractor to ensure that his work force and the public are adequately protected against any hazards.

The City of Zillah or Developer shall have the authority at all times to issue a stop work order at no penalty if, in their opinion, working conditions present an undue hazard to the public, property, or the work force. Such authority shall not, however, relieve the Contractor of responsibility for the maintenance of safe working conditions or assess any responsibility to the City or Developer for the identification of any or all unsafe conditions.

G. 1-08 Prosecution and Progress – 1-08.3 Progress Schedule. The provisions of Section 1-08.3 of the Standard Specifications, Division One shall be supplemented with the following:

Prior to the commencement of any work, a preconstruction conference shall be held. The Contractor or Developer shall contact the City of Zillah and set a date and time for the meeting. It shall be the responsibility of the Contractor/Developer to notify and invite all parties having an interest in the project to the meeting.

At this conference all points of the approved Plans and Specifications will be open to discussion

including scope, order and coordination of work, equipment lead time required means and methods of construction, inspection and reporting procedures, etc. The Contractor should satisfy himself that all provisions and intentions of the work are fully understood.

The Contractor shall prepare and submit to the City and Developer at the Preconstruction Conference a Construction Progress and Completion Schedule using a bar graph format. Items in the Schedule shall be arranged in the order and sequence in which they will be performed. The schedule shall be drawn to a time scale, shown along the base of the diagram, using an appropriate measurement per day with weekends and holidays indicated. The Construction Progress Schedule shall be continuously updated and, if necessary, redrawn upon the first working day of each month or upon issuance of any Change Order which substantially affects the scheduling. Copies (2 prints or 1 reproducible) of newly updated Schedules shall be forwarded to the City and Engineer, as directed, immediately upon preparation.

H. 1-10 Temporary Traffic Control. This section is supplemented with the following:

The provisions of the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways and amendments thereto published by the U.S. Department of Transportation, Federal Highway Administration, and WSDOT by this reference are made a part of these Documents.

1. 1-10.2(2) Traffic Control Plans. Delete the entire section and replace with the following:

The Contractor shall prepare a signing plan showing the necessary Class A and B construction signing, barricades, and traffic control devices required for the project and submit it to the Consultant and City for review no later than the preconstruction conference date. When the Class B signing for a particular area will be provided as detailed on one or more of the figures included in the MUTCD without modification, the Contractor may reference the applicable MUTCD figure at the appropriate location on the Plan. When this procedure is used, variable distances such as minimum length of taper must be specified by the Contractor.

The signing plan prepared by the Contractor shall provide for adequate warning within the limits of the project and on all streets, alleys, and driveways entering the project so that approaching traffic may turn left or right onto existing undisturbed streets before reaching the project. The Plan shall be prepared to create a minimum of inconvenience for pedestrian and vehicle traffic.

All modifications to the accepted signing plans shall be reviewed by the City.

2. 1-10.3(3)(A) Construction Signs. The first sentence of the first paragraph is revised to read:

All signs, barricades, flashers, cones, traffic safety drums, barricades, and other traffic control devices required by the approved traffic control plan(s), as well as any other appropriate signs

prescribed by the City or County, shall be furnished and maintained by the Contractor.

Open trenches shall be provided with proper barricades and at night they shall be distinctly indicated by adequately spaced lights.

(Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

15.10.040 Water system improvements.

A. General Requirements for Water System Improvements. All extensions and additions to the city of Zillah's domestic water system shall conform to the design and construction standards of the city of Zillah and the Washington State Department of Health (WSDOH) as follows:

All new lots and developments shall be served by a public water supply line to be maintained by the city of Zillah and located adjacent to the lot or development site. The water supply line shall be capable of providing sufficient flow and pressure to satisfy the fire flow and domestic service requirements of the proposed lots and development requirements.

Water lines shall be extended by the developer to the point where the adjoining property owner's responsibility for further extension begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner. In some cases, it will require dedication of an easement and a line extension across the property or extension across two or more sides of the developing property. Extensions will be consistent with and implement the city's adopted water comprehensive plan.

All new public domestic water mains shall be a minimum diameter of eight-inch. Fire hydrant runs less than 50 feet from the water main to the fire hydrant shall be a minimum of six-inch.

New water mains shall be located in existing or proposed streets and shall be offset from the street centerline and not located within a vehicle wheel path.

Larger public water mains may be required depending upon fire flow requirements as determined by the city of Zillah's public works director, fire chief, and/or city engineer.

Water main over sizing, above that required for the particular development being submitted, may be required by the city of Zillah to be installed for future extension. The cost of the materials only for the over sizing shall be reimbursed to the developer by the city. The developer shall submit actual material invoices showing the actual cost of the materials furnished and the cost of the same materials of the size required for the development.

All domestic water mains shall be looped, where possible. Temporary dead-end mains over 500 feet in length will only be allowed where future water main looping via public right-of-way will be assured. No permanent dead-end water mains over 500 feet in length will be allowed to be part of the city of Zillah's domestic water system.

Maximum valve spacing in public water mains will be 750 linear feet. Valves will be furnished and installed on all legs of new water main intersections.

All water service lines, meter box and meter setters shall be installed by the developer/contractor.

All new water meters shall be a minimum of three-fourths inch and shall be furnished and installed by the city of Zillah and paid for by developer.

Only one water service meter shall be served from each main tap. All taps shall be made under the supervision of the public works director or his designee.

Fire hydrants shall be spaced at least every 300 feet in all zones. Additional hydrants may be required to protect structures as determined by the fire chief and public works director. Additional fire hydrants required on a site may require a looped, on-site fire hydrant main. Easements will be provided for all on-site, public, looped water mains, in accordance with ZMC 15.10.010(K).

Water and sewer mains shall be separated in accordance with Section C1-9.1 of the Criteria for Sewage Works Design, August 2008, by the Washington State Department of Ecology.

The design of water mains and appurtenances is subject to review and approval by the city of Zillah director of public works. The director of public works may, at his discretion, adjust these standards as necessary to facilitate installation of water lines and appurtenances for the health, safety, and protection of the general public.

B. Irrigation Systems. The proposed development shall be served by a separate irrigation water distribution system with an individual service for each lot. The irrigation system shall be designed by a professional and constructed in accordance with Sunnyside Valley Irrigation District, the Zillah Irrigation District, and city of Zillah construction standards. All irrigation pipelines under roadways shall meet the requirements of Section 9-30.1(5)(A) (AWWA C900 or C905). Pipe not under the roadway may meet the requirements of Section 9-05.12 (PVC solid wall ASTM D3034 SDR35) or 9-15.1(2) (ASTM D1784, 200 psi, SDR21). All irrigation pipes shall be installed with a minimum cover of 30 inches pipe zone bedding and backfill per Standard Detail 55-5, and with a three-inch-wide magnetic marking tape eight inches above the pipe.

C. Special Provisions for Water System Improvements. The following sections of the WSDOT Standard Specifications have been amended or supplemented as described below and apply to public works improvements within the city of Zillah:

1. 7-09 Water Mains.

    a. 7-09.2 Materials. Section 7-09.2 of the Standard Specifications shall be revised as follows:

Water Main pipe shall be either:

Ductile Iron, conforming to the requirements of Section 9-30.1(1) of the Standard Specifications, except that it shall be Standard Thickness Class 52. Joints shall be rubber gasket, push-on type (Tyton Joint). Fittings shall be mechanical joint or flanged, as shown on the Plans, and shall conform to Section 9-30.2(1) of the Standard Specifications.

OR

Polyvinyl Chloride (PVC) Pipe conforming to the requirements of Section 9-30.1(5) A (AWWA C900 or C905). Fittings shall be the same as specified for Ductile Iron pipe. PVC pipe must be installed with size 12 Blue plastic coated solid copper tracer wire on the top of the pipe.

Delete entire aggregates subsection and replace with the following:

Bedding Materials (Flexible Pipes) 9-03.9(3) Crushed Surfacing Top Course

Bedding Materials (Rigid Pipes) 9-03.12(3) Gravel Backfill for Pipe Zone Bedding

Imported Select Backfill 9-03.9(3) Crushed Surfacing Base Course

b. 7-09.3(5) Grade and Alignment. The first sentence of the third paragraph is replaced with the following:

The depth of trenching for water mains shall be such to provide a minimum cover of 4 feet and a maximum cover of 6 feet, unless otherwise approved by the Director of Public Works.

c. 7-09.3(9) Bedding the Pipe. Add the following:

Imported pipe zone bedding for rigid pipe shall be Crushed Surfacing Top Course or Gravel Backfill, placed and compacted in layers per the Standard Specifications. Use as directed by the Engineer.

Imported pipe zone bedding for flexible pipe shall be Crushed Surfacing Top Course, placed and compacted per the Standard Specifications. Bedding shall be placed under all flexible pipes.

d. 7-09.3(10) Backfilling Trenches. Add the following:

Street crossing trenches and other locations where directed shall have the trench backfilled full depth with Imported Select Backfill. The Director of Public Works may require the use of Controlled Density Fill (CDF) for trench backfill in certain circumstances. The requirements for CDF are set forth in ZMC 15.10.070(B)(8), Section 8-30 of these Special Provisions.

Mechanical compaction to 95% of maximum density is required for all trenches. The Developer/Contractor shall be responsible for scheduling and paying for all testing required.

2. 7-12 Valves for Water Mains – 7-12.2 Materials. Add the following:

All valves sizes 3-inch through 10-inch shall be gate valves and shall conform to the latest revision of AWWA Resilient Seated Gate Valves Standard C509 and AWWA C104.

All gate valves shall have non-rising stems, open counterclockwise, and shall be provided with a 2-inch square AWWA operating nut. Gate valves 4-inch and larger shall have mechanical joint connections.

All valves sizes 12 inches and larger shall be butterfly valves suitable for direct burial and shall be rubber seated and conform to the latest revision of AWWA Standard C504 Class 150B and C104.

Valve operators shall be worm gear type, sealed, gasketed, and lubricated for underground service. All valves shall open counterclockwise and shall be provided with a 2-inch square AWWA operating nut.

Valve Boxes shall be two piece adjustable. The top section shall be similar to Olympic Foundry Model 940-B, or equal, 18-inches high. The bottom section shall be an Olympic Foundry Model R-36, or equal, 36-inches high. Extension sections shall be Olympic Foundry Model 044, or equal, 12-inches high.

3. 7-14 Fire Hydrants.

a. 7-14.2 Materials. Replace the entire section with the following:

The City of Zillah accepts fire hydrants of the following manufacturers, providing the hydrants conform to the City's technical specifications for fire hydrants:

Mueller Centurion

M & H 929 Reliant

All hydrants shall have a Main Valve Opening (MVO) of 5-1/4" and one port with a 5" Storz Quick Coupling and two (2) 2-½" diameter ports. Threads on all ports shall be National Standard Thread.

b. 7-14.3(1) Setting Hydrants. Add the following:

The hydrant shall be set to the correct elevation on a concrete block base measuring 12" x 12" x 6" thick, which has been placed on undisturbed earth. Around the base of the hydrant, the Contractor shall place 0.35 cubic yards of "Gravel Backfill for Drywells" per Section 9-03.12(5) to allow free drainage of the hydrant.

The hydrants will be painted a color approved by the City.

c. 7-14.3(2) Hydrant Connections. Add the following:

Hydrant runs of less than 50 feet shall be connected to the main with 6-inch minimum diameter water main. Each hydrant lateral shall include an auxiliary gate valve and valve box.

d. 7-14.3(2)(A) Hydrant Restraint. Add the following:

The Contractor shall securely connect the hydrant to the water main as indicated on the Standard Detail.

e. 7-14.3(2)(C) Hydrant Guard Posts. The director of public works may determine that four six-inch diameter Schedule 40 steel guard posts be installed at a hydrant location. The posts will be painted the same color as the hydrants.

4. 7-15 Service Connections.

a. 7-15.1 General. This work consists of the relocation of existing water meters, meter setters, and water meter boxes, where necessary, and the installation of new saddles, corp stops, service pipe, water meter boxes and meter stops and setters as shown on the plans.

b. 7-15.2 Materials. Section 7-15.2 of the Standard Specifications shall be revised as follows:

Saddle: New service tapping saddles shall be ROMAC D. I. service saddle with double stainless steel straps or approved equal.

Corporation Stop: New corp stops shall be Ford type 1001 or approved equal.

Service Line: New service pipe shall be Cross linked Polyethylene (PEX) Tubing meeting ASTM F876/F877 specifications and ANSI/NSF Standard 14/61.

Meter Box: Mueller/McCullough Coil Type Setter, style 15, with 2" insulation pad and non-locking lid.

Pipe Bedding and Select Backfill: The imported pipe bedding and select backfill to be utilized for trench backfill as directed by the Engineer or Public Works Director shall be in accordance with SECTION 7-09 of these Special Provisions.

c. 7-15.3 Construction Details. Add the following:

The Contractor shall set the meter box to the finished grade of the area. The Contractor will be required to reset the meter box if it is not at finished grade at the completion of the project. The completed water service shall be tested at system operating pressure by the Contractor and must show no signs of leakage.

Future water services shall be marked with an 18" long section of #4 rebar buried vertically with the top of the rebar set 6" below the finish surface.

(Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

15.10.050 Sanitary sewer system improvements.

A. General Requirements for Sanitary Sewer Lines. All extensions to the city's sanitary sewer system shall conform to the design standards of the city of Zillah, the Washington State Department of Ecology, and be designed by a licensed professional engineer as follows:

All new lots and developments shall be served by a public sanitary sewer line adjacent to the lot or development site.

Sewer lines shall be extended by the developer to the point where the adjoining property owner's responsibility for further extension begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner. In some cases, it will require dedication of an easement and a line extension across the property or extension across two or more sides of the developing property. Extensions will be consistent with and implement the city's adopted sewer comprehensive plan.

Sewer lines shall be located in streets to serve abutting properties. When necessary, sewer lines may be located within public easements. Lines located in streets will be offset from the street centerline and not located within a vehicle wheel path. Sewer lines located in easements shall generally be located in the center of the easement, but may, with the approval of the director of public works, be offset to accommodate the installation of other utilities or to satisfy special circumstances.

The minimum size for public sewer lines is eight inches in diameter. The developer's sewer system must provide capacity for the proposed development, but must also provide capacity for future extensions.

Sewer lines shall be terminated with a manhole. In special circumstances, a flush-end (cleanout) may be installed on the end of a sewer main extension, provided the end is no further than 150 feet from the last manhole and the sewer main line and grade will permit further extension.

Manholes shall be installed at intervals of no greater than 350 feet and at all vertical and horizontal angle points in the sewer main.

Each building containing sanitary sewer facilities shall be served by a separate private side sewer line. Branched side sewers serving multiple buildings and properties shall not be permitted. Side sewers serving multi-unit buildings are permitted.

Side sewers shall be installed in accordance with the Uniform Plumbing Code (UPC) and subject to review and approval by the city of Zillah building inspector. Water and sewer lines shall not be laid in the same trench,

except as provided in Section 1008 of the UPC and with written approval of the city of Zillah building inspector.

Sewer lines shall be designed for gravity flow operation. Lift stations and force mains shall be limited to those locations and circumstances where they are consistent with the comprehensive sewer plan and are the only viable solution to serve the proposed development and other properties in the vicinity. Lift stations and force mains shall be designed by a professional civil engineer licensed in the state of Washington.

The design of sewer lines and appurtenances is subject to review and approval by the city of Zillah director of public works. The director of public works may, at his discretion, adjust these standards as necessary to facilitate installation of sewer lines and appurtenances for the health, safety, and protection of the general public.

B. Special Provisions for Sanitary Sewer System Improvements. All construction work shall be performed in accordance with the Standard Specifications and these sections that have been amended or supplemented as described below.

C. 7-05 Manholes, Inlets, Catch Basins, and Drywells.

1. 7-05.2 Materials. Add the following:

Sanitary Sewer Manholes shall be gasketed and constructed of 48-inch diameter reinforced precast concrete manhole sections in conformance with the requirements of Section 9-12.4. The base and first barrel section shall be precast monolithically with preformed channels.

Joints in the manhole sections shall be watertight and shall be a rubber ring compression joint complying with ASTM C443, a flexible, plastic gasket, or approved equal.

Manhole frames and covers shall be manufactured in the United States and be cast iron with a combined weight of not less than 400 pounds and have a clear opening of 24 inches. The frames and covers shall be the manufacturer’s stock pattern capable of withstanding, with appropriate margin of safety, an H20 loading. Covers shall have a 1-inch hole only, unless otherwise noted, and the top shall be flat with a non-skid pattern and marked “SEWER.” The contact surfaces of the frames and covers shall be machine finished to a common plane or have other adequate provision to prevent rocking.

2. 7-05.3 Construction Requirements. Add the following:

The design and construction of all manholes shall provide for a 0.10 foot vertical drop through the manhole.

Manhole coupling adaptors may be precast in the manhole to accept PVC pipe, provided diameters match. No field grouting of pipe into manholes will be allowed. Pipe connections at manholes must be gasketed and must be flexible. “A-Lok” gasket system or approved equal may be used as an alternate to the manhole coupling adapter.

a. 7-05.3(1) Adjusting Manholes and Catch Basins to Grade. Delete and replace with the following:

Manholes, valve boxes and similar utility appurtenances and structures shall not be adjusted until the pavement is completed, at which time the center of each structure shall be relocated from references previously established by the Contractor.

The asphalt pavement shall be cut and removed to a neat circle, the diameter of which shall be equal to the outside diameter of frame plus 2 feet. The frame shall be placed on cement concrete blocks or adjustment rings and wedged up to the desired grade. The base materials shall be removed and Class 3000 cement concrete shall be placed within the entire volume of the excavation up to, but not to exceed, 1½ inches below the finished pavement surface.

On the following day, the concrete, the edges of the asphalt pavement, and the outer edge of the casting shall be painted with hot liquid asphalt. Class 3/8" HMA shall then be placed and compacted with hand tampers and a patching roller.

The completed patch shall match the existing paved surface for texture, density, and uniformity of grade. The joint between the patch and the existing pavement shall then be painted with hot liquid asphalt or asphalt emulsion and shall be immediately covered with dry paving sand before the HMA solidifies.

b. 7-05.3(2) Abandon Existing Manholes. Replace the entire section with the following:

Where shown on the Plans, existing sanitary sewer manholes shall be abandoned in place after the new sanitary sewer collection system is in place and all side sewers have been transferred to the new sanitary sewer pipeline. The following new section shall be added to the Standard Specifications:

At least the top 3 feet of each manhole, or the top conical section in precast concrete manholes, shall be removed, including the cast iron ring and cover and concrete pad, if any. Debris resulting from breaking of the upper portion of the manhole may be mixed with backfill subject to the approval of the Engineer. Ring and cover will become property of the Contractor and all other surplus material shall be disposed of.

The existing pipe openings shall be plugged watertight with Class 3000 concrete and the manhole bottom slabs shall be broken to promote drainage. The remaining manhole structure shall be backfilled with granular material conforming to SECTION 9-03.9(3) CRUSHED SURFACING BASE COURSE. Place backfill in uniform layers and compact to 95% maximum dry density, as determined by ASTM D 1557 (Modified Proctor).

Excavations resulting from manhole abandonment shall be backfilled with suitable, job-excavated material to top of subgrade. Compact shall be to 95% maximum dry density as determined by ASTM D

698 (Standard Proctor). Restore surface to the condition existing prior to excavation with native material, gravel surfacing, or asphalt concrete pavement, as shown for trench repair on the Plans.

D. 7-08 General Pipe Installation Requirements – 7-08.1 General. Add the following:

The Contractor shall notify the Utility Notification Center (One Call Center) at least 48 hours prior to start of excavation so that underground utilities may be marked. Telephone number is 1-800-424-5555.

All construction work shall be inspected by the City of Zillah prior to backfilling. At least 48 hours notice shall be given to the City Public Works Department prior to backfilling.

1. 7-08.3(1)(C) Bedding the Pipe. Add the following:

The imported pipe zone bedding to be utilized for the trench backfill shall be Crushed Surfacing Top Course in conformance with Section 9-03.9(3), placed and compacted in layers as designated by the Public Works Director.

2. 7-08.3(2)(B) Pipe Laying – General. Add the following:

All sewer pipes shall be installed with 3-inch wide magnetic marking tape as detailed in Standard Detail SS-5 and Section 9-15.18.

3. 7-08.3(3) Backfilling. Add the following:

Street crossing trenches and other locations, where directed, shall be backfilled for the full depth of the trench with Imported Select Backfill conforming to Section 9-03.9(3) Crushed Surfacing Base Course. The Director of Public Works may require the use of Controlled Density Fill (CDF) for trench backfill in certain circumstances. The requirements for CDF are set forth in Part 7, Section 8-30 of these Special Provisions.

Mechanical compaction shall be required for all trenches. The density of the compacted materials shall be at least 95% of the maximum density as determined by ASTM D 698 Test (Standard Proctor). The Developer/Contractor shall be responsible for scheduling and paying for all testing required.

E. 7-17 Sanitary Sewers – 7-17.2 Materials. Sanitary sewer pipe approved for the city of Zillah shall be:

PVC Sewer Pipe (Gravity): Polyvinyl Chloride Pipe with flexible gasketed joints shall conform to the requirements of Section 9-05.12 of the Standard Specifications (ASTM D3034, SDR 35). Pipe joint type for restrained gasket.

PVC fittings for PVC sewer pipe such as tees, wyes, elbows, plugs, caps, etc., shall be flexible gasket joint fittings acceptable for use and connection to PVC sewer pipe.

F. 7-18 Side Sewers – 7-18.3 Construction Requirements – 7-18.3(1) General. Add the following:

> Side sewer connections shall be constructed in accordance with the City's Standard Detail with a minimum of 36 inches of cover. This provision may be waived by the Director of Public Works under special circumstances; however, under no circumstances shall the side sewer be laid with less than 18 inches of cover.
>
> Side sewers shall be a minimum of 4-inches in diameter. Larger sizes, if required, will be approved by the Director of Public Works on a case by case basis.

(Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

15.10.060 Stormwater improvements.

A. General Requirements for Stormwater Improvements. All extensions and additions to the city of Zillah's storm sewer (storm drain) system shall conform to the following design standards and requirements of the city:

All new storm drainage facilities, public or private, shall be designed by a professional civil engineer licensed in the state of Washington in accordance with the Department of Ecology Eastern Washington Stormwater Management Manual. Complete stormwater runoff and drainage facilities sizing calculations shall be submitted to the city of Zillah for review and comment. Storm sewer facilities and pipelines shall be designed to meet a minimum 25-year storm criterion, and both the long duration storm and short duration storm shall be considered in the design.

Storm runoff occurring on all new lots and developments (private property) shall be retained and disposed of on site. No storm runoff from private property will be allowed to enter public property or public storm drainage system.

Storm runoff for new public streets shall be designed and constructed as required to the point where the adjoining property owner's responsibility for further extension begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner.

All storm sewer designs for new public streets shall be based upon an engineering analysis which takes into account total drainage areas, runoff rates, pipe and inlet capacities, and any other factors pertinent to the design.

All stormwater facilities shall have oil and silt separation.

Inlet spacing shall be designed in accordance with the WSDOT Hydraulics Manual, Part 5. Generally, inlet spacing shall not exceed 300 feet. There shall be installed a manhole or Type II catch basin at the intersection of two collector storm sewers. A collector storm sewer is a system servicing more than one catch basin.

B. Special Provisions for Storm Sewers and Drainage. The following sections of the Standard Specifications

have been amended or supplemented as described below:

1. 7-02 Culverts – 7-02.4 Materials. Add the following:

Culvert pipe approved for use on this project shall be as follows:

Corrugated Aluminum Alloy Culvert Pipe meeting the requirements of SECTION 9-05.5 of the Standard Specifications.

OR

Aluminized Corrugated Steel Culvert Pipe meeting the requirements of SECTION 9-05.4 of the Standard Specifications.

2. 7-04 Storm Sewers.

a. 7-04.2 Materials. Add the following:

The storm sewer (drain) pipe approved for use on this project shall be as follows:

15-INCH THROUGH 36-INCH PIPE

Corrugated Aluminum Alloy Storm Sewer Pipe: All corrugated aluminum alloy storm sewer pipe shall comply with the requirements specified in SECTION 9-05.11 of the Standard Specifications and shall be 15 gauge with helical corrugations. A protective coating shall not be required. All corrugated metal pipe joints shall be flexible using rubber gasket joints. Gaskets shall be made of 3/8-inch thick by 12-inch minimum width closed cell synthetic sponge rubber, per ASTM D 1056, Grade SCE-43, fabricated in the form of a cylinder with a diameter of approximately 10 percent less than the nominal pipe size. The gasket shall be centered under the band and lapped an equal distance on the ends of the adjoining pipe sections. Coupling bands shall be used and shall conform to the provisions of SECTION 9-05.11 (1) of the Standard Specifications. Coupling bands shall be made by the same manufacturer as the pipe and shall be made of the same base material as the pipe which it connects.

PE Pipe: Corrugated High Density Polyethylene (CPEP) pipe, couplings, and fittings shall comply with the requirements of SECTION 9-05.20 of the Standard Specifications.

12-INCH AND SMALLER PIPE

PVC Pipe: Polyvinyl chloride (PVC) pipe shall conform with requirements specified in SECTION 9-05.12 of the Standard Specifications (ASTM D 3034, SDR 35). The pipe joint type shall be restrained gasket.

OR

PE Pipe: Corrugated High Density Polyethylene (CPEP) pipe, couplings, and fittings shall comply with all the requirements of Section 9-05.20. Joints shall be water-tight.

Pipe shall be as manufactured by Hancor, Advanced Drainage Systems, Inc., or approved equal.

The perforated underdrain pipe for infiltration trenches approved for use shall be as follows:

PE Pipe: Perforated Corrugated High Density Polyethylene (CPEP) underdrain pipe, couplings, and fittings shall comply with all the requirements of SECTION 9-05.2(8) of the Standard Specifications.

DRAIN ROCK: Drain rock for use as backfill for the perforated underdrain pipe in infiltration trenches shall be clean coarse aggregate conforming to the requirements for “Gravel Backfill for Drywells” as specified in SECTION 9-03.12(5) of the Standard Specifications.

b. 7-04.3(1) Cleaning and Testing – 7-04.3(1)(A) General. No infiltration or exfiltration test will be required for the storm drain pipe.

3. 7-05 Manholes, Inlets, Catch Basins, and Drywells – 7-05.2 Materials. Section 7-05.2 of the Standard Specifications shall be revised as follows:

Gravel Backfill for Drywells: Gravel backfill for drywells shall be as specified in Section 9-03.12(5) of the Standard Specifications.

Manhole Metal Castings: All cast iron frames and covers shall be manufactured in the United States and as specified in SECTION 9-05.15 (1) of the Standard Specifications. All cast iron frames and covers to be used on this project shall be of the type, weight, and size approved by the City of Zillah, and shall be furnished by the Contractor. Covers for sanitary sewer shall be stamped “SEWER.” Covers for storm drain shall be stamped “STORM.”

Precast Concrete Catch Basin: Catch basins shall be WSDOT Type I, IL or 2 and constructed as shown on the City Standard Details.

Catch Basin Metal Castings: All frames and grates shall be capable of withstanding, with a reasonable margin of safety, a concentrated load of 20,000 pounds and shall be as specified in SECTION 9-05.15(2) of the Standard Specifications and Standard Plans B-30.10, B-30.30, B-30.40, and B-30.50. The contact surfaces of the frame and grate shall be machine finished to a common plane and shall be so cast as to prevent rocking.

(Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

15.10.070 Street improvements.

A. General Requirements for Street Improvements. All new street design and construction must conform to the

design standards of the city of Zillah and ZMC 17.22.070(A), (B) and (C) and the latest edition of the Standard Specifications.

1. Traffic Studies. In order to provide sufficient information to assess a development's impact on the transportation system and level of service, the director of public works may require a traffic study to be completed by the developer at the developer's expense. This decision will be based upon the size of the proposed development, existing roadway condition, existing and expected, traffic volumes, accident history, expressed community concern, and other factors relating to transportation. Traffic studies shall be conducted under the direction of a traffic engineer or civil engineer licensed in the state of Washington and possessing special training and experience in traffic engineering. The level of detail and scope of the traffic study may vary with the size, complexity, and location of the proposed development. A traffic study shall, at a minimum, be a thorough review of the immediate and long-range effects of the proposed development on the city's transportation system. Guidelines for the traffic study shall be reviewed by the director of public works on a project basis. However, the ADT for the development shall be estimated using the trip generators found in the latest edition of the Trip Generation Manual published by ITE.

2. Street Design Requirements. Major collector arterial streets serve as the high volume corridors that connect the major traffic generators and shall be designed with a 70-foot-wide right-of-way and 46-foot-wide roadway surface face of curb to face of curb. Face of curb radius shall be a minimum of 50 feet and the street centerline radius shall be designed to a minimum 40 mph design speed or as approved by the director of public works.

Minor collector arterial streets shall be designed with a 60-foot-wide right-of-way and a 40-foot-wide roadway surface curb to curb. Face of curb radius shall be a minimum of 40 feet and the street centerline radius shall be designed to a minimum 35 mph design speed or as approved by the director of public works.

Local access (residential) streets shall be designed with a minimum 50-foot-wide right-of-way and 32-foot-wide roadway surface curb to curb when on-street parking is prohibited, and a 37-foot-wide roadway surface curb to curb when on-street parking is permitted. Face of curb radius shall be a minimum of 25 feet and street centerline radius shall be designed to a minimum of 30 mph design speed or as approved by the director of public works.

The maximum length of a cul-de-sac street shall be 500 feet measured along the street centerline from the nearest street intersection to the throat of the cul-de-sac. Where it is not feasible to construct a cul-de-sac turnaround, the city may allow the use of an "L" or "Tee" turnaround upon approval.

Street jogs with centerline offsets of less than 125 feet shall be avoided. Collector arterials centerline angle point deflections of more than 10 degrees shall require the design of a curve. A tangent at least 200 feet long shall be introduced between reverse curves on collector arterials.

Street grades shall be kept to a maximum of six percent for major collectors, eight percent for minor collectors and 12 percent for local access streets. The minimum grade for all streets shall be three-tenths percent.

Cement concrete traffic curb and gutter and sidewalks along both sides shall be installed along all new streets unless otherwise approved by the city of Zillah. Mountable curb is allowable for local access streets in subdivisions, except for the curb return and 20 feet beyond at an intersection radius where the curb shall be full height.

Driveways shall be located on the lowest classification of roadway abutting the development. Driveways accessing onto collectors are discouraged and shall be limited. Driveway widths and locations are limited to one per lot as approved by the director of public works. “Corner” lots shall have the driveway located as far from the street intersection as possible.

A street light shall be installed at each street intersection, at mid block, no more than 175 feet apart, and at ends of cul-de-sacs. Street lights shall meet the design and placement requirements of these standards and the city public works director and the local electric utility.[3]

Installation of a monument case cover and monument caps at the centerline of street intersects angle point and points of curves and at other locations as directed by the director of public works is required in new developments.

Traffic control signs, posts and post sleeves shall be provided and installed by the developer in accordance with the MUTCD and city standards.

B. Special Provisions for Street Improvements. The following sections of the Standard Specifications have been amended or supplemented as described below:

1. 2-03 Roadway Excavation and Embankment.

a. 2-03.3(14)(C) Compacting Earth Embankments.

All embankment construction shall be compacted by Method “C” as specified in the above section.

b. 2-03.3(14)(D) Compacting and Moisture Control Tests.

The contractor shall notify the City and Consultant when the subgrade is ready for in-place density tests and the materials testing firm will be on the site. Placement of aggregate courses shall not proceed until density requirements are met. The Developer/Contractor shall be responsible for scheduling and paying for all testing.

2. 2-07 Watering – 2-07.1 Description.

The Contractor shall be solely responsible for dust control on the Developer's project and shall protect the adjacent property, homes and businesses, orchards, crops and school yards from dust by whatever means necessary. The Contractor shall be responsible for any claims for damage or dust impacts and shall protect the City and the Developer from all such claims.

When directed by the City, the Contractor shall provide and apply water within two hours of such an order, including on weekends and holidays.

3. 5-04 Hot Mix Asphalt.

a. 5-04.2 Materials. This section is supplemented with the following:

The Class of Hot Mix Asphalt used for asphalt pavement shall be HMA Class 1/2" with grade PG 64-28 asphalt binder.

b. 5-04.3(3) HMA Pavers. This section is supplemented with the following:

The asphalt paver that is utilized on the Developer built streets shall be capable of spreading and finishing courses of HMA plant mix in a width from center line of the roadway to the edge of the gutter in one single pass.

c. 5-04.3(7)(A) Mix Design.

i. General. This section is supplemented with the following:

The Contractor may submit for acceptance an approved WSDOT mix design for the class of HMA specified in the contract if the mix design has been approved within the previous twelve month period using aggregate and asphalt binder from the same sources. The Contractor shall provide the mix design to the City at least fifteen (15) working days prior to any paving.

ii. Delete Paragraph 1 in Part 2, Statistical or Nonstatistical Evaluation. The contractor shall be responsible for the verification of the mix design.

d. 5-04.3(8)(A) Acceptance Sampling and Testing – HMA Mixture.

i. Subsection 1 is deleted and replaced with the following:

1. General. Acceptance of HMA shall be as provided under Nonstatistical or Commercial evaluation.

Commercial evaluation will be used for Commercial HMA and for other classes of HMA in the following applications: sidewalks, road approaches, ditches, slopes, paths, trails, gores and other

nonstructural applications as approved by the Engineer. Sampling and testing of HMA accepted by commercial evaluation will be at the option of the Engineer. The proposal quantity of HMA that is accepted by commercial evaluation will be excluded from the quantities used in the determination of Nonstatistical evaluation.

Commercial HMA can be used for patching utility or conduit trenches less than 24 inches in width.

ii. Test Results. Paragraph 1 is deleted and replaced with the following:

HMA not meeting the quality and density requirements of the Specifications shall be rejected.

e. 5-04.3(9) Spreading and Finishing. Section 5-04.3(9) of the Standard Specifications is revised with the following:

Unless otherwise approved by the Engineer, the nominal compacted depth of any layer of HMA Cl. 1/2-inch and Cl. 3/4-inch shall not exceed 0.25 feet.

f. 5-04.3(10) Compaction – 5-04.3(10)(B) Control. Section 5-04.3(10)(B) of the Standard Specifications is deleted and replaced with the following:

HMA used in traffic lanes, including lanes for ramps, truck climbing, weaving, and speed change, and having specified compacted course thickness greater than 0.10 foot, shall be compacted to a specified level relative density. The specified level of relative density shall be a minimum of 91.0 percent of the reference maximum density as determined by WSDOT for AASHTO T 209. The reference maximum density shall be determined as the moving average of the most recent five determinations for the lot of HMA being placed. The specified level of density attained will be determined by five nuclear gauge tests taken in accordance with WAQTC FOP TM8 and WSDOT SOPT 729 on the day the mix is placed (after completion of the finish rolling) at locations determined by the stratified random sampling procedure conforming to WSDOT Test Method 715 within each density lot. The quantity represented by each density lot will be no greater than a single day's production or approximately 400 tons, whichever is less. The Engineer will furnish the Contractor with a copy of the results of all acceptable testing performed in the field within one working day.

In addition to the randomly selected locations for tests of density, the Engineer may also isolate from a normal lot any area that is suspected of being defective in relative density. Such isolated material will not include an original sample location. A minimum of 5 randomly located density tests will be taken.

Control lots not meeting the minimum density standard shall be removed and replaced with satisfactory material.

HMA constructed under conditions other than those listed above shall be compacted on the basis of a

test point evaluation of the compaction train. The test point evaluation shall be performed in accordance with instructions from the Project Engineer. The number of passes with an approved compaction train, required to attain the maximum test point density, shall be used on all subsequent paving.

g. 5-04.3(11) Reject HMA. This section is supplemented with the following:

Delete all references to Combined Pay Factor (CPF). HMA not meeting the quality and density requirements of the Specifications shall be rejected.

h. 5-04.3(13) Surface Smoothness. This section is supplemented with the following:

Where directed by the Engineer, the Contractor shall feather the HMA pavement in a manner to produce a smooth-riding connection to the existing pavement.

HMA Cl. 3/8-inch shall be utilized in the construction of the feathered connections to existing pavement.

All utility appurtenances such as manhole covers, catch basins, and valve boxes shall be adjusted to finished grade in accordance with the procedure in Section 7-05.3(1) in 15.10.050.

i. 5-04.3(19) Sealing of Pavement Surfaces. This section is supplemented with the following. Revise the first sentence to read:

The Contractor shall apply a fog seal to all travel lanes and allow it to cure prior to opening the lane to traffic, when the wearing course is placed after October 1 and before April 1.

4. 8-04 Curbs, Gutters, and Spillways – 8-04.3(1) Cement Concrete Curbs, Gutters, and Spillways. This section is supplemented with the following:

Cement concrete traffic curb and gutter shall be as shown on the City's Standard Plans. Full Height or "Barrier" cement concrete traffic curb and gutter as shown shall be used on the roadway as shown on the Plans. Depressed or "Driveway" cement concrete traffic curb and gutter as shown shall be used at all driveway entrances and sidewalk ramp locations as shown on the Plans and as directed in the field by the Engineer. Mountable or "Rolled" curb shall be used on the roadway as shown on the Plans. Cement concrete curb and gutter which does not comply with the City's details shall be removed and replaced at the Contractor's expense.

A template shall be required to be placed at the back of curb for construction of driveway transitions from Barrier to Driveway or Rolled curb and gutter. The template shall extend from the bottom of curb to the top of the curb, and shall have a minimum length of 8 feet, with the 6-foot long transition centered in the template. The Contractor shall also be required to use a template at the back of

Driveway/Depressed curb and gutter to ensure a straight and uniform back of curb in conformance with the Standard Plan.

The new concrete curb and gutter shall be cured in accordance with SECTION 5-05.3(13) B of the Standard Specifications. Application of the curing compound shall be in accordance with the manufacturer's recommendations.

First-class workmanship and finish will be required on all portions of concrete curb and gutter work. Quality of workmanship and finish will be evaluated continuously and will be based solely upon the judgment of the Engineer. The Contractor shall be required to construct a minimum 20 linear foot section of curb and gutter which demonstrates quality which is acceptable by the Owner and Engineer. This "model" section will be referenced during construction for comparison to newly poured curb. If at any time it is found that quality is unacceptable, work shall be immediately stopped, and no additional curb and gutter shall be placed. Cement concrete curb and gutter which does not comply with the section details on the Plans, or in the Engineer's opinion does not demonstrate first-class workmanship and finish, shall be removed and replaced at the Contractor's expense. Should the Contractor's equipment or methods be unable to produce curb and gutter meeting the requirements of the Details and Specifications, no further curb and gutter construction will be allowed until corrections have been made to said equipment or methods.

5. 8-06 Cement Concrete Driveway Entrances – 8-06.3 Construction Requirements. This section is supplemented with the following:

The concrete driveway entrance/sidewalk shall be six (6) inches in thickness.

6. 8-14 Cement Concrete Sidewalks – 8-14.3(3) Placing and Finishing Concrete. This section is supplemented with the following:

All sidewalks not located in driveway entrance areas shall be four (4) inches in thickness. All sidewalks and concrete driveway entrances located behind a depressed curb and gutter section or Rolled Curb section shall be six (6) inches in thickness.

Sidewalks shall be marked across the entire width every five (5) feet and with preformed asphalt impregnated joint fillers 3/8-inch thick every twenty (20) feet. Concrete sidewalk shall be cured in accordance with SECTION 5-05.3(13) A of the Standard Specifications. Application of the curing compound shall be in accordance with the manufacturer's recommendations. Failure to properly secure or seal the cement concrete sidewalk will require the Contractor to remove and replace the sidewalk section at his expense.

Sidewalk ramps shall be constructed at all intersections as shown on the Detail Sheet and at a width shown on the plans.

First-class workmanship and finish will be required on all portions of cement concrete sidewalk work. Quality of workmanship and finish will be evaluated continuously and will be based solely upon the judgment of the Engineer. If at any time it is found that quality is unacceptable, work shall be immediately stopped, and no additional sidewalk shall be placed. Cement concrete sidewalk which does not comply with the section details on the Plans, or in the Engineer's opinion does not demonstrate first-class workmanship and finish, shall be removed and replaced at the Contractor's expense. Should the Contractor's equipment or methods be unable to produce sidewalk meeting the requirements of the Details and Specifications, no further sidewalk construction will be allowed until corrections have been made to said equipment.

7. 8-21 Permanent Signing.

a. 8-21.2 Materials. This section is supplemented with the following:

Sign posts for permanent signing within an approved development shall be Unistrut Telespar 2"x2" 12-gage steel tubing. Socket sleeves for the Sign Post shall be Unistrut Telespar 2-1/4"x 2-1/4"x30" 12-gage steel tubing.

Reflective background sheeting material shall be Type III for regulatory signs and Type 1 for all other signs.

b. 8-21.3 Construction Requirements. This section is supplemented with the following:

Socket sleeves for sign posts shall be set in 12" diameter x 12" deep base of class 3000 concrete at finish grade so that erected signs will be plumb. The Contractor shall correct any misaligned socket sleeves at his own expense.

8. 8-30 Controlled Density Fill (New Section). The following new section shall be added to the Standard Specifications:

1) 8-30.1 General

Controlled Density Fill (CDF) may be required for street crossings by the Public Works Director. It shall be a mixture of Portland Cement, fly ash, aggregate, water, and admixtures proportioned to provide a non-segregating, self-consolidating, free-flowing material which will result in a hardened, dense, non-settling fill.

2) 8-30.2 Materials

Materials shall meet the requirements of the following Sections of the Standard Specifications:

Portland Cement	9-01 Type

	II
Fly Ash	Class F or C
Aggregates	9-03.1
Water	9-25
Admixtures	9-23.6

3) 8-30.3 Construction Requirements

1. 8-30.3(1) Construction Materials

The CDF shall be a mixture of Portland cement, fly ash, aggregate, water, and admixtures which has been batched and mixed in accordance with Section 6-02.3 of the Standard Specifications.

The following table provides a guideline for proportioning the Controlled Density Fill for this project. The final mix provided by the Contractor shall result in a material which is excavatable by machine with a maximum unconfined compressive strength of 300 psi.

Water	50 gals per cubic yard
Cement	50 lbs per cubic yard
Fly Ash	250 lbs per cubic yard
Aggregate	3,200 lbs per cubic yard

The above table provides a guideline for the CDF mixture. The weights shown are only an estimate of the amount to be used per cubic yard of CDF. Actual amounts may vary from those shown as approved by the Engineer or approved mix data from similar projects which provided proper strength, workability, consistency, and density.

8-30.3(7) Placing Controlled Density Fill

The floatable CDF shall be placed in the trench area where directed by the Engineer or Inspector for smaller jobs and brought up uniformly to the elevation directed. In the cases where existing concrete slabs have been undermined by excavation, the Contractor shall ensure that the CDF is flowed completely under the slab.

Mixing and placing may be started if weather conditions are favorable, when the temperature is at least 34 F and rising. At the time of placement, CDF must have a temperature of at least 40 F. Mixing and placing shall stop when the temperature is 38 F and falling. Each filling stage shall be as continuous an operation as practicable. CDF shall not be placed on frozen ground.

The trench section to be filled with CDF shall be contained at either end of trench section by bulkhead or earth fill.

(Ord. 1289 § 1 (Exh. A), 2011; Ord. 1213 § 2, 2009; Ord. 1202 § 2 (Exh. A), 2009)

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[1] ZMC 17.06.010(D) and Chapter 17.08 ZMC.

[2] ZMC 15.20.050.

[3] ZMC 17.22.030.

Chapter 15.15
FIRE HYDRANTS

Sections:

15.15.010 Statement of purpose.

15.15.020 Painting and identification of hydrants.

15.15.010 Statement of purpose.

To provide standards and requirements for the painting, maintenance, and identification of fire hydrants located within the city limits of Zillah. (Ord. 1408 § 1, 2016)

15.15.020 Painting and identification of hydrants.

The barrel and bonnet of all fire hydrants shall be painted colors similar to Chrome Yellow, Smokin Hot, or a color designated and approved by the Zillah city council.

The cap of all fire hydrants shall be painted in compliance with American Water Works Association (AWWA), National Fire Protection Association (NFPA) 291, and based on their rated fire flow capacity as follows:

A. Light blue: rated capacity of 1,500 gpm (5,680 L/min) or greater;

B. Green: rated capacity of 1,000 to 1,499 gpm (3,785 to 5,675 L/min);

C. Orange: rated capacity of 500 to 999 gpm (1,900 to 3,780 L/min);

D. Red: rated capacity of less than 500 gpm (1,900 L/min). (Ord. 1408 § 2, 2016)

ORDINANCE NO. 1428

AN ORDINANCE REPEALING ORDINANCE NO 1247 AND ESTABLISHING DISCOUNTS FOR RESIDENTIAL UTILITY SERVICES ON WATER, SEWER AND GARBAGE PROVIDED TO QUALIFYING LOW INCOME SENIOR CITIZENS AND QUALIFIED DISABLED CITIZENS.

BE IT ORDAINED BY THE CITY COUNCIL FOR THE CITY OF ZILLAH, WASHINGTON, AS FOLLOWS:

Section 1. **Purpose:** The purpose of this ordinance is to replace Ordinance No. 1247 establishing discounts for residential utility services for water, sewer and garbage to low income senior citizens and qualified disabled citizens. The City recently established utility tax rates through Ordinance No. 1421 as follows:

Tax on Water Charges. There is hereby assessed a tax of 26.3% against the total gross revenue of the water fund derived from water charges, not including charges for water supplied from the Sunnyside Valley Irrigation District.

Tax on Sewer Charges. There is hereby assessed a tax of 32% against the total gross revenue of the sewer fund derived from sewer charges.

Tax on Garbage Collection Fees. There is hereby assessed a tax of 32% against the total gross revenue of the current expense fund derived from garbage collection fees.

Section 2. **Program for discounts established:** City Council has previously determined that it is in the best interest of the City to establish discounts for residential utility services, water, sewer and garbage charged to low income senior citizens and qualified disabled citizens in order to provide necessary support for the disadvantaged. Such reductions are intended to offset rate increases and relate to the applicable utility tax rate. City Administrator/Clerk-Treasurer is authorized and directed to administer the program and may establish administrative processes and procedures to implement the intent and purpose of the ordinance codified in this chapter.

Section 3. **Low income senior citizen qualifications:** A low-income senior citizen may establish eligibility for the discount program by submitting the following information to the City Administrator/Clerk-Treasurer:

A. Is 65 years of age or older; and
B. Has a maximum annual household income at or below one hundred twenty-five percent (125%) of federal poverty guidelines; and
C. Is a single occupant or the head of a household or the spouse of the head of the household; and
D. Resides in the dwelling unit served by the solid waste, sewer, and water utility; and
E. Is billed or is the spouse of a person billed by the water, sewer and garbage utility.

Applicants shall provide such verification and shall provide such other data as is deemed appropriate upon forms provided by City and in the manner determined by the City.

Section 4. **Disabled citizen qualifications:** A disabled citizen may establish eligibility for the discount program by submitting the following information to the City Administrator/Clerk-Treasurer:

A. Is disabled; and

B. Has a maximum annual household income at or below one hundred twenty-five percent (125%) of federal poverty guidelines; and
C. Is a single occupant or the head of a household or the spouse of the head of the household, and
D. Resides in the dwelling unit served by the solid waste, sewer and water utility, and
E. Is billed or is the spouse of a person billed by the garbage, sewer and water utility.

Applicants shall provide such verification and shall provide such other data as is deemed appropriate upon forms provided by City and in the manner determined by the City.

Section 5. **Application:** Discount applies to the utility tax rate applicable to residential water, sewer and garbage utility services. Persons qualified by the city as eligible recipients of a low-income senior citizen discount or disabled citizen discount provided for in this chapter, shall be charged a discounted utility tax rate for charges assessed for residential water, sewer and garbage utility services. Such discount shall be applicable for the first month following submission of a complete application and city approval of the application.

Section 6. **Discount Rate:** City Administrator/Clerk-Treasurer is authorized to reduce the most current/applicable utility tax rate on charges for residential water, sewer and garbage utility services to qualified low-income senior citizens or qualified disabled citizens by 25 basis points. For example, if the sewer utility tax rate is assessed at 32%, it will be reduced from thirty-two percent (32%) to seven percent (7%). (32% minus 25% equals 7%).

Section 7. **Procedure:** All persons claiming the discount provided for in this section shall first be required to file an application at City Hall in Zillah to initiate the reduction. The application shall be on forms prescribed by the City Administrator/Clerk-Treasurer and shall provide information by which the City Administrator/Clerk-Treasurer may verify the applicant's eligibility to participate. Applicants shall be required to submit such additional information as may be required by the City Administrator/Clerk-Treasurer to verify eligibility. In order to remain eligible for the program, an applicant must verify to the city that they are still eligible and reapply for the discount every twelve months by filing a new application. If the city determines that the applicant is ineligible for the reduction, the applicant will be notified by the city. If applicant moves from the residence to which the service is provided or otherwise becomes ineligible for the reduced rate, the applicant shall be required to notify Zillah city hall immediately and the applicable discount rate shall be terminated.

Section 8. **False/Incorrect Information:** If false, incorrect or misleading information is submitted to the city in connection with any application for a reduced utility tax rate, the applicant will automatically become ineligible to receive any future discounts and any discounts or reductions already given shall be fully repaid to the city, together with a penalty in the amount of one hundred percent (100%) of the repayment amount. This remedy shall be in addition to any other remedies the city may have for the provision of false, incorrect or misleading information.

Section 9. **Repeal of Ordinance No. 1247:** Ordinance No. 1247 is hereby repealed.

Section 10. **Severability:** If any provision of this ordinance or its application to any person is held to be invalid the remainder of this ordinance or the application thereof to any other person shall not be affected.

Section 11. **Effect:** This ordinance shall be in full force and effect January 1, 2017 and shall be in full force and effect from and after its passage, approval, and publication as provided by law.

PASSED BY THE CITY COUNCIL FOR THE CITY OF ZILLAH, WASHINGTON, this 17th day of January 2017.

_____
Gary Clark, Mayor

ATTEST:

_____
Sharon Bounds, City Administrator

APPROVED AS TO FORM:

_____
Jamie Carmody, City Attorney

9.
EXTENSION BY DEVELOPERS POLICY

HLA
Engineering and Land Surveying, Inc.

EXTENSION BY DEVELOPERS

If a developer, or other person desires to extend the water system, they must do so at their own expense, provided they comply with the standards and other requirements of the City.

1. At the time that the preliminary proposal is submitted to the City, a letter requesting the availability of water should be submitted to the City for approval. A map showing the area to be served, the number of units, and the type of units should accompany this request.

2. If the area to be served is inside the service area but outside the City Limits, and Outside Utility Service Agreement must be executed.

3. Prior to the installation of water mains, an application to extend the water system must be submitted by the Developer for approval by the City. At this time, the Developer should authorize his consulting engineer to proceed with design and furnish the City three copies of the preliminary drawings. After review and approval by all applicable agencies, the Developer's consulting engineer must provide four copies of the final water system extension design to the City.

4. After the plans are complete, the developer may call for bids for the work described herein. It is required that the Developer secure a Performance Bond guaranteeing the completion of this work and payment of bills and guarantee the materials and workmanship for one year. It is required that licensed and bonded contractors be employed by the Developer.

5. After the award of the Contract and before proceeding with any work on the job, the City must be notified at least five working days in advance of start of work. Any work that is performed without proper notification of the City will be summarily rejected.

6. During the progress of the work, the City should be kept informed and inspection requested prior to covering pipe and other major phases of construction.

7. After completion of construction, the standard pressure test must be performed.

8. After the pressure test, lines must be tested and approved for purity. The procedure used for disinfection shall conform to the most current edition of the Standard Specifications for Road, Bridge, and Municipal Construction or other standards acceptable to the Washington State Department of Health. In cases of new construction, drinking water shall not be furnished to the consumer until satisfactory bacteriological samples have been analyzed by a laboratory certified by the State.

9. All fees must be paid prior to ordering meters. This includes cut-in fees, engineering fees, and connection charges that might be applicable to this development.

10. At this point, the Developer and the Contractor should ask for an inspection and acceptance of the mains. This inspection must be performed by the City, Contractor, and the Developer.

11. The developer must furnish the City with a cost breakdown showing the total cost of construction for this development.

12. The Developer must furnish the City permanent easements that might be necessary or applicable to this installation.

13. The Developer must furnish to the City a Maintenance Bond guaranteeing materials and workmanship for a period of one year. This Bond can be a part of the Performance Bond.

14. At this time of development, the Developer may order meters. Any areas where excessive pressure exists (in excess of 90 pounds per square inch), the Developer is responsible for the installation of pressure reducing valves.

15. After acceptance of the water mains by the City, the Developer must sign a Bill of Sale deeding these mains to the City. The Conditions and Standards, which correspond to the Specifications, on all Developer's jobs are on file with the

City. It is the responsibility of the Developer and his Contractor to familiarize themselves with the Specifications prior to starting work. On all construction work, the Developer is responsible to the City for performance of all required work and the Developer will be responsible for directing his Contractor. Nothing contained herein or advice given by the project inspector shall relieve the Developer from his responsibility for conformance with the approved plans and specifications or the City's Construction Standards.

10.
WATER RIGHTS

HLA
Engineering and Land Surveying, Inc.

CERTIFICATE RECORD NO. 7 PAGE NO. 3350-A

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY That THE TOWN OF ZILLAH, WASHINGTON, ..., has made proof ~~of~~ to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a well located within the NE¼NW¼NE¼ Sec. 36, Twp. 11 N., R. 20 E.W. M., for the purpose of municipal supply under and subject to provisions contained in Ground Water Permit No. 4[illegible]5 issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume 7 at page 3350-A; that the right hereby confirmed dates from July 9, 1958; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 550 gallons per minute; 296 acre-feet per year for municipal supply.

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

Town of Zillah, Yakima County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 21st day of May, 1959.

State Supervisor of Water Resources.

ENGINEERING DATA

Jim Daley, Town Clerk [redacted]

Progress Sheet—Ground Water Application

NAME Town of Zillah, Wash. Assigned to 4775

G. W. APPLI. NO. 4912 PERMIT NO 4775 CERT. NO. 3350 A

AMENDED CANCELLED

Application received 7-9-58 Initial $10.00 fee received 7-9-58

Statement of additional examination fee $ Sent Received

Application returned for completion or correction Received

Issued

TEMPORARY PERMIT: Approved by

PUBLICATION: Notice sent 8-4-58

O.K.'d by JL Date 9-1-58

Protests

Filed

Affidavit received and checked 9-5-58 Time expired 9-15-58

Amended notice sent: Affidavit received

Time expires

DEPT. OF GAME REPORT

EXAMINATION Made 10-22-58 by JL

O.K.'d for permit 3-24-59 by [redacted]

Statement of permit fee sent Amount $ 20.00 Received 4-8-59

PERMIT NO 4775 ISSUED 4-17-59

BEGINNING OF CONSTRUCTION: Notice sent started Filed

Extension fee $ Extended to

Extended to

WELL DRILLER'S REPORT: Sent Filed 6-15-59

COMPLETION OF CONSTRUCTION: Notice sent 4-27-59 Filed 4-28-59

$2.00 extension fee Extended to

To

PROOF OF APPROPRIATION: Sent 4-30-59 Filed 5-8-59

$2.00 extension fee Extended to

Statement of certificate fee sent 4-30-59 $ 3.00 Received 5-8-59

CERTIFICATE OF GROUND WATER RIGHT NO. 3350 A ISSUED 5-21-59

STATE PRINTING PLANT OLYMPIA, WASHINGTON

STATE OF WASHINGTON

Department of Conservation

EARL COE, DIRECTOR

335 GENERAL ADMINISTRATION BUILDING

OLYMPIA

ALBERT D. ROSELLINI
GOVERNOR

May 21, 1959

DIVISIONS:
RECLAMATION
FLOOD CONTROL
WATER RESOURCES
MINES AND GEOLOGY
COLUMBIA BASIN PROJECT
POWER RESOURCES
WEATHER MODIFICATION

Auditor of Yakima County
Yakima, Washington

Dear Sir:

Enclosed is Certificate of Water Right No 3350-A and a check or money order in the amount of $1.25 to cover the cost of recording in your office.

When this has been done, please forward the certificate to:

Jim Daley, Town Clerk
Zillah, Washington

Very truly yours,

DEPARTMENT OF CONSERVATION

EARL COE, DIRECTOR

M. G. Walker

M. G. WALKER, Supervisor
Division of Water Resources

MGW: mb
Enc.

Proof of Appropriation of Water

Application No. 4912 Permit No. 4775

1. Name of Permittee TOWN OF ZILLAH
2. Postoffice address ZILLAH, WASHINGTON
3. Source of appropriation Well
4. Name or number of works (if any) No. 4
5. For what purpose or purposes is water used? Municipal
6. Give date of beginning of construction February, 1958
7. Give date of completion of construction work, including water distribution system August, 1958
8. Give date when water was completely applied to proposed use August 10, 1958
9. If used for irrigation:

   Give number of acres described in permit

   Give number of acres actually irrigated
10. If used for power: HP actually developed
11. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

    TOWN OF ZILLAH

12. During what months is water used? 12 months
13. Does map filed with your application show correctly the location of well or point of diversion for withdrawal of water, and area of land where water is used? Yes
14. If the dimensions, location or type of structure do not correspond to those described in your permit, state what changes have been made, giving dimensions, etc.
15. Actual measured discharge or diversion of permanent system: 550 (gpm or cfs)

552 gpm
2.96 cfs

(Sign certification on reverse side)

STATE PRINTING PLANT OLYMPIA, WASHINGTON

STATE OF WASHINGTON,
County of Yakima } ss.

I, James P. Daley, 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 7th day of May, 1959.

James P. Daley

Subscribed and sworn to before me this 7th day of May, 1959

David W Ross
Notary Public.
In and for the State of Washington
residing at Zillah

RECEIVED
STATE OF CONSERVATION
APR 28 1959
A. M. P. M.

Notice of Completion of Construction

I, TOWN OF ZILLAH, the holder of Ground Water Permit No. 4775 issued by the State Supervisor of Water Resources of the State of Washington for the appropriation of ground waters withdrawn from a well (Well, tunnel or infiltration trench), in accordance with the tenor of such permits and the limitations endorsed therein by the State Supervisor of Water Resources, have completed the construction of the works described therein, on the day of August, 19 58

If construction has been abandoned: Date ..... Reason .....

Remarks: .....

IN WITNESS WHEREOF, I have hereunto set my hand this 27 day of April, 19 59

Town Clerk (Signature of applicant)

City Hall Zillah, Washington (Present address)

S. F. No. 378—4-51—3M. 27804.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

Permit to Appropriate Public Ground Waters of the State of Washington

Book No. 10 of Ground Water Permits, on page 4775 under Application No. 4912

TOWN OF ZILLAH, WASHINGTON

~~X~~

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

Priority date of this permit is July 9, 1958

Source of the proposed ground water appropriation is a well

within ..... area, ... sub-area

..... zone. Name or number of works is .....

Quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 813 gallons per minute; 296 acre-feet per year, to be used for the following purposes: municipal supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is 1950 feet west and 250 feet south of northeast corner of sec.36

being within NE¼NW¼NE¼, sec.36, T.11 N., R.20 E.W.M.

county of Yakima

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

For municipal supply: 813 gallons per minute; 296 acre-feet per year,

to supply the Town of Zillah.

For irrigation: ..... gallons per minute: ..... acre-feet per year

for the irrigation of ..... acres.

For miscellaneous uses: ..... gallons per minute: ..... acre-feet per year,

for .....

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Town of Zillah, Yakima County, Washington.

WILLARD GRAY
MAYOR

JAMES P. DALEY
TOWN CLERK

GEOFFREY HILTON
TOWN TREASURER

The Town of Zillah

Zillah, Washington

Where Soft Fruit Reigns in the Heart of the Roza

June 20, 1958

JUN 2 ? 1958

Dept. of Conservation
335 General Administration Building
Olympia, Washington

Dear Mr. Russell:

I am enclosing a voucher for the examination fee for ground water right permit for Zillah municipal well no. 4. Would you please sign the enclosed voucher and return to me so that I can submit a warrant for $10.00 with our permit application.

The failure on our part to obtain the necessary permit was due to the fact that we have a well about 30 feet away that was abandoned due to difficulties in rehabilitation of the well. The new well was drilled to the same depth and our engineer assumed that we did not have to obtain a new permit. However we will be able to take 813 g.p.m. from the well although a 500 g.p.m. pump was installed for the present. All arrangements have been made to install a larger pump if the occasion demands in the near future.

Very truly yours,

Jim Daley
Town Clerk

June 24, 1958

The Town of Zillah
Zillah,
Washington

Attention: Jim Daley, Town Clerk

Gentlemen:

Returned herewith is the town's voucher signed as requested. The warrant should accompany the completed application when submitted.

The other well to which you refer was drilled under Permit No. 435 and is apparently the one which proved non-productive and in response to your letter of June 18, 1949 that permit was cancelled. For that reason the new well will require a permit.

Yours very truly,

DEPARTMENT OF CONSERVATION
EARL COE, DIRECTOR

ROBERT H. RUSSELL, Asst. Supervisor
Division of Water Resources

RHR:fls
Enc.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled (Dug or drilled) and have a diameter of 12 inches, and depth of 280 feet.

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources for the purpose of preventing waste of public waters:

The total yearly withdrawal authorized under this filing shall be limited to 290 acre-feet per year, less any amount available from other sources under existing rights.

Construction work shall begin on or before Started and shall thereafter be prosecuted with reasonable diligence and completed on or before May 1, 1960

and complete application of water to proposed use shall be made on or before May 1, 1961

Given under my hand and the seal of this office at Olympia, Washington, this 17th day of April, 1959.

M B Walker

State Supervisor of Water Resources

RETURN TO:
DIVISION OF WATER RESOURCES
335 GENERAL ADMINISTRATION
OLYMPIA, WASHINGTON

S. F. No. 7256—4-57—5M. 48912.

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS FOR WITHDRAWAL OF GROUND WATER

JUN 13 1958

AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

Under Permit No. G. W. _____

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

1. Town of Zillah, Washington
(Name and address of owner of well or other works for withdrawal of water)
2. Type; name or number of works where water is taken Municipal Well #4
(Well, tunnel or infiltration trench)
3. Date on which work on well or other structure was started January 31, 1958 (spud-in)
4. Date on which work was completed February 19, 1958 - final depth
5. If work on well or other structure was abandoned, give date —
and reason for abandonment —
6. DESCRIPTION OF WORKS:

(a) WELL: Depth 280 ft. Diameter 12" in. or ft. Dug or drilled drilled

Flowing or pump well pump . Water Temp. _____

IF PUMP WELL: Type and size of pump is vertical turbine 500 GPM

Type and size of motor or engine is 50 Hp. electric motor

Depth from ground surface to water level before pumping 109 feet

After continuous operation for 24 (At least four) hours, the measured discharge of the pump is 813 g.p.m., and the drawdown of water level is 119 (Pumping level minus static water level) feet

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
Fully recovered in one hour			

Date of test March 21 - 24, 1958

IF FLOWING WELL: Measured discharge _____ g.p.m. on _____ (Date)

Shut-in pressure at ground surface _____ lbs. per sq. in. on _____ (Date)

Water is controlled by _____ (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

12" in. diameter Standard black steel pipe from 0 to 242 ft.

_____ in. diameter _____ from _____ to _____ ft.

_____ in. diameter _____ from _____ to _____ ft.

_____ in. diameter _____ from _____ to _____ ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

Perforated casing or screens:

40' Johnson Everdur screen, 12" diam. from 238' 2" to 279' 9" ft.
(Number per foot and size of perforations, or describe screen)

10' of #20 slot; 30' of #30 slot from ____ to ____ ft.

from ____ to ____ ft.

from ____ to ____ ft.

from ____ to ____ ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

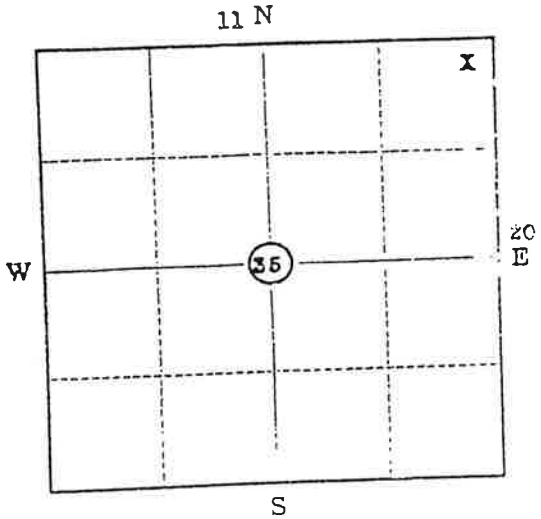
MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Topsoil	2	2
Brown hardpan	3	5
Gray clay	36	41
Brown sandy clay	92	133
Gray clay	12	145
Brown clay	23	168
Hard brown sand and gravel	37	205
Hard sandy silt, gravel & a little clay	25	230
Cemented gravel	5	235
Sand and gravel	10	245
Sand, gravel, silt and pea gravel	18	265
Sand, silt and gravel	17	280

(b) INFILTRATION TRENCH OR TUNNEL: Type ____

Dimensions: ____ (Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ____ ft. Discharge ____ g.p.m. Date of test ____

Position of water bearing stratum with reference to portal of tunnel ____



Sec. 35 Twp. 11 N. Rge. 20 E

Show approximate location of well or other works with (X) on section plat at left.

MIDLAND DRILLING CO.

By. Eugene J. Jungmann
Signature of well driller or other contractor

Eugene J. Jungmann, Vice President

P. O. Box 637

Walla Walla, Washington
Address

Report of Examination on Ground Water

Received date 7-9-58 Date of exam. 10-22-58 11-17-58 Appl. No. 4912

Name Town of Zillah Address City Hall, Zillah, Washington

Type of works well #4 Dimensions 12"x280'

Progress of works Drilled but not fully developed

Quantity applied for 813 g.p.m. acre-feet per year

Legal sub. NE¼ NW¼ Sec. 36 Twp. 11 N. Rge. 20 E. County Yakima

Use municipal supply

Irrigation-acreage: Present Planned Feasible

Municipal: Population 1200 as of 1960

Industrial

Time pump will be operated continuously

Other water rights appurtenant to this land see below

Proximity to existing works, springs, wells, or streams Town of Zillah N. 1000 ft. and NW 100 ft.

Area Sub-area Zone

RECOMMENDATIONS

Approved for 813 g.p.m. 296 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

The total quantity of water recommended above is based on a withdrawal of 200 gallons per person per day being adequate for the domestic requirements for the Town of Zillah. Actually this amount may be somewhat excessive since lawn irrigation water is supplied from a separate source under the Zillah Irrigation District. However, permit should issue as recommended based on an anticipated population of 1200 people requiring 269 acre-feet per year, plus an allowance of 10% for population increase in the near future.

At the present time the applicant holds numerous ground water rights. These rights are for municipal supply purposes and are as follows:

Declaration Certificate #605 for the withdrawal of 50 g.p.m. and 80 acre-feet per year.
Declaration Certificate #606 for the withdrawal of 276 g.p.m. and 150 acre-feet per year.
Declaration Certificate #607 for the withdrawal of 150 g.p.m. and 10 acre-feet per year.
Certificate 1277-A for the withdrawal of 250 g.p.m. and 146 acre-feet per year.

Of the wells covered by the above rights, three have been abandoned and one is presently in use. The well covered by Declaration Certificate #606 is located near the city storage reservoir and presently yields about 250 g.p.m.

In view of these prior rights, it is recommended that this application be approved as a partial supplemental supply to the source presently utilized. Permit should therefore include the provision: "The total yearly withdrawal authorized under this filing shall be limited to 296 acre-feet per year, less any amount available from other sources under existing rights."

The installation of an access port to well as described in attached Ground Water Bulletin No. 1 is recommended.

Signed this 27th day of February, 1959.

Glen H. Fiedler

GLEN H. FIEDLER, Deputy Supervisor
Division of Water Resources

State of Washington
Department of Ecology

APPLICATION FOR PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

RECEIVED [redacted] 1988
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO	W.R.I.A	COUNTY	PRIORITY DATE	TIME	ACCEPTED
G1-29863	37	Yakima	12-16-88		8/1/3

APPLICANT'S NAME — PLEASE PRINT: City of Zillah — BUSINESS TEL 829-5151 — HOME TEL

ADDRESS (STREET): P.O. Box 475 — (CITY): Zillah, Washington — (STATE) — (ZIP CODE): 98953

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE)	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.): A well
TRIBUTARY	SIZE AND DEPTH: 12" 280'

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)

Continous municipal and industrial use and irrigation during irrigation seas

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF: CUBIC FEET PER SECOND (CFS) **OR** GALLONS PER MINUTE ~~[illegible]~~ GPM 1600 ACRE FEET PER YEAR

TIMES DURING YEAR WATER WILL BE REQUIRED

IF IRRIGATION NUMBER OF ACRES	IF DOMESTIC USE NUMBER OF UNITS BY TYPE, E.G. 1-HOME 1-MOBILE HOME, 2-CAMPSITES, ETC	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY
150	~1000	4,000
DATE PROJECT WAS OR WILL BE STARTED: Started	DATE PROJECT WAS OR WILL BE COMPLETED: 2000	

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)	SECTION	TOWN	RANGE	ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION

3B. IF NOT IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL

400 feet east and 200 feet south of the north quarter corner of Section 36

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N	RANGE (E OR W.) W.M.	COUNTY
NW¼ NE¼	36	11	20 E.	Yakima

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED IF NOT, INSERT NAME & ADDRESS OF OWNER

Yes

5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY (ON WHICH THE WATER WILL BE USED) TAKEN FROM A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY, OR, COPY CAREFULLY IN THE SPACE BELOW

City of Zillah Sub-area service Plan, being Sections 25 and 36 of T. 11 N., R. 20 E.W.M. and the W½ of Section 30 and 31 lying west of Hwy 410, T. 11 N., R. 21 E.W.M.

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH T[illegible]TER IS TO BE USED (PROPERTY OWNER LESSEE CONTR[illegible]URCHASER ETC.)

Owner

ARE THERE ANY EXISTING WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES.) ☒ YES ☐ NO

IF YES, FROM [illegible] [illegible]URFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

G4-29702 606-D 3350-A WRC No. 007086

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.)

50 hp turbine

REMARKS

7. Since the well requested in this application is an Ellensburg Formation well, it could not be included with the two Saddle Mountain Basalt Formation Wells under GWP No G4-29702P. This request supplements that authorized under G4-29702P.

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

C. W. Walker
APPLICANT'S SIGNATURE

CITY OF ZILLAH
LEGAL LANDOWNERS NAME (PLEASE PRINT)

CITY OF ZILLAH
C. W. Walker
LEGAL LANDOWNER'S SIGNATURE

P.O. Box 475 Zillah, WA. 98953
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY } ss.

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows: .....

.....

.....

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before ..... *19*.....

Witness my hand this.....*day of*..... *19*.....

.....
Department of Ecology

OLYMPIA, WASHINGTON

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS FOR WITHDRAWAL OF GROUND WATER

JUN 13 1958

Under Permit No. G. W.

AM PM
7,8,9,10,11,12,1,2,3,4,5,6

(The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263 Laws of 1945.)

1. Town of Zillah, Washington
(Name and address of owner of well or other works for withdrawal of water)

2. Type; name or number of works where water is taken Municipal Well #4
(Well tunnel or infiltration branch)

3. Date on which work on well or other structure was started January 21, 1958 (spud-in)

4. Date on which work was completed February 19, 1958 - final depth

5. If work on well or other structure was abandoned, give date —

and reason for abandonment —

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 480 ft. Diameter 12" in. or ft. Dug or drilled drilled

Flowing or pump well pump Water Temp.

IF PUMP WELL: Type and size of pump is vertical turbine 500 GPM

Type and size of motor or engine is 50 Hp, electric motor

Depth from ground surface to water level before pumping 109 feet

After continuous operation for 24 (At least four) hours, the measured discharge of the pump is 513 g.p.m., and the drawdown of water level is 110 feet (Pumping level minus static water level)

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
Fully recovered in one [illegible]			

Date of test March 21 - 24, 1958

IF FLOWING WELL: Measured discharge g.p.m. on (Date)

Shut-in pressure at ground surface lbs. per sq. in. on (Date)

Water is controlled by (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

12" in. diameter Standard black steel pipe from 0 to 342 ft.

in. diameter from to ft.

in. diameter from to ft.

in. diameter from to ft.

Describe

Perforated casing or screens:

40' Johnson Everdur screen, 12" diam.
(Number per foot and size of perforations, or description of screens)
10' of #20 slot; 30' of #60 slot — from 238' 2" to 278' 9" ft.

from ____ to ____ ft.

from ____ to ____ ft.

from ____ to ____ ft.

from ____ to ____ ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

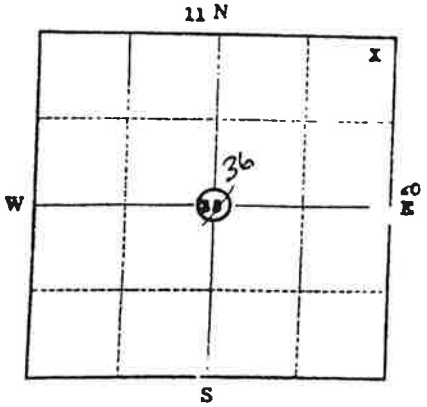
MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Topsoil	2	2
Brown hardpan	3	5
Gray clay	36	41
Brown sandy clay	92	133
Gray clay	12	145
Brown clay	23	168
Hard brown sand and gravel	37	205
Hard sandy silt, gravel & a little clay	25	230
Cemented gravel	5	235
Sand and gravel	10	245
Sand, gravel, silt and pea gravel	18	263
Sand, silt and gravel	17	280

(b) INFILTRATION TRENCH OR TUNNEL: Type ____

Dimensions: (Tunnel—length, course and cross-sectional area) (Trench—minimum and maximum depths)

Bottom width ____ ft. Discharge ____ g.p.m. Date of test ____

Position of water bearing stratum with reference to portal of tunnel ____



Sec. 36 Twp 11 N Rge. 30 E

Show approximate location of well or other works with (X) on section plat at left.

MIDLAND DRILLING CO.

By: Eugene G. Jungmann

(Signature of well driller or authorized representative)

Eugene G. Jungmann, Vice President

P. O. Box 637

Walla Walla, Washington

Address

CERTIFICATE RECORD NO. 6 PAGE NO. [illegible]

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY That TOWN OF ZILLAH

of Zillah, Washington has filed

in the office of the State Supervisor of Hydraulics of Washington Declaration of Claim No. 555

to withdraw ground waters of the State from a Pump Well

located within the E½ of SW¼ of SE¼ of Sec. 25, Twp. 11 N., Rge. 20 E.W.M.

for the purpose of Municipal and industrial supply.

The right to the use of said ground waters has been ~~restained and approved by~~ the Supervisor of Hydraulics in accordance with Chapter 263, Laws of Washington for 1945, and is hereby confirmed of record in Volume 2 of Ground Water Certificates at page 606-D; the right approved has a priority of the year 1908; the amount of water which the Declarant is entitled to withdraw for the aforesaid purpose is limited to the amount actually beneficially used and shall not exceed 276 gallons per minute; 150 acre-feet per year; and is appurtenant to the following described lands or place of use:

Town of Zillah, Yakima County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 12th day of July, 19[illegible]

State Supervisor of Hydraulics.

Declaration of Claim No. 555

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 2 of Ground Water Right Certificates, on page 606-D on the 12th day of July, 19 43

STATE OF WASHINGTON, }
County of Yakima } ss.

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

.....

STATE PRINTING PLANT, OLYMPIA, WASH.

GROUND WATER

DECLARATION OF CLAIM

PROGRESS SHEET

NAME: Mrs. James P. Daley, Town Clerk,
Town of Sillah,
Washington

DECLARATION NO. 555 CERTIFICATE NO. (616) D

Declaration received 1-8-48 Voucher signed and returned 1-8-48 recording fee received 1-8-48

Returned for completion or correction _____ Received _____

Amended _____

Cancelled _____

Report: Game _____ Fisheries _____

O.K'd for publication Jan 9 '48 by G J B

Notice of Declaration sent 1-13-48

Protests filed _____

Affidavit of Publication received and checked 2-25-48

Time for making protests expires March 5, 1948

Examination made 6/21/48 by FBR

O.K'd for Certificate _____ by _____

Statement of filing and recording fee sent 6/28/48 Amount $1.50

Fee received 7-6-48

Ground Water Certificate issued 7-12-48 No. (616) D

REPORT OF FIELD EXAMINATION OF WELL Decl. 555

NAME: Town of Lillah, James Caley, Town Clerk

TYPE OF WORKS: Deep well Date of examination June 21, 1948

Dimensions: 950' x 18" Progress of Works completed

QUANTITY Claimed ~~for~~ ~~beneficial use~~: 276 c.f.s. 150 acre feet per year

LOCATION: E½ of S½ of S½ of Sec. 22-11-4 E. within corporate limits, but not platted

U.S.: Municipal and industrial

Irrigation- acreage: Present Planned Possible

Municipal: Population 937 as of 1948

Industrial:

Time Pump Will be Operated:

Other Water Rights of Applicant: Decls. 556 & 557

Proximity to existing works, springs or streams:

2 Town of Lillah Wells North 650' & North 630'

Water Bearing Zone:

RECOMMENDATIONS

Approved for 276 c.f.s. 150 acre-feet per year, subject to existing water rights. (1 acre-foot = 325,850 gallons)

This well is used at 276 c.f.s. to furnish 150 acre-feet a year according to Mr. Carlson, Water Superintendent.

Signed this 25th day of June, 1948.

FRED E. SCOTT
Ground Water Geologist

JOHN DILLON, Mayor

JAMES P. DALEY, Town Clerk

GEOFFREY HILTON, Town Treasurer

RECEIVED
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

The Town of Zillah

Zillah, Washington

January 21, 1948

Dept. of Conservation & Development
Transportation Building
Olympia, Washington

Dear Mr. Bartholet:

Listed on the section plat is the correct location of the well in question. The correct description as near as we can figure it is E2 SW SE Sec. 25 Twp. 11N N. R. 20E. This location was figured by Hess Morris, Secretary of the Roza Irrigation District, who seems to be the only person in this community who knows anything about this well. We have absolutely no information in our files on this well and Mr. Morris is our only source of information. This well is in Twp. 11N and not 21N as you have on the heading.

Yours truly,

James P. Daley

James P. Daley
City Clerk

STATE OF WASHINGTON

OFFICE OF SUPERVISOR OF HYDRAULICS

Olympia

NOTICE OF DECLARATIONS OF CLAIM OF RIGHT TO WITHDRAW GROUND WATER

NOS. 554, 555 and 556.

To Whom It May Concern: Notice is hereby given that Town of Zillah, Washington, on January 8, 1948, filed with the State Supervisor of Hydraulics, Olympia, Washington, three (3) declarations of claim of vested rights existing prior to June 7, 1945 to withdraw public ground waters in Yakima County, as follows: Declaration No. 554 to withdraw 50 gallons per minute, 80 acre-feet per year, by means of a pump well located within Lot 5, Block 4 of Jaeger's First Addition to Zillah (Sec. 36, Twp. 11 N., Rge. 20 E.W.M.), used continuously each year for domestic supply and industrial uses; with priority (date of first beneficial use of water) as of the year 1910, and Declaration No. 555 to withdraw 270 gallons per minute, 150 acre-feet per year, by means of a pump well located within the Town of Zillah in ~~S. of SW¼~~ NE¼NW¼ of Sec. 25, Twp. 11 N., Rge. ~~21~~ 20 E.W.M., used continuously each year for domestic and industrial supply; with priority of 1909, and Declaration No. 556 to withdraw 150 gallons per minute, 10 acre-feet per year, by means of a pump well located within Lot 5, Block 4 of Jaeger's First Addition to Zillah (Sec. 36, Twp. 11 N., Rge. 20 E.W.M.), used for domestic standby well or for fire use; with priority of 1908, and Claimant has requested Certificates of Ground Water Rights under such claims. Any person, firm or corporation disputing such claims or protesting that the rights claimed are not vested rights to be recognized under Chap. 263 of the 1945 Session Laws of the State of Washington, may file with the State Supervisor of Hydraulics, at Olympia, Washington, such objections or representations, in writing, as he may desire to make within thirty (30) days after date of last publication, which date is_____.

Witness my hand and official seal this 13th day of January, 1948.

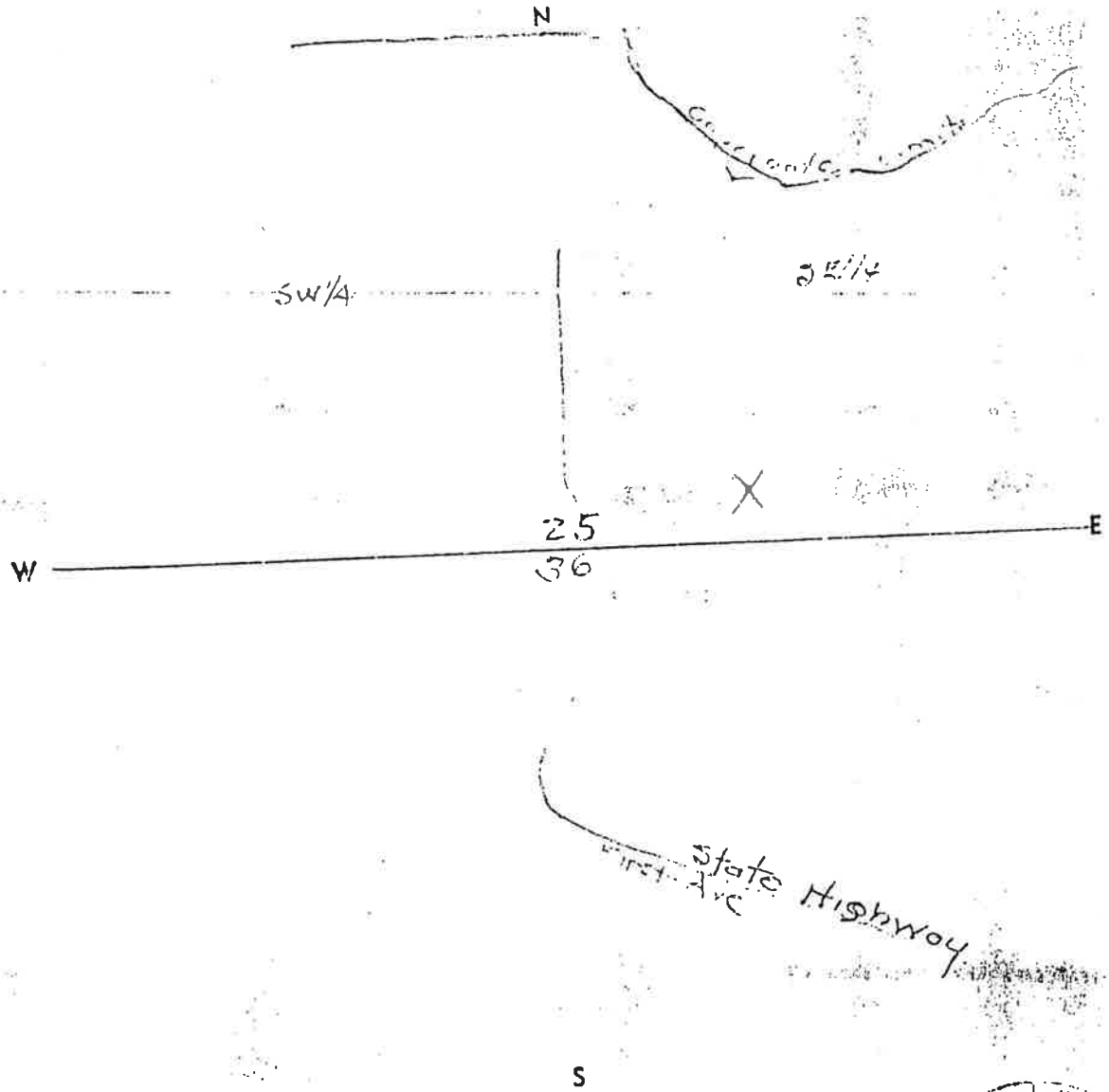
RODNEY KYER, Supervisor of Hydraulics

By: CHAS. J. BARTHOLET, Deputy

S. F. No. 1134-B—7-47—6M. 13830.

SECTION PLAT

Sec. [illegible] Twp. [illegible] N. R. [illegible]



Show by a cross (X) the location of the well or other works covered by the application or declaration. Show by circle (O) the locations of other wells or works within a quarter of a mile. Also traveling directions from nearest town on main highway.

Scale: 1 inch = 800 feet.

PERFORATED CASINGS OR SCREENS:

(Number per foot and size of perforations, or describe screen)

from 10

from to

from to

from to

LOG OF WELL: *(Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)*

MATERIAL	Thickness (Feet)	Depth to Bottom (Feet)
No information available		

(b) INFILTRATION TRENCH: *Covered or open*

Dimensions: Length *ft. Minimum depth* *ft. Maximum depth* *ft.*

Bottom width *ft. Discharge* *g.p.m. Date of test*

(c) TUNNEL: *Type of lining*

Dimensions: (Length, course, and cross sectional size)

Position of water bearing stratum with reference to portal of tunnel

Log of tunnel: (Preceding table for log of well may be used, if desired. Give footage from portal and character of materials, as pertinent.)

7. Ownership of each existing well or other works for withdrawal of ground water within a radius of one-quarter mile and the distance and direction from well or other works being reported herein:

(Name of owner)	650 (Distance)	North (Direction)
Town of Zillah		
Town of Zillah	550	North

(On accompanying plat or map show location of the existing wells or works.)

8. *Remarks:* No exact data on this well.

James P. Daley Town Clerk
(Signature of claimant)

STATE OF WASHINGTON,
COUNTY OF Yakima } ss.

I, the claimant named in the foregoing claim, being first duly sworn, depose and say that I have read the above and foregoing claim to ground water right; that I know the contents thereof; and that to the best of my knowledge, information and belief, the facts therein stated are true and correct.

James P. Daley

Subscribed and sworn to before me this 22 *day of* December, 19 47

Notary Public in and for the State of Washington,
Residing at Zillah, Washington

DIRECTIONS FOR PREPARING DECLARATIONS OF CLAIM

A $5.00 examination fee should accompany each declaration.

1. ~~$2.00 filing and recording fee should accompany each declaration.~~

2. Write plainly in ink or use typewriter.

3. Read carefully all questions. Answer only those that apply to your project.

4. In answering Question 2, concerning location, give distance and direction of location of well or other construction works for withdrawal of water from nearest 40 acre corner or other legal subdivision, as

(a) "320 feet north and 1100 feet east from the southwest corner of SE¼ of SW¼ of Sec. 1, Twp. 13 N., Rge. 2 E. W. M.," or
"North 36° 29' east 400 feet from the northeast corner of NW¼ of SW¼ of Sec. 33, Twp. 12 N., Rge. 3 W. W. M." or

(b) If within limits of incorporated town or city, or recorded plat:
"Lot 4, Block 6 of Churchill's Addition to City of Spokane."

5. Maps, showing location of well or other works and place of use, must be made in triplicate (3) on the enclosed section plats. If for irrigation, show the approximate area irrigated. Show also location of other existing wells or other works for withdrawing ground water within a radius of one-quarter mile.

6 Sign declaration and affidavit on back of form

S. F. No. 7349 - 12-45-3M 10784

accompany each declaration.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

Declaration of Ground Water Claim

(Separate claims should be filed for each well, tunnel or infiltration trench)

Declaration No. 555 *Your well No.* ..... (If you have more than one)

I, Town of Zillah by James F. Daley, Town Clerk (Name of claimant)

of Zillah, Washington (Complete postoffice address)

do hereby make declaration of claim of vested right to ground water by use prior to June 7, 1945, and file the same with the State Supervisor of Hydraulics, in accordance with Section 9, Chapter 263, Laws of 1945 of the State of Washington, and request a Certificate of Ground Water Right thereunder.

1. SOURCE *from which water is withdrawn is* Pumping well (Flowing well, pump well, infiltration trench, or tunnel)

2. LOCATION *is:* Approximately 1,300 feet north of Zillah City Hall (Approximate distance and direction from nearest city or town)

and is more particularly described as follows:

(a) ..... (Give distance and bearing to corner of section or other legal subdivision)

being within NW¼ SW¼ (Smallest legal subdivision) *of Sec.* 25 *Twp.* 11 *N., Rge.* 20 21 E. (E. or W.)

or (b) Within limits of recorded platted property, town or city: Within corporate limits but not platted

in Lot ....., *Block* ..... *of* ..... (Name of plat or addition)

Zillah (If within city or town, give name) *County of* Yakima *within* ..... (Leave blank) *area*

..... (Leave blank) *sub-area* ..... (Leave blank) *zone*

(c) The location of the well or other works is shown on the accompanying plat, or other adequate maps or drawings

(d) The owner of property on which the works are constructed is:

Town of Zillah (Name) Zillah, Washington (Post office address)

3. CONSTRUCTION WORK *was begun on* ? (Date) *; was completed on* ? (Date)

and the ground water claimed was first used for the purposes set out below on 1908 (Date)

since which time the water has been used Continuously in summer, intermittenly in winter (Continuously or intermittently)

from ..... (Date) *to* 1947 (Date)

4. QUANTITY *of water claimed and used is* 276 *gallons per minute:* 150 *acre feet per year.*

Maximum number of days water is used each year:

For irrigation: ..... *days.*

For other purposes: 120 *days.*

5. PURPOSE OR PURPOSES *for which water is used* Domestic municipal and industrial use

(Domestic, irrigation, municipal, manufacturing, industrial, etc.)

(a) FOR MUNICIPAL SUPPLY: To supply the city, town or community of Zillah

in the county of Yakima, having a present population of 937, and an estimated population of 1,200 in 19 50

(b) FOR IRRIGATION: The land irrigated has a total area of acres, and water is used each year for this purpose from (Date) to (Date)

(c) Legal description of property on which water is used for all purposes other than municipal supply:

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 950 feet. Diameter 12 inches or feet. Dug or drilled drilled

Flowing or pump well pump

IF PUMP WELL: Type and size of pump is A Sterling 8" 17 bowl unit deep well turbine

Type and size of motor or engine is 25 horsepower 220 U. S. Induction motor

Depth from ground surface to water level before pumping 116 feet.

After continuous operation for at least four hours, the measured discharge of pump is 276 g.p.m., and the drawdown of water level is 276 feet.

Date of test 1940

IF FLOWING WELL: Measured discharge g.p.m. on (Date)

Shut-in pressure at ground surface lbs. per sq. in. on (Date)

Water is controlled by (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

12 distances not known inch diameter from to feet

8 " " " inch diameter from to feet

inch diameter from to feet

inch diameter from to feet

Describe and show depth of shoe, plug, adapter, liner or other details:

State of Washington
Department of Ecology
Yakima, Washington

IN THE MATTER OF APPLICATION)
FILED BY THE CITY OF ZILLAH)
TO CHANGE THE PURPOSE OF USE)
AND THE PLACE OF USE AS CLAIMED)
IN WATER RIGHT CLAIM NO. 007086)

Report of Findings
Conclusions, and
Recommendations

Background

On August 14, 1987, the City of Zillah filed an application to change the purpose of use and the place of use claimed in Water Right Claim No. 007086. The application was accepted and public notice was made. The 30-day protest period expired with no protests being received.

Investigation

A field inspection was conducted by the author on February 2, 1988. Based on this inspection, conversations with various city officials including Mrs. Althea Spencer, the City Clerk, and a review of WDOE office records, the following data were collected:

Water Right Claim No. 007086 was filed on December 14, 1971 by Dallas Anderson for Stokely-Van Camp, Inc. It claims the withdrawal of 1400 gallons per minute (gpm), 2250 acre-feet per year for a continuous industrial food processing supply with the date of first use being September, 1942. The claim states that 700 gpm and 1125 acre-feet per year were currently being withdrawn. The well was listed as being located approximately 610 feet north and 810 feet east from the southwest corner of Section 25, being within the SW1/4 SW1/4 of Section 25, T. 11 N., R. 20 E.W.M. The claimed place of use was described as being the following:

Beginning at a point on the northern line of the right-of-way for the Northern-Pacific Railroad located 490 feet southeast from the intersection with the western line of Section 25, T. 11 N., R. 20 E.W.M.; thence southeasterly along said right-of-way 649.4 feet; thence northeasterly 161.8 feet; thence northwesterly parallel to the northern right-of-way line 439.6 feet; thence southwesterly 244.4 feet to the point of beginning. Also the southern 0.04 acre of that portion of the eastern 102 feet of the western 404 feet of the SW1/4 SW1/4 of said section lying north of the Northern-Pacific Railroad right-of-way. Also the southern 20 feet of Bartley Street vacated.

Prior to ownership by Stokely-Van Camp, Inc., the property was owned by Big Y Fruit. The exact age of the well is unknown, however, it is believed to have been drilled when the property was owned by Big Y Fruit. No well report is available for the well, however, it is believed to be approximately 700 feet deep. A 75 horsepower, turbine pump had been installed in the well when it was operated by Stokely-Van Camp, Inc. When the fruit processing plant closed, the well, with water right claim, was sold to the City of Zillah. The city installed a 40 horsepower, turbine pump in the well and constructed a well house. Although the well may have produced more than 700 gpm in the past, recent withdrawal and current plans for withdrawal have and will not exceed this quantity. Since the city plans to use the well for a portion of their municipal supply, they have requested that the purpose of use be changed to continuous municipal supply and that the place of use be changed to the Zillah City service area.

df 12-16-88 800'

40 HP pump installed by Wippco between 1978-80 df 12-16-88

The intent of the Water Right Claims Registration Act, Chapter 90.14 RCW, was to document those uses of surface water in existence prior to the adoption of the State Surface Water Code, Chapter 90.03 RCW, which was adopted in 1917, and those uses of ground water in existence prior to the adoption of the State Ground Water Code, Chapter 90.44 RCW, which was adopted in 1945. Since each code's adoption, the only means of acquiring a right within the State is by filing for, and receiving, a permit from the Department of Ecology.

The City of Zillah is currently the holder of five water right certificates. These are described below:

Certificate of Ground Water Right No. 605-D (with a 1910 priority date) authorizes the withdrawal of 50 gpm, 80 acre-feet per year for a municipal and industrial supply to be used within the Town of Zillah. It is located within Lot 5 of Block 4 of Jaeger's Addition to Zillah, Washington. The well is a 6-inch diameter well that was drilled to a depth of 167 feet. In 1940, the static water level was determined to be 116 feet below land surface with a dynamic water level of 130 feet below land surface. The well, equipped with a five horsepower pump, was capable of producing 50 gpm. This well has been abandoned and sealed since prior to 1958.

Certificate of Ground Water Right No. 606-D (with a 1908 priority date) authorizes the withdrawal of 276 gpm, 150 acre-feet per year for a municipal and industrial supply to be used within the Town of Zillah. The well is located within the E1/2 SW1/4 SE1/4 of Section 25, T. 11 N., R. 20 E.W.M. It is a 12-inch diameter well that is drilled to a depth of 950 feet. Based on the geological formations expected to be present at the well site, it is likely this well penetrates and derives water from the Saddle Mountains Basalt Formation. In 1940, the static water level was measured to be 116 feet below land surface and the dynamic water level was 276 feet below land surface. The well, equipped with a 25 horsepower, turbine pump was capable of producing 276 gpm. This well is located near one of the city reservoirs and is still used as one of the production wells for the city.

3rd Ave. Well

Certificate of Ground Water Right No. 607-D (with a priority date of 1908) authorizes the withdrawal of 150 gpm, 10 acre-feet for a domestic supply and for fire protection within the Town of Zillah. The well is located within Lot 5 of Block 4 of Jaeger's First Addition to Zillah. It is a 8-inch diameter well that is drilled to a depth of 160 feet. The static water level was determined to be 116 feet below land surface and the dynamic water level to be 120 feet below land surface in 1940. With a 15 horsepower pump installed in the well, the capacity was 150 gpm. This well was used as a backup well since continuous pumping resulted in sanding problems. Prior to 1958, this well was abandoned and sealed.

With a priority date of May 14, 1952, Ground Water Certificate No. 1277-A was issued to the Water Department of the Town of Zillah authorizing the withdrawal of 250 gpm, 146 acre-feet per year for a municipal supply for the Town. The well, which is located within the NE1/4 NW1/4 NE1/4 of Section 36, T. 11 N., R. 20 E.M.W., is a 280-foot deep well that is cased with 10-inch casing to a depth of 92 feet and with 8-inch casing from 92 to 268 feet below land surface. The casing is perforated from 248 to 266 feet below land surface. There is no well report for the original well, which was only 170 feet deep. When the well was deepened, it penetrated cemented gravel, sand and clay, cemented gravel, clay, and terminates in gravel and sand. The static water level was measured to be 112 feet below land surface in 1952 and the dynamic water level was 127 feet below land surface. A 15 horsepower, turbine pump is installed in the well. This well served as a backup well but has since been abandoned.

The final right is Ground Water Certificate No. 3350-A with a priority date of July 9, 1958. It authorizes the withdrawal of 550 gpm, 296 acre-feet per year for a municipal supply for the Town of Zillah. The well is located within the NE1/4 NW1/4 NE1/4 of Section 36, T. 11 N., R. 20 E.W.M. It is a 12-inch diameter well that is drilled to a depth of 280 feet and cased to 242 feet. The casing is perforated from 238.2 to 279.8 feet below land surface. It penetrates soil, hardpan, clay, sand and gravel, cemented gravel, sand and gravel, and terminates in a sand, gravel, and silt mixture. Water is derived from the unconfined sediments of the Ellensburg Formation. The static water level was measured to be 109 feet below land surface and the dynamic water level was 110 feet below land surface. This well has served as the primary source of water for the city.

Rainier Ave. Well

* Original application for 813 gpm

Since the wells authorized under Ground Water Certificates No. 605-D, No. 607-D, and No. 1277-A have been abandoned and sealed, these three certificates should be relinquished. Based on the status of the remaining wells and the rights associated with them, the city is authorized to withdraw a total of 1089 gpm and 446 acre-feet per year under Ground Water Certificates No. 606-D and No. 3350-A. The city has two water storage reservoirs. One has a capacity of 75,000 ~~cubic feet~~ gallons and the other has a capacity of ~~50,000~~ 750,000. df 12-16-88

The current population of the City of Zillah is 1,838 people. From November 1, 1987 to October 31, 1988, the City supplied 394.3 acre-feet of water to metered customers. Based on this annual water consumption and the current population, the per capita consumption rate for the City is currently 0.22 acre-feet per year per person. Since the City estimates the population may approach 4,000 people by the year 2000 and significant changes in water consumption are not anticipated, the annual water requirement would approach 858.1 acre-feet per year by 2000. This figure represents an annual consumption of 412.1 acre-feet per year more than is currently authorized. The 858.1 acre-feet per year is, however, less than the quantity claimed and historically used under Water Right Claim No. 007086.

There are four ground water certificates on record within a three-quarter mile radius of the city's well (the former Stokely-Van Camp, Inc. well). All these wells are at the same approximate elevation as the city's well. It is likely they all derive water from the unconfined sediments of the Ellensburg Formation. Ground Water Certificate No. 533-D was issued to the Northern Pacific Railway Company authorizing the withdrawal of 65 gpm, 32.2 acre-feet per year for a water supply for locomotives. The well is located within the NE1/4 NW1/4 of Section 36, T. 11 N., R. 20 E.W.M. and the water was to be used at the station grounds of the Northern Pacific Railway Company in Zillah. The well is described as a 6-inch diameter well that is 145 feet deep, however, no well report is available. This well is located approximately 1600 feet southeast of the applicant's well site. It is unlikely that the right is currently being exercised.

Ground Water Certificate No. G4-23170C was issued to Douglas Merkle for a well located approximately 880 feet west and 760 feet north from the center of Section 25, being within the W1/2 SE1/4 NW1/4 of Section 25, T. 11 N., R. 20 E.W.M. It authorizes the withdrawal of 19 gpm, 17 acre-feet per year for a domestic supply and for the supplemental irrigation of 3 acres located within the E1/2 SW1/4 SE1/4 NW1/4 and the NW1/4 SE1/4 NW1/4 of Section 25, T. 11 N., R. 20 E.W.M. Primary irrigation water is obtained through the Sunnyside Valley Irrigation District. The well is a 6-inch diameter, 128-foot deep well that is cased to 126 feet. It penetrates soil, sand, cemented gravel, sand, clay, sandstone, and terminates in a sand and gravel mixture that is water bearing. The static water level was 16 feet below land surface when the well was completed in 1974. This well is located approximately 2900 feet north-northeast of the instant well site.

Two wells are authorized under Ground Water Certificate No. G4-23743C which was issued to James R. Wyn. Both wells are located within the NE1/4 SE1/4 of Section 26, T. 11 N., R. 20 E.W.M. Well No. 1 is more specifically located approximately 280 feet west and 700 feet south from the east quarter corner of Section 26 while Well No. 2 is located approximately 500 feet west and 1250 feet south from the same east quarter corner. This certificate authorizes the withdrawal of 300 gpm, 151 acre-feet per year for a domestic supply and for the irrigation of 28 acres located within a portion of the E1/2 SE1/4 of Section 26, T. 11 N., R. 20 E.W.M. There is no information available regarding the construction of the wells. These wells are located approximately 1900 feet northwest of the applicant's well site.

The final certificate is Ground Water Certificate No. G4-27362C. It was issued to Harriet Clark authorizing the withdrawal of 10 gpm, 5.3 acre-feet per year for stock water and for the irrigation of 1 acre located within the SW1/4 SW1/4 SE1/4 of Section 25, T. 11 N., R. 20 E.W.M. The well is located approximately 200 feet north and 100 feet east from the south quarter corner of Section 25, T. 11 N., R. 20 E.W.M. Although no well report is available, the well is believed to be 62 feet deep. This well is located about 2200 feet east-northeast of the applicant's well.

There are 16 domestic wells on record within a mile radius of the applicant's well site. They range in depth from 60 to 208 feet with a mean depth of 139.3 feet.

Conclusions

Based and these data, the following conclusions are drawn:

Since the well was drilled for and/or used by Big Y Fruit and Stokely-Van Camp, Inc., the beneficial use of water can be traced back to being prior to 1945. The instantaneous quantity of water withdrawn was likely 700 gpm based on current and past pump sizes. Since the canning industry involves high water consumption, the annual quantity of water historically used was likely greater than the city's future requirement of 858.1 acre-feet per year. It, therefore, appears that Water Right Claim No. 007086 is a valid claim that has not relinquished due to non-use.

Changing the purpose of use from a continuous industrial supply to a continuous municipal supply should not significantly alter the historical water use pattern. Since the claimed quantities of water will not be exceeded, the requested changes in the place of use and the purpose of use will not enhance the right as claimed under Water Right Claim No. 007086. Approval of these changes is in the public interest as the changed right will make it possible for the City of Zillah to fulfill their municipal water supply commitments now and in the future.

Recommendations

It is recommended that the requested change in the purpose of use and the place of use be approved for Water Right Claim No. 007086.

Since the annual quantity of water required by the city will depend on the future population and development of the area, the City of Zillah will have until the year 2000 to put the water to full beneficial use under the approved change. At the end of this development period, a certificate of change will issue authorizing the withdrawal of 700 gpm and a maximum of 858.1 acre-feet per year for a municipal supply to be used within the city limits of the City of Zillah. The authorized point of withdrawal will be described as being located approximately 610 feet north and 810 feet east from the southwest corner of Section 25, being within the SW1/4 SW1/4 of Section 25, T. 11 N., R. 25 E.W.M.

The combined withdrawal between Ground Water Certificates No. 606-D, No. 3350-A, and this right shall not exceed 1526 gpm and 858.1 acre-feet per year.

Since the applicant has abandoned the wells authorized under Ground Water Certificates No. 605-D, No. 607-D, and No. 1277-A and no longer withdraws water under these certificates, they will be required to relinquish these rights prior to issuance of a certificate of change for the instant application.

REPORT BY: Darlene M. Frye DATE: December 9, 1988
Darlene M. Frye

APPROVED BY: Doug Clausing DATE: 12/12/1988
Doug Clausing, Regional Supervisor

ska
1219rm8

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

RECEIVED
AUG 14 1987
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Accepted By: BP
Date: 8-31-87
Is Field Exam. Required? ☐ YES ☐ NO
Determined By

APPLICATION FOR CHANGE OF WATER RIGHT

☒ PURPOSE ☐ DIVERSION OR WITHDRAWAL
☒ PLACE ☐ ADDITIONAL POINT OR POINTS

WRIA 37 CHW2C 007086

NAME: TOWN OF ZILLAH
Bus. Tel. 829-5151
Home Tel.
Other Tel.

ADDRESS: PO BOX 475 (CITY) ZILLAH (STATE) WA (ZIP CODE) 98953

APPLICATION NUMBER | PERMIT NUMBER | CERTIFICATE NUMBER: WRC 007086

DECREED RIGHT (TITLE OF CASE)

APPROPRIATIONS MADE (GIVE DATE IF PRIOR TO JUNE 7, 1917 IF SURFACE WATER, OR JUNE 7, 1945 IF GROUND WATER): 1942

IS THE WATER RIGHT RECORDED IN YOUR NAME? ☐ YES ☒ NO
IF NO, GIVE NAME RECORDED UNDER: STOKELY-VAN CAMP, INC.

1. RIGHT CONSISTS OF

WATERS USED FROM (STREAM, LAKE, WELL, OR TRENCH, ETC.): A WELL
GALLONS PER MINUTE OR CUBIC FEET PER SECOND: 700 GPM / 1.25 AC/FT
WATER CURRENTLY USED FOR: INDUSTRIAL / FOOD PROCESSING
TIME OF USE: CONTINUOUSLY

2. LOCATION OF PRESENT POINT OF DIVERSION OR WITHDRAWAL

ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL.
610 FT N. + 810 FT E. FROM SW CORNER 25

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
SW¼ SW¼	25	11	20E	YAKIMA

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

3. LEGAL DESCRIPTION OF LANDS WATER IS USED ON

4. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: Beg at a pt on W ln of R/W of N.P. Ry. 490 ft SE from inters with W ln of Sec th SE'ly al R/W 649.4 ft, th NE'ly 161.8 ft. th NW'ly par to W R/W ln 439.6 ft.

Th SW'ly 284.4 ft to beg also S .04 ac of the pt of E 102 ft of W 404 ft of SW¼ SW¼ lv N of N.P. Ry. R/W also S 20 ft Bartlow St. Vac.

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY
25	11	20	YAKIMA

(ATTACH SEPARATE SHEET IF NECESSARY)

ARE YOU THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS ☒ YES ☐ NO
IF NO, EXPLAIN YOUR INTEREST

REASONS FOR THE PROPOSED CHANGE: CHANGE PURPOSE FOR MUNICIPAL USE

A MINIMUM FEE OF $10.00 MUST ACCOMPANY THIS APPLICATION

CONTINUE ON REVERSE SIDE

CHANGE

ECY 040-1-87
Rev. 1/85 OX A-209
3

4. CHANGE REQUESTED

CHANGE WATER USE TO	TIME OF USE	GALLONS PER MINUTE OR CUBIC FEET PER SECOND
MUNICIPAL	SAME	SAME

5. LOCATION OF PROPOSED POINT OF DIVERSION OR WITHDRAWAL

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER.

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
SWNE				

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

ARE YOU THE OWNER OF THE LAND ON WHICH THE PROPOSED POINT OF DIVERSION OR WITHDRAWAL IS TO BE LOCATED

☐ YES ☐ NO

6. LEGAL DESCRIPTION OF LANDS WATER IS TO BE USED ON

CITY OF ZILLAH

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY

(ATTACH SEPARATE SHEET IF NECESSARY)

ARE YOU THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS	IF NO, EXPLAIN YOUR INTEREST
☐ YES ☐ NO	

C.W Walker

APPLICANT'S SIGNATURE

DEPARTMENT OF E...
WATER RIGHT CLAIM ...

WATER RIGHT CLAIM

DEC 15 71 09500

...ER ...

1 NAME Stokely-Van Camp, Inc.

ADDRESS P.O. Box 747

Zillah, Wa. ZIP CODE 98953

2 SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: Ground (SURFACE OR GROUND WATER)

W.R.I.A. 37 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS Well

B. IF SURFACE WATER, THE SOURCE IS _____

3 THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 1400 gallons per min. PRESENTLY USED 700 gallons per min. (CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED 2,250 acre feet PRESENTLY USED 1,125 acre feet (ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED -0- PRESENTLY IRRIGATED -0-

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED. Entire year

4 DATE OF FIRST PUTTING WATER TO USE MONTH September YEAR 1942

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL 610 FEET North AND 810 FEET East FROM THE Southwest CORNER OF SECTION 25

BEING WITHIN SW¼ of SW¼ OF SECTION 25 T 11 N., R. 20 E (E.OR W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT _____ BLOCK _____ OF _____

(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED. Beg at a pt on N ln of R-W of N.P. Ry. 490 ft SE from inters with W ln of Sec th SE'ly al R-W 649.4 ft, th NE'ly 161.8 ft. th N'ly par to N R-W ln 439.6 ft.

Th SW'ly 244.4 ft to beg also S .04 ac of the pt of E 102 ft of W 404 ft of SW¼ SW¼ ly N of N.P. Ry. R-W also S 20 ft Bartley St. Vac.

COUNTY Yakima

7. PURPOSE(S) FOR WHICH WATER IS USED: Industrial - Food Processing

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED. Appropriation

DO NOT USE THIS SPACE

...OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION ...T TO USE OF WATERS AS BETWEEN THE WATER USE ...AS BETWEEN ONE OR MORE WATER USE CLAIMANTS ...ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR ...

...RECORDED ...

...REGISTRY NO. ...

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF

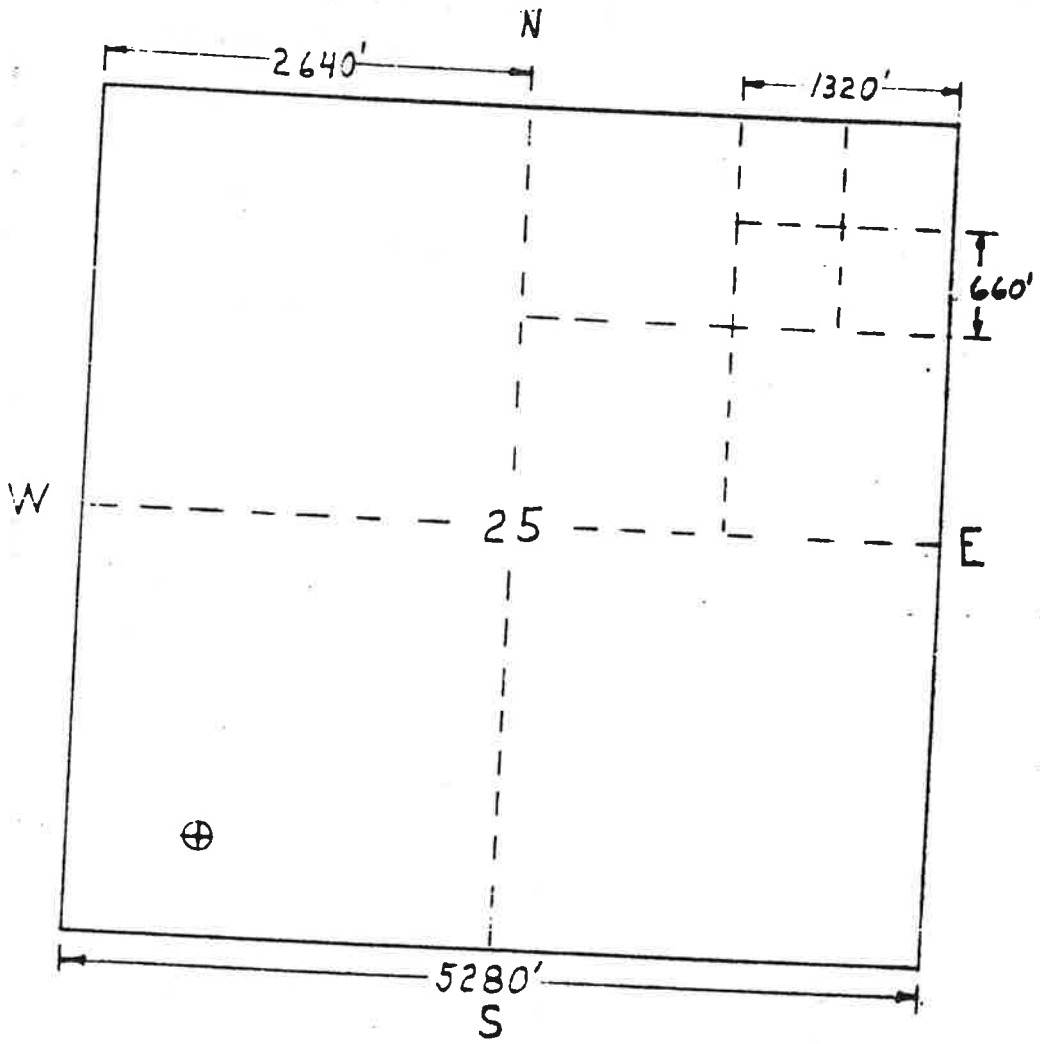
X [signature]

DATE December 14, 1971

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

DALLAS ANDERSON

P. O. Box 747, Zillah, Wa. [illegible]



WELL LOCATION - 610 feet north and 810 feet east of the southwest corner of section 25, T11N, R20 WAM.

Being within the SW¼ SW¼ of said section.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

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

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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
February 28, 1988	G4-29702	G4-29702P	

NAME
City of Zillah

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 475	Zillah,	Washington	98953

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

PUBLIC WATER TO BE APPROPRIATED

SOURCE
Two wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2000	1458.1

QUANTITY, TYPE OF USE, PERIOD OF USE
858.1 acre-feet per year for a continuous municipal and industrial supply;

600 acre-feet per year for the irrigation of 150 acres from April 1 to October 31

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
#1: 610 feet north and 810 feet east from the southwest corner of Section 25;

#2: 1200 feet east and 100 feet north from the south quarter corner of Section 25

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, IE. OR W.I W.M.	W.R.I.A.	COUNTY
#1: $SW\frac{1}{4}SW\frac{1}{4}$ #2: $SW\frac{1}{4}SE\frac{1}{4}$	25	11	20 E	37	Yakima

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Zillah's Sub-Area Service Plan which includes Sections 25 and 26 of T. 11 N., R. 20 E.W.M.; the $W\frac{1}{2}$ of Section 31, T. 11 N., R. 21 E.W.M.; and that portion of the $W\frac{1}{2}$ of Section 30, T. 11 N., R. 21 E.W.M. lying west of Highway No. 410 (Yakima Valley Highway).

DESCRIPTION OF PROPOSED WORKS

Two wells - #1 approximately 800 feet deep with 40 horsepower turbine pump, #2 12-inch diameter and 950 feet deep with 25 horsepower turbine pump; 75,000 and 750,000 gallon storage reservoirs; sprinkler irrigation systems.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Begun	January 1, 2000	January 1, 2001

PROVISIONS

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

All water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells).

The portion of this authorization relating to irrigation is classified as a PUBLICLY OWNED LAND PERMIT in accordance with Chapter 90.66 (Initiative Measure No. 59).

The combined withdrawal between Ground Water Certificates No. 606-D and No. 3350-A, the approved certificate of change for Water Right Claim No. 007086, and this right shall not exceed 2,550 gallons per minute and 1,458.1 acre-feet per year.

As the water will not be put to full beneficial use until the population has increased toward the proposed 4,000 and industry has developed further, the final certificate will not be issued until after the beginning of the year 2000. The annual quantity of water authorized on the certificate will reflect the actual development that has taken place.

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

Given under my hand and the seal of this office at Yakima, *Washington, this* 16th *day of* February, *19* 89

Department of Ecology

ENGINEERING DATA
OK df
23x27 ska

by Doug Clausing
DOUG CLAUSING, SECTION SUPERVISOR

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

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

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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
February 28, 1988	G4-29702		

NAME
City of Zillah

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 475	Zillah,	Washington	98953

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Two wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2000	1458.1

QUANTITY, TYPE OF USE, PERIOD OF USE
858.1 acre-feet per year for a continuous municipal and industrial supply;

600 acre-feet per year for the irrigation of 150 acres from April 1 to October 31

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
#1: 610 feet north and 810 feet east from the southwest corner of Section 25;

#2: 1200 feet east and 100 feet north from the south quarter corner of Section 25 (Wippco well / 3rd Ave well (well No. 2))

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
#1: SW¼SW¼ #2: SW¼SE¼	25	11	20 E	37	Yakima

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Zillah's Sub-Area Service Plan which includes Sections 25 and 26 of T. 11 N., R. 20 E.W.M.; the W½ of Section 31, T. 11 N., R. 21 E.W.M.; and that portion of the W½ of Section 30, T. 11 N., R. 21 E.W.M. lying west of Highway No. 410 (Yakima Valley Highway).

DESCRIPTION OF PROPOSED WORKS

Two wells - #1 approximately 800 feet deep with 40 horsepower turbine pump, #2 12-inch diameter and 950 feet deep with 25 horsepower turbine pump; 75,000 and 750,000 gallon storage reservoirs; sprinkler irrigation systems.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Begun	January 1, 2000	January 1, 2001

REPORT

Background

On February 28, 1988, the City of Zillah filed an application to appropriate public ground waters. The application was accepted, assigned number G4-29702, and public notice was made. The 30-day protest period expired with no protests being received.

Investigation

A field inspection was conducted by the author on February 2, 1988 in conjunction with an application for change of Water Right Claim No. 007086 filed by the City of Zillah. Based on this inspection, conversations with various city officials including Mrs. Althea Spencer, the City Clerk and Mr. Curtis W. Walker, Public Water District, and a review of WDOE office records, the following data were collected:

The applicant has requested the withdrawal of 2,000 gallons per minute (gpm) from three existing wells for a continuous municipal and industrial supply and for the irrigation of 150 acres. The water will be used in accordance with the proposed sub-area service plan developed by the City of Zillah which includes serving land outside the current city limits. This expanded service area includes Sections 25 and 26 of T. 11 N., R. 20 E.W.M. and those portions of the W1/2 of Sections 30 and 31 of T. 11 N., R. 21 E.W.M. lying west of Highway 410 (Yakima Valley Highway).

The City of Zillah was currently the holder of five water right certificates and an approved change on a water right claim. These are described below:

Water Right Claim No. 007086 was filed on December 14, 1971 by Dallas Anderson for Stokely-Van Camp, Inc. It claims the withdrawal of 1,400 gallons per minute (gpm), 2,250 acre-feet per year for a continuous industrial food processing supply with the date of first use being September, 1942. The claim states that 700 gpm and 1,125 acre-feet per year were currently being withdrawn. The well was listed as being located approximately 610 feet north and 810 feet east from the southwest corner of Section 25, being within the SW1/4 SW1/4 of Section 25, T. 11 N., R. 20 E.W.M. The claimed place of use was described as being the following:

Beginning at a point on the northern line of the right-of-way for the Northern Pacific Railroad located 490 feet southeast from the intersection with the western line of Section 25, T. 11 N., R. 20 E.W.M.; thence southeasterly along said right-of-way 649.4 feet; thence northeasterly 161.8 feet; thence northwesterly parallel to the northern right-of-way line 439.6 feet; thence southwesterly 244.4 feet to the point of beginning. Also the southern 0.04 acre of that portion of the eastern 102 feet of the western 404 feet of the SW1/4 SW1/4 of said section lying north of the Northern-Pacific Railroad right-of-way. Also the southern 20 feet of Bartley Street vacated.

Prior to ownership by Stokely-Van Camp, Inc., the property was owned by Big Y Fruit. The exact age of the well is unknown, however, it is believed to have been drilled when the property was owned by Big Y Fruit. No well report is available for the well, however, it is believed to be approximately 800 feet deep. A 75-horsepower turbine pump had been installed in the well when it was operated by Stokely-Van Camp, Inc. When the fruit processing plant closed, the well, with water right claim, was sold to the City of Zillah by Wippco who owned it from 1978 to 1980. During Wippco ownership, a 40-horsepower turbine pump was installed in the well to increase efficiency. In early 1988, a well house was constructed by the city.

The City of Zillah filed an application for change requesting the purpose of use for Water Right Claim No. 007086 be changed to continuous municipal supply and that the place of use be changed to the Zillah City Limits. This application has been recommended for approval. An instantaneous quantity of 700 gpm and a maximum annual quantity of 858.1 acre-feet per year has been recommended for the certificate of change which will be issued after the year 2000. This well is known as the Wippco Well (Well No. 3) in the city records.

Certificate of Ground Water Right No. 605-D (with a 1910 priority date) authorizes the withdrawal of 50 gpm, 80 acre-feet per year for a municipal and industrial supply to be used within the Town of Zillah. It is located within Lot 5 of Block 4 of Jaeger's Addition to Zillah, Washington. The well is a 6-inch diameter well that was drilled to a depth of 167 feet. In 1940, the static water level was determined to be 116 feet below land surface with a dynamic water level of 130 feet below land surface. The well, equipped with a five horsepower pump, was capable of producing 50 gpm. This well has been abandoned since prior to 1958.

Certificate of Ground Water Right No. 606-D (with a 1908 priority date) authorizes the withdrawal of 276 gpm, 150 acre-feet per year for a municipal and industrial supply to be used within the Town of Zillah. The well is located within the E1/2 SW1/4 SE1/4 of Section 25, T. 11 N., R. 20 E.W.M. The location can be more specifically described as being approximately 1,200 feet east and 100 feet north of the south quarter corner of said Section 25. The well is a 12-inch diameter well that is drilled to a depth of 950 feet. Based on the geological formations expected to be present at the well site, it is likely this well penetrates and derives water from the Saddle Mountains Basalt Formation. In 1940, the static water level was measured to be 116 feet below land surface and the dynamic water level was 276 feet below land surface. The well, equipped with a 25-horsepower turbine pump was capable of producing 250 gpm. This well is located near one of the city reservoirs and is still used as one of the production wells for the city. It is known as the 3rd Ave Well (Well No. 2) in the city records.

Certificate of Ground Water Right No. 607-D (with a priority date of 1908) authorizes the withdrawal of 150 gpm, 10 acre-feet per year for a domestic supply and for fire protection within the Town of Zillah. The well is located within Lot 5 of Block 4 of Jaeger's First Addition to Zillah. It is an 8-inch diameter well that is drilled to a depth of 160 feet. The static water level was determined to be 116 feet below land surface and the dynamic water level to be 120 feet below land surface in 1940. With a 15-horsepower pump installed in the well, the capacity was 150 gpm. This well was used as a backup well since continuous pumping resulted in sanding problems. Prior to 1958, it was abandoned.

With a priority date of May 14, 1952, Ground Water Certificate No. 1277-A was issued to the Water Department of the Town of Zillah authorizing the withdrawal of 250 gpm, 146 acre-feet per year for a municipal supply for the Town. The well, which is located within the NE1/4 NW1/4 NE1/4 of Section 36, T. 11 N., R. 20 E.W.M., is a 280-foot deep well that is cased with 10-inch casing to a depth of 92 feet and with 8-inch casing from 92 to 268 feet below land surface. The casing is perforated from 248 to 266 feet below land surface. There is no well report for the original well, which was only 170 feet deep. When the well was deepened, it penetrated cemented gravel, sand and clay, cemented gravel, clay, and terminates in gravel and sand. The static water level was measured to be 112 feet below land surface in 1952 and the dynamic water level was 127 feet below land surface. A 15-horsepower turbine pump was installed in the well. This well served as a backup well but has since been abandoned.

The final right is Ground Water Certificate No. 3350-A with a priority date of July 9, 1958. It authorizes the withdrawal of 550 gpm, 296 acre-feet per year for a municipal supply for the Town of Zillah. The well is located within the NE1/4 NW1/4 NE1/4 of Section 36, T. 11 N., R. 20 E.W.M. The location can be more specifically described as being approximately 400 feet east and 200 feet south of the north quarter corner of said Section 36. The well is a 12-inch diameter well that is drilled to a depth of 280 feet and cased to 242 feet. The casing is perforated from 238.2 to 279.8 feet below land surface. It penetrates soil, hardpan, clay, sand and gravel, cemented gravel, sand and gravel, and terminates in a sand, gravel, and silt mixture. Water is derived from the unconfined sediments of the Ellensburg Formation. The static water level was measured to be 109 feet below land surface and the dynamic water level was 110 feet below land surface. This well has served as the primary source for the City with a current capacity of 650 gpm. It is known as the Rainier Ave Well (Well No. 1) in the city records.

Since the wells authorized under Ground Water Certificates No. 605-D, No. 607-D, and No. 1277-A have been abandoned, these three certificates have been relinquished. The city has requested assistance in determining proper abandonment of these wells. Based on the status of the remaining wells and the rights associated with them, the City is authorized to withdraw a total of 1089 gpm and 446 acre-feet per year under Ground Water Certificates No. 606-D and No. 3350-A. The City has two water storage reservoirs. One has a capacity of 75,000 gallons and the other has a capacity of 750,000 gallons.

The current population of the City of Zillah is 1,838 people. From November 1, 1987 to October 31, 1988, the City supplied 394.3 acre-feet of water to metered customers. Based on this annual water consumption and the current population, the per capita consumption rate for the City is currently 0.22 acre-foot per year per person. Since the City estimates the population may approach 4,000 people by the year 2000 and significant changes in water consumption are not anticipated, the annual water requirement would approach 858.1 acre-feet per year by the year 2000. This figure represents an annual consumption of 412.1 acre-feet per year more than was authorized under Ground Water Certificates 606-D and No. 3350-A. The well claimed under Water Right Claim No. 007086 was approved, in the change of this claim, as the primary source for the additional 412.1 acre-feet per year.

The City also irrigates the lawn and landscaping associated with the city parks and cemetery. The water used for this purpose is not included in the metered water records and is, therefore, in addition to the annual consumption discussed above. The total area to be irrigated using city water will not exceed 150 acres. The maximum annual water requirement for irrigation in this area is 4 acre-feet per year per acre irrigated.

The three wells requested for approval for the instant right are those authorized individually under Ground Water Certificates No. 606-D (3rd Ave Well) and No. 3350-A (Rainier Ave Well) and under Water Right Claim No. 007086 (Wippco Well). The well authorized under Ground Water Certificate No. 3350-A derives water from the Ellensburg Formation while the remaining two wells derive water from the Saddle Mountains Basalt Formation. Since a water right defines a specific use of water from a specific aquifer, all three wells cannot be authorized under the same water right. The two Saddle Mountains Basalt Formation wells may be authorized under the same right while the Ellensburg Formation well will require a separate right. Mrs. Spencer has indicated that the City would prefer the instant right authorize the two Saddle Mountains Basalt Formation aquifer wells. A new application has been submitted requesting approval for the use of the Ellensburg Formation aquifer well for the same uses.

Based on the potential for expanded instantaneous production from their two wells (the Wippco Well is capable of pumping at least 1400 gpm), the instant application will be recommended for the approval of the requested 2,000 gpm. The new application has requested an expanded capacity of 1,600 gpm for the third well. The final certificate for the instant right will issue authorizing the actual capacity of the two wells at that time, up to the approved 2,000 gpm.

There are four ground water certificates on record within a three-quarter mile radius of the city's three wells. All these wells are at the same approximate elevation as the city's wells. It is likely they all derive water from the unconfined sediments of the Ellensburg Formation. Ground Water Certificate No. 533-D was issued to the Northern Pacific Railway Company authorizing the withdrawal of 65 gpm, 32.2 acre-feet per year for a water supply for locomotives. The well is located within the NE1/4 NW1/4 of Section 36, T. 11 N., R. 20 E.W.M. and the water was to be used at the station grounds of the Northern Pacific Railway Company in Zillah. The well is described as a 6-inch diameter well that is 145 feet deep, however, no well report is available. This well is located approximately 1,600 feet southeast of the applicant's well sites. The property was purchased by the City of Zillah with hopes of utilizing the well to supplement the city's water supply. Due to the presence of debris in the well which would be too costly to remove, the well was abandoned. The city will relinquish Ground Water Certificate No. 533-D since it is no longer exercised.

Ground Water Certificate No. G4-23170C was issued to Douglas Merke for a well located approximately 880 feet west and 760 feet north from the center of Section 25, being within the W1/2 SE1/4 NW1/4 of Section 25, T. 11 N., R. 20 E.W.M. It authorizes the withdrawal of 19 gpm, 17 acre-feet per year for a domestic supply and for the supplemental irrigation

of 3 acres located within the E1/2 SW1/4 SE1/4 NW1/4 and the NW1/4 SE1/4 NW1/4 of Section 25, T. 11 N., R. 20 E.W.M. Primary irrigation water is obtained through the Sunnyside Valley Irrigation District. The well is a 6-inch diameter, 128-foot deep well that is cased to 126 feet. It penetrates soil, sand, cemented gravel, sand, clay, sandstone, and terminates in a sand and gravel mixture that is water bearing. The static water level was 16 feet below land surface when the well was completed in 1974. This well is located approximately 2,900 feet north-northeast of the instant well sites.

Two wells are authorized under Ground Water Certificate No. G4-23743C which was issued to James R. Wyn. Both wells are located within the NE1/4 SE1/4 of Section 26, T. 11 N., R. 20 E.W.M. Well No. 1 is more specifically located approximately 280 feet west and 700 feet south from the east quarter corner of Section 26 while Well No. 2 is located approximately 500 feet west and 1,250 feet south from the same east quarter corner. This certificate authorizes the withdrawal of 300 gpm, 151 acre-feet per year for a domestic supply and for the irrigation of 28 acres located within a portion of the E1/2 SE1/4 of Section 26, T. 11 N., R. 20 E.W.M. There is no information available regarding the construction of the wells. These wells are located approximately 1,900 feet northwest of the applicant's well sites.

The final certificate is Ground Water Certificate No. G4-27362C. It was issued to Harriet Clark authorizing the withdrawal of 10 gpm, 5.3 acre-feet per year for stock water and for the irrigation of 1 acre located within the SW1/4 SW1/4 SE1/4 of Section 25, T. 11 N., R. 20 E.W.M. The well is located approximately 200 feet north and 100 feet east from the south quarter corner of Section 25, T. 11 N., R. 20 E.W.M. Although no well report is available, the well is believed to be 62 feet deep. This well is located about 2,200 feet east-northeast of the applicant's wells.

There are 16 domestic wells on record within a mile radius of the applicant's well sites. They range in depth from 60 to 208 feet with the mean depth of 139.3 feet.

Conclusions

Based on these data, the following conclusions are drawn:

Water is available for the proposed beneficial use. Due to the distance from neighboring wells within the same aquifer, there should be no impairment of existing rights. Granting a permit is not contrary to the public interest.

Recommendations

It is recommended that an instantaneous quantity of 2,000 gpm and an annual quantity of 1,458.1 acre-feet per year from two wells be approved for a continuous municipal and industrial supply and for the irrigation of 150 acres from April 1 to October 31.

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

All water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells).

The portion of this authorization relating to irrigation is classified as a PUBLICLY OWNED LAND PERMIT in accordance with Chapter 90.66 (Initiative Measure No. 59).

The combined withdrawal between Ground Water Certificates No. 606-D and No. 3350-A, the approved certificate of change for Water Right Claim No. 007086, and this right shall not exceed 2,550 gallons per minute and 1,458.1 acre-feet per year.

Since the applicant has abandoned the well authorized under Ground Water Certificate No. 533-D, and water is no longer withdrawn for locomotive water supply, they are advised to relinquish this right and to properly abandon the well along with the other city wells that have been abandoned.

As the water will not be put to full beneficial use until the population has increased toward the proposed 4,000 and industry has developed further, the final certificate will not be issued until after the beginning of the year 2000. The annual quantity of water authorized on the certificate will reflect the actual development that has taken place.

REPORT BY: Darlene M. Frye — DATE: December 21, 1988
Darlene M. Frye

APPROVED BY: Doug Clausing — DATE: 12/21/1988
Doug Clausing, Regional Supervisor

ska
23x27

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
15 W Yakima Ave, Ste 200 • Yakima, WA 98902-3452 • (509) 575-2490

RECEIVED
SEP 24 2014
BY:

September 22, 2014

Tom Tilley
City of Zillah
PO Box 475
Zillah WA 98953-0475

Re: Water Right No. G4-29702P

Dear Mr. Tilley:

In response to the city's request, an extension is hereby granted to put the water to full beneficial use for the reason(s) below:

As described in the Huibregtse, Louman Associates letter of August 19, 2014, and the draft City of Zillah Water system Plan (August 2014), you have shown good cause and due diligence by:

- Taking steps to address the deficiencies in the 3rd Avenue Well (S02) and restore it to its full capacity
- Taking steps to upgrade and repair the WIPPCU Well (S03) to ensure reliable water production.

The new deadline to submit your *Proof of Appropriation of Water* is **July 31, 2021.**

YOUR RIGHT TO APPEAL

You have a right to appeal this decision to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this decision. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of this decision:

- File your appeal and a copy of this decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey WA 98503 **Pollution Control Hearings Board** 1111 Israel Road SW Ste 301 Tumwater WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia WA 98504-0903

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov
To find laws and agency rules visit the Washington State Legislature Website: http://www.leg.wa.gov/CodeReviser

If you have any questions, please contact Teresa Mitchell at 509-575-2597.

Sincerely,

Robert F. Barwin
Acting Section Manager
Water Resources Program

RFB:DH:HD
140911

Enclosures: *Proof of Appropriation of Water*
Your Right to Be Heard

By certified mail: 7010 0290 0000 7131 2443

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
15 W Yakima Ave, Ste 200 • Yakima, WA 98902-3452 • (509) 575-2490

RECEIVED
MAY 1 2 2008
Huibregtse Louman Associates, Inc.

May 9, 2008
CERTIFIED MAIL
[7006 0100 0002 8191 4142]

City of Zillah
Tim Tilley
PO Box 475
Zillah WA 98953

Re: City of Zillah Water Right No. G4-29702P

A written request dated January 29, 2008, was submitted to the Department of Ecology (Ecology) by Huibregtse, Louman Associates, Inc., on behalf of the City of Zillah (the City). The request asked Ecology to do research and make an aquifer designation for the wells for Ground Water Permit No. G4-29702P. The Technical Unit of the Central Region Office, Department of Ecology, investigated records for the City's wells and determined they were drilled into the Ellensburg Formation aquifer. A Superseding Permit is being issued to reflect the correct information.

A separate written correspondence from the City, dated January 22, 2008, was submitted requesting an extension on the permit. This request is being dealt with by means of the Superseding Permit. There is an updated development schedule giving additional time to put the water to full beneficial use. The date set by the Superseding Permit is **December 31, 2013**, (six years) in conjunction with when the next update of the City's Water System Plan is due.

Please read the enclosed information sheet, as well as your entire Superseding Permit. One of the new provisions is that any wells constructed under this permit must be completed into the Ellensburg Formation aquifer.

You have a right to appeal this order. To appeal this you must:

- File your appeal with the Pollution Control Hearing Board within 30 days of the "date of receipt" of this document. Filing means actual receipt by the Board during regular office hours.
- Serve your appeal on the Department of Ecology within 30 days of the "date of receipt" of this document. Service may be accomplished by any of the procedures identified in WAC 371-08-305(10). "Date of receipt" is defined at RCW 43.21B.001(2).

Be sure to do the following:

- Include a copy of this document that you are appealing with your Notice of Appeal.
- Serve and file your appeal in paper form; electronic copies are not accepted.

1. To file your appeal with the Pollution Control Hearings Board:

Mail appeal to:	OR	Deliver your appeal in person to:
Pollution Control Hearings Board PO Box 40903 Olympia WA 98504-0903		Pollution Control Hearings Board 4224 – 6th Ave SE Rowe Six, Bldg 2 Lacey WA 98503

2. To serve your appeal on the Department of Ecology:

Mail appeal to:	OR	Deliver your appeal in person to:
Department of Ecology Appeals Coordinator PO Box 47608 Olympia WA 98504-7608		Department of Ecology Appeals Coordinator 300 Desmond Dr SE Lacey WA 98503

3. And send a copy of your appeal packet to:

   G. Thomas Tebb, L.E.G.
   Department of Ecology
   15 W Yakima Ave Ste 200
   Yakima WA 98902-3452

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov
To find laws and agency rules visit the Washington State Legislature Website: http://www.leg.wa.gov/CodeReviser

Sincerely,
G Thomas Tebb, Water Resources Section Mgr
by Darrell Monroe
G. Thomas Tebb, L.E.G.
Section Manager
Water Resources Program
Central Region Office

GTT:RM:gg/080403

Enclosures: Your Right To Be Heard
Proof of Appropriation of Water
Important Information About Your Water Right

cc: Jeffrey T. Louman, Huibregtse, Louman Associates, Inc.
Justin Bellamy, EIT, Huibregtse, Louman Associates, Inc.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

SUPERSEDING PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON
Supersedes Permit Issued February 16, 1989

☐ 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
February 28, 1988	G4-29702	G4-29702P	

NAME
City of Zillah

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 475	Zillah	Washington	98953

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

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Two Wells
#1: a.k.a. City #3, a.k.a. Wippco Well
#2: a.k.a. City #2, a.k.a. 3rd Avenue Well
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2000	1458.1

QUANTITY, TYPE OF USE, PERIOD OF USE
858.1 acre-feet per year for a continuous municipal and industrial supply;
600 acre-feet per year for the irrigation of 150 acres from April 1 to October 31.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

#1: a.k.a. City #3, a.k.a. Wippco Well, 610 feet north and 810 feet east from the southwest corner of Section 25;
#2: a.k.a. City #2, a.k.a. 3rd Avenue Well, 1200 feet east and 100 feet north from the south quarter corner of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
#1: a.k.a. City #3, a.k.a. Wippco Well: SW¼, SW¼ #2: a.k.a. City #2, a.k.a. 3rd Avenue Well: SW¼, SE¼	25	11	20 E W.M.	37	Yakima

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The place of use of this water right is the service area described in the most recent Water System Plan approved by the Washington State Department of Health, so long as City of Zillah is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

COPY

COPY

DESCRIPTION OF PROPOSED WORKS

Two wells –
#1: a.k.a. City #3, a.k.a. Wippco Well, approximately 260 feet deep with 40 horsepower turbine pump,
#2: a.k.a. City #2, a.k.a. 3rd Avenue Well, 12 -inch diameter and 950 feet deep with 25 horsepower turbine pump;
75,000 and 750,000 gallon storage reservoirs: sprinkler irrigation systems

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Begun	Complete	December 31, 2013

PROVISIONS

Any replacement or additional points of withdrawal constructed under Ground Water Permit No. G4-29702P shall be restricted to the Ellensburg Formation aquifer and be constructed with solid, un-perforated, un-screened casing to a minimum depth of 300 feet.

Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required. An air line and gage may be installed to the access port.

All wells constructed in the state shall meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard shall be decommissioned.

The portion of this authorization relating to irrigation is classified as a PUBLICLY OWNED LAND PERMIT in accordance with Chapter 90.66 (Initiative Measure No. 59).

The combined withdrawal between Ground Water Certificate Nos. 606-D and 3350-A, the approved certificate of change Water Right Claim No. 007086, and this right shall not exceed 2,550 gallons per minute and 1,458.1 acre-feet per year.

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

Given under my hand the seal of this office at Yakima, Washington, this 9th *day of* May *2008.*

DATA REVIEW
OK

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Department of Ecology
G Thomas Tebb, Water Resources Section Mgr
by Darrell J Monroe COPY
G. Thomas Tebb, L.E.G.
Section Manager
Water Resources Program
Central Region Office

M E M O R A N D U M

DATE: February 13, 2008

TO: Melissa Downes; File G4-29702P, City of Zillah

FROM: Anna Hoselton

RE: Review of Aquifer designation for ground water permit G4-29702P, City of Zillah. Written request for review on behalf of the City of Zillah submitted by Huibregtse, Louman Associates, Inc., dated January 29, 2008.

Review of file documents, well logs, geologic cross-sections, etc., was done in consideration of the City's questions: (1) what aquifer are the wells authorized under G4-29702 drilled into and (2) how this information affects the status of Ground water Permit G4-29702 and the associated development schedule.

Discussion of Issue 1

As issued in 1988, Permit G4-29702 implies the City of Zillah's 3rd Avenue well (well 2) and the Wippco well (well 3) were completed in and withdraw water from the Saddle Mountains aquifer.

Sometime after the permit issued, it was demonstrated by down hole video that the Wippco well, thought to be 800 feet deep, had either been filled in or had originally terminated at a depth of only 260 feet. Additionally in 1993, construction of the 1,507 ft deep George Joseph well approximately 1.2 miles northwest of the City wells, suggested that the 3rd Avenue well at 950 feet was more likely completed in and withdrawing water from the Ellensburg Formation aquifer than from the Saddle Mts aquifer.

Current evaluation of area geology, well logs, and extension of Ecology's South Flank Rattlesnake Ridge Cross-Section C-C' to include the George Joseph well and the existing city wells is clearly supportive towards City wells 2 and 3 being completed in and withdrawing water from the Ellensburg Formation.

It should be noted however that the Report of Exam for G4-29702P contains a sentence stating "Mrs. Spencer has indicated that the City would prefer the instant right authorize the two Saddle Mountains Basalt Formation aquifer wells." This may imply the City requested a permit for the Saddle Mts aquifer, however, it can easily be argued that Ecology had identified Wells 2 and 3 as Saddle Mts aquifer wells and that the City merely requested rights to wells 2 and 3, accepting Ecology's aquifer determination in the process.

The current request by the City seeks to correct the error and correctly identify and assign the Ellensburg Formation aquifer to the rights associated with ground water permit G4-29702P.

Discussion of Issue 2

Ecology apparently erred in its original aquifer identification or designation of the City of Zillah's 3rd Avenue (well 2) and Wippco (well 3) wells. ***An effect of this error would be to potentially nullify the original impairment analysis.***

The original impairment analysis did, however, inventory and consider water rights within ¾ mile radius, all of which are perfected within the Ellensburg Formation aquifer. The original analysis also identified 16 domestic wells, all of which range in depth from 60 to 208 feet and withdraw water from the Ellensburg Formation aquifer.

Since G4-29702P issued, no reports or complaints of well interference or impairing conditions have been received by Ecology regarding operations at the City of Zillah wells since G4-29702 issued. The absence of complaints suggest the City's pumping from the Ellensburg Formation aquifer has not had negative effects on neighboring well users. This is likely due to stratification of the aquifer and aquifer characteristics which result in drawdown cones that tend to be steep and narrow. The lack of noticeable negative effects is also likely related to the Ellensburg Formation aquifer's quick response to recharge being the uppermost aquifer. Another factor is likely a lack of need for wells within the City's water service area. Lastly, it should be noted that the majority of the existing Ellensburg Formation aquifer wells only penetrate about 30 % or less of the aquifer's available thickness.

Current review of the Ecology well log database, suggest that few domestic wells have been drilled since the report of exam issued. The few water wells that have been constructed since issuance of G4-29702P do not exceed 280 feet in depth. Area static water levels appear to be healthy and respond well to seasonal recharge. Static water levels taken at City wells 2 and 3 in January, 2008, were 53 and 140 feet, respectively; adjusted for elevation, they are 812 and 676 ft msl, respectively. The relatively high static water level at City well 2 is likely related to it being used only as a standby or backup well presently. The lower static water level at well 2 likely has a dynamic component due to recent pumping and possibly some composite drawdown due to City well 1 approximately 450 feet away.

Given the historic and current status of well densities, aquifer health and aquifer thickness, impairment of existing rights as a result of withdrawals currently being made from the Ellensburg Formation aquifer under G4-29702P is concluded to be unlikely.

Another potential effect of the error would be to require deepening of the authorized wells into the Saddle Mts aquifer under the current construction schedule. Conversely, it could also be argued that the city has met the intent of the authorization in G4-29702P and has effectively perfected this right into the Ellensburg Formation aquifer.

It is reasonably clear and convincing that Ecology erred in the original aquifer designation. It is also reasonably clear that the City's intention was to acquire rights for the Wippco and 3rd Avenue wells and that they relied on Ecology's aquifer designation.

As a result, the CRO Technical Unit respectfully requests that the files associated with G4-29702P be amended to reflect the following:

- City of Zillah well 2, the 3rd Avenue well, is constructed into and withdraws water from the Ellensburg Formation aquifer.

- City of Zillah well 3, the Wippco well, is constructed into and withdraws water from the Ellensburg Formation aquifer.

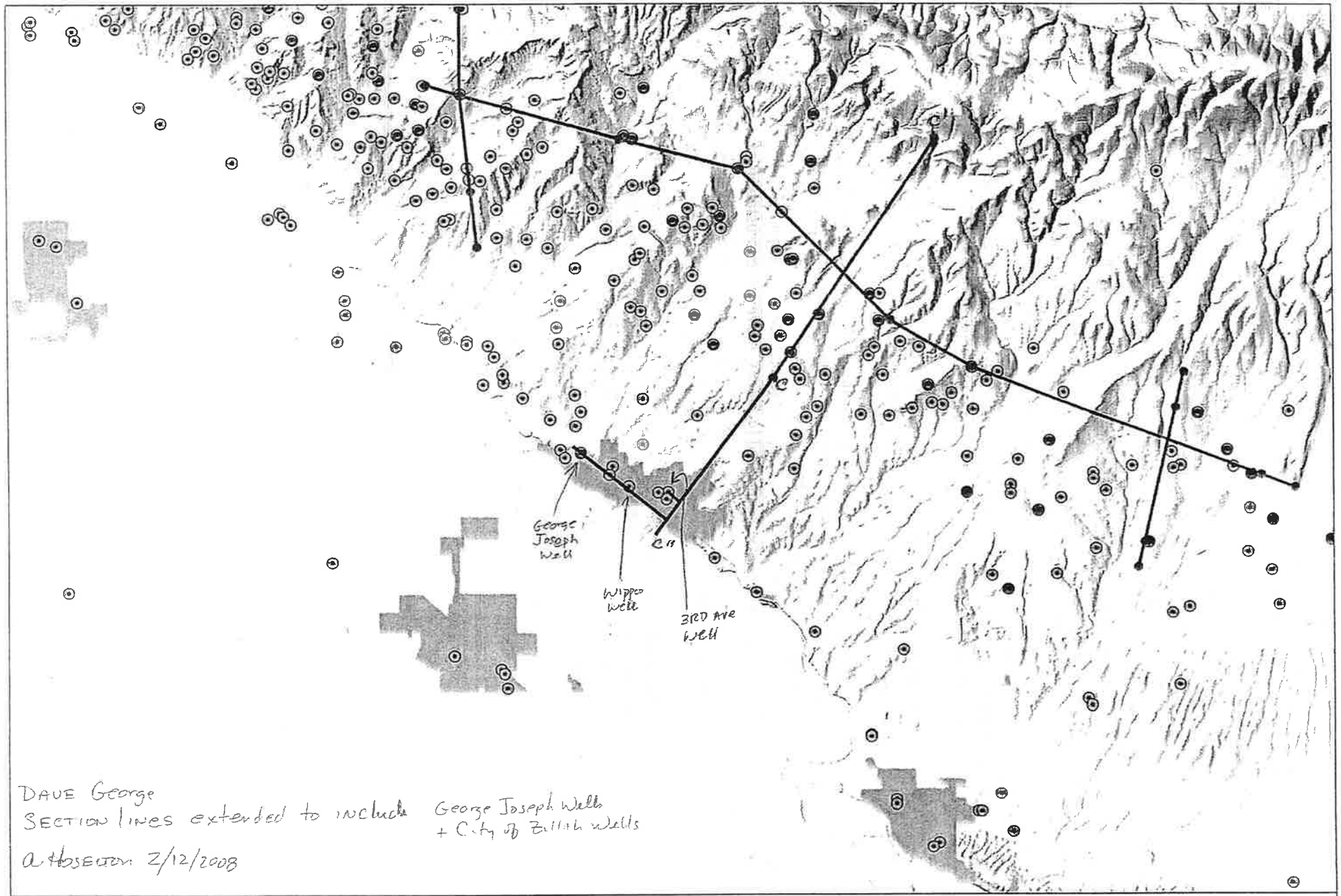
- Impairment of existing Ellensburg Formation aquifer rights, as a result of withdrawals authorized under G4-29702P is concluded to be unlikely.

- As constructed, existing City well 2 and 3, reasonably meet construction requirements for wells developed into the Ellensburg Formation aquifer.

  - ✓ City well 2, the 3rd Avenue well, was shown to be cased to at least 500 feet by down hole video in 1994 as indicated in the City of Zillah, August 2000, Water Right Study.
  - ✓ City well 3, the Wippco well, appears to be cased to a depth of 260 feet. The well may be perforated in places, however, encrustation of the casing made precluded confident identification from the City's 1994 down hole video.

- Any replacement or additional points of withdrawal constructed under ground water permit G4-29702P shall be restricted to the Ellensburg Formation aquifer and be constructed with solid, un-perforated, un-screened casing to a minimum depth of 300 feet.

2/19/2008



DAVE George
SECTION lines extended to include George Joseph Wells + City of Billings Wells
A HOSEATON 2/12/2008

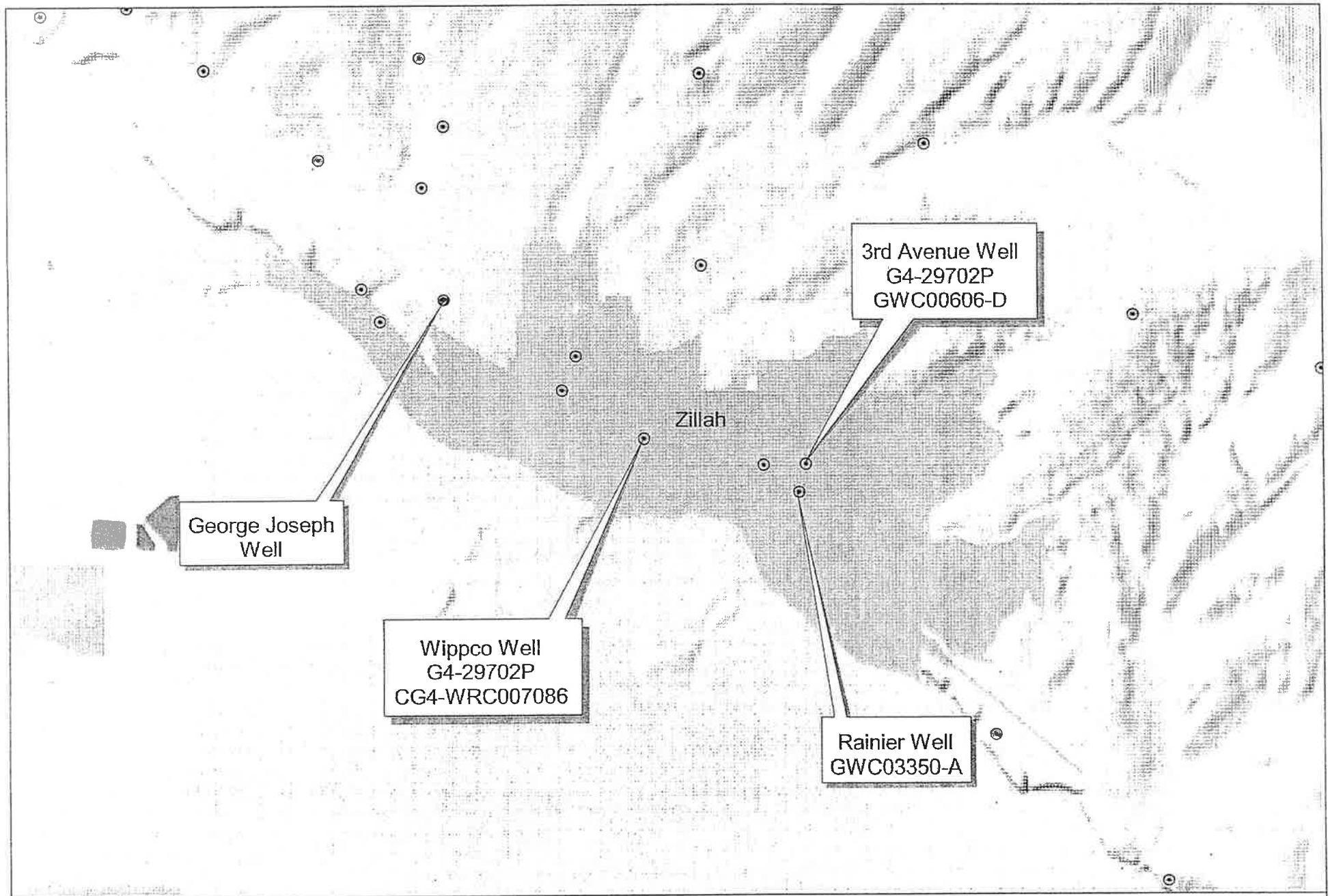
ArcView Quick Map

4167 0 4167 8334 Feet

1:100000

N

Map p · *2/11/2008*



ArcView Quick Map

1000 0 1000 2000 Feet

1:24000

N

Map printed 2/19/2008

GEORGE JOSEPH WELL
— PROJECTED —

3rd St. WELL
(PROJECTED)

Notes:
3rd Street Well
Appears to Extend
to zone above the EM unit
Even if the EM unit is encountered -
it is only 17 ft thick at the George
Joseph well and underlain by
a very thick RE sedimentary unit
@ ft. 2/19/2008

EM

RE

PO

SE

UM

DRAFT
Extension of C-C'
done by A. Haselton
Feb 19, 2008

JOHN BALDWIN

CENTRAL POINT

EM

RE

PO

SE

UM

HASTON

WAHKAPUM

DAVE GEORGE X-SECTION

HORIZONTAL SCALE

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Central Region Office
1250 West Alder St., Union Gap, WA 98903-0009 • 509-575-2490

SENT VIA EMAIL

August 5, 2022

City of Zilla
PO Box 475
Zillah, WA 98953-0475
Email: sbounds@cityofzillah.us

Re: Water Right No. G4-29702

Dear City of Zillah:

In response to your request, you are hereby granted an extension to put the water to full beneficial use for the reason(s) below:

- Upgrading and making improvements to the City's water system infrastructure and wells
- Continue to upgrade the existing Water System in an effort to increase the efficiency and longevity of the system
- Increase the water service area to match the established urban growth boundary

The new deadline to submit your *Proof of Appropriation of Water* is **July 31, 2031**.

If you have any questions, please contact the Water Resources Help Desk at (509) 575-2597.

YOUR RIGHT TO APPEAL

You have a right to appeal this Decision to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Decision. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Decision:

- File your appeal and a copy of this Decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION	
Street Addresses	**Mailing Addresses**
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey WA 98503 **Pollution Control Hearings Board** 1111 Israel Road SW, Ste. 301 Tumwater WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia WA 98504-0903

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov
To find laws and agency rules visit the Washington State Legislature Website: http://www.leg.wa.gov/CodeReviser

Sincerely,

Heather Simmons, Interim Section Manager
Water Resources Program
Central Regional Office

HS:KJ:aa (220811)

Enclosures: Your Right to Be Heard
Proof of Appropriation of Water
Water Measurement Requirements, Form 1, Form 2, Telemetered Metering Options
FAQ – Extensions Request WR Permits and Change Auth.

By certified mail: **Sent electronically with read receipt, delivery confirmation/notification**

cc: Phil Rigdon, Yakama Nation – ecc

The City Of Zillah
THE HEART OF WINE COUNTRY

July 23, 2021

Trevor Hutton
Department of Ecology
Central Regional Office
1250 Alder St
Union Gap, WA 98903

Re: Water Right Permit Extension (G4-29702P)
City of Zillah, Yakima County Washington

Dear Trevor:

The purpose of this letter is to request an extension for Ground Water Permit No. G4-29702 (Permit) on behalf of the City of Zillah (City). This extension will provide the City with additional time to put the full quantity of water provided in the Permit to beneficial use. The current deadline is July 31, 2021 but for the reasons discussed below the City is requesting to extend the deadline date by an additional 10 years (July 31, 2031) which should correspond with the projected date of the City's next water system plan. Note that the Department of Health (DOH) is allowing 10-year plan renewals instead of 6-year renewals for some water system plans, and our next plan is expected to be approved in 2021.

Permit Background

The Permit is currently, one of four water rights supplying the City's Water System (ID No. 99800W) which serves over 3,000 people within the City's Urban Growth Area. The Permit authorizes the withdrawal of 2,000 gallons per minute (gpm) and 1,458.1 acre-feet/year (ac-ft/yr) from two City wells (named the "Wippco Well" and the "3rd Avenue Well"). The Permit allocates 600 ac-ft/yr for the irrigation of 150 acres and 858.1 ac-ft/yr for continuous municipal and domestic use. This water right is limited by a provision that states: The combined withdrawal between the City's three existing water rights and this right shall not exceed 2,550 gpm and 1,458.1 ac-ft/yr. Attributes of the Permit are presented below in Table 1.

Table 1. Attributes of Water Right Permit No. G4-30642P

Water Right Permit No.	G4-29702P
Original Owner	City of Zillah
Instantaneous Flow, Qi, gpm	2,000
Annual Withdrawal, Qa, ac-ft/yr	1,458.1
Priority Date	February 28,1988
Points of Withdrawal	Wippco Well and 3rd Ave Well
Purpose of Use	Municipal and Irrigation
Season of Use	Continuous (Municipal) and Seasonal (Irrigation)

We have consulted Ecology's policy on permit extensions, POL 1050, and have included information that we believe is relevant to Ecology's review of our permit extension request. This policy requires the applicant file for an extension to demonstrate good cause, good faith, and due diligence in meeting the development schedule. This includes information on population growth, expenditures the City has made to invest in additional water system infrastructure, and forecasted future planning estimates to support the need for continued development of the permit as issued.

Ecology's Policy 1050 states:

> *For good cause and due diligence, the department shall extend any phase of the development schedule (BC, CC, and PA sates), and shall grant a further period or periods of time as may be reasonably necessary, having due regard to the good faith of the applicant, the public interests affected, and the nature and scope of the project.*

This policy requires the applicant file for an extension to demonstrate good cause, good faith, and due diligence in meeting the development schedule. It also states Ecology should consider whether the initial development schedule provided sufficient time given the scope and nature of the project.

Recent Due Diligence Under Permit

Since the issuance of the superseding permit (2008) the City has made several upgrades to their water system in an effort to put the water to full beneficial use. The recent upgrades are presented in the current Water System Plan and below in Table 2.

Table 2. Recent Water System Improvements

Year	Improvement Description	Construction Costs
2009	Zillah Lakes Development constructed	Unknown (private)
2010	Cutler Way 613,000-gallon reservoir and Zone 2 booster pump station constructed	$2,530,000
2014	Water System Plan Update	$85,000
2018	Source Well improvements	$2,208,000
2020	Vintage Valley water improvement	$638,000

In addition to the Water System upgrades listed above, the City also has also made several improvements in an effort to stay consistent with their "Water Use Efficiency Program" which is outlined in the City's most recent Water System Plan. While actively trying to conserve water and reduce the average equivalent residential units (ERU) water consumption across all user classes the City has replaced water service lines, valves and distribution mains that were leaking and completed a major well rehab project which included installation of new source meters.

As a result of the City's Water Use Efficiency Program the City has reduced single-family residential water consumption by 12 gallons per service per day (since 2014). This is equivalent to about a 7 percent reduction in consumption per single-family residential service/ERU. Moving forward the City plans on reducing the residential and commercial water consumption per service

by 1 percent over the next 10-year period. If successful, approximately 828,000 gallons of water would be saved annually over the next 10-year period.

Continued Due Diligence Under the Permit

Evidence of continued due diligence to put the full water right quantities to beneficial use includes the following actions.

Future Water System Improvements

Demonstrating good faith and due diligence to develop the project and put water to beneficial use, the City has identified and prioritized future projects to increase the efficiency and longevity of the existing Water System. Table 3 and Table 4 presents a prioritized list of the required and/or recommended improvements for the Water System over the next 10 years (Section 8 of most current Water System Plan).

Table 3. Prioritized List of O&M Improvements for Next Ten Years (2031)

Priority	Description	Estimated Cost
1	Source Well Protection Covenants	$20,000
2	Meter Replacement Project	$6,000 (annually)
3	Department of Health Sanitary Survey	$5,000
4	Reservoir Cleaning and Inspection	$24,000 (once every 5 years)
5	Rainer Ave Well Rehabilitation	$132,500
6	Third Ave Well Rehabilitation	$50,000
7	Wippco Well Rehabilitation	$132,500
8	Water System Plan Update (2031)	$95,000
	Total Costs	$737,375

Table 4. Prioritized List of Recommended Major Capital Improvements (2031)

Priority	Description	Estimated Cost
1	Recoat Existing Reservoirs No. 1 and No. 2	$670,900
2	Construct New Source Well	$1,275,600
3	Reservoir Storage Expansion	$1,098,000
4	Cutler Way Booster Station Pump No. 3	$234,100
5	Zone 2 Booster Station Pump No. 4	$234,100
6	System Disinfection/Chlorination	$500,600
7	Third Ave Well Filtration Improvements	$807,400
8	Zone 2 8-inch Water Main Loop	$206,380
9	Schoentrup Drive to Redo Drive, 8-Inch Water Main Loop	$245,360
10	South First Ave to Miles Drive, 8-Inch Water Main Loop	$171,770
11	Meade Street to S. First Avenue Water Main Loop	$63,970
12	Polluck Avenue Upsize 4-Inch Water Main	$198,540
13	Replace 6-Inch Steel Line in First Avenue from Cheyne Road to Fourth Street	$824,460

14	Replace Existing 4-Inch Water Main in Edson Street and Loop New Piping to Fourth Avenue 8-Inch Water Main	$174,250
15	Collin's Place Water Main Upsize	$120,250
16	Zone 2 Catholic Church Water Main Upsize	$99,850
17	First Avenue 6-Inch Steel Line Replacement	$242,350
18	Industrial Area Water Main Loop	$99,850
19	Fifth Street from Glenwood Dr. to Third Avenue Water Main Upsize	$167,460
	Total Costs	**$7,435,190**

Future Growth Projections

In an effort to meet the put the water to full beneficial use the City is in the process of expanding its service area to match its existing Urban Growth Boundary (Attachment 1). The expansion of service area will increase the total area served (by 723 acres) and the number of connections served which will ultimately enlarge the City's water use. The service area expansion project is currently on a 20-year development schedule will incorporate new commercial, industrial, and residential parcels into the existing Water System (Attachment 2).

Permit Extension Timeline and Rational

The Report of Examination written by Ecology prior to the issuance of the Permit assumed that the City of Zillah would reach a population of 4,000 people by the original Permit deadline (January 1, 2001). However, the population of the City grew much slower than anticipated which has overall postponed the perfection of the Permit. According to population projections listed in the City's most recent Water System Plan the City's population should reach 4,000 people in 2027 (Table 5). Thus, the City is requesting a 10-year permit extension to put the water to full beneficial use in order to serve the intended population and more closely align with regular Water System planning updates.

Table 5. City of Zillah's Past Population Trends and Future Population Projections

Recorded Population Trends (OFM)[1]			Population Projections		
Year	Population	% Increase from Previous Year	Year	Future Population	% Increase from Previous Year
2011	3,000	1.2	2020	3,523	10.6
2012	3,035	1.2	2021	3,589	1.96
2013	3,115	2.6	2022	3,657	1.96
2014	3,140	0.8	2023	3,725	1.96
2015	3,140	0	2024	3,794	1.96
2016	3,145	0.2	2025	3,864	1.83

2017	3,150	0.2	2026	3,935	1.83
2018	3,165	0.5	2027	4,006	1.83
2019	3,185	0.6	2028	4,079	1.83
-	-	-	2029	4,152	1.83
-	-	-	2030	4,226	1.77

[1] Source of Population Data: Washington State Office of Financial Management (OFM)

Conclusion

Since the last permit extension in 2014, the City of Zillah has continued to improve and grow their existing Water System under the Permit to demonstrate good faith and due diligence in accordance with Ecology's Policy 1050.

Moving forward the City is planning to: (1) upgrade the existing Water System in an effort to increase the efficiency and longevity of the system and (2) increase the water service area to match the established urban growth boundary (Attachment 1). These combined efforts will increase both the production capacity and the number of residential, industrial, and commercial connections of the Water System.

Based on the continued, steady growth and improvements to the Water System since issuance of the Permit, the City is requesting a 10-year permit extension to put the water to full beneficial use in order to serve the intended population and more closely align with regular water system planning updates.

We appreciate your consideration of this request. Please find enclosed the $50 processing fee for a single water right. Please direct any questions to myself or Justin Bellamy of HLA by email (jbellamy@hlacivil.com) or phone (509-966-7000).

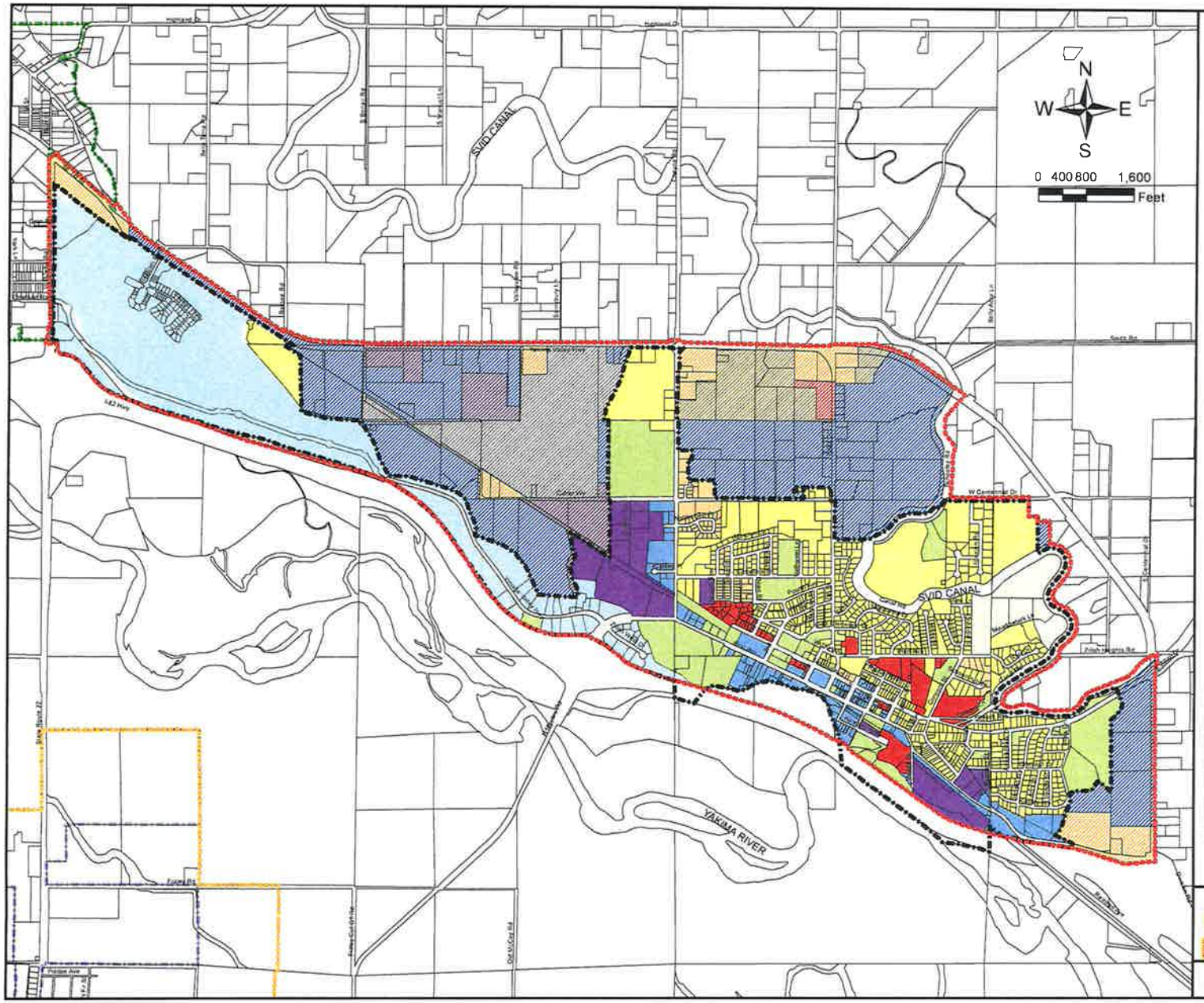
Sincerely,

Sharon Bounds

Sharon Bounds
City Administrator
City of Zillah
sbounds@cityofzillah.us
(509) 829-5151

Attachments: Attachment 1 – Existing and Future Service Area Boundaries
Attachment 2 – Existing Zoning Map

cc: Ecology Cashiering Office
Justin Bellamy, HLA
Tyson D. Carlson, Aspect Consulting



CITY OF ZILLAH

Water System Plan Update

EXISTING ZONING MAP

LEGEND

- Zillah City Limits
- Zillah UGA Boundary
- Zillah Proposed UGA
- Toppenish City Limits
- Toppenish UGA Boundary
- Buena - Yakima County Rural Settlement Boundary

CITY ZONING

- Commercial (C-1)
- Commercial Tourism (CT)
- Light Manufacturing (M-1)
- Public Lands/Church Zone (PC)
- Single Family Residential (R-1)
- Two Family Residential (R-2)
- Multi-Family Residential (R-3)
- Suburban Residential (SR)

YAKIMA COUNTY ZONING

- General Commercial (GC)
- Single Family Residential (R-1)
- Two Family Residential (R-2)
- Remote/Limited Development Potential (RLDP)
- Suburban Residential (SR)
- Light Industrial (M-1)

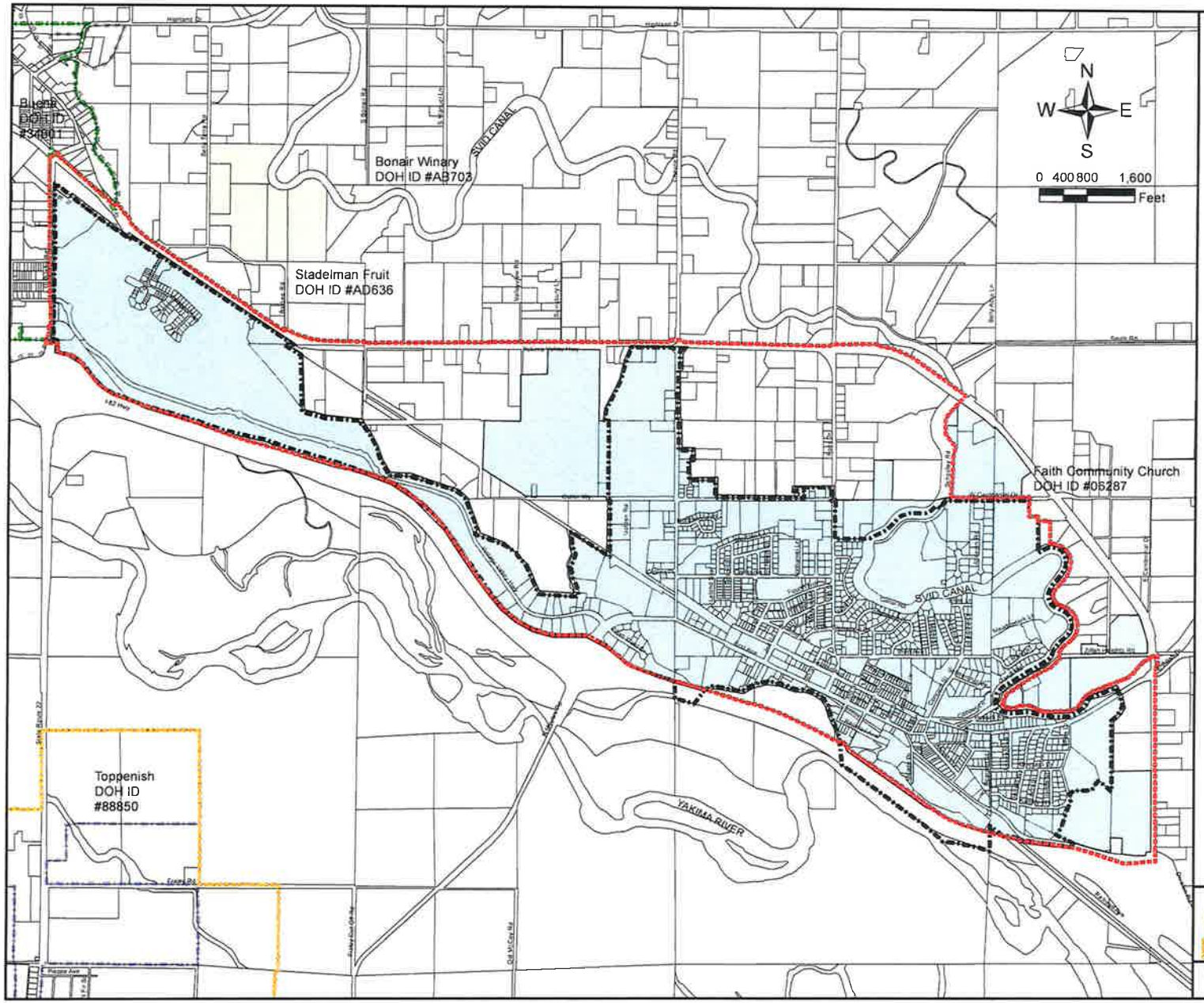
CITY OF ZILLAH

HLA Engineering and Land Surveying, Inc.

2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

03/26/21
Path: P:\arcview\2018\19202\FIG 1-4.mxd

FIGURE 1-4



CITY OF ZILLAH

Water System Plan Update

EXISTING AND FUTURE SERVICE AREA BOUNDARIES

LEGEND

- Zillah City Limits
- Zillah Existing Service Area*
- Future Retail Service Area (UGA)*
- Toppenish City Limits
- Toppenish UGA Boundary
- Buena - Yakima County Rural Settlement Boundary
- Buena - Yakima County Future Service Area
- Private Water Systems

* WATER RIGHTS PLACE OF USE MATCHES THE EXISTING AND FUTURE SERVICE AREA IN ACCORDANCE WITH RCW 90.03.386

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

03-26-21
Path: P:\arcview\2019\19202\FIG 1-2.mxd

FIGURE 1-2

The City Of Zillah

THE HEART OF WINE COUNTRY

P.O. BOX 475 (509) 829-5151
ZILLAH, WASHINGTON 98953

KEY BANK

PAYABLE AT
Key Bank of Washington
ZILLAH OFFICE, ZILLAH, WA 98953

19-57/1250

54546

Check Number

Fifty and o/100's Dollars

PAY TO THE ORDER OF

DATE	CHECK NO.	AMOUNT
7/23/2021	54546	$50.00

Department of Ecology
Cashiering Unit PO Box 47611
Olympia WA 98504-7611

CITY / TREASURER

MAYOR

⑈054546⑈ ⑆125000574⑆ 022039403⑈

DATE	INVOICE	AMOUNT	NOTES
7/23/2021	Invoice - 7/23/2021 8:52:36 AM	$50.00	Processing Fee

11.
WELL LOGS

HLA
Engineering and Land Surveying, Inc.

RETURN TO
DIVISION OF WATER RESOURCES
335 GENERAL ADMINISTRATION
OLYMPIA, WASHINGTON

RAINER WELL
501

RECEIVED
DEPARTMENT OF CONSERVATION
JUN 13 1958
AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

S. F. No. 7328—4-57—6M. 43012.

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS FOR WITHDRAWAL OF GROUND WATER

Under Permit No. G. W. _____

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

1. Town of Zillah, Washington
(Name and address of owner of well or other works for withdrawal of water)
2. Type; name or number of works where water is taken Municipal Well #4
(Well, tunnel or infiltration trench)
3. Date on which work on well or other structure was started January 31, 1958 (spud-in)
4. Date on which work was completed February 19, 1958 - final depth
5. If work on well or other structure was abandoned, give date ---
and reason for abandonment ---
6. DESCRIPTION OF WORKS:

(a) WELL: Depth 280 ft. Diameter 12" in. or ft. Dug or drilled drilled

Flowing or pump well pump Water Temp. _____

IF PUMP WELL: Type and size of pump is vertical turbine 500 GPM

Type and size of motor or engine is 50 Hp. electric motor

Depth from ground surface to water level before pumping 109 feet

After continuous operation for 24 hours (At least four), the measured discharge of the pump is 813 g.p.m., and the drawdown of water level is 119 feet (Pumping level minus static water level)

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
Fully recovered in one hour			

Date of test March 21 - 24, 1958

IF FLOWING WELL: Measured discharge _____ g.p.m. on _____ (Date)

Shut-in pressure at ground surface _____ lbs. per sq. in. on _____ (Date)

Water is controlled by _____ (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

12" in. diameter Standard black steel pipe from 0 to 242 ft.

_____ in. diameter _____ from _____ to _____ ft.

Kind and diameter of casing or screen:

40' Johnson Everdur screen, 12" diam. from 238' 2" to 279' 9" ft.
(Number per foot and size of perforations, or describe screen)

10' of #20 slot; 30' of #60 slot from ____ to ____ ft.

from ____ to ____ ft.

from ____ to ____ ft.

from ____ to ____ ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

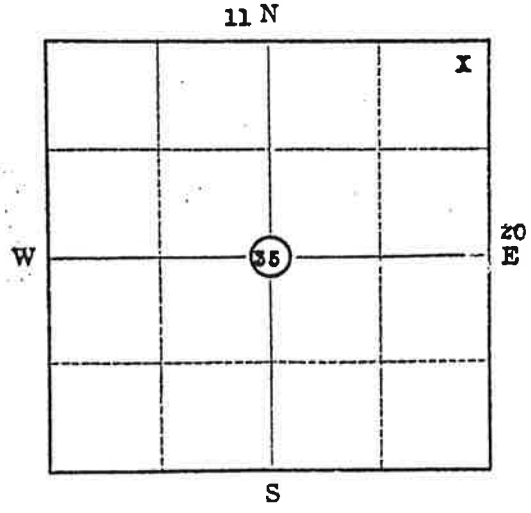
MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Topsoil	2	2
Brown hardpan	3	5
Gray clay	36	41
Brown sandy clay	92	133
Gray clay	12	145
Brown clay	23	168
Hard brown sand and gravel	37	205
Hard sandy silt, gravel & a little clay	25	230
Cemented gravel	5	235
Sand and gravel	10	245
Sand, gravel, silt and pea gravel	18	263
Sand, silt and gravel	17	280

(b) INFILTRATION TRENCH OR TUNNEL: Type ____

Dimensions: ____
(Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ____ ft. Discharge ____ g.p.m. Date of test ____

Position of water bearing stratum with reference to portal of tunnel ____



Scale: 1" = 2000'

Sec. 35 Twp. 11 N. Rge. 20 E

Show approximate location of well or other works with (X) on section plat at left.

MIDLAND DRILLING CO.

By: Eugene A. Jungsand
Signature of well driller or other contractor

Eugene A. Jungsand, Vice President

P. O. Box 637

Walla Walla, Washington
Address

STATE PRINTING PLANT OLYMPIA, WASH., 1957

The Department of Ecology does NOT Warranty Data and/or the Information on this Well Repor

STATE OF WASHINGTOI
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG No. Appli. 4912

Date March 21-24, 1958

Record by well driller

Source driller's record

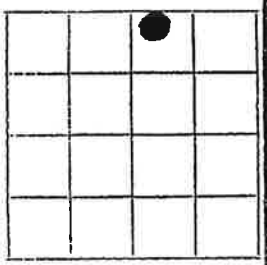


Diagram of Section

Location: State of WASHINGTON

County Yakima

Area

Map

NE¼ NW¼ NE¼ sec. 36 T. 11 N., R. 20 E.

Drilling Co. Midland Drilling Co.

Address Walla Walla, Wash.

Method of Drilling Date, 19

Owner Town of Zillah, Wash.

Address

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Top soil	2	2
	Brown hardpan	3	5
	Gray clay	36	41
	Brown sandy clay	92	133
	Gray clay	12	145
	Brown clay	23	168
	Hard brown sand & gravel	37	205
	Hard sandy silt, gravel & a little clay	25	230
	Cemented gravel	5	235
	Sand & gravel	10	245
	Sand, gravel, silt & pea gravel	18	263
	Sand, silt & gravel	17	280
	PUMP TEST:		
	Dim. 280'x12"		
	SWL: 109 ft.		
	DD: 119 ft.		

Turn up (over) Sheet ____ of ____ sheets

WELL LOG.—Continued No. A 4912

Town of Zillah WA

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Depth forward	———	
	Yield: 813 g.p.m.		
	Type & size of pump: vertical turbine 500 g.p.m.		
	Type & size of motor: 50 h.p. electric motor		
	CASING:		
	12" diam. Std. black steel pipe from 0 to 242 ft.		
	PERFORATIONS:		
	40 ft. Johnson Everdur screen, 12" screen from 238'2" to 279'9"		
	10' of #20 slot; 30' of #30 slot		

S. F. No. 7448—12-54—3M. 40108.

The Department of Ecology does NOT Warranty Data and/or the Information on this Well Report

The Department of Ecology does NOT Warranty Data and/or the Information on this Well Repo

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG No. Dacla. #555
Cert. #606-D

Date 1908, 19

Record by James P. Daley

Source G. W. Dacla Claims

Location: State of WASHINGTON

County Yakima

Area

~~NW~~ E½ SW¼ SE¼

¼ ¼ sec. 25 T. 11 N., R. 20 E. W.

DIAGRAM OF SECTION

Drilling Co.

Address

Method of Drilling drilled Date 1940 19

Owner Town of Zillah

Address Zillah, Washington

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	no record		
Pump Test:			
	Dim: 950' x 12"		
	SWL: 116'		
	Dd: 276'		
	Yield 276 g.p.m.		
	Casing: 12" dia. distances not give		
	8" dasing		
	Pump: Sterling 8", 17 bowl, turbine		
	Motor: 25 hp, 220 U.S. Induction		

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up

Sheet of sheets

12.
PROTECTIVE COVENANTS

HLA
Engineering and Land Surveying, Inc.

AFTER RECORDING RETURN TO:

James C. Carmody
VELIKANJE, MOORE & SHORE, P.S.
P. O. Box 22550
Yakima, WA 98907

DECLARATION OF RESTRICTIVE COVENANTS

(FOR WELL PROTECTION AREA)

Grantor:	**CITY OF ZILLAH**
Grantee:	**CITY OF ZILLAH**
Abbreviated Legal Description:	**S 25, T 11 N, R 20 E** SW SW
Complete legal descriptions are on pages 5, 6, 7 of this document.	
Assessor's Tax Parcel ID No:	**201125-33003** 10, 11 + 12

DATED: 5/2, 2006

DECLARANT/OWNER: **CITY OF ZILLAH, a Washington municipality**
503 First Avenue
Zillah, Washington 98953

SUBJECT PROPERTY (BURDENED PROPERTY). The real property subject to this Declaration of Restrictive Covenants is situated in Yakima County, State of Washington and is described on attached Exhibit A.

7507888
Page: 1 of 12
05/12/2006 03:09P
Yakima Co, WA
CITY OF ZILLAH COV $43.00

INTRODUCTION. The Declarant owns the Subject Property and has constructed or intends to construct a well and waterworks to furnish water for public consumption on the Property. Declarant is required to keep the water supplied from the well free from impurities which might be injurious to the public health. Accordingly, the Declarant desires to set forth covenants, conditions, reservations and restrictions on the Covenant Area described in paragraph 1 below, which prevent certain uses of the property that have the potential to pollute or contaminate the groundwater. The covenants, conditions, reservations and restrictions set forth in this instrument are imposed upon the Subject Property and shall be considered as restrictive covenants running with the title to the Property.

RESTRICTIVE COVENANT

Subject to the terms and conditions set forth below, the Declarant hereby declares and creates the following use restrictions on the Covenant Area described in paragraph 1 below:

1. ***Covenant Area.*** Declarant hereby declares and creates restrictions on the Covenant Area described below which prevent improvements from being constructed upon or the use of the Covenant Area for any purposes which have the potential to pollute or contaminate the groundwater within the Covenant Area, including but not limited to septic systems, sewers, drain fields, spray fields, confined animal feeding operations of any kind, the above or underground storage of hazardous substances of any kind or description, disposal or release of hazardous substances or the housing and enclosing of livestock or animals;

COVENANT AREA – SEE DESCRIPTION ATTACHED HERETO AS EXHIBIT B.

The owner of the Subject Property shall have the right to use the surface of the ground within the Covenant Area for any purpose which is not prohibited and which will not have the potential to pollute or contaminate the groundwater within the Covenant Area.

2. **Binding Effect.** This Declaration shall be binding upon and inure to the benefit of the owner of the Subject Property or the water system located thereon, its successors and assigns, and shall constitute a covenant running with the land.

7507888
Page: 2 of 12
05/12/2006 03:09P
CITY OF ZILLAH COV $43.00 Yakima Co, WA

IN WITNESS WHEREOF, the undersigned have set their hands on the day and year first above written.

OWNER/DECLARANT:

CITY OF ZILLAH

By: Gary V. Clark
Mayor Gary Clark

WITNESSED AND ATTESTED TO:

By: Sharon Bounds
Sharon Bounds, City Clerk

STATE OF WASHINGTON)
) ss.
County of Yakima)

I certify that I know or have satisfactory evidence that **GARY CLARK** is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the Mayor of City of Zillah, a municipality, to be the free and voluntary act of such party for the uses and purposes therein described.

Dated this 1 day of May, 2006.

SHELLI RAE QUANTRELL NOTARY PUBLIC COMMISSION EXPIRES JUNE 14, 2008 STATE OF WASHINGTON

Shelli Rae Quantrell
Shelli Rae Quantrell
(*print name*)
NOTARY PUBLIC in and for the state of Washington, residing at Zillah
My appointment expires June 14, 2008

7507888
Page: 3 of 12
05/12/2006 03:09P
Yakima Co, WA
CITY OF ZILLAH COV $43.00

STATE OF WASHINGTON)
) ss.
County of Yakima)

I certify that I know or have satisfactory evidence that **SHARON BOUNDS** is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the City Clerk of City of Zillah, a municipality, to be the free and voluntary act of such party for the uses and purposes therein described.

Dated this 1 day of May, 2006.

SHELLI RAE QUANTRELL
COMMISSION EXPIRES
NOTARY PUBLIC
JUNE 14, 2008
STATE OF WASHINGTON

Shelli Rae Quantrell
Shelli Rae Quantrell
(print name)
NOTARY PUBLIC in and for the state of Washington, residing at Zillah
My appointment expires June 14, 2008

7507888
Page: 4 of 12
05/12/2006 03:08P
Yakima Co, WA
CITY OF ZILLAH COV $43.00

Parcel "A"

Beginning at a point on the North line of the Southwest Quarter of the Southwest Quarter of Section 25, Township 11 North, Range 20 East, W.M., which said point is 302 feet East of the Northwest corner of said Southwest Quarter of the Southwest Quarter, of said Section 25;
Running thence South and parallel with the West line of said Section 25 a distance of 392 feet, more or less, to an intersection with the northern boundary of the right of way of North Yakima and Valley Railroad;
Thence in a southeasterly direction along said northern boundary a distance of 123.7 feet:
Thence North and parallel with the West line of said Section 25 a distance of 463 feet, more or less, to an intersection with the North line of said Southwest Quarter of the Southwest Quarter of Section 25;
Thence West along said North line a distance of 102 feet to the Point of Beginning.

EXHIBIT A

CITY OF ZILLAH CDV $13.00
7507888
Page: 5 of 12
05/12/2006 03:05P
Yakima Co, WA

Legal Description for Declaration of Well Restrictive Covenant

Parcel Number: 201125-33003
Property Owner: City of Zillah

That portion of the following described Parcel "A" lying within a 75.00 foot radius of the City of Zillah Well. The center of said well being described as follows:

The center of said well is 378.97 feet east of the west line of the Southwest Quarter of the Southwest Quarter of Section 25, Township 11 North, Range 20 East, W.M., as measured perpendicular thereto and 152.00 feet south of the north line of said Southwest Quarter of the Southwest Quarter as measured perpendicular thereto.

Parcel "A"

Beginning at a point on the North line of the Southwest Quarter of the Southwest Quarter of Section 25, Township 11 North, Range 20 East, W.M., which said point is 302 feet East of the Northwest corner of said Southwest Quarter of the Southwest Quarter; of said Section 25;
Running thence South and parallel with the West line of said Section 25 a distance of 392 feet, more or less, to an intersection with the northern boundary of the right of way of North Yakima and Valley Railroad;
Thence in a southeasterly direction along said northern boundary a distance of 123.7 feet:
Thence North and parallel with the West line of said Section 25 a distance of 463 feet, more or less, to an intersection with the North line of said Southwest Quarter of the Southwest Quarter of Section 25;
Thence West along said North line a distance of 102 feet to the Point of Beginning.

EXHIBIT "B"

CITY OF ZILLAH COU $43.00
7507868
Page: 6 of 12
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Yakima Co, WA

SUBJECT PROPERTY (BURDENED PROPERTY). The Real Property on which the covenants and use restrictions set forth below apply to the following described Real Property situated in Yakima County, State of Washington:

SEE ATTACHED EXHIBIT A.

BENEFITED PROPERTY. The use restrictions created in these Covenants shall be appurtenant to the following described Real Property ("Benefited Property") located adjacent to the Covenant Area:

SEE ATTACHED EXHIBIT B.

INTRODUCTION. The undersigned Grantors own the Subject Property described above. The Grantee, the City of Zillah, Washington, owns the Benefited Property described above and operates a well and waterworks supplying water for public use on the property, which is in close proximity to the property owned by Grantors. The City is required to keep the water supplied from its well and waterworks free from impurities which might be injurious to public health. The purpose of these Restrictive Covenants is to prevent certain uses of a portion of the Grantor's property (the "Covenant Area"), which might have the potential to pollute or contaminate the well and water supply. Accordingly, the restrictive covenants set forth in this document are imposed upon the Covenant Area described in paragraph 1 below and shall be construed as a restrictive covenant running with title to the Subject Property.

SUBJECT TO THE TERMS AND CONDITIONS SET FORTH BELOW, THE GRANTORS IN CONSIDERATION OF TEN DOLLARS ($10.00) IN HAND PAID AND OTHER GOOD AND VALUABLE CONSIDERATION, HEREBY AGREE AND COVENANT WITH THE CITY OF ZILLAH, WASHINGTON, ITS SUCCESSORS AND ASSIGNS TO LIMIT USE OF THE COVENANT AREA AS SET FORTH IN PARAGRAPH 1 BELOW.

1. **Use Restrictions (Well Protection Area)**. The Grantors, on behalf of themselves, their heirs, successors and assigns, hereby agree and covenant for the benefit of the owner of the Benefited Property, its successors and assigns to refrain from constructing certain improvements on or using the Covenant Area (described below) for any purpose that would have the potential to pollute or contaminate the groundwater including septic systems, sewers, drain fields, spray fields, confined animal feeding operations of any kind, the above or underground storage of hazardous substances of any kind or description, disposal or release of hazardous substances or the housing and enclosing of livestock or other animals;

COVENANT AREA - SEE DESCRIPTION ATTACHED HERETO AS EXHIBIT C.

CITY OF ZILLAH COV $13.00
7507888
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05/12/2006 03:09P
Yakima Co, WA

AFTER RECORDING RETURN TO:

James C. Carmody
VELIKANJE, MOORE & SHORE, P.S.
P. O. Box 22550
Yakima, WA 98907

RESTRICTIVE COVENANTS
(FOR WELL PROTECTION AREA)

Grantor/Declarant:	**KUNS, DAVID L.** **KUNS, CARLA A.**
Grantee:	**CITY OF ZILLAH**

Abbreviated Legal Description: S 25, T 11 N, R 20 E

Complete legal descriptions are on pages 4, 5, 6 of this document.

Assessor's Tax Parcel ID No: 201125-33002

DATED: May 12, 2006 DLK CAK

DECLARANT/OWNER: **DAVID L. AND CARLA A. KUNS,**
husband and wife
3050 Thacker Road
Zillah, Washington 98953

GRANTEE: **CITY OF ZILLAH, a Washington municipality**
503 First Avenue
Zillah, Washington 98953

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Page: 8 of 12
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Yakima Co, WA
CITY OF ZILLAH CDU $43.00

The owner of the Subject Property shall have the right to use the ground within the Covenant Area for any purpose which is not prohibited above, and which does not have the potential to pollute or contaminate the groundwater and well on the Benefited Property.

2. **Binding Effect**. This Restrictive Covenant shall be binding upon and inure to the benefit of the owner of the Benefited and Burdened Properties, their heirs, successors and assigns, and shall constitute a covenant running with the land.

IN WITNESS WHEREOF, the undersigned have set their hands on the day and year first above written.

OWNER/DECLARANT:

David L. Kuns

DAVID L. KUNS

Carla A. Kuns

CARLA A. KUNS

STATE OF WASHINGTON)
) ss.
County of Yakima)

I certify that I know or have satisfactory evidence that David L. and Carla A. Kuns, husband and wife, are the persons who appeared before me and said persons acknowledged that they signed this instrument and acknowledged it to be their free and voluntary act for the uses and purposes therein mentioned.

Dated this 12 day of May, 2006.

SHELLIRAE QUANTRELL NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES JUNE 14, 2006

Shelli Rae Quantrell
Shelli Rae Quantrell
(*print name*)
NOTARY PUBLIC in and for the state of Washington, residing at Zillah
My appointment expires June 14, 2008

7507888
Page: 8 of 12
05/12/2006 03:09P
Yakima Co, WA
CITY OF ZILLAH COV $43.00

Parcel "A"

Beginning at a point on the North line of the Southwest Quarter of the Southwest Quarter of Section 25, Township 11 North, Range 20 East, W.M., 674.9 feet West of the Northeast corner thereof;
Thence West along said North line 241.8 feet;
Thence South 0°31' West to the Northerly right of way line of the Northern Pacific Railroad;
Thence Southeasterly along said right of way line to a point bearing South 0°31' West from the point of beginning;
Thence North 0°31' East to the Point of Beginning.

EXCEPT any portion lying Southerly of the following described line:

Commencing at a point on the North line of said Southwest Quarter of said Southwest Quarter, 674.9 feet West of the Northeast corner thereof;
Thence South 0°31' West 437.50 feet to a point marked by a ½" rebar per that Survey recorded in Book 63 of Surveys, Page 70, under Auditor's file No. 3137911, records of Yakima County, Washington and the true point of beginning;
Thence South 86°17'31" West 240.35 feet, more or less, to terminate at said Northerly right of way line of the Northern Pacific Railroad, said termination point being marked by a 3/8" rebar and plastic cap as shown on that Survey recorded in Book 61 of Surveys, Page 60, under Auditor's file No. 3101549, records of Yakima County, Washington.

EXHIBIT A

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Yakima Co, WA

Parcel "A"

Beginning at a point on the North line of the Southwest Quarter of the Southwest Quarter of Section 25, Township 11 North, Range 20 East, W.M., which said point is 302 feet East of the Northwest corner of said Southwest Quarter of the Southwest Quarter; of said Section 25;
Running thence South and parallel with the West line of said Section 25 a distance of 392 feet, more or less, to an intersection with the northern boundary of the right of way of North Yakima and Valley Railroad;
Thence in a southeasterly direction along said northern boundary a distance of 123.7 feet:
Thence North and parallel with the West line of said Section 25 a distance of 463 feet, more or less, to an intersection with the North line of said Southwest Quarter of the Southwest Quarter of Section 25;
Thence West along said North line a distance of 102 feet to the Point of Beginning.

EXHIBIT B

7507888
Page: 11 of 12
05/12/2008 03:09P
Yakima Co, WA
CITY OF ZILLAH COV $43.00

Legal Description for Well Restrictive Covenant

Parcel Number: 201125-33002
Property Owner: David L. and Carla A. Kuns

That portion of the following described Parcel "A" lying within a 75.00 foot radius of the City of Zillah Well. The center of said well being described as follows:

The center of said well is 378.97 feet east of the west line of the Southwest Quarter of the Southwest Quarter of Section 25, Township 11 North, Range 20 East, W.M., as measured perpendicular thereto and 152.00 feet south of the north line of said Southwest Quarter of the Southwest Quarter as measured perpendicular thereto.

Parcel "A"

Beginning at a point on the North line of the Southwest Quarter of the Southwest Quarter of Section 25, Township 11 North, Range 20 East, W.M., 674.9 feet West of the Northeast corner thereof;
Thence West along said North line 241.8 feet;
Thence South 0°31' West to the Northerly right of way line of the Northern Pacific Railroad;
Thence Southeasterly along said right of way line to a point bearing South 0°31' West from the point of beginning;
Thence North 0°31' East to the Point of Beginning.

EXCEPT any portion lying Southerly of the following described line:

Commencing at a point on the North line of said Southwest Quarter of said Southwest Quarter, 674.9 feet West of the Northeast corner thereof;
Thence South 0°31' West 437.50 feet to a point marked by a ½" rebar per that Survey recorded in Book 63 of Surveys, Page 70, under Auditor's file No. 3137911, records of Yakima County, Washington and the true point of beginning;
Thence South 86°17'31" West 240.35 feet, more or less, to terminate at said Northerly right of way line of the Northern Pacific Railroad, said termination point being marked by a 3/8" rebar and plastic cap as shown on that Survey recorded in Book 61 of Surveys, Page 60, under Auditor's file No. 3101549, records of Yakima County, Washington.

EXHIBIT "C"

7507888
Page 12 of 12
05/12/2006 03:09P
Yakima Co, WA

13.
SUSCEPTIBILITY ASSESSMENT SURVEY FORMS

HLA
Engineering and Land Surveying, Inc.

COPY

Ground Water Contamination Susceptibility Assessment Survey Form

Version 2.1b

IMPORTANT! **Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.**

PART I: System Information

Well owner/manager : City of Zillah

Water system name : City of Zillah

County: Yakima

Water system number: 99800 W Source number: S01

Well depth: 280' (ft.) (*From WFI form*)

Source name: Rainier well

WA well identification tag number: ___ ___ ___-___ ___ ___

__x__ well not tagged

Number of connections: 885 Population served: 2080

Township: 11 N. Range: 20 E.W.M.

Section: 36 1/4 1/4 Section: NE 1/4, NW 1/4, NE 1/4

Latitude/longitude (if available): 46°, 24', 10" 120°, 15', 31"

How was lat./long. determined?

_____ global positioning device _____ survey __x__ topographic map
___other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 2 /19 /58 month/day/year

last reconstruction: ___ / ___ /___ month/day/year

_____ information unavailable

2) Well driller: Midland Drilling Co.

Eugene J. Jungmann

__ well driller unknown

3) Type of well:

X Drilled: __ rotary __ bored X cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other: _____

Additional comments: _____

4) Well report available? X YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 550 (gallons/min)

Source of information: Meter at well house

If not documented, how was pumping rate determined? _____

__ Pumping rate unknown

6) Is this source treated? NO

If so, what type of treatment:

__ disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained: __ YES __ NO

Residual level: _____ (*At the point closest to the source.*)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft _X_ 20–50 ft ___ 50–100 ft ___ 100–200 ft ___ >200 ft

___ information unavailable (*'<' means less than; '>' means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft ___ 20–50 ft ___ 50–100 ft _X_ >100 ft

___ flowing well/spring (artesian)

How was water level determined?

_X_ well log ___ other: _____

109' depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure: Unknown

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES _X_ NO

5) Wellhead elevation (height above mean sea level): 850 (ft)

How was elevation determined? _X_ topographic map ___ Drilling/Well Log ___ altimeter

___ other: _____

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_x_ evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer? _x_ YES ___ NO

___ information unavailable

7) Sanitary setback:

X < 100 ft* ___ 100–120 ft ___ 120–200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

Resident's approx. 60' away east and west

8) Wellhead construction:

X wellhead enclosed in a wellhouse

X controlled access (describe): Locked door

___ other uses for wellhouse (describe): _____

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('< ' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('< ' *means less than*)

___ > 18 ft ('> ' *means greater than*)

X depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

X < 10 in/yr ___ 10–25 in/yr ___ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: ~~57,272,000~~ 142,728,000 (gallons)

~~How was this determined?~~

X meter

___ estimated: X pumping rate (550 GPM)

X pump capacity (550 GPM)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : ~~440~~ 800 (ft)

1 year ground water travel time : ~~620~~ 980 (ft)

5 year ground water travel time: ~~1,390~~ 2550 (ft)

10 year ground water travel time: ~~1,970~~ 3590 (ft)

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/open interval: 10' #20; 30' #50 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

Comments: The wastewater treatment plant is located at a down gradient elevation of 800'

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application				X
stormwater injection wells				X
other injection wells				X
abandoned ground water well				X
landfills, dumps, disposal areas				X
known hazardous materials clean-up site				X
water system(s) with known quality problems				X
population density > 1 house/acre	X	X	X	
residences commonly have septic tanks				X
Wastewater treatment lagoons				X
sites used for land application of waste				X

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

UNKNOWN

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	X
< 2 mg/liter nitrate	___	___
2–5 mg/liter nitrate	___	___
> 5 mg/liter nitrate	X	___
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	___
VOCs detected at least once	___	___
VOCs never detected	___	X
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	X
___ EDB/DBCP tests required but not yet completed		
___ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected (pesticides and other synthetic organic chemicals)	___	___

___ Other SOC tests performed but none detected
(list test methods in comments

X Other SOC tests not performed

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

X YES ___ NO

Describe with references to map produced in Part IV:

The Yakima River is located down gradient

The Sunnyside canal located north of well

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES X NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

X YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES X NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	___	___
6 month–1 year travel time	___	___	___
1–5 year travel time	___	___	___
5–10 year travel time	___	X	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	___	___
1–5 year travel time	___	___	___
5–10 year travel time	X	___	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

UNKNOWN

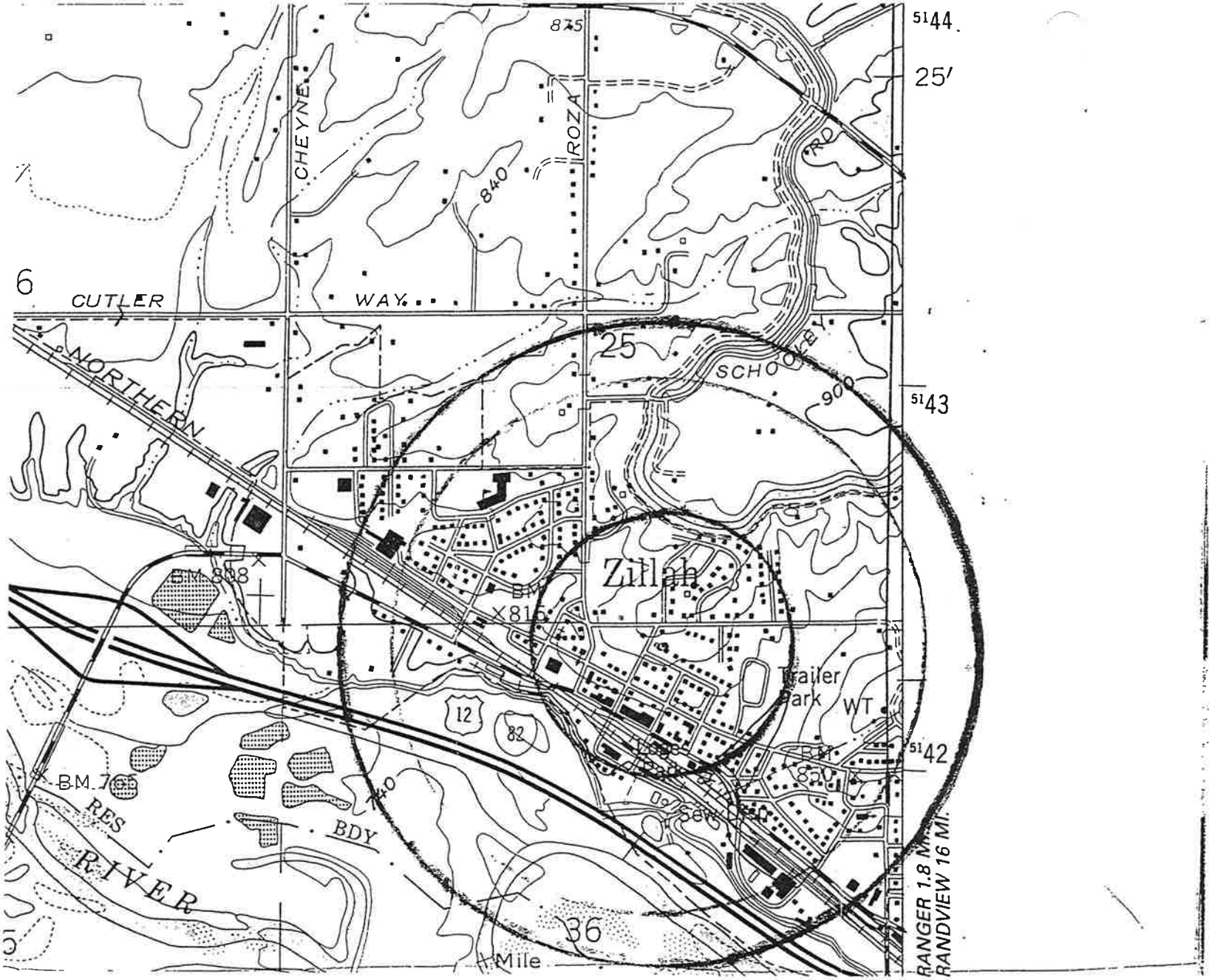
Suggestions and Comments

Did you attend one of the susceptibility workshops? ___ YES X NO

Did you find it useful? ___ YES ___ NO

Did you seek outside assistance to complete the assessment? X YES ___ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.



RAINIER AVE WELL 501

5 YRS

1 YRS

6 MO

Copy

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1b

Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

System Information

...manager : City of Zillah

...m name : City of Zillah

Yakima

...m number: 99800 W Source number: S02

... 800' (ft.) (*From WFI form*)

...me: Third Ave. well

... Identification tag number:___ ___ ___-___ ___ ___

__X__ well not tagged

... connections: 885 Population served: 2080

... 11 N Range: 20

... 25 1/4 1/4 Section: E1/2, SW 1/4, SE 1/4

...ngitude (if available): 46°, 24', 13" 120°, 15', 28"

... lat./long. determined?

_____ global positioning device _____ survey __X__ topographic map
___other: _____

Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Well Construction and Source Information

... originally constructed: ___ / ___ /08 month/day/year

last reconstruction: 6 / 1 /87 month/day/year Video taped well

_____ information unavailable

2) Well driller: _____

_____

_____

X well driller unknown

3) Type of well:

X Drilled: ___ rotary ___ bored X cable (percussion) ___ Dug

___ Other: ___ spring(s) ___ lateral collector (Ranney)

___ driven ___ jetted ___ other: _____

Additional comments: _____

_____

4) Well report available? ___ YES (attach copy to form) X NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 325 (gallons/min)

Source of information: Meter

If not documented, how was pumping rate determined? Meter

_____

___ Pumping rate unknown

6) Is this source treated? NO

If so, what type of treatment:

___ disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

_____

7) If source is chlorinated, is a chlorine residual maintained: ___ YES ___ NO

Residual level: _____ (*At the point closest to the source.*)

Hydrogeologic Information

...th of open interval: [check one]

__ 20 ft __ 20–50 ft __ 50–100 ft X 100–200 ft __ >200 ft

__ information unavailable (*'<' means less than; '>' means greater than*)

...ground water (static water level):

__ < 20 ft __ 20–50 ft __ 50–100 ft X > 100 ft

__ flowing well/spring (artesian)

...was water level determined?

__ well log X other: Air line and Video Tape

__ depth to ground water unknown

...is a flowing well or spring, what is the confining pressure: Flowing well

Unk psi (pounds per square inch)
or
_____ feet above wellhead

...If ... is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with ... source: __ YES X NO

...) W... elevation (height above mean sea level): 840 (ft)

... was elevation determined? X topographic map __ Drilling/Well Log __ altimeter

__ other: _____

__ information unavailable

...) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

__ evidence of a confining layer in well log

__ no evidence of a confining layer in well log

...re is evidence of a confining layer, is the depth to ground water more than 20 feet above the ...m of the lowest confining layer? __ YES __ NO

__ information unavailable

7) Sanitary setback:

X < 100 ft* ___ 100–120 ft ___ 120–200 ft ___ > 200 ft

* if less than 100 ft describe the site conditions:

Resident's located within 75'

8) Wellhead construction:

X wellhead enclosed in a wellhouse

___ controlled access (describe): Lock door and fenced

___ other uses for wellhouse (describe): _____

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('< ' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('< ' *means less than*)

___ > 18 ft ('> ' *means greater than*)

X depth of seal unknown

___ no surface seal

___

10) Annual rainfall (inches per year):

X < 10 in/yr ___ 10–25 in/yr ___ ≥ 25 in/yr

P... Mapping Your Ground Water Resource

1) ... olume of water pumped: 159606 (gallons)

... was this determined?

__ meter

__ estimated: __ pumping rate (325 GPM)

__ pump capacity (325 GPM)

__ other: This a back-up we use as needed

2) "C...culated Fixed Radius" estimate of ground water movement:
see Instruction Packet)

... month ground water travel time : 140 (ft)

... year ground water travel time : 200 (ft)

... year ground water travel time: 440 (ft)

...0 year ground water travel time: 620 (ft)

Information available on length of screened/open interval?

__ YES X NO

Length of screened/open interval: Unknown (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? __ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? __ YES X NO (mark and identify on map).

Comments: Waste water treatment plant is located at a down gradient elevation 800'

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application				X
stormwater injection wells				X
other injection wells				X
abandoned ground water well				X
landfills, dumps, disposal areas				X
known hazardous materials clean-up site				X
water system(s) with known quality problems				X
population density > 1 house/acre	X			
residences commonly have septic tanks				X
Wastewater treatment lagoons				X
sites used for land application of waste				X

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*) NONE

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

waste water treatment plant is at a down gradient elevation 800'.

2. Specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. ___ Nitrate MCL = 10 mg/l)

	YES	NO
Results greater than MCL	___	X
1 mg/liter nitrate	___	X
1 - 3 mg/liter nitrate	___	___
3 mg/liter nitrate	___	___
___ Nitrate sampling records unavailable		

B. ___ VOC detection level 0.5 ug/l or 0.0005 mg/l.)

	YES	NO
Results greater than MCL or SAL	___	___
VOCs detected at least once	___	___
VOCs never detected	___	X
___ VOC sampling records unavailable		

C. EDB/DBCP:

(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

	YES	NO
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	X

___ EDB/DBCP tests required but not yet completed

___ EDB/DBCP tests not required

D. Other SOCs (Pesticides):

	YES	NO
Other SOCs detected	___	___

(pesticides and other synthetic organic chemicals)

___ Other SOC tests performed but none detected

(list test methods in comments

X Other SOC tests not performed

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed but no SOCs detected, list test methods here: _____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

X YES ___ NO

Describe with references to map produced in Part IV:

Yakima River is located down gradient; sunnyside canal located North of well.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES X NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel? No log on this well, but other well in area would indicate this.

X YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs...

___ YES _X_ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	___	___
6 month–1 year travel time	___	___	___
1–5 year travel time	___	___	___
5–10 year travel time	___	X	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	___	___
1–5 year travel time	___	___	___
5–10 year travel time	X	___	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Unknown

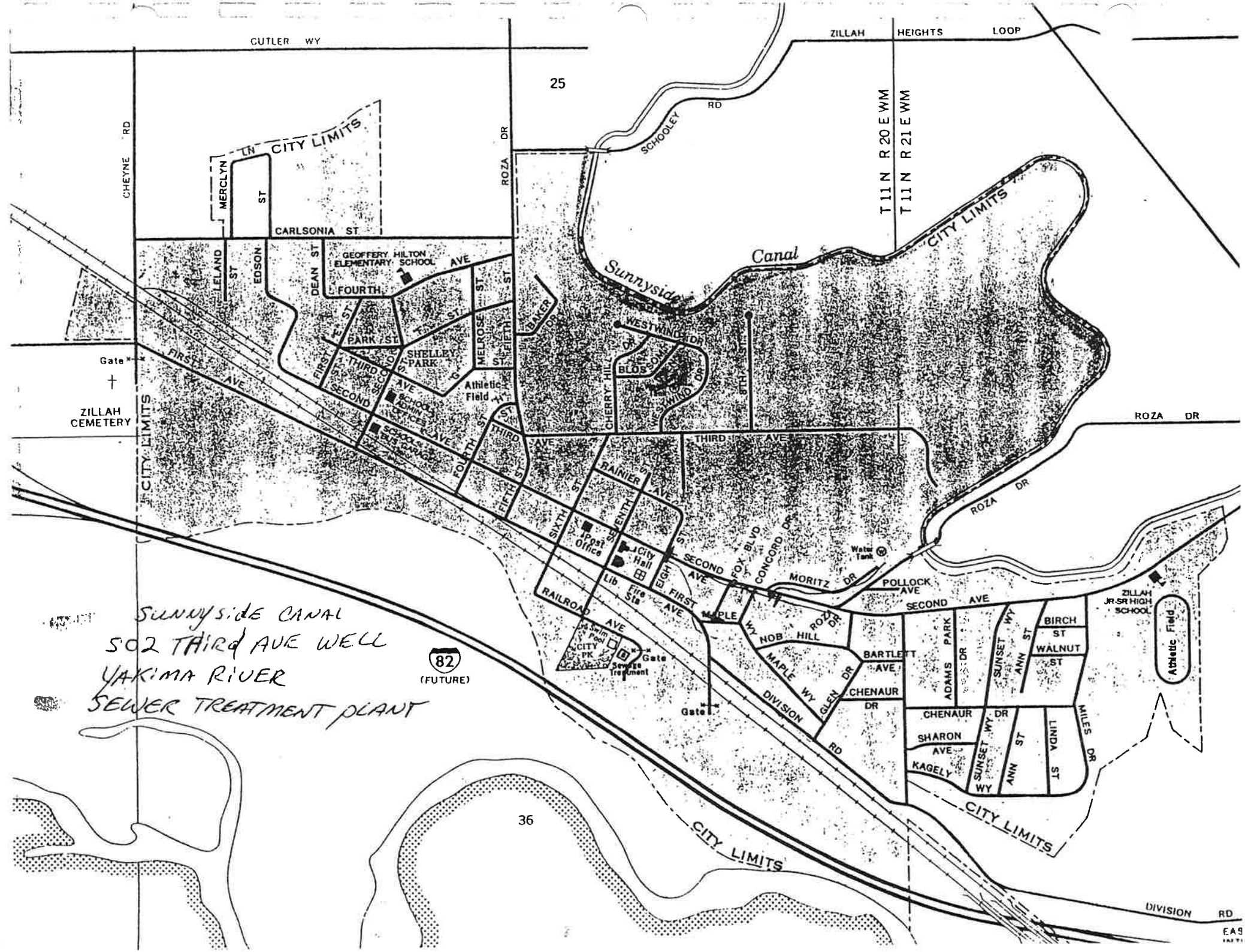
Suggestions and Comments

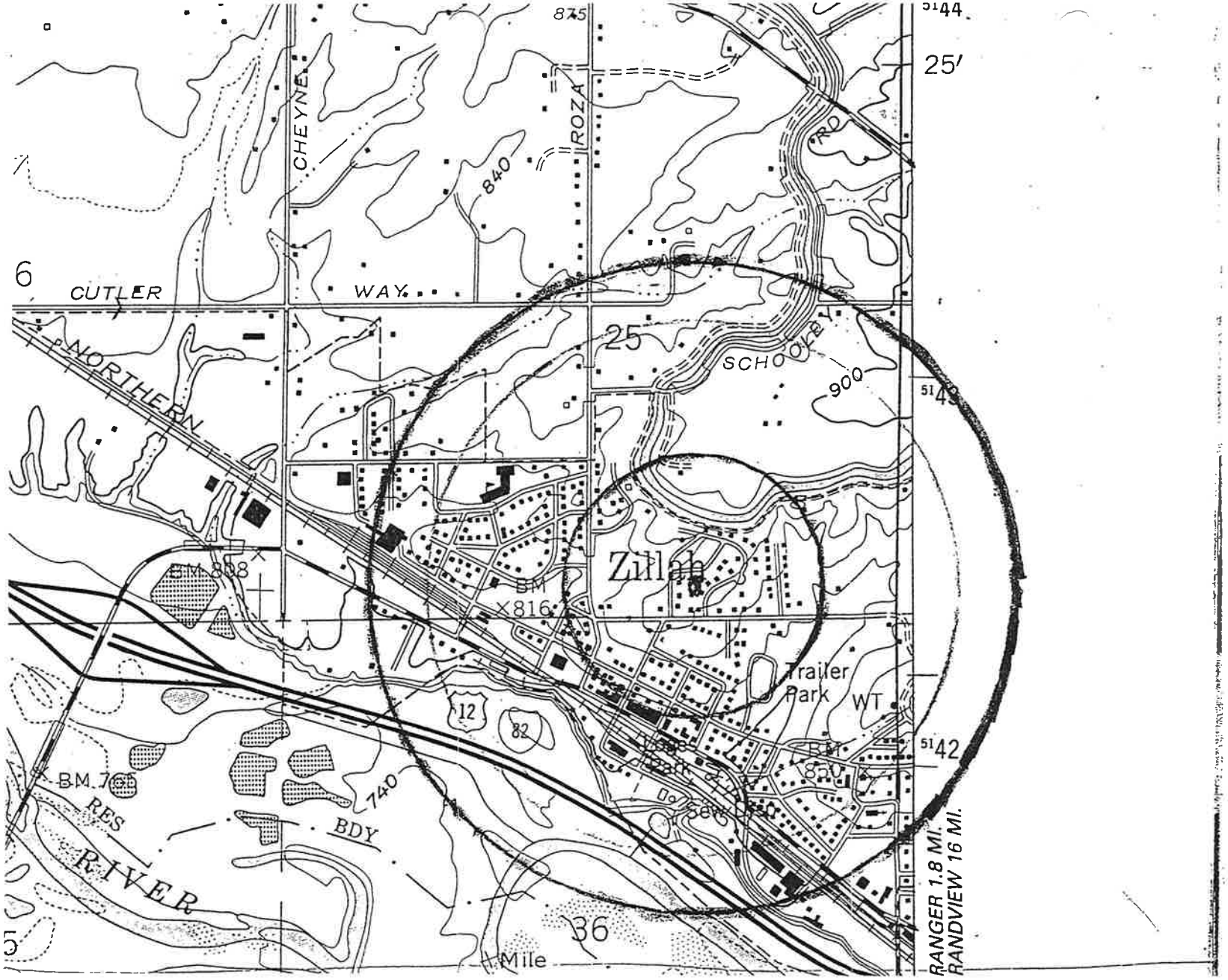
Did you attend one of the susceptibility workshops? ___ YES _X_ NO

Did you find it useful? ___ YES ___ NO

Did you seek outside assistance to complete the assessment? _X_ YES ___ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.


CUTLER WY
ZILLAH HEIGHTS LOOP
25
CHEYNE RD
MERCLYN LN
CITY LIMITS
ST
CARLSONIA ST
ROZA DR
SCHOOLEY RD
T 11 N R 20 E WM
T 11 N R 21 E WM
CITY LIMITS
Sunnyside Canal
LELAND ST
EDSON ST
DEAN ST
GEOFFERY HILTON ELEMENTARY SCHOOL
AVE
FOURTH
PARK ST
SHELLEY PARK
MELROSE ST
BAKER DR
WESTWIND DR
BLOSSOM DR
CHERRY HILL
Gate
FIRST AVE
ZILLAH CEMETERY
CITY LIMITS
SECOND AVE
School Admin Offices
School Bus Garage
Athletic Field
THIRD AVE
ROZA DR
FOURTH AVE
FIFTH ST
SIXTH ST
SEVENTH ST
RAINIER AVE
Post Office
City Hall
Lib.
Fire Sta
EIGHTH ST
FOX BLVD
CONCORD DR
Water Tank
MORITZ DR
POLLOCK AVE
SECOND AVE
ZILLAH JR-SR HIGH SCHOOL
Athletic Field
FIRST AVE
RAILROAD AVE
Swim Pool
CITY PK
Gate
Sewage Treatment
MAPLE
NOB HILL WY
ROZA DR
BARTLETT AVE
CHENAUR DR
ADAMS DR
PARK DR
SUNSET WY
ANN ST
BIRCH ST
WALNUT ST
MAPLE WY
GLEN DR
DIVISION RD
CHENAUR DR
SHARON AVE
KAGELY WY
SUNSET WY
ANN ST
LINDA ST
MILES DR
82
(FUTURE)
Gate
SUNNYSIDE CANAL
502 THIRD AVE WELL
YAKIMA RIVER
SEWER TREATMENT PLANT
36
CITY LIMITS
CITY LIMITS
DIVISION RD



- 3RD AVE WELL 502
- 5 YRS
  1 YRS
  6 MO

COPY

Ground Water Contamination Susceptibility Assessment Survey Form

Version 2.1b

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Water owner/manager : City of Zillah

Water system name : City of Zillah

County: Yakima

Water system number: 99800 W Source number: S03

Well depth: 260' (ft.) (*From WFI form*)

Source name: Whippco well

WA well identification tag number: ___ ___ ___-___ ___ ___

__X__ well not tagged

Number of connections: 885 Population served: 2080

Township: 11 Range: 20 E W.M

Section: 25 1/4-1/4 Section: SW 1/4 of SW 1/4

Latitude/longitude (if available): 46°, 24', 23" , 120°, 16', 06"

How was lat./long. determined?

_____ global positioning device _____ survey __X__ topographic map

____other: _____

- Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 9 / 1 /42 month/day/year

last reconstruction: 1 / 10 /95 month/day/year

_____ information unavailable

2) Well driller: _____

_____

_____

_X_ well driller unknown

3) Type of well:

_X_ Drilled: ___ rotary ___ bored _X_ cable (percussion) ___ Dug

___ Other: ___ spring(s) ___ lateral collector (Ranney)

___ driven ___ jetted ___ other: _____

Additional comments: _____

_____

4) Well report available? ___ YES (attach copy to form) _X_ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 750 (gallons/min)

Source of information: Ponderosa pump system Inc.

If not documented, how was pumping rate determined? Test pumped the well 11-23-94; Also meter at well site

___ Pumping rate unknown

6) Is this source treated? NO

If so, what type of treatment:

___ disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

_____

7) If source is chlorinated, is a chlorine residual maintained: ___ YES ___ NO

Residual level: _____ (*At the point closest to the source.*)

Sanitary setback:

X < 100 ft* ___ 100–120 ft ___ 120–200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

50' from mini storage

Wellhead construction:

X wellhead enclosed in a wellhouse

X controlled access (describe): Locked door

___ other uses for wellhouse (describe): _____

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('< ' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('< ' *means less than*)

___ > 18 ft ('> ' *means greater than*)

X depth of seal unknown

___ no surface seal

___

10) Annual rainfall (inches per year):

X < 10 in/yr ___ 10–25 in/yr ___ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 570350 (gallons)

~~How was this determined?~~

X meter

___ estimated: ___ pumping rate (750)

___ pump capacity (750)

X other: This is a back-up we use only as needed.

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 140 (ft)

1 year ground water travel time : 200 (ft)

5 year ground water travel time: 440 (ft)

10 year ground water travel time: 620 (ft)

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/open interval: 122', 126', 127 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

Comments: Waste water treatment plant is located at a down gradient elevation 800'.

PART V: Assessment of Water Quality

Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	X
stormwater injection wells	____	____	____	X
other injection wells	____	____	____	X
abandoned ground water well	____	____	____	X
landfills, dumps, disposal areas	____	____	____	X
known hazardous materials clean-up site	____	____	____	X
water system(s) with known quality problems	____	____	____	X
population density > 1 house/acre	X	X	X	____
residences commonly have septic tanks	____	____	____	X
Wastewater treatment lagoons	____	____	____	X
sites used for land application of waste	____	____	____	X

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*) NONE

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

Waste water treatment plant is at a down gradient elevation 800'.

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	X
< 2 mg/liter nitrate	___	___
2-5 mg/liter nitrate	___	X
> 5 mg/liter nitrate	___	___
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	___
VOCs detected at least once	___	___
VOCs never detected	___	X
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	X
___ EDB/DBCP tests required but not yet completed		
___ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected	___	___
(pesticides and other synthetic organic chemicals)		

___ Other SOC tests performed but none detected
(list test methods in comments
X Other SOC tests not performed

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	____	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	____	X

___ Source sampling records for bacteria unavailable

Part VI: **Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution**

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

X YES ___ NO

Describe with references to map produced in Part IV:

Yakima River is located down gradient Sunnyside canal located North of well

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES X NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

X YES ___ NO

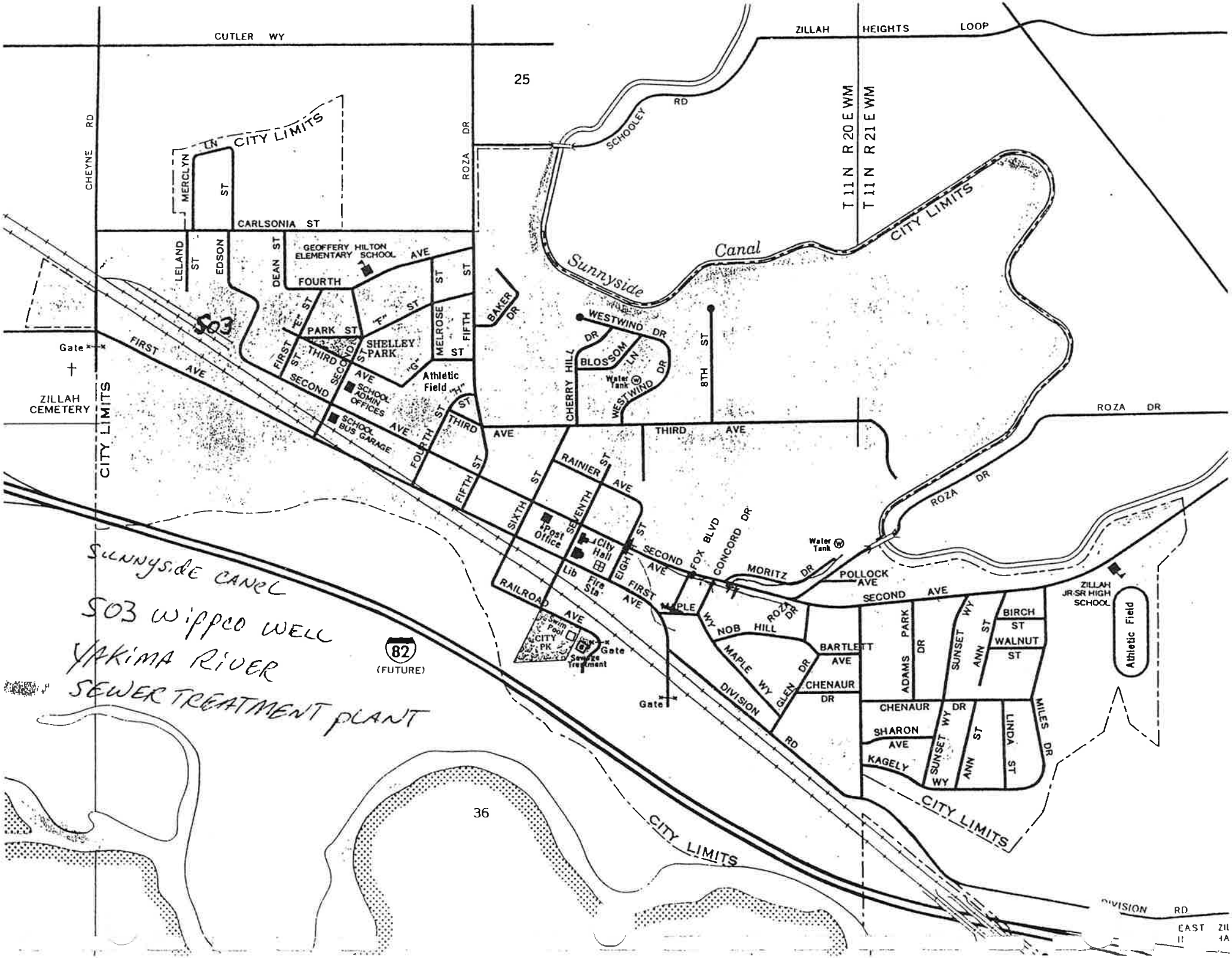
Suggestions and Comments

Did you attend one of the susceptibility workshops? ___ YES X NO

Did you find it useful? ___ YES ___ NO

Did you seek outside assistance to complete the assessment? X YES ___ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.


CUTLER WY
ZILLAH HEIGHTS LOOP
25
CHEYNE RD
MERCLYN LN
CITY LIMITS
ROZA DR
SCHOOLEY RD
T 11 N R 20 E WM
T 11 N R 21 E WM
CARLSONIA ST
LELAND ST
EDSON ST
DEAN ST
GEOFFERY HILTON ELEMENTARY SCHOOL
FOURTH AVE
Sunnyside Canal
CITY LIMITS
SR 823
PARK ST
SHELLEY PARK
MELROSE ST
FIFTH ST
BAKER DR
WESTWIND DR
BLOSSOM LN
CHERRY HILL DR
Water Tank
8TH ST
Gate
FIRST AVE
SECOND AVE
THIRD AVE
Athletic Field
SCHOOL ADMIN OFFICES
SCHOOL BUS GARAGE
ZILLAH CEMETERY
CITY LIMITS
FOURTH ST
RAINIER AVE
SIXTH ST
SEVENTH ST
EIGHTH ST
Post Office
City Hall
Lib
Fire Sta
RAILROAD AVE
Swim Pool
CITY PK
Gate
Sewage Treatment
FOX BLVD
CONCORD DR
MORITZ DR
POLLOCK AVE
ROZA DR
MAPLE
NOB HILL WY
MAPLE WY
GLEN DR
BARTLETT AVE
CHENAUR DR
ADAMS DR
PARK DR
SUNSET WY
ANN ST
BIRCH ST
WALNUT ST
ZILLAH JR-SR HIGH SCHOOL
Athletic Field
SHARON AVE
KAGELY WY
LINDA ST
MILES DR
DIVISION RD
CITY LIMITS
SUNNYSIDE CANAL
SO3 WIPPCO WELL
YAKIMA RIVER
SEWER TREATMENT PLANT
82
(FUTURE)
36
CITY LIMITS
DIVISION RD
EAST ZIL
HA

14.
CITY OF ZILLAH WELLHEAD PROTECTION PLAN

HLA
Engineering and Land Surveying, Inc.

APPENDIX E

ZILLAH WELLHEAD PROTECTION PLAN

This appendix presents the Wellhead Protection Plan for the City of Zillah in compliance with the requirements of WAC 246-290-135.

WELLHEAD PROTECTION AREA (WHPA) DELINEATIONS

DEFINITION OF A WELLHEAD PROTECTION AREA

A wellhead protection area (WHPA) is defined as the surface and subsurface area surrounding a well that supplies a public water system through which contaminants are likely to pass and eventually reach the well (DOH, 1995). In Washington, WHPAs are based on time-of-travel criteria, or the theoretical distance a particle of water travels in a proscribed period of time. At a minimum, the DOH requires communities to look at the following five WHPAs:

- sanitary control area
- 6-month time-of-travel WHPA
- 1-year time-of-travel WHPA
- 5-year time-of-travel WHPA
- 10-year time-of-travel WHPA

A discussion of the WHPAs is provided in the following sections.

Sanitary Control Zone

The sanitary control area is the protective area around the wellhead as required by WAC 246-290-135. According to this statute, the minimum sanitary control area for wells is 100 feet, unless engineering justification supports a smaller area. Conversely, the DOH may require a larger sanitary control area if geological and hydrological data support such a decision.

Time-of-Travel WHPAs

The time-of-travel WHPAs are determined by estimating the travel distance of a hypothetical particle of water traveling through the aquifer to a pumping well for a selected travel time, (e.g., 1 year). The WHPAs define aquifer management regions around the well that can be used to identify and control potential sources of contamination. The management of WHPAs is often done incrementally with the most aggressive management strategies being applied in the 6-month and 1-year WHPAs.

Time-of-travel WHPAs are based on several assumptions. First, time-of-travel criteria do not consider vertical movement of water or contaminants from the land surface to the screened interval of the well. Therefore, time-of-travel zones tend to be inherently conservative. Also, it is assumed that contaminants move at the same rate as water in the subsurface, where actual contaminants may move slower or faster than water. This assumption is also typically conservative because the soil matrix, biological process, and chemical processes tend to retard the transport of contaminants in the subsurface.

Time-of-travel criteria may not be applicable in every situation. The DOH note that in some areas of the state, time-of-travel criteria may not be appropriate if the capture zone is recharged in less than 10 years, if complicated geographic features are present, or if a significant contribution to the well is from a nearby surface source. In these settings, alternate WHPA delineation criteria may be used with DOH approval. Because the City of Zillah's wells do not meet these conditions, time-of-travel criteria are appropriate. A discussion of the 6-month, 1-year, 5-year, and 10-year time-of-travel zones is provided in the following sections.

6-Month Time-of-Travel Zone

The six-month time-of-travel zone represents the surface area overlying the portion of aquifer supplying water to the well within a six-month period. Aggressive management strategies are recommended in the six-month time-of-travel zone because of the limited time a purveyor can respond to contamination in this zone. The six-month time-of-travel zone is vulnerable to both microbial and chemical contamination. EPA literature suggests that bacteria and viruses survive less than one year in groundwater, so potential sources of microbial contamination should be monitored carefully. Similarly, limited response times for mitigation actions following chemical contamination require aggressive control of potential sources of chemical contamination within this zone.

1-Year Time-of-Travel Zone

The one-year time-of-travel zone represents the surface area overlying the portion of aquifer supplying water to the well within a one-year period. As in the six month time-of-travel zone, the susceptibility of the one-year time-of-travel zone to both microbial and chemical contamination requires aggressive controls of potential contamination sources.

5-Year Time-of-Travel Zone

The five-year time-of-travel zone represents the surface area overlying the portion of aquifer supplying water to the well within a five-year period. Microbial contamination in the five-year time-of-travel zone is not a major concern, because existing literature suggests that bacteria and viruses cannot survive for more than one year in groundwater. However, chemical contamination is a concern and potential sources of chemical

contamination should be monitored closely. The primary difference between the five-year time-of-travel zone and the zones closer to the well is that the five-year zone provides an increased response time to mitigate the effects of chemical releases.

10-Year Time-of-Travel Zone

The ten-year time-of-travel zone represents the surface area overlying the portion of aquifer supplying water to the well within a ten-year period. The purpose of the ten-year zone is to control high risk chemical contamination sources, and to encourage long-term planning for contaminant risk reduction. Public education of contamination prevention measures is a key management tool used in protecting this zone.

WELLHEAD PROTECTION AREA DELINEATION METHODS

Several methods exist for delineating wellhead protection areas. These methods range in complexity and cost of implementation. Table E-1 summarizes the relative costs and complexity of the common delineation models.

Table E-1: Costs and Complexity of Common Delineation Methods

Delineation Method	Relative Cost	Relative Complexity
Calculated Fixed Radius Model	Low	Low
Analytical Model	High	Medium
Numerical Model	High	High

A discussion of the delineation methods evaluated for the purposes of this plan is presented in the following sections.

Calculated Fixed Radius Model (CFR)

The CFR model is a simple volumetric flow model used to calculate WHPAs based on time-of-travel criteria. This method involves drawing a circular boundary around a well for a specified time-of-travel (i.e., 1-year). This delineation method is a required element of DOH susceptibility assessments and is calculated by using the following equation:

$Qt = n\pi Hr^2$, where

Q = Pumping rate of the well in ft^3/year
n = Aquifer porosity (assumed to be 0.22 if no other information is available)
H = Screened or open interval of the well in feet
t = Time-of travel selected in years (i.e., 1-Year, 5-Years, etc.)
r = CFR radius of the WHPA in feet

This equation is solved for the radius of the WHPA, which defines a circular time-of-travel zone around the well extended vertically through the aquifer. The CFR denotes a cylinder with a soil matrix pore volume equal to the volume of water pumped during the selected time of travel.

Analytical Model

Analytical models make use of established groundwater flow equations to provide a more accurate delineation of WHPAs. Dozens of equations have been developed for differing hydrogeologic settings and conditions, most of which are based on time-of-travel criteria. Analytical models require more information about hydrogeological conditions than the CFR method, but tend to be more accurate. WHPAs delineated with analytical models tend to be elongated in shape with the majority of the WHPA lying upgradient of the well in the direction of groundwater flow.

Numerical Model

Numerical models are generally accepted as the superior method for the delineation of WHPAs. Numerical models require a significant amount of field information and is based on the formation of a grid that simulates the aquifer in question. At each node in the grid, data on water surface elevation, hydraulic conductivity, and aquifer thickness are input. These data are the input for a matrix of equations that simulate the behavior of the aquifer under varying pumping conditions. These models can be either two-dimensional or three-dimensional and are typically used when complex geologic features are present.

DETERMINATION OF WHPA DELINEATION METHOD

Following a review of the WHPA delineation methods discussed in the previous sections, it was determined that the CFR method is the simplest, most conservative, and generally the most appropriate wellhead delineation method for the City of Zillah at this time. The City will continue to evaluate the adequacy of its WHPAs during its biennial updates and will determine if a more rigorous delineation method is appropriate in the future.

Source Delineations

A summary of the WHPA radii and areas for each of the sources is provided in Table E-2. Because Well No. 2 and Well No. 3 are emergency wells, the City is not required to include them in wellhead protection planning. However, in preparation of future use of these wells, the City has delineated the WHPAs for Well No. 2 and No. 3.

Table E-2: City of Zillah WHPA Characteristics

Source	CFR (in feet)				Area (in acreage)
	6-Month	1-Year	5-Year	10-Year	10-Year
Well No. 1	800	980	2,550	3,590	930
Well No. 2	140	200	440	620	30
Well No. 3	140	200	440	620	30

INVENTORY OF POTENTIAL SOURCES OF CONTAMINATION

After delineating the wellhead protection areas (WHPAs) associated with the three wells located in the City of Zillah, an inventory of existing and potential sources of groundwater contamination was compiled and mapped. Inventorying potential sources of groundwater contamination provides a comprehensive source of information about risks from potential sources of contamination.

DATA COLLECTION METHODOLOGY

In order to facilitate the update of this plan according to the biennial schedule outlined in WAC 246-290-135, existing databases of potential contamination sources were explored. The databases were augmented with a site specific inventory for the City of Zillah WHPAs based on a survey of high risk businesses. The following sections provide a discussion of the available data used to form the potential contamination source inventory and maps of the locations of these sources within the Zillah WHPAs.

Available Data and Databases

The DOE maintains an active hazardous materials management program that manages hazardous materials in the entire State and stores data related to hazardous materials spills, transport, storage and cleanup. The following DOE databases are available:

- Businesses which handle substances that require a material safety data sheet (MSDS)
- Businesses that treat, transport, store, or dispose of hazardous wastes
- Businesses that own and operate underground storage tanks (USTs)
- Sites occupied by leaking underground storage tanks (LUSTs)
- Confirmed or suspected sites of contamination
- Solid waste facilities or landfills

High Risk Businesses

In addition to the available DOE databases of potential contamination sources, a search of high risk businesses was performed based on EPA literature. Table E-3 summarizes types of businesses that may be a risk in WHPAs along with corresponding contaminant types.

Table E-3: Potential Sources of Groundwater Contamination (EPA/625/R-93/002)

Source	Contaminants
Naturally Occurring Sources	
Rocks and soils	*Aesthetic Contaminants*: Iron and iron bacteria; manganese; calcium and magnesium (hardness) *Health and Environmental Contaminants:* Arsenic; asbestos; metals; chlorides; fluorides; sulfates; and microorganisms
Contaminated water	Excessive sodium; bacteria; viruses; low pH (acid) water
Decaying organic matter	Bacteria
Geological radioactive gas	Radionuclides (radon, etc.)
Natural hydrogeological events and formations	Salt-water/brackish water intrusion (or intrusion of other poor quality water); contamination through sink-hole infiltration in limestone terrains
Agricultural Sources	
Animal feedlots and burial areas	Livestock sewage wastes; nitrates; phosphates; chloride; chemical sprays and dips for controlling insect, bacterial, viral, and fungal pests on livestock; coliform [4] and non-coliform bacteria; viruses
Manure spreading areas and storage pits	Livestock sewage wastes; nitrates
Livestock waste disposal areas	Livestock sewage wastes; nitrates
Crop areas and irrigation sites	Pesticides [5], fertilizers [6], gasoline, motor oils from chemical applicators
Chemical storage areas and containers	Pesticides [5]; fertilizers [6]; residues
Farm machinery areas	Automotive wastes [7]; welding wastes
Agricultural drainage wells and canals	Pesticides [5], fertilizers [6]; bacteria; salt water (in areas where the fresh-saltwater interfaces lies at shallow depth and where the water table is lowered by channelization, pumping, or other causes)
Residential Sources	
Common household maintenance and hobbies	*Common Household Products.* [8] Household cleaners; oven cleaners; drain cleaners; toilet cleaners; disinfectants; metal polishes; jewelry cleaners; shoe polishes; synthetic detergents; bleach; laundry soil and stain removers; spot removers and dry cleaning fluid; solvents; lye or caustic soda; household pesticides [9], photochemicals; printing ink; other common products *Wall and Furniture Treatments:* Paints; varnishes; stains; dyes; wood preservatives (creosote); paint and lacquer thinners; paint and varnish removers and deglossers; paint brush cleaners; floor and furniture strippers *Mechanical Repair and Other Maintenance Products:* Automotive wastes [9]; waste oils; diesel fuel; kerosene; #2 heating oil; grease; degreasers for garages; metal degreasers; asphalt/roofing tar; tar removers; lubricants; rustproofers; car wash detergents; car waxes/polishes; rock salt; refrigerants
Lawns and gardens	Fertilizers [5]; herbicides and other pesticides used for lawn and garden maintenance [10]
Swimming pools	Swimming pool maintenance chemicals [11]
Septic systems, cesspools, and sewer lines	Septage; coliform and non-coliform bacteria [4]; viruses; nitrates; heavy metals; synthetic detergents; cooking and motor oils; bleach; pesticides [9] [10], paints; paint thinner; photographic chemicals; swimming pool chemicals [11]; septic tank/cesspool cleaner chemicals [12]; elevated levels of chloride, sulfate, calcium, magnesium, potassium, and phosphate
Underground storage tanks	Home heating oil
Apartments and condominiums	Swimming pool chemicals [11]; pesticides for lawn and garden maintenance and cockroach, termite, ant, rodent, and other pest control [9], [10]; wastes from onsite sewage treatment plants; household hazardous wastes [8]

Table E-3: Potential Sources of Groundwater Contamination (continued)

Source	Contaminants
Municipal Sources	
Schools and government offices and grounds	Solvents; pesticides [9], [10]; acids; alkalis; waste oils; machinery/vehicle servicing wastes; gasoline and oil from storage tanks; building wastes [13]
Park lands	Fertilizers [6]; herbicides [10]; insecticides [9]
Public and residential areas infested with mosquitoes, gypsy moths, ticks, ants, or other pests	Pesticides [5], [9]
Highways, road maintenance depots, and deicing operations	Herbicides in highway rights-of-way [5],[10]; road salt (sodium and calcium chloride); road salt anti-caking additives (ferric ferrocyanide, sodium ferrocyanide); road salt anti-corrosives (phosphate and chromate); automotive wastes [7]
Municipal sewage treatment plans and sewer lines	Municipal wastewater; sludge; [14] treatment chemicals [15]
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments	sewage wastewater; nitrates; other liquid wastes; microbiological contaminants
Land areas applied with wastewater or wastewater byproducts	Organic matter; nitrate; inorganic salts; heavy metals; coliform and non-coliform bacteria [4]; viruses; nitrates; sludge [14]; non-hazardous wastes [16]
Storm water drains and basins	Urban runoff; gasoline; oil; other petroleum products; road salt; microbiological contaminants
Combined sewer overflows (municipal sewers and storm water drains)	Municipal wastewater; sludge [14]; treatment chemicals [15]; urban runoff; gasoline; oil; other petroleum products; road salt; microbial contaminants
Recycling/reduction facilities	residential and commercial solid waste residues
Municipal waste landfills	Leachate; organic and inorganic chemical contaminants; waste from households [8] and businesses [13]; nitrates; oils; metals
Open dumping and burning sites, closed dumps	Organic and inorganic chemicals; metals; oils; wastes from households[8] and businesses [13]
Municipal incinerators	Heavy metals; hydrocarbons; formaldehyde; methane; ethane; ethylene; acetylene; sulfur and nitrogen compounds
Water supply wells, monitoring wells, older wells, domestic and livestock wells, unsealed and abandoned wells, and test hole wells	Surface runoff; effluents from barnyards, feedlots, septic tanks, or cesspools; gasoline; used motor oil; road salt
Sumps and dry wells	Storm water runoff; spilled liquids; used oil; antifreeze; gasoline; other petroleum products; road salt; pesticides;[5] and a wide variety of other substances
Drainage wells	Pesticides [9], [10]; bacteria
Well pumping that causes interaquifer leakage, induced filtration, landward migration of sea water in coastal areas; etc.	Saltwater; excessively mineralized water
Artificial groundwater	Stormwater runoff; excess irrigation water; stream flow; cooling water; treated sewage effluent; other substances that may contain contaminants, such as nitrates, metals, detergents, synthetic organic compounds, bacteria, and viruses

Table E-3: Potential Sources of Groundwater Contamination (continued)

Source	Contaminants
Commercial Sources	
Airports, abandoned airfields	Jet fuels; deicers; diesel fuel; chlorinated solvents; automotive wastes [7]; heating oil; building wastes [13]
Auto repair shops	Waste oils; solvents; acids; paints; automotive wastes [7]; cutting oils
Barber and beauty shops	Perm solutions; dyes; miscellaneous chemicals contained in hair rinses
Boat yards and marinas	Diesel fuels; oil; septage from boat waste disposal areas; wood preservative and treatment chemicals; paints; waxes; varnishes; automotive wastes [7]
Bowling alleys	Epoxy; urethane-based floor finish
Car dealerships	Automotive wastes [7], waste oils; solvents; miscellaneous wastes
Car washes	Soaps; detergents; waxes; miscellaneous chemicals
Campgrounds	Septage; gasoline; diesel fuel from boats; pesticides for controlling pests [5], [9], household hazardous wastes from recreational vehicles (RVs) [8]
Carpet stores	glues and other adhesives; fuel from storage tanks if forklifts are used
Cemeteries	Leachate; lawn and garden maintenance chemicals [10]
Construction trade areas and materials	Solvents; asbestos; paints; glues and other adhesives; waste insulation; lacquers; tars; sealants; epoxy waste; miscellaneous chemical wastes
Country clubs	Fertilizers [6]; herbicides [5],[10], pesticides for controlling pests [9]; swimming pool chemicals [11]; automotive wastes
Dry cleaners	Solvents (perchloroethylene, petroleum solvents, Freon); spotting chemicals (trichloroethane, methylchloroform, ammonia, peroxides, rust removers, etc.)
Funeral services and crematories	Formaldehyde; wetting agents; fumigants; solvents
Furniture repair/finishing shops	Paints; solvents; degreasing and solvent recovery sludges
Gasoline services stations	Oils; solvents; miscellaneous wastes
Golf courses	Fertilizers [6]; herbicides [5], [10] pesticides for controlling pests [9]
Hardware/lumber/parts stores	Hazardous chemical products in inventories; heating oil and fork lift fuel from storage tanks; wood-staining and treating products such as creosote
Heating oil companies, USTs	Heating oil; wastes from truck maintenance areas [7]
Horticultural practices, garden nurseries, florists	Herbicides, insecticides, fungicides, and other pesticides [10]
Jewelry/metal plating shops	Sodium and hydrogen cyanide; metallic salts; hydrochloric acid; sulfuric acid;
Laundromats	Detergents; bleaches; fabric dyes
Medical institutions	X-ray developers [17]; infectious, radiological, and biological wastes; disinfectants; asbestos; beryllium; dental acids; miscellaneous chemicals
Office buildings	Building wastes [13]; lawn/garden maintenance chemicals [10]; gasoline; oil
Paint stores	Paints; paint thinners; lacquers; varnishes; other wood treatments
Pharmacies	Spilled and returned products
Photography shops, photo labs	Biosludges; silver sludges; cyanides; miscellaneous sludges
Print shops	Solvents; inks; dyes; oils; photographic chemicals
Railroad tracks and yards	Diesel fuel; herbicides for rights-of-way; creosote for preserving wood ties
Research laboratories	X-ray developers [17]; infectious, radiological, and biological wastes; drugs; asbestos; disinfectants; beryllium; solvents; infectious materials; disinfectants
Scrap and junk yards	Any wastes from businesses [13] and households [8]; oils
Sports and hobby shops	Gunpowder and ammunition; rocket engine fuel; model airplane glue
Above and underground tanks	Heating oil; diesel fuel; gasoline; petroleum products; commercial chemicals
Transportation services for passenger transit	Waste oil; solvents; gasoline and diesel fuel from vehicles and storage tanks; fuel oil; other automotive wastes [7]
Veterinary services	Solvents; infectious materials; vaccines; drugs; disinfectants (quaternary ammonia, peroxides, bleach); x-ray developers and fixers [17]

Table E-3: Potential Sources of Groundwater Contamination (continued)

Source	Contaminants
Industrial Sources (Presently Operated or Torn Down Facilities) [18]	
Asphalt plants	Petroleum derivatives
Communications equipment manufacturers	Nitric, hydrochloric, and sulfuric acid wastes; heavy metal sludges; copper-contaminated etchant (e.g., ammonium persulfate); cutting oil and degreasing solvent (trichloroethane, Freon, or trichloroethylene); waste oils; corrosive soldering flux; paint sludge; waste plating solution
Electric and electronic equipment manufacturers and storage facilities	Cyanides; metal sludges; caustics (chromic acid); solvents; oils; alkalis; acids; paints and paint sludges; calcium fluoride sludges; methylene chloride; perchloroethylene; trichloroethane; acetone; methanol; toluene; PCBs
Electroplaters	Boric, hydrochloric, hydrofluoric, and sulfuric acids; sodium and potassium hydroxide; chromic acid; sodium and hydrogen cyanide; metallic salts
Foundries and metal fabricators	Paint wastes; acids; heavy metals; metal sludges; plating wastes; oils; solvents; explosive wastes
Furniture/fixtures manufacturers	Paints; solvents; degreasing sludges; solvent recovery sludges
Machine and metalworking shops	Solvents; metals; miscellaneous organics; sludges; oily metal shavings; lubricant and cutting oils; degreasers (tetrachlorethylene); metal marking fluids; mold-release agents
Mining operations, underground storage mines	Mine spoils or tailings that often contain metals; acids; highly corrosive mineralized waters; metal sulfides
Unsealed abandoned mines used as waste pits	Metals, acids; minerals; sulfides; other hazardous and nonhazardous chemicals [16]
Paper mills	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals [16], organic sludges; sodium hydroxide; chlorine; hypochlorite; chlorine dioxide; hydrogen peroxide
Petroleum production and storage companies, secondary recovery of petroleum	Hydrocarbons; oil-field brines (highly mineralized salt solutions)
Industrial pipelines	Corrosive fluids; hydrocarbons; other hazardous and nonhazardous material and wastes [16]
Photo processing laboratories	Cyanides; ;Biosludges; silver sludges; miscellaneous sludges
Plastics materials and synthetics producers	Solvents; oils; miscellaneous organics and inorganics (phenols, resins); paint wastes; cyanides; acids; alkalis; wastewater treatment sludges; cellulose esters; surfactant; glycols; phenols; formaldehyde; peroxides; etc.
Primary metal industries (blast furnaces, steel works, rolling mills)	Heavy metal wastewater treatment sludge; pickling liquor; waste oil; acid tar sludge; alkaline cleaners; degreasing solvents; slag; metal dust
Publishers, printers, and allied industries	Solvents; inks; dyes; oils; miscellaneous organics; photographic chemicals
Public utilities (phone, electric power, gas)	PCBs from transformers and capacitors; oils; solvents; sludges; acid solution; metal plating solutions (chromium, nickel, cadmium); herbicides from utility rights-of-way
Public utilities (phone, electric power, gas)	PCBs from transformers and capacitors; oils; solvents; sludges; acid solution; metal plating solutions (chromium, nickel, cadmium); herbicides from utility rights-of-way
Sawmills and planers	Treated wood residue (copper quinolate, mercury, sodium bazide); tanner gas; paint sludges; solvents; creosote; coating and gluing wastes
Stone, clay, and glass manufacturers	Solvents; oils and grease; alkalis; acetic wastes; asbestos; heavy metal sludges; phenolic solids or sludges; metal finishing sludge
Welders	Oxygen, acetylene
Wood preserving facilities	wood preservatives; creosote

Table E-3: Potential Sources of Groundwater Contamination (continued)

Source	Contaminants
Industrial Sources	
Material stockpiles	Acid drainage; other hazardous and nonhazardous wastes [16]
Waste tailing ponds (commonly for the disposal of mining wastes)	Acids; metals; dissolved solids; radioactive ores; other hazardous and nonhazardous wastes [15]
Transport and transfer stations (trucking terminals and rail yards)	Fuel tanks; repair shop wastes [7], other hazardous and nonhazardous wastes [15]
Above-ground and underground storage tanks and containers	Heating oil; diesel and gasoline fuel; other petroleum products; hazardous and nonhazardous materials and wastes [16]
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments	Hazardous and nonhazardous liquid wastes [16]; septage; sludge [14]
Chemical landfills	Leachate; hazardous and nonhazardous wastes [16]; nitrates
Radioactive waste disposal sites	Radioactive wastes from medical facilities, power plants, and defense operations; radionuclides (uranium, plutonium)
Unattended wet and dry excavation sites (unregulated dumps)	A wide range of substances; solid and liquid wastes; oil-field brines; spent acids form steel mill operations; snow removal piles containing large amounts of salt
Operating and abandoned production and exploratory wells (for gas, oil, coal, geothermal, and heat recovery); test hole wells; monitoring and excavation wells	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals [16]
Dry wells	Saline water from wells pumped to keep them dry
Injection wells	Highly toxic wastes; hazardous and nonhazardous industrial wastes [16]; oil-field brines
Well drilling operations	Brines associates with oil and gas operations

[1] In general, groundwater contamination stems from the *misuse and improper disposal* of liquid and solid wastes; the *illegal dumping or abandonment* of household, commercial, or industrial chemicals; the *accidental spilling* of chemicals from trucks, railways, aircraft, handling facilities, and storage tanks; or the *improper siting, design, construction; operation, or maintenance* of agricultural, residential, municipal, commercial, and industrial drinking water wells and liquid and solid waste disposal facilities. Contaminants also can stem from *atmospheric pollutants,* such as airborne sulfur and nitrogen compounds, which are created by smoke, flue dust, aerosols, and automobile emissions, fall as acid rain, and percolate through the soil. When the sources listed in t his table are used and managed properly, groundwater contamination is not likely to occur.

[2] Contaminants can reach groundwater from activities occurring on the land surface, such as industrial waste storage; from sources below the land surface but above the water table, such as septic systems; from structures beneath the water table, such as wells; or from contaminated recharge water.

[3] This table lists the most common wastes, but not all potential wastes. For example, it is not possible to list all potential contaminants contained in storm water runoff or research laboratory wastes.

[4] Coliform bacteria can indicate the presence of pathogenic (disease-causing) microorganisms that may be transmitted in human feces. Diseases such as typhoid fever, hepatitis, diarrhea, and dysentery can result from sewage contamination of water supplies.

[5] Pesticides include herbicides, insecticides, rodenticides, fungicides, and avicides. EPA has registered approximately 50,000 different pesticide products for use in the United States. Many are highly toxic and quite mobile in the subsurface. An EPA survey found that the most common pesticides found in drinking water wells were DCPA (iacthal) and atrazine, which EPA classifies as *moderately toxic* (Class 3) and *slightly toxic* (Class 4) materials, respectively.

[6] The EPA National Pesticides Survey found that the use of fertilizers correlates to nitrate contamination of groundwater supplies.

[7] Automotive wastes can include gasoline; antifreeze; automatic transmission fluid; battery acid; engine and radiator flushes; engine and metal degreasers; hydraulic (brake) fluid; and motor oils.

[8] Toxic or hazardous components of common household products re noted in Table 3-2.

[9] Common household pesticides for controlling pests such as ants, termites, bees, wasps, flies, cockroaches, silverfish, mites, ticks, fleas, worms, rats, and mice can contain active ingredients including napthalene, phosphorus, xylene, chloroform, heavy metals, chlorinated hydrocarbons, arsenic, strychnine, kerosene, nitrosamines, and dioxin.

[10] Common pesticides used for lawn and garden maintenance (i.e., weed killers, and mite, grub, and aphid controls) include such chemicals as 2.4-D; chlorphyrifos; diazinon; benomyl; captan; dicofol; and methoxychlor.

[11] Swimming pool chemicals can contain free and combined chlorine; bromine; iodine; mercury-based, copper-based, and quaternary algicides; cyanuric acid; calcium or sodium hypochlorite; muriatic acid; sodium carbonate.

[12] Septic tank/cesspool cleaners include synthetic organic chemicals such a 1,1,1 trichloroethane, tetrachloroethylene, carbon tetrachloride, and methylene chloride.

[13] Common wastes from public and commercial buildings include automotive wastes; rock salt; and residues from cleaning products that may contain chemicals such as xylenols, glycol esters, isopropanol, 1,1,1 trichloroethane, sulfonates, chlorinated phenolys, and cresols.

[14] Municipal wastewater treatment sludge can contain organic matter; nitrates; inorganic salts; heavy metals; coliform and noncoliform bacteria; and viruses.

[15] Municipal wastewater treatment chemicals include calcium oxide; alum; activated alum, carbon, and silica; polymers; ion exchange resins; sodium hydroxide; chlorine; ozone; and corrosion inhibitors.

[16] The Resource Conservation and Recovery Act (RCRA) defines a hazardous waste as a solid waste that may cause an increase in mortality or serious illness or pose a substantial threat to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed. A waste is hazardous if it exhibits characteristics of ignitability, corrosivity, reactivity, and/or toxicity. Not covered by RCRA regulations are domestic sewage; irrigation waters or industrial discharges allowed by the Clean Water Act; certain nuclear and mining wastes; household wastes; agricultural wastes (excluding some pesticides); and small quantity hazardous wastes (i.e. less than 220 pounds per month) generated by businesses.

[17] X-ray developers and fixers may contain reclaimable silver, glutaldehyde, hydroquinone, phenedone, potassium bromide, sodium sulfite, sodium carbonate, thiosulfates, and potassium alum.

[18] This table lists potential groundwater contaminants from many common industries, but it does not address all industries.

Susceptibility Assessment Inventory

The City completed required DOH Susceptibility Assessments in 1994; these assessments are included at the end of this appendix. Part of the assessments required the identification of preliminary inventory items for inclusion in a WHPP. Several of these inventory items have already been discussed as part of the available DOE databases, including USTs, LUSTs, and landfills. Additional inventory items include septic tanks, private wells (both active and abandoned), wastewater treatment lagoons, stormwater injection wells and collection basins, areas of high population (greater than 1 house per acre), pesticide application areas

WELLHEAD CONTAMINANT INVENTORY

Following a preliminary review of the available databases and susceptibility assessments, a wellhead contaminant inventory was identified. Table E-4 summarizes the City of Zillah contaminant inventory and Figure E-1 shows the locations of these inventory items.

Table E-4: Zillah Well Contaminant Inventory

Site	Contaminant Source	Address	I.D. #	Description
1	Bleyhl Farm Service	1404 1st Avenue	WAD085248540	Hazardous Waste
2	George F. Joseph Orchard Siding Inc.	1511 Cutler Way	CRK000041350	Ammonia, Methyl Bromide
3	Sprint Communications	702 South 2nd	CRK000031090	Sulfuric Acid
4	Covey Run Vitners	1500 Vintage Road	83331756	Winery
5	El Ranchito Inc	1319 First Avenue	43959263	Hazardous Waste
6	USWCOM Zillah	Highway 410	43194642	Hazardous Waste
7	Zillah Police Dept.	111 7th Street	37732766	Hazardous Waste
8	Zillah School District	1602 2nd Avenue	47759183	Hazardous Waste
9	Zillah STP	740 Railroad Ave.	56545852	Sewage System
10	Mt. Arbor Nurseries	507 1st Avenue	101762	LUST
11	G. Hilton Elementary	4th St. & Dean Ave.	200542	LUST
12	Circle L Minimart	1st Ave. & 8th St.	1637	UST
13	El Ranchito Restaurant	1316 E. 1st Ave.	102120	UST
14	Zillah School District	205 2nd Avenue	101556	UST
15	Zillah Texaco	808 1st Avenue	1337	UST

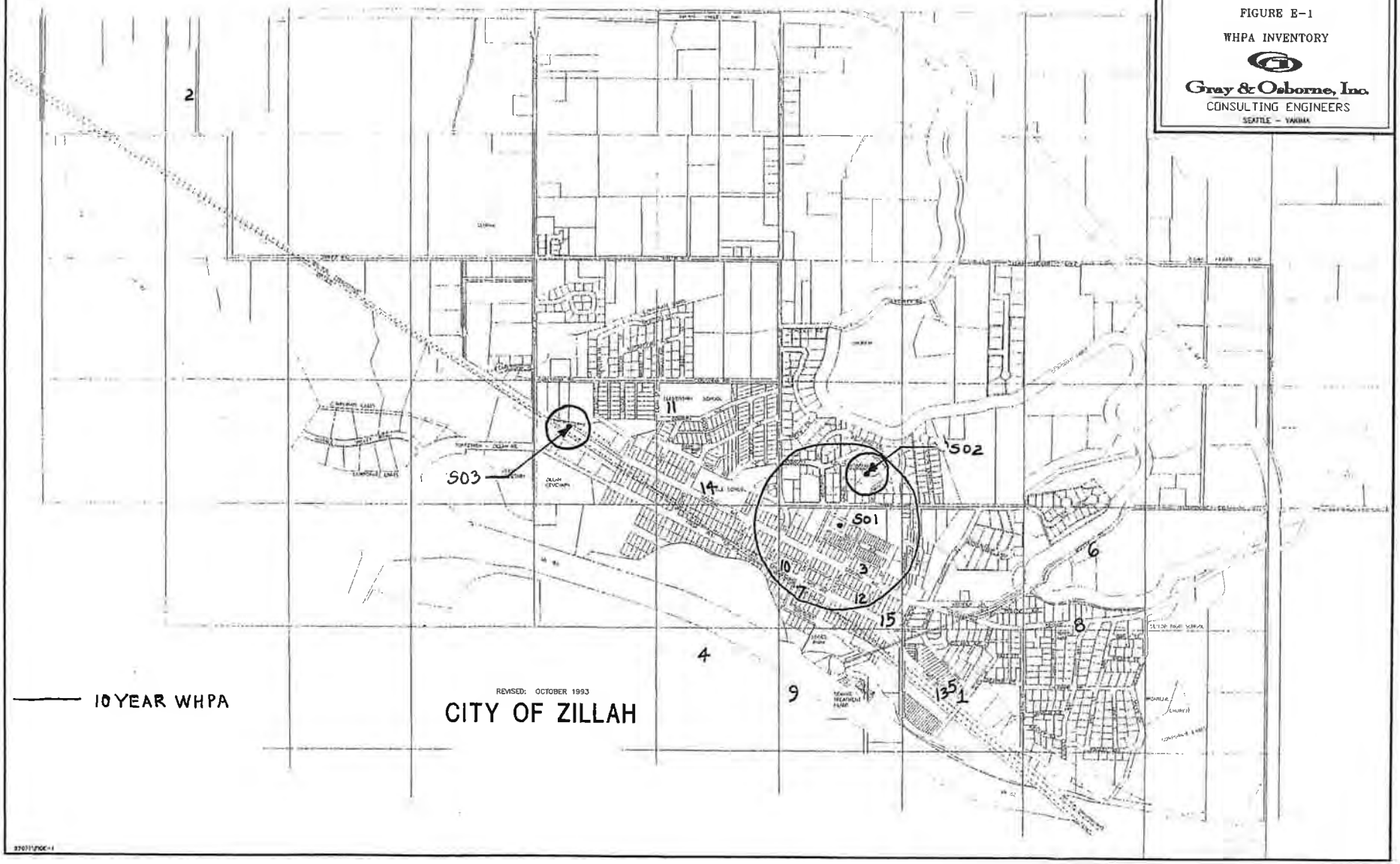
Following a review of the inventory items identified in this wellhead protection program, the susceptibility of the City's wells to contamination is termed low. A more rigorous investigation of inventory items and their associated risk will be completed in the City's 1999 WHPP.

CITY OF ZILLAH
WATER SYSTEM PLAN

FIGURE E-1

WHPA INVENTORY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
SEATTLE - YAKIMA



WELLHEAD SUSCEPTIBILITY

As in the susceptibility assessments, the risk of contamination from the inventory sources identified in the last section is considered to be low. The City has notified the owners of the inventory items in Table E-4 with the sample identification letter presented at the end of this appendix.

CONTINGENCY PLAN

Contingency planning is an important component of a wellhead protection program. Careful planning cannot always account for unanticipated incidents. A properly prepared and updated contingency plan helps ensure the water system personnel and officials are prepared to respond to emergency situations.

One element of a contingency plan is an evaluation of the ability of a purveyor to meet future demand based on existing capacity and water rights, even with the loss of a well to contamination.

In order to minimize the effect of a release of contaminants into the environment, procedures must be in place to ensure that the decision making personnel can execute the proper mitigation measures. This contingency plan contains emergency response procedures to be implemented immediately following a release of contaminants into the environment. These procedures identify the appropriate personnel to contact at the local, state, and federal levels, the appropriate equipment needed, and a structured plan of action to respond quickly to effectively mitigate environmental damage resulting from such a release.

In the event that the City's source water becomes contaminated, additional sources of drinking water, or treatment of the contaminated water, will be necessary. Both short-term and long-term alternative drinking water supplies, and treatment methods for common contaminants, are identified in the following sections.

SOURCE ANALYSIS

A key element in contingency planning is the determination of the City's ability to meet existing and future demand with the largest well (Well No. 1) out of service. Based on the demand projections in Chapter 2, the City can meet the existing demand with the available capacity from Well No. 2 and Well No. 3 if these wells are run 24-hours per day on the maximum day. The City cannot meet the 20-year demand projections with the available capacity from Well No. 2 and Well No. 3.

EMERGENCY MANAGEMENT

The first step in emergency management is the development of an emergency call-up list. This list has been prepared as part of the water system plan in Table 5-X. Emergency planning for several emergency situations has also been identified in Chapter 5.

SHORT-TERM CONTINGENCY PLANNING

As a matter of planning priority, it is important to identify appropriate emergency and short-term options. These include the steps required for immediate provision of water for a periods of days, weeks or months. The following is a list of short-term and emergency options that could be implemented at the City of Zillah following the short-term loss of a well.

Bottled Water

In an emergency situation which requires a well(s) to be shut off, bottled water is one alternative supply of drinking water. In many cases, sufficient supply is immediately available in either stores or a bottling facility. With Zillah being located geographically a short distance from neighboring communities, it is feasible that enough bottled water could be supplied for a short term using available sources from other communities.

Tank Trucks

Alternative supplies can be brought in by tank trucks. Zillah could use a contractor to transport hauled water. Careful attention must be given to disinfecting the tanks to avoid bacterial contamination. If the tanker truck(s) assigned to haul the water are known potable water hauling vehicles only, then the water need only be disinfected using a standard chlorine residual concentration. However, if the tanker truck(s) has been used to haul nonpotable water or the hauling status of the tanker truck(s) is not known, then the tank will be super-chlorinated with a concentration of a least 50 mg/L for a period of 24-hours. After the 24 hour period, the super-chlorinated water will be discarded and the tank filled with fresh chlorinated water and that water must be given a bacteriological test to determine if it is suitable for drinking. If this option is selected, a source of sanitary containers would be identified and supplied so that personnel are not required to use receptacles that could possibly be contaminated.

Water Conservation

The City of Zillah has developed a water conservation plan as part of this water system plan (Chapter 4). The conservation measures required for the City by the DOH include program promotion, source and service meter readings, and conservation pricing. In an emergency situation, more aggressive water conservation measures may be required than those outlined in Chapter 4. In an emergency situation which requires the complete or partial shutoff of the City's wells, non-essential water uses must be restricted. The City

may be forced to implement aggressive water conservation measures, which may include water restrictions for activities such as landscape watering, laundry, vehicle washing, or bathing. Water conservation measures may also be used with other short-term supply options.

Groundwater Treatment

Treatment of contaminated can be accomplished through *in situ* or *ex situ* methods. *In situ*, or in place treatment involves the remediation of an aquifer by introducing chemical, physical, or biological agents into the subsurface which reduce contamination levels. *Ex situ*, or pump and treat technologies involve the removal of contaminated groundwater from the subsurface and subsequent treatment at the source. Examples of *in* situ remediation include bioremediation and soil vapor extraction, while examples of *ex situ* treatment include reverse osmosis (RO), granular activated carbon (GAC), and air stripping. Both of these treatment methods can be extremely expensive. The capital investment for the treatment equipment along with cost of operating and chemical costs amount to a significant expenditure.

Surface Water Treatment

The only surface water within an acceptable distance from the City is the Yakima River. Treating water withdrawn from the Yakima River is probably not a viable short-term alternative. Since surface water is very susceptible to contamination and other water quality problems, it must pass through extensive treatment. Surface water treatment is likely to be difficult and expensive to implement and maintain on a short-term basis. In addition, water rights in the Yakima River may be a complex and time-consuming issue to resolve.

LONG-TERM CONTINGENCY PLANNING

Long-term water replacement options differ from emergency and short-term options in two ways. First, the amount of time available to evaluate the various alternatives is longer, permitting more extensive analysis of the considerations of future needs and other factors prior to a decisionmaking. Second, the range of alternatives which are viable is larger. The following sections provide a discussion of long-term options.

Drill New Wells

If investigations indicate that there is an untapped supply of groundwater in the form of a separated aquifer or a portion of the contaminated aquifer which is up-gradient and uncontaminated, it may be feasible for the City to drill new wells. This alternative can often be more economical and carry lower risk than treatment.

Groundwater Treatment

The same treatment technologies previously described are available as permanent solutions for contaminant removal. As discussed above, treatment of contaminated water should be viewed as a last resort and should be considered only after the other alternatives have been completely abandoned.

Interconnection

Interties with other water systems is sometimes a cost effective solution. However, the nearest City with a reliable water supply is the Town of Granger, 3 miles away. The cost of this intertie could be substantial.

Water Conservation

While it is possible to use conservation strategies to reduce consumption over the long-term, the water savings from conservation are not likely to be large enough to replace the production of a contaminated well.

Dual Systems

The City already maintains a separate non-potable irrigation system that serves to reduce water demands on the potable water system.

Surface Water Treatment

As in the short-term surface water treatment discussion, the water quality, water right, and costs associated with surface water treatment make it a an unattractive alternative.

ZILLAH WELLHEAD PROTECTION MANAGEMENT PLAN

Development of management strategies is essential for a successful wellhead protection program. Without proper management, potential contaminant sources are likely to become a reality. An informed public that understands the link between potential contamination sources and its drinking water is one of the most effective ways of protecting groundwater supplies. *The City will send out information pertaining to wellhead protection on an annual basis with billings to provide continuous education of the public on the merits of wellhead protection.*

Date, Year

Mr. John Doe
111 7th Avenue
Zillah, WA 98953

SUBJECT: CITY OF ZILLAH WELLHEAD PROTECTION PROGRAM

Dear Property Owner:

In Zillah, we rely upon groundwater as our primary source for drinking water. We are taking a proactive approach to ensure that Zillah maintains the safe quality of its drinking water. To do so, we have developed a Wellhead Protection Plan in accordance with State guidelines. A copy of this document is located in the Public Works Office in the City Shop.

As part of our Wellhead Protection Plan, we mapped the area overlaying the most sensitive areas around our wells, termed wellhead protection zones. These zones represent the time it takes for water to travel from the edge of the zone to the well. Following the mapping of the wellhead protection zones, an inventory of potential source of groundwater contamination was conducted. Your business was identified as a potential contamination source for our wellhead protection areas following a review of such sources in DOE databases. The presence of your business in the City's wellhead protection area means that your activities have the potential to affect the City's drinking water supplies.

We have notified the State of your presence within the City's wellhead protection area. The State can assist you with technical information to help manage your activities in a way that will best prevent groundwater contamination. Additionally, we will include guidelines in our water statements on how to protect our water supply.

We realize you are already careful to protect the environment in and around your property. We hope that informing you of your location within our wellhead protection area will result in an increase in precautions to ensure that your activities do not impact the City's drinking water supply.

Sincerely,

City of Zillah

Washington State Department of Ecology
Water Resources Program, Attn: Mr. Gene Potts
15 W Yakima Avenue
Yakima, WA 98902-3401

SUBJECT: INVENTORY OF POTENTIAL CONTAMINATION SOURCES, ZILLAH WELLHEAD PROTECTION PROGRAM

Dear Sir:

The City of Zillah has recently completed an inventory of potential contamination sources located in and around our three drinking water wells. The inventory was completed as part of our wellhead protection program, required under the water system plan under WAC 246-290-135.

We would like to share our findings with you and solicit input from you on how best to mitigate the effects of the potential contamination sources outlined in our inventory. We would appreciate any input you could provide.

Sincerely,

City of Zillah

The City Of Zillah
THE HEART OF WINE COUNTRY
503 First Avenue, P.O. Box 475, Zillah, WA 98953 • (509) 829-5151 • Fax (509) 829-5457

June 22, 2020

Dear Resident,

The City of Zillah has developed a Source Water Protection Program as required by the State Department of Health. Wellhead protection, a component of the program, involves protecting the land areas surrounding our wells. This plan will help prevent the contamination of our drinking water supply.

Part of the plan is a letter of notification to all potential sources of contamination to our wells, including residents. Many of us live within the wellhead protection zones surrounding the wells. This letter is intended to inform you and to serve as a reminder that hazardous materials put onto the ground (or in septic systems) can contaminate our drinking water supply. Some examples of household hazardous materials are:

- Household chemicals including cleaners, bleach, and furniture polish.
- Home improvement supplies including paint, paint thinner and other solvents.
- Automotive fluids including motor oil, gasoline, antifreeze or similar products.
- Lawn and garden supplies including fertilizers and pesticides.

These materials should only be used and disposed of according to the manufacture's label instructions.

We are fortunate to have a very good supply of drinking water here in Zillah. It should be everyone's intent to keep it that way for our continued good use, and for those who come along after us. Thank you for following these guidelines. If you have any questions about this matter, please feel free to contact me at (509) 829-5151.

Sincerely,

John Simmons
Public Works Director

15.
CROSS-CONNECTION CONTROL MANUAL

HLA
Engineering and Land Surveying, Inc.

Cross-Connection Control Activities (Blue)
Annual Summary Report (ASR) for 2022

PWS ID: **99800W** PWS Name: **ZILLAH CITY OF** County: **YAKIMA**

Part 1: Designated Cross-Connection Control Specialist (CCS) Information

CCS Name	John T Simmons	CCS Phone	509-221-8493	CCS Cert. #	8342	BAT Cert. #	
CCS is: PWS owner or employee							

Part 2: Status of Cross-Connection Control (CCC) Program at End of 2022

Provide information about the status of your CCC Program at the end of the reporting year.

PWS has:	**A written CCC Program Plan**[1] ◉ Yes ○ No **CCC implementation activities**[2] ◉ Yes ○ No	**Program Plan Last Updated**[3] 12/01/2022

[1] Enter "Yes" if PWS has **any** type of written CCC Program Plan, policies, or procedures. Written CCC Program Plan must be part of a Water System Plan (WSP) or Small Water System Management Program (SWSMP).

[2] Enter "Yes" if PWS implemented **any** CCC Program activities during the reporting year, such as establishing legal authority, conducting hazard evaluations, requiring installation of backflow assemblies to protect the PWS, requiring assembly testing, maintaining CCC records, or enforcing the PWS's or CCC Program requirements.

[3] PWS can update the CCC Program Plan at any time (independent of WSP or SWSMP update).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is:	
		Included in Written Program Plan	Being Implemented or Is Completed
1	**Legal Authority Established**	◉ Yes ○ No	◉ Yes ○ No
2	**Hazard Evaluation Procedures and Schedules**	◉ Yes ○ No	◉ Yes ○ No
3	**Procedures/Schedules for Ensuring Installation of Backflow Preventers**	◉ Yes ○ No	◉ Yes ○ No
4	**Certified CCS Provided**	◉ Yes ○ No	◉ Yes ○ No
5	**Backflow Preventer Inspection and Testing**	◉ Yes ○ No	◉ Yes ○ No
6	**Assembly Testing Quality Assurance/Quality Control (QA/QC) Program**	◉ Yes ○ No	◉ Yes ○ No
7	**Backflow Incident Response Procedures**	◉ Yes ○ No	◉ Yes ○ No
8	**Public Education Program**	◉ Yes ○ No	◉ Yes ○ No
9	**CCC Records**	◉ Yes ○ No	◉ Yes ○ No
10	**Reclaimed Water Permit**	○ Yes ○ No ◉ N/A	○ Yes ○ No ◉ N/A

Part 3A: PWS Characteristics at End of 2022

Enter the number of connections (new and existing) served by the PWS by type.

Type of Service Connection	Number
Residential (As defined by PWS)	1155
All Other (include dedicated fire lines, dedicated irrigation lines, and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	94
Total Number of Connections	1249

Part 3B: Cross-Connection Control for Severe and High-Hazard Premises and High-Hazard Dedicated Lines Served by the PWS

Answer the following questions carefully. These answers control your access to pages 2 and 3 for data entry.

1. Does your PWS serve any severe or high-hazard premises or any high-hazard dedicated fire or irrigation lines? (●) Yes ( ) No

2. Does PWS serve any high-hazard medical premises? (●) Yes ( ) No

- If you answer Yes to both questions, you must enter data in at least one row on page 2 and one row on page 3.
- If you answer Yes to Question 1 and No to Question 2, you must enter data on page 2 only.
- If you answer No to both questions, pages 2 and 3 will be grayed out to prevent data entry.

- Count only premises PWS serves water to.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information.**

Type of Severe or High-Hazard Premises or Dedicated Lines [WAC 246-290-490(4)(b)]	Number of Connections at end of 2022			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Agricultural (farms and dairies)	0	0	0	0
Beverage bottling plants (including breweries)	0	0	0	0
Car washes	3	2	2	0
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	1	1	1	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	0	0	0	0
Dedicated fire lines with chemical addition or using unapproved auxiliary supplies	0	0	0	0
Food processing plants (including canneries, slaughter houses, rendering plants)	0	0	0	0
Hospitals, medical centers, medical, dental and veterinary clinics, mortuaries, nursing homes, etc., reported on Part 3C page 3 (totals imported from page 3)	7	7	7	0
Dedicated irrigation systems using purveyor's water supply and chemical addition[4]	0	0	0	0
Laboratories	0	0	0	0
Metal plating industries	0	0	0	0
Petroleum processing or storage plants	0	0	0	0
Piers and docks	0	0	0	0
Radioactive material processing plants or nuclear reactors	0	0	0	
Survey access denied or restricted	0	0	0	0
Wastewater lift/pump stations (non-residential only)	0	0	0	0
Wastewater treatment plants	1	1	1	
Unapproved auxiliary water supply interconnected with potable water supply	0	0	0	0
Totals	12	11	11	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections whose premises isolation preventers were inspected (AGs) or tested (RPs) during the reporting year.

[4] For example, dedicated irrigation lines to parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RP), such as aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, for example:"Other manufacturing" or "Other commercial".

Part 3C: Cross-Connection Control for High-Hazard Medical Premises Served by the PWS

- Count only medical premises PWS serves water to.
- Don't count the same premises more than once. If you serve different medical category premises through a single connection, count the connection under the medical category you consider to pose the highest hazard to PWS.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information**

Type of High-Hazard Medical Premises [WAC 246-290-490(4)(b)]	Number of Connections at end of 2022			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	0	0	0	0
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers	0	0	0	0
Out-patient clinics and offices	2	2	2	0
Alternative health out-patient clinics and offices	0	0	0	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors with water-connected X-ray equipment	0	0	0	0
Hospice care centers	0	0	0	0
Childbirth centers	0	0	0	0
Kidney dialysis centers	1	1	1	0
Blood centers	0	0	0	0
Dental clinics and offices	2	2	2	0
Facilities for Housing Patients				
Nursing homes	0	0	0	0
Assisted Living Facilities (formerly Boarding Homes)	0	0	0	0
Residential treatment centers	0	0	0	0
Other Medical-Related Facilities				
Mortuaries with embalming equipment	1	1	1	0
Morgues and autopsy facilities (not in hospitals)	0	0	0	0
Veterinarian offices, clinics and hospitals	1	1	1	0
Other high-hazard medical premises				
0	0	0	0	0
Totals	7	7	7	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises backflow preventers only or connections with premises isolation DCVAs or DCDAs isolation.

Part 4A: Backflow Preventer Inventory and Testing Information for 2022

- Complete all fields. Enter **zero (0)**, if no backflow preventers in a specific category.
- Count only backflow preventers relied on to protect the PWS.
- Count AVBs on *irrigation systems only*. Select No to AVB question above Table 2 if PWS doesn't track AVBs.
- Count multiple tests (or failures) for the same backflow preventer as one test (or failure) for that backflow preventer.
- For multiple service connections or parallel installations, count each assembly separately.
- Count RPDAs and DCDAs as ***single*** assemblies. Count the tests of the mainline assembly and bypass assembly as ***one test***. Count the failure of either the mainline or bypass assembly (or the failure of both) as ***one failure***. Count an entire detector assembly taken out of service as ***one assembly removed from service***.
- Count assemblies installed on dedicated fire or irrigation lines as **Premises Isolation Assemblies** in Table 1.

	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Table 1: Premises Isolation Preventers (include preventers isolating PWS-owned facilities)									
Existing Premises Isolation Backflow Preventers									
1	In service at beginning of 2022	0	32	0	35	0			
2	Inspected and/or tested in 2022[1]	0	30	0	25	0			
3	Failed inspection or test in 2022	0	0	0	0	0			
New Premises Isolation Backflow Preventers									
4	Installed in 2022[2]	0	0	1	0	0			
5	Inspected and/or tested in 2022[1]	0	0	1	0	0			
6	Failed inspection or test in 2022	0	0	0	0	0			
Premises Isolation Backflow Preventers (existing or new)									
7	Removed from service in 2022[3]	0	0	0	0	0			
Total Premises Isolation Preventers at End of 2022		**0**	**32**	**1**	**35**	**0**	**0**	**0**	**0**

Does PWS track AVBs on irrigation systems? ○ Yes ◉ No

	Table 2: In-Premises Preventers (include preventers within PWS-owned facilities)								
Existing In-Premises Backflow Preventers									
8	In service at beginning of 2022	0	0	0	0	0	5	0	unk
9	Inspected and/or tested in 2022[1]	0	0	0	0	0	0	0	unk
10	Failed inspection or test in 2022	0	0	0	0	0	0	0	unk
New In-Premises Backflow Preventers									
11	Installed in 2022[2]	0	0	0	0	0	0	0	unk
12	Inspected and/or tested in 2022[1]	0	0	0	0	0	0	0	unk
13	Failed inspection or test in 2022	0	0	0	0	0	0	0	unk
In-Premises Backflow Preventers (existing or new)									
14	Removed from service in 2022[3]	0	0	0	0	0	0	0	unk
Total In-Premises Preventers at End of 2022[4]		**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**
Grand Totals at End of 2022		**0**	**32**	**1**	**35**	**0**	**5**	**0**	**0**

[1] Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only, using DOH-approved USC field test procedures).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of the reporting year. Replacement preventers may be of a different type than the originals.

[3] Existing or new preventers taken out of service, whether or not they were replaced by the same or a different type of preventer.

Part 4B: Other Implementation Activities in 2022

Complete all cells. Enter zero if not applicable.

Water Use Questionnaires	
Did your PWS send any water use questionnaires to customers during 2022?	○ Yes ◉ No

On-site Hazard Surveys			
Did your CCS conduct any on-site hazard surveys during 2022?			◉ Yes ○ No
	Service Connection Type		
	New	**Existing**	**Total**
1. Number of connections surveyed for cross-connection hazards to PWS.	0	2	2
2. Number of connections requiring backflow prevention to protect PWS.[1,2]	0	2	2

New Exceptions to Premises Isolation	
Did your CCS grant any new premises isolation exceptions in 2022 to high-hazard premises?[3]	○ Yes ◉ No

CCC Enforcement Actions	
Did your PWS take any enforcement actions during 2022?[4]	○ Yes ◉ No

[1] Include services where either premises isolation or in-premises preventers were required to protect the PWS.

[2] Include existing services that need new, additional or higher level backflow prevention.

[3] Submit a completed DOH Exception Form (green) for each new exception granted in the reporting year.

[4] "Enforcement actions" means actions taken by the PWS (such as water shut-off, PWS installation or testing of backflow preventer, assessment of fines, etc.) when the customer fails to comply with the PWS's CCC requirements.

Part 5: Backflow Incidents and "Off-Normal" Events in 2022

	Backflow Incidents, Risk Factors, and Indicators during 2022	Number
Backflow Incidents during 2022		
1	Backflow incidents that contaminated the PWS[5].	0
2	Backflow incidents that contaminated the customer's drinking water system ***only***[5].	0
Risk Factors for Backflow during 2022		
3	Distribution main breaks per 100 miles of pipe.	0.00
4	Low pressure events (<20 psi in PWS distribution system).	0
5	Water outage events.	0
Indicators of Possible Backflow during 2022		
6	Total health-related complaints received by PWS.[6]	0
7	Received during BWA or PN events.[7]	0
8	Received during low pressure or water outage events.	0
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).	0
10	Received during BWA or PN events.[7]	0
11	Number of these complaints received during low pressure or water outage events.	0

[5] Purveyors must submit a Backflow Incident Report form for each backflow incident known to have contaminated the public water system. DOH is also interested in receiving incident report forms for backflow incidents that contaminated the customer's drinking water system only.

[6] Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.

[7] **"BWA"** means **Boil Water Advisory** and **"PN"** means **Public Notification** for water quality reasons.

Part 6: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe challenges faced or accomplishments made in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

Part No.	Date Added	Comments
Pt 1	04-28-2023	sending a staff member get BAT certified

Part 7: Report Certification and Contact Information

I, john simmons , certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/28/2023	**All ASR Forms Certified/Submitted**	04/28/2023

Designated CCS/CCC Program Manager[1]					
Name	John T Simmons	**Title**	Cross Connection Specialist	**CCS Cert #**	8342
Email Address	jsimmons@cityofzillah.us	**Phone**	509-221-8493	**Phone Ext**	

PWS Manager[2]					
Name	John Simmons	**Title**	P.W.D.	**Operator Cert #**	8342
Email Address	jsimmons@cityofzillah.us	**Phone**	509-221-8493	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Cross-Connection Control Program Summary (Cream)
Annual Summary Report (ASR) for 2022

PWS ID: **99800W** PWS Name: **ZILLAH CITY OF** County: **YAKIMA**

Describe the characteristics of the PWS's Cross-Connection Control (CCC) Program at the end of 2022.

Part 1: CCC Program Characteristics

A. Type of Program Implemented

Type of Program	Check One
Premises isolation only.	○
Combination program: reliance on both premises isolation and in-premises prevention.	◉
In transition from a combination program to a premises isolation only program.	○

B. Coordination with Authority Having Jurisdiction (AHJ) on CCC Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code at the local level. The AHJ is usually your county or city building department. Don't list DOH as an AHJ.

AHJ #	Name of AHJ (City or County Building Department)[1]	PWS		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	city of zillah	Yes ◉ No ○	Yes ◉ No ○	Yes ○ No ○

[1] Do not enter an individual's name.

C. Corrective/Enforcement Actions Available to the Purveyor

Type of Corrective Action/Enforcement Action	Indicate Whether Available	Most Often Used (Check One)
Purveyor denies or discontinues water service.	Yes ◉ No ○	◉
Purveyor installs backflow assembly and bills customer.	Yes ○ No ◉	○
Purveyor assesses fines (in addition to eliminating or controlling cross connection).	Yes ◉ No ○	○
Purveyor tests backflow assembly and bills customer.	Yes ○ No ◉	○

[1] Enter detailed description of other enforcement actions available to PWS. Don't enter "None", "Not Applicable", or "Not Available."

D. CCC Program Responsibilities
Do not include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	○	◉
Backflow preventer (BP) ownership	◉	○
BP installation	◉	○
BP *initial* inspection (for proper installation - all BPs)	○	◉
BP *initial* test (for testable assemblies)	◉	○
BP *annual* inspection (Air Gaps and AVBs)	◉	○
BP *annual* test (for testable assemblies)	◉	○
BP maintenance and repair	◉	○

E. Backflow Prevention for Fire Protection Systems
Please remember to enter number of days allowed if you require retrofitting.

PWS coordinates with *AHJ* on CCC issues for fire sprinkler systems (FSSs)	Yes ◉ No ○ N/A ○
PWS coordinates with *local Fire Marshal* on CCC issues for FSSs.	Yes ○ No ○ N/A ◉
PWS ensures backflow prevention is installed before serving *new* connections with FSSs.	Yes ◉ No ○
PWS requires retrofits to *high*-hazard FSSs.	Yes ○ No. of days allowed: No ○ N/A ◉
PWS requires retrofits to *low*-hazard FSSs.	Yes ○ No. of days allowed: No ○ N/A ◉

F. Backflow Prevention for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems *without* chemical addition.	Not Addressed ○ AVB ◉ PV/SVBA ○ DCVA ○ RPBA ○
PWS currently inspects AVBs upon *initial* installation.	Yes ◉ No ○ N/A ○
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Yes ◉ No ○ N/A ○

G. Used Water

Does PWS prohibit, by ordinance, rules, policy, by-laws or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system?	Yes ◉ No ○
If not prohibited at present, date plan to prohibit use.	N/A
Current number of service connections returning used water to distribution system.	0

H. Backflow Prevention for Unapproved Auxiliary Water Supplies[1] NOT Interconnected with PWS
Show the **minimum** backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies *when they are NOT interconnected to the PWS.*

***Existing* service connections.**	None ○ DCVA ◉ RPBA ○ AG ○
Type of protection required.	N/A ○ In-premises prevention ◉ Premises isolation ○
***New* service connections.**	None ○ DCVA ◉ RPBA ○ AG ○
Type of protection required.	N/A ○ In-premises prevention ◉ Premises isolation ○

[1] An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.

I. Backflow Prevention for Tanker Trucks and Temporary Water Connections

Minimum **level of backflow prevention (installed on or associated with the truck) required for tanker trucks taking water from PWS.**	AG ◉ DCVA ○ RPBA ○ Not Specified ○ Tanker trucks not allowed ○
PWS requires tanker trucks to obtain water at designated fill sites each equipped with permanently installed backflow preventer(s).	Yes ○ (Minimum preventer: DCVA ○ RPBA ○) No ○ N/A ○ No sites provided ◉
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Yes ○ No ○ N/A ◉
Minimum **level of backflow prevention required for temporary water connections (e.g., for construction sites).**	AG ○ DCVA ◉ RPBA ○ Not specified ○ Temp. connections not allowed ○
PWS provides approved backflow preventer for temporary connections.	Yes ○ No ◉ N/A ○ (Temp. connections not allowed)
PWS requires testing each time the temporary connection backflow preventer is relocated.	Yes ○ No ◉ N/A ○ (Temp. connections not allowed)

J. Backflow Prevention for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow prevention required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Prevention Required
Commercial	Yes ◉ No ○	Not Required ◉ DCVA ○ RPBA ○
Industrial	Yes ◉ No ○	Not Required ◉ DCVA ○ RPBA ○
Institutional	Yes ○ No ◉	Not Required ◉ DCVA ○ RPBA ○

K. Backflow Prevention for Wholesale Customers

Indicate whether the PWS requires backflow prevention at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has Customers of this Type	Minimum Backflow Prevention Required (if prevention is required, indicate minimum level).	
Existing	Yes ○ No ◉	Not specified / Not required ◉ Always required ○ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ○ RPBA ○
New	Yes ○ No ◉	Not specified / Not required ◉ Always required ○ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ○ RPBA ○

L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan *allows* system to grant exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii)	Yes ○ No ○ Doesn't Address ◉
PWS currently grants new Exceptions.	Yes ○ No ◉
PWS granted Exceptions in past reporting years.	Yes ○ No ◉

Part 2: CCC Program Record-Keeping Software

Indicate the type or name of computer software the PWS uses to track CCC records.

BPMS ○	**Cross-Track (BMI)** ○	**Tokay** ○	**XC2** ○	**Custom developed for or by PWS[1]** ○
Other non-CCC software (e.g. Excel) ○	**Other commercial CCC software (specify)** ○	**None Used** ◉		

[1] Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

Part 3: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe accomplishments made in this reporting year.
  - Identify challenges faced in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

Part #	Date Added	Comment
General	04-28-2023	looking to have others trained to our expanding staff

Part 4: Report Certification and Contact Information

I,john simmons, certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/28/2023	**All ASR Forms Certified/Submitted**	04/28/2023

Designated CCS/CCC Program Manager[1]					
Name	John T Simmons	**Title**	Cross Connection Specialist	**CCS Cert #**	8342
Email Address	jsimmons@cityofzillah.us	**Phone**	509-221-8493	**Phone Ext**	

PWS Manager[2]					
Name	John Simmons	**Title**	P.W.D.	**Operator Cert #**	8342
Email Address	jsimmons@cityofzillah.us	**Phone**	509-221-8493	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Backflow Prevention for Severe Health Hazard Facilities (Gray)
Annual Summary Report (ASR) for 2022

PWS ID: **99800W** PWS Name: **ZILLAH CITY OF** County: **YAKIMA**

Part 1: Backflow Prevention Status

- Describe the backflow prevention status at the end of the reporting year for each wastewater treatment plant and nuclear facility your system serves.
- If you serve more than one severe health hazard facility, click the “Add Facility” button to display another facility data entry box.
- If you serve more than one connection to the same facility, click the “Add Connection” button to display another connection row for that facility.
- You may add as many facilities and connections as needed.
- To update this form, you may delete facilities and connections which are no longer served.

***Facility* 1 of 1**

Facility Name	zillah wwtp
Physical Address	740 railroad ave
City	zillah
Zip	98953
NPDES Permit#	wa 0020168
Facility Type	Wastewater Treatment Plant (WWTP)
Facility Comments	plant is functioning great, performance award acknowledged for past 3 years with new operator

Facility 1 Connection 1 of 1

Connection Name	tyson driesen
Backflow Prevention Status	Premises Isolation RP but No In-Plant Air Gap
Connection Comments	great operator

Part 2: Report Certification and Contact Information

I,john simmons, certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/28/2023	**All ASR Forms Certified/Submitted**	04/28/2023

Designated CCS/CCC Program Manager[1]

Name	John T Simmons	**Title**	Cross Connection Specialist	**CCS Cert #**	8342
Email Address	jsimmons@cityofzillah.us	**Phone**	509-221-8493	**Phone Ext**	

PWS Manager[2]

Name	John Simmons	**Title**	P.W.D.	**Operator Cert #**	8342
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[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

CITY OF ZILLAH
CROSS CONNECTION CONTROL MANUAL

I. Definitions

A. Approved
Accepted by the Building Inspector as meeting an applicable specification stated or cited in this regulation.

B. Auxiliary Water Supply
Any water supply to the premises other than the City's approved public potable water supply.

C. Backflow
The undesirable reversal of flow of water or other substances through a cross-connection and into the piping of a public water system or consumer's potable water system.

D. Backflow Prevention Assembly
The nomenclature "assembly" refers to a backflow preventer which is designed to be in-line tested and repaired, and to meet the head loss and flow requirements of the recognized approval authority. The "assembly" consists of the backflow prevention unit, two resilient seated shutoff valves, and test cocks.

E. Backflow Prevention Device
The nomenclature "device" refers to a backflow preventer that is not designed for in-line testing.

1. Air Gap (AG)
A physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be an "approved air gap", 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 located within three pipe diameters (measured horizontally) of a wall, the separation must be at least three times the diameter of the supply piping or four times the diameter of the supply piping for intersecting walls.

2. Atmospheric Vacuum Breaker (AVB)
A device which contains a float check (poppet), a check seat and an air inlet vent. When water pressure is reduced to a gauge pressure of zero or below, the float check drops, allowing air to enter the device, preventing backsiphonage. It is designed to prevent backsiphonage only.

3. Double Check Valve Assembly (DCVA)
An approved assemble consisting of two independently operating check valves, loaded to the closed position by springs or weights, and installed as a unit with, and

between, two resilient seated shut off valves and having suitable connections for testing.

4. Pressure Vacuum Breaker Assembly (PVBA)
An approved assembly consisting of a spring loaded check valve loaded to the closed position and installed as a unit with, and between, two resilient seated shut off valves and having suitable connections for testing. It is designed to protect against backsiphonage only.

5. Reduced Pressure Backflow Assembly (RPBA)
An approved assembly consisting of two independently operated check valves, spring loaded to the closed position, separated by a spring loaded differential pressure relief valve loaded to the open position, and installed as a unit with, and between, two resilient seated shut off valves and having four suitable test cocks for checking the water tightness of the check valves and the operation of the relief valve.

F. Backpressure
Backflow due to increased pressure above the supply pressure caused by pumps, gravity, or other sources of pressure.

G. Backsiphonage
Backflow due to negative or subatomic pressure in the distribution system.

H. City
The City of Zillah or their duly authorized representative.

I. Contamination
An impairment of the quality of the potable water which creates an actual hazard to the public health through poisoning or through the spread of diseases by sewage, industrial fluids or waste. Also defined as severe or high hazard. Also see *Pollution*. The term "contamination" used in EPA and state drinking water regulations "Maximum contamination level" bestows a different meaning than that used in describing a cross-connection hazard.

J. Cross-Connection
Any actual or potential physical connection between a public water system and any source of non-potable liquid, solid or gas that could contaminate the public water supply by backflow.

K. Customer
For purposes of cross-connection control, the owner or operator of a plumbing system connected to a public water system via a service connection.

L. Director
The Director, or delegated representative, in charge of the City of Zillah Department of Public Works.

M. In-Premise Protection
A method of backflow prevention in which a backflow prevention assembly is installed on the customer's internal water supply line prior to a fixture, piece of equipment or area that has been determined to have backflow potential. This shall effectively isolate the fixture, piece of equipment or area from the rest of the customer's distribution system.

N. Owner
Any person who has legal title to, or license to operate or occupy, a property upon which a cross-connection inspection will be made or upon which a cross-connection is present.

O. Person
Any individual, partnership, company, public or private corporation, political subdivision or agency of the State or of the United States or any other legal entity.

P. Pollution
An impairment of the quality of the potable water supply which does not create a hazard to the public health but which does adversely affect the aesthetic qualities of such potable waters for domestic use. Also defined as low hazard. See also *Contamination.*

Q. Premise Isolation
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 to isolated the customer's plumbing system from the purveyor's distribution system.

R. Purveyor
The Purveyor or delegated representative in charge of the City of Zillah water system.

S. Reclaimed Water
Effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater.

T. Water Service Entrance
That point in the owner's water system beyond the sanitary control of the City; generally considered to be the outlet end of the water meter and always before any unprotected branch.

II. Purpose and Scope

A. This Manual establishes minimum standards for the City to protect the public potable water supply from possible contamination of pollution due to backflow or back-siphon from a customer's private internal system into the public potable water system.

B. This Manual establishes minimum cross-connection control operating policies, provides guidelines and requirements for installation, testing, and maintenance of approved backflow prevention assemblies and establishes permitting, and inspection requirements for existing and new backflow prevention assemblies.

C. The purpose of this Manual is not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this Manual.

III. Authority

A. The Federal Safe Drinking Water Act of 1974 (and Amendments of 1996), the statutes of the State of Washington Title 43 RCW and Chapter 246-290-490 WAC require purveyors to "protect public water systems from contamination due to cross connections".

B. *City of Zillah Municipal Code, Chapter 13.08 regulates cross-connections.*

IV. Responsibility

A. The Director shall be responsible for administering the provisions of this Manual.

B. If the Director determines, consistent with the provisions of this Manual, a backflow prevention assembly is required at any customer's premises, the Director, or his delegated agent, shall give notice to the customer to install an air gap or approved backflow prevention assembly which isolates the customer's plumbing system from the City's distribution system.

C. Installation of requested backflow protection assemblies shall be a condition of continued water service from the City. Service from the City's water supply system to any premises upon which the potential for backflow into the city system exists shall be discontinued or refused unless corrective action is taken in accordance with this manual.

D. Upon installation the customer shall contact the City requesting inspection of said assembly or assemblies. The customer shall be subject to all applicable inspection and permitting fees.

E. Upon approval of the installation by the City the customer shall have the assembly or assemblies tested by a State of Washington certified Backflow Assembly Tester (BAT) and shall submit a copy of the test report signed by the property owner to the City in accordance with this Manual.

V. Failure to Comply - Violations - Penalties

Any person, firm, or corporation who willfully violates any provisions and requirements of this Manual or Zillah Municipal Code Chapter 13.08 shall be subject to discontinuance of supply of City water to the premise where the violation exists. Discontinuance of the City potable supply to the premise shall remain in effect until corrective action as required by the Director is completed, tested and approved.

VI. Requirements

General

A. Compliance with the provisions of the City of Zillah Cross Connection Control Manual shall be a condition of receiving the City of Zillah water supply.

B. It is unlawful for any person to allow any contaminants or pollutants to back feed from their facility and/or property into the city distribution system. Any connections now existing or hereafter installed that could allow for back feed of any contaminants or pollutants into the city distribution system shall be discontinued and/or eliminated. Connection which cannot be discontinued and/or eliminated shall require the installation of a State of Washington approved backflow protection assembly that shall be regularly inspected and tested in accordance with the City of Zillah Cross Connection Control Manual.

C. When the City requires that the public water supply be protected by premise isolation, the owner shall be responsible for water quality beyond the outlet end of the premise isolation assembly and should utilize fixture isolation protection for that purpose. Fixture isolation assemblies shall be installed in accordance with the Uniform Plumbing Code.

D. The City may allow that the public supply be protected by fixture isolation for existing customer connections. Such an allowance shall only be permitted so long as the Director determines that the level of protection is adequate to protect the City's distribution system, and the owner agrees, in writing (unless waived by the City) to (1) implement and maintain the fixture isolating backflow protection to the satisfaction of the City; and (2) comply with all applicable plumbing codes, including permitting requirements.

City of Zillah

E. On new installations the City will provide on-site evaluation and/or inspection of plans in order to determine the type of backflow prevention assembly, if any, that will be required.

F. For premises existing prior to the start of this program, the City will perform evaluations and inspections of plans and/or premises and inform the owner by letter of any corrective action deemed necessary, the method of achieving the correction, and the time allowed for the correction to be made. Up to sixty days will be allowed; however, this time period may be shortened by the Director depending upon the degree of hazard involved and the history of the device(s) in question.

G. Premises are subject to inspection on or after the expiration date of required action to correct a cross-connection. Premises that have failed to comply with the City's request shall receive written notice, via registered mail, that water service to the premise will be terminated within a period not to exceed thirty (30) calendar days. In the event the owner informs the City of extenuating circumstances as to why the correction has not been completed, the City may grant a time extension up to but not exceeding sixty (60) days.

H. If the City determines at any time that a serious threat to the public health exists, the water service shall be terminated immediately, provided, however, that notice will be posted on the premises affected at the time said service is terminated.

I. Inspection shall be done during the initial installation, during on-site reviews of existing installations, and after any relocation.

J. When an initial installation or test identifies a backflow prevention assembly is not properly functioning, the owner shall correct the malfunction and have the assembly inspected and re-tested until the backflow device operates correctly.

Owner

K. The owner shall be responsible for the elimination or protection, by an air gap or approved backflow prevention assembly, of all cross-connection on their premises.

L. The owner after having been informed by a letter from the City shall, at their expense, install any and all required backflow prevention assemblies.

M. The Owner shall, at their expense, be responsible for having all backflow prevention assemblies tested: (1) at the time of installation, (2) annually after installation, or more frequently if test indicate repeated failures to meet test criteria; and (3) after an assembly is repaired, reinstalled or relocated or an air gap is re-plumbed or replaced by an approved RPBA. The test shall be performed by a State of Washington certified Backflow Assembly Tester (BAT) and signed by the owner. The results of the tests shall be reported within 30 days to the Director on a form provided by or approved by the City.

N. The owner shall, immediately, or no later than 30 days, or otherwise as directed by the Director, correct any malfunction of the backflow preventer which is revealed by periodic testing.

O. The owner shall inform the City of any proposed or modified cross-connection and also any existing cross-connections of which the owner has actual knowledge but has not been found by the City.

P. The owner shall install only backflow prevention assemblies approved by the City.

Q. Any owner having a private well or other private water source shall not cross-connect to the City's system.

R. The owner shall provide access to premises to the City at the City's request. Failure to provide access to inspect facilities shall be grounds for termination of water service.

S. The owner shall be responsible for the payment of all fees for permits, annual or semi-annual device testing, re-testing in the case that the assembly fails to operate correctly, and any re-inspection for non-compliance with City requirements. Permits and fee schedules shall be as specified in the applicable sections the City of Zillah's Municipal Code.

VII. Installation and Testing - Minimum Requirements

A. Minimum requirements for the installation and testing of all backflow protection assemblies shall be in accordance with the Cross Connection Control Manual - Accepted Procedure and Practice produced by the Pacific Northwest Section, American Water Works Association (PNWS/AWWA), Sixth Edition, December 1995, including subsequent revisions, adopted by reference herein. A copy is available for viewing at the Public Works Department of the City of Zillah, additional copies can be purchased from the PNWS/AWWA.

B. In addition, all backflow protection assemblies shall be installed at a location that is easily accessible for inspection and testing. Assemblies located in vaults shall have adequate clearances and depths to allow the City to inspect and test. Assemblies that cannot be easily and readily inspected shall be required to be relocated and re-plumbed as required by the City. The owner shall contact the City of applicable installation requirements and standards.

C. All bypass lines parallel to a line on which a backflow prevention assembly is installed shall have an approved backflow prevention assembly installed that is equal in type to the assembly required by the City on the main line.

VIII. Backflow Protection Devices

A. All backflow protection assemblies (RPBAs, RPDAs, DCVAs, DCDAs, PVBAs and AVBs) installed for protection of the public water supply shall be models included on the current approved backflow prevention assemblies list developed by the University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research Manual of Cross Connection Control or other such agency acceptable to the Director. The Washington Department of Health maintains a copy of this list (DOH Publication # 331-090). A copy is available for viewing at the Public Works Department of the City of Zillah, additional copies can be purchased from the PNWS/AWWA.

B. Any existing backflow protection assembly in use, but not currently listed by USC, can continue to be used providing all the following conditions are met

1. The assemblies were included on the City and/or USC list of approved backflow prevention assemblies at the time of installation;
2. The assemblies have been properly maintained;

3. The assemblies are functioning properly based on inspection by the City and testing by a certified Backflow Assembly Tester;
4. The degree of protection is satisfactory for protection of the City's water system as determined by the Director.

C. When an unlisted assembly does not meet the above conditions, is moved, or can not be repaired using spare parts from the original manufacturer, the assembly shall be replaced by an assembly currently listed as approved by the USC Foundation for Cross-Connection Control and Hydraulic Research or other such agency acceptable to the Director.

IX. Applicability

A. The provisions of this Manual are applicable to all connections to the City water supply. The City recognizes there are varying degrees of risks associated with different types of uses and will consider this when determining if a cross connection exists and applicable backflow prevention assemblies.

B. The following Tables 1, 2, 3 and 4 are derived from the Pacific Northwest Section - American Water Works Association's Cross Connection Control Manual, Accepted Procedures and Practices, Sixth Edition, 1995. These tables, subject to revisions, provide minimum requirements and guidance for the assessment of the degree of hazard and required level of protection. If the actual degree of hazard is determined, by the Director, to be higher than these tables indicate, a higher lever of protection may be required.

Table 1. Summarizes the relative level of protection provided by the different categories of assemblies and devices.
Table 2. A list of customer categories or types of water use where premise isolation is required in all cases.
Table 3. A list of customer categories or types of water use where premise isolation is required for existing service connections is accordance with the provisions of Section VI - D of this Manual.
Table 4. A list of some of the fixtures, equipment or uses of water which may constitute a cross connection and the minimum level of protection required.

TABLE 1
RELATIVE LEVEL OF PROTECTION

Abbreviations	Description/Application Summary [1]	Relative Level of Protection [2]
AG	Approved Air Gap For high and low health hazards, backpressure and backsiphonage	1
RPBA & RPDA	Reduced Pressure Backflow Assembly Reduced Pressure Detector Assembly For high and low health hazards, backpressure and backsiphonage	2
DCVA & DCDA	Double Check Valve Assembly Double Check Detector Assembly For low health hazards only, backpressure and backsiphonage	3
PVBA & SVBA	Pressure Vacuum Breaker Assembly Spill-Resistant Vacuum Breaker Assembly For high and low health hazards, backsiphonage only	4
AVB HBVB LFVB DCAV DCV	Atmospheric Vacuum Breaker Hose Bib Vacuum Breaker Lab Faucet Vacuum Breaker For very low health hazards, and backsiphonage only Dual Check with Atmospheric Vent Dual Check Valve or Meter Check Valve (Dual) For very low health hazards, backpressure and backsiphonage	5

Note: [1] The above descriptions of applicable and relative level of protection are based on the perspective of the City's selection of assemblies and devices for the prevention of the contamination of the water distribution system. Plumbing codes may classify some devices as providing higher levels of protection and as suitable for both backpressure and backsiphonage.

[2] This Manual does not address the location, inspection, and testing of AVBs, HBVBs, LFVBs, DCAVs and DCVs.

TABLE 2
MANDATORY SERVICE ISOLATION

Category of Premise or Use of Water	Assessed Health Hazard	Minimum Protection Recommended at Meter
Radioactive material processing plants or nuclear reactors	severe	RPBA & AG
Sewer treatment plants or sewage pump station	severe	RPBA & AG
Hospitals, medical centers, medical/dental or vet clinics, plasma centers, blood plasma centers	high	RPBA
Mortuaries	high	RPBA
Laboratories	high	RPBA
Metal plating industries	high	RPBA
Petroleum processing or storage plants	high	RPBA
Food processing and beverage bottling plants, canneries, packing (slaughter) houses	high	RPBA
Film processing facilities	high	RPBA
Piers and docks, graving docks, boat marinas, dry docks	high	RPBA
Commercial laundries and dry cleaners	high	RPBA
Premises restricting inspection	high	RPBA
Premises with unapproved auxiliary supply, including reclaimed water	high	RPBA
New	high	RPBA
Existing	low	DCVA
Interconnected with potable water supply		
Not interconnected with potable water supply		
Premises with approved auxiliary supply	low	DCVA
Car washes	high	RPBA
Premises with fire sprinkler systems and/or private hydrants		
With chemical addition	high	RPBA/RPDA
Without chemical addition	low	DCVA/DCDA
Tall buildings (over 30 feet) (elevation above the connection between the service line and the distribution system)	low	DCVA
Irrigation Systems (individually metered and supplied by domestic water supply)		
With chemical addition	high	RPBA
Without chemical addition	low	DCVA

TABLE 3
RECOMMENDED SERVICE ISOLATION

Category of Premise or Use of Water	Assessed Health Hazard	Minimum Protection Recommended at Meter
Battery manufacturing or repair facilities	high	RPBA
Ice manufacturing and cold storage plants	high	RPBA
Residential irrigation	low	DCVA

TABLE 4
RECOMMENDED PROTECTION AT FIXTURES AND EQUIPMENT

Description of fixture, equipment or use of water [1]	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premise or Internal Isolation [2]
Air compressor	low	DCVA	
Air conditioning systems	high	RPBA	
Air washers	high	RPBA	
Aquarium make-up water	high	AG/RPBA	
Aspirators, medical/lab	high	AVB	RPBA
Aspirators, medical/lab	high	RPBA	
Aspirator, weedicide, herbicide, and pesticide	high	RPBA	
Aspirator, vault drain	high	RPBA	
Autoclave	high	RPBA	
Autopsy tables	high	RPBA	
Baptismal fountain	high/low	RPBA, AG/AVB	
Bathtub, below rim filler	high	RPBA	
Bedpan washer	high	RPBA	
Post-mix beverage dispenser using CO2	high	RPBA	
Bidets	low	AVB	
Boiler feed lines	high	RPBA	
Bottle washing equipment	high	RPBA	
Bottle washing equipment	high	PVBA/AVB	RPBA
Box hydrant (irrigation)	high	PVBA/DCVA	
Brine tank	low	AG/DCVA	
Can washing equipment	high	RPBA	
Can washing equipment	high	PVBA/AVB	RPBA
Chemical feed tank for industrial process	high	AG/RPBA	RPBA

Table 4: Continued

Description of fixture, equipment or use of water [1]	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premise or Internal Isolation [2]
Chemical feeder for commercial cleaners	high	AG/RPBA	
Chemical feeder for commercial cleaners	high	AVB/PVBA	RPBA/DCVA
Chlorinators	high	RPBA	
Commercial coffee urns	low	AG/AVB	
Computer cooling lines	high	RPBA	
Condensate tanks	high	RPBA	
Commercial cooling kettles	low	AG/AVB	
Cooling towers	high	AG/RPBA	
Decorative ponds	high	AG/RPBA	
Degreasing equipment	high	RPBA	
Dental equipment/cuspidors	high	RPBA	RPBA
Dialysis equipment	high	RPBA	
Dishwashers	low	AVB	
Drinking fountains	low	AG	
Dye vats and tanks	high	AG/RPBA	
Etching tanks	high	AG/RPBA	RPBA
Fermenting tanks	high	AG/RPBA	RPBA
Fertilizer injection	high	RPBA	
Film processors	high	RPBA	
Fire dept. connection	low	DCVA	
Fire sprinkler system w/o chemical addition	low	DCVA/DCDA	
Fire sprinkler system with chemical addition	high	RPBA/RPDA	
Floor drains	high	AG	
Flushing floor drains	high	AVB	DCVA
Fume hoods (lab)	high	AVB	RPBA
Garbage can washers	high	RPBA	
Heat exchangers other than double wall with leak path	high	RPBA	
Heat pumps	high	RPBA	
High pressure washers w/o chemical injection	low	DCVA	
Hose bibbs (residential)	low	AVB/HBVB	
Hose bibbs (industrial)	varies	AVB/HBVB	RPBA/DCVA
Hoses, kitchen rinse	low	AVB	
Hot tubs	high	AG/RPBA	
Commercial hot water heating boilers	high	RPBA	
Hydrotherapy baths	high	RPBA	
Ice makers	high	AG/RPBA	
Industrial fluid systems	high	RPBA	

Table 4: Continued

Description of fixture, equipment or use of water [1]	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premise or Internal Isolation [2]
Intertied (looped) services	low	DCVA	
Irrigation system (lawn) with chemical addition	high	RPBA	
Irrigation system (lawn) w/o chemical addition	low	PVBA/DCVA	
Janitor sinks	low	AVB/HBVB	
Kitchen equipment	low	AVB	
Laboratory equipment	high	AVB/LFVB	RPBA
Laundry machines, commercial	high	RPBA	
Livestock drinking tanks	high	AC/AVB	DCVA
Make-up tanks	high	AG/RPBA	
Mobile carpet cleaners	high	RPBA	
Pesticide applicator trucks	high	AG/RPBA	
Photo developing sinks/tanks	high	RPBA	
Private fire hydrants	low	DCVA	
Pump prime lines	high	RPBA	
Radiator flushing equipment	high	RPBA	
Recreational vehicle dump station	severe	AG	RPBA
Sewer connected equipment	severe	AG	
Sewer flushing	severe	AG	
Spas	high	AG/RPBA	
Steam generating equipment	high	RPBA	
Sterilizers	high	RPBA	
Stills	high	RPBA	
Sumps	high	AG	
Swimming pools	high	AG/RPBA	
Trap primers	high	AG	
Used or gray water systems	high	RPBA	
X-ray equipment	high	RPBA	

[1] The information in Table 4 may differ from the backflow prevention requirements for individual plumbing fixtures found in plumbing codes. For public health protection within a customer's premise, the Uniform Plumbing Code governs. Table 4 is provided to illustrate only some of the health hazards found in plumbing systems. This table will be used by the City in assessing the degree of hazard a customer's plumbing system places upon the City's water distribution system. Deficiencies in backflow prevention within the customer's premise should be compensated for through the selection of an appropriate assembly for premise isolation.

[2] Where a high health hazard is assessed, the use of an atmospheric vacuum breaker or other backflow devise for protection at a fixture should only be allowed when area or premise isolation is provided by an approved backflow assembly.

X. Administrative Procedures

The City of Zillah has recently amended the Municipal Code and adopted this Cross Connection Control Program Manual. In order to carry out the provisions of these new requirements, a surveillance program based upon proper management, effective customer education, adequate record keeping, and aggressive inspections must be properly implemented.

Such a program for cross connections and sanitary hazards initially requires the inspection of all new and existing buildings, structures, and grounds. As proposed, this procedure will require the Public Works Director and Building Official to assist with these requirements. Each must be knowledgeable in the field of pumping and building inspection, pipe arrangements, and certified in cross connection control.

1. Minimum Requirements

The following requirements are based on the most current edition of the Cross Connection Control Manual published by the Pacific Northwest Section - American Water Works Association (PNWS-AWWA). These requirements are provided for clarification and in any disagreement between these listed below and requirements listed elsewhere in this Manual, the more restrictive shall govern. As described in elsewhere in this manual, the premise isolation requirement may be waived or reduced for certain existing businesses, providing certain conditions are met.

RPBAs

A. Premises on which materials dangerous to health or wherein toxic substances are handled, shall be required to have an approved reduced backflow assembly installed at the service connection.

B. Premises where entry is physically restricted so that inspections for cross connections cannot be made sufficient to assure that cross connections do not exist, shall be required to have an approved reduced pressure backflow assembly installed at the service connection.

C. Premises having an auxiliary water supply with internal cross connections that are not correctable or intricate plumbing arrangements which make it impractical to ascertain whether or not cross connections exist, shall be required to have an approved reduced pressure backflow assembly installed at the service connection.

DCVAs

D. Premises which handle a substance that is objectionable, although not a health hazard, in a manner constituting a potential cross connection, shall be required to have an approved double check valve assembly installed at the service connection.

E. Premises having an auxiliary water supply with no known cross connections, shall be required to have an approved double check valve assembly installed at the service connection.

F. Premises on which any substance that is not a health hazard but is under pressure so as to enable entry into the public water supply or where a cross connection could reasonably be expected to be present, shall be required to have an approved double check valve assembly installed at the service connection.

G. Premises which have a repeated history of cross connections being established or re-established, shall be required to have an approved double check valve assembly installed at the service connection.

Fire Protection Systems

H. Premises having a fire protection system where no chemicals are allowed to be used, shall be required to have an approved double check valve assembly (DCVA) or approved double check detector assembly (DCDA) installed at the fire service connection.

I. Residential premises having a fire protection system where no chemicals are allowed to be used, shall be required to have an approved double check valve assembly (DCVA) installed at the water service connection.

J. Residential fire systems with a flow through system using approved potable water pipe and materials shall not be required to install backflow protection.

Irrigation Systems

K. Premises having an irrigation system where chemicals or herbicides are allowed to be used, shall be required to have an approved reduced pressure backflow assembly installed at the service connection.

L. Non-residential premises having an irrigation system which is subject to flooding, , elevated piping or where compressed air is allowed to be used, shall be required to have an approved double check valve assembly installed at the service connection.

M. Non-residential premises having an irrigation system which does not fall into one of the prior two categories, shall be required to have an approved pressure vacuum breaker assembly or double check valve assembly installed on the system.

2. New and Proposed Construction

A. Upon application for a building permit, the Building Official or authorized designate shall require detailed plans and specifications for the plumbing installation. The customer shall also be required to complete a Cross Connection Control Program Survey.

B. The Building Official, or authorized designate, shall review these plans, specifications and survey to determine the probability of cross connections, the availability of auxiliary water supply, and the handling of substances which, if introduced into the water supply, would constitute a health, plumbing, or system hazard.

C. During the construction phase of any new building, structure, or ground installation, and during the plumbing inspection, the Building Official or authorized designate will also perform the required cross connection control inspection. Upon completion of

the plumbing inspections the Building Official or authorized designate shall complete the CCC Field Inspection Form, to document that subject cross connection control inspection has been made and to document the location of any and all backflow prevention assemblies and/or devices.

D. All backflow prevention assemblies installed internally or at the service connection shall be tested by a certified Backflow Assembly Tester and the test reports submitted to the Building Official or authorized designate (using the Backflow Assembly Test Report form).

3. Existing Buildings, Structures, and Grounds

The systematic program of inspection shall be established with priority given on the basis of risk to public health and shall be conducted as outlined below.

A. A form letter will be sent to each commercial and industrial metered customer explaining the program and stressing the relationship between cross connections and water-borne disease epidemics, types of health hazards, and cross connection. The duties and liabilities of the owners or managers as well as the rules and regulations that apply, will be explained. The letter will also include a questionnaire of desired information such as the type of water used on the premises, auxiliary water supplies, chemicals used, and certain types of fixtures installed. These questionnaires are to be returned to the Building Official or authorized designate.

B. Based on the known information of the customers operation and the information received on the questionnaire, an inspection schedule will be prepared based on the location of the hazard within the facility and the degree of hazard posed to the utility.

C. Approximately 10 days prior to the scheduled date of inspection the City will contact the owner, requesting an appointment with the owner/manager of the premises to discuss the necessity for the inspection and other pertinent matters.

D. On the appointed date the Building Official or authorized designate will meet with the owner/manager and explain the purpose of the inspection. The Building Official or authorized designate will suggest the owner/manager appoint an individual from his firm that is knowledgeable with the firm's plumbing system to accompany the inspectors. At this time, the Building Official or authorized designate can obtain any blue prints or drawings of the "in-plant" system that are available and discuss any questions or other problems the owner/manager may have.

E. On the date of the scheduled inspection, the City of Zillah's Inspector, with the owner's representative, will make a complete physical survey of all exposed piping. The underground system is to be checked as accurately as possible. All lines will be sketched on a field drawing, except where intricate plumbing arrangements make it impractical. In this case an "as-built" drawing will be requested. Each line shall be followed to its end and a survey made to determine whether there are any actual or potential cross connections or any conditions that might tend to pollute the potable water system.

F. Immediately upon completion of the survey the inspection team will orally brief the owner/manager of their findings.

G. The inspection team will prepare a written report that will include, but shall not be limited to, the following:

- Complete identifying information.
- All cross connections found, their location and optional methods of control.
- All industrial fluids, chemical, or other contaminating liquids used or pumped under pressure and their use and probability of cross connections.
- Any applicable drawings, sketches, blueprints or other documents used in support of the inspection.
- A summary of findings.
- Specific recommendations.

H. The inspection team will submit a copy of the completed report to the Building Official or authorized designate.

I. Upon completion of the review of the report the Building Official or authorized designate shall prepare a letter to the respective customer. The letter will outline the findings of the report, the corrective action required, and establish a corrective action completion date (usually 60 days). A copy of the report will be maintained on file for review by the State Department of Health.

J. On the corrective action completion date, or soon thereafter, the Inspector shall take a copy of the report and re-inspect the items that required corrective action.

K. Upon completion, the Inspector shall report in writing to the Building Official or authorized designate, the results of the re-inspection.

L. After receiving the results of the re-inspection the Building Official or authorized designate shall take such action as deemed appropriate under the provisions of the City's Cross Connection Control Manual.

M. When all required actions have been completed and the device(s) tested by a certified Backflow Assembly Tester, a letter shall be sent to the Owner. Said letter will inform them of the annual testing requirements, including maintaining all backflow prevention devices in proper operating order as evidenced by submission, to the City, of the annual testing report.

4. Residential Education and Awareness

The City may develop or acquire pamphlets and/or bill stuffers to send to all of the water system customers. These shall include, but are not limited to, the following subjects:

A. Home irrigation safety;
B. Residential fire sprinkler systems;
C. Health hazards associated with hose connection (chemical sprayers, radiator flush kits, etc.), utility sinks, and other household dangers.

If the City develops this program, this information shall be mailed directly to the customers.

The City shall also take advantage of other opportunities for public education by developing a traveling exhibit that can be set up at community events, schools and at City Hall.

5. Registering of Certified Testers

The City will maintain a list of Backflow Assembly Testers (BATs) that may be provided to customers. Persons or organizations wishing to be added to this list will be required to provide the City with copies of the following:

A. Proof of current certification by the State of Washington as a BAT for all persons that are authorized to perform tests.

B. Proof of current calibration tests performed for all testing equipment (annual calibration is required).

C. A copy of a current business license authorizing the company to work in the City of Zillah.

6. Record keeping and tracking of assemblies

The City will establish records that will meet all of the record keeping requirements of the state and allow effective monitoring and tracking of customer compliance with the annual backflow assembly testing requirements. The general content of the City's records will be as follows:

Information on each assembly will include: the location of the business (or water service) where it is located (some businesses may have multiple devices), initial inspection information for each location (inspector, date, survey #, comments) installation information (installed by, contact information., date installed, specific location, water line size, water pressure, hazard level and hazard protected), assembly information (assembly #, type manufacturer, size, model, serial # and inspection period), and a complete testing history (initial and final test results for each year with: pass/fail, test type, date, tester's name and certification #, line pressure and test results for all three valves, repair information, test kit info and owner's signature.)

7. Standard Forms and Letters

A. Form Letter to be sent to all commercial and industrial customers
B. CCC Program Survey
C. CCC Plan Check
D. CCC Inspection Form
E. Backflow Assembly Test Form

16.
CONSUMER CONFIDENCE REPORT

HLA
Engineering and Land Surveying, Inc.

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

Consumer Confidence Report Certification Form

Consumer Confidence Reports are due before July 1, 2020

You need to complete the following:

1. **Before July 1, 2020**, mail or otherwise directly deliver a copy of your 2019 Consumer Confidence Report (CCR) to your water system customers. Keep a copy for your records.

2. **Before July 1, 2020**, mail or email a copy of your CCR to the regional office for your county (information on back).

3. **By October 1, 2020,*** complete and send this certification form to the regional office with your CCR.

***Note**: We are better able to properly credit your water system when we receive both documents, together, before the July 1 deadline.*

Certification for:

Water System Name City of Zillah

Water System ID Number 99800W Water System County Yakima

Date delivered 6/30/2020

URL (if delivered electronically) _____

In compliance with the CCR requirements in WAC 246-290-72001 through -72012, I confirm that:

- The CCR has been appropriately delivered to customers who use this water system.
- All information contained in this report is correct.
- The monitoring data stated in the CCR matches information submitted to Washington State Department of Health, Office of Drinking Water.

Certified by:

Signature _____

Printed Name John Simmons

Phone 509-829-5151 Date 6/24/2020

The City Of Zillah
THE HEART OF WINE COUNTRY
503 First Avenue, P.O. Box 475, Zillah, WA 98953 • (509) 829-5151 • Fax (509) 829-5457

2020 CONSUMER CONFIDENCE REPORT (CCR)

INTRODUCTION

We're pleased to present to you this year's Annual Quality Water Report. This report is designed to inform you about the quality water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water.

Consumer Confidence Report Translation

"Este Informe contiene informacion muy importante. Traduscalo o hable con un amigo quien lo entienda bien."

Where can I find out more information about my drinking water?

If you have any questions about this report or concerning your water utility, please contact **Public Works Director** John Simmons, at 509-221-8493. We want our valued customers to be informed about their water utility. If you want to learn more, please attend any of our regularly scheduled City Council meetings. They are normally held at the council chambers located at 111 7th St. Zillah. The meetings are held on the first and third Monday of each month at 6:30 p.m. Due to COVID-19, meetings are currently being held telephonically. If you are interested in participating in the telephonic meetings you can call 509-949-1266. General drinking water issues can also be directed to the following contacts:

Environmental Protection
Agency (EPA)
Safe Drinking Water Act
Hotline
(1-800-426-4791)

State Department of Health
Office of Drinking Water
16201 E. Indiana Ave., Suite 1500
Spokane Valley, WA 99216
(509) 329-2100

DESCRIPTION OF THE CITY'S WATER SYSTEM

Zillah derives its drinking water supply from groundwater wells. Wells No. 1 and 3 draw from the Ellensburg Formation aquifer. Well No. 2 draws from the Saddle Mountain Basalt aquifer. The wells pump groundwater to three storage reservoirs that provide protection against fire, power outages, and high-water use periods. Water is carried from the wells and reservoirs to customers' homes through approximately 18.7 miles of water distribution pipes. We have Zone 2 (Alteejen area) booster pumps and the booster pump station and reservoir on Cutler Way in service and operating.

Water Production / Consumption:

The City of Zillah is required to file an annual report with the Department of Health on the volume of water pumped from its sources (water produced) and the volume of water sold to its customers (water consumed). The volume of water produced, and water consumed in 2019 are shown below:

2019 Distribution System Leakage Summary:	
Total Water Produced and Purchased (TP) – Annual Volume	131,447,099
Authorized Consumption (AC) – Annual Volume	123,208,728
Distribution System Leakage – Annual Volume **TP - AC**	8,238,371
Distribution System Leakage – Percent **DSL = [(TP - AC) / TP] x 100**	6.33%
3-year annual average	7.25%

The difference between production and consumption (%) is likely due in part to a water main break in the past year, source meters that need calibration, and possible broken residential meters. The City is working toward the implementation of a water use efficiency program which includes the establishment of specific water use efficiency goals to reduce the amount of water loss.

Definitions

In this table, you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms we've provided the following definitions:

Non-Detects (ND) - laboratory analysis indicates that the constituent is not present.

Parts per million (ppm) or Milligrams per liter (mg/l) - one part per million corresponds to one minute in two years or a single penny in $10,000.

Parts per billion (ppb) or Micrograms per liter - one part per billion corresponds to one minute in 2,000 years or a single penny in $10,000,000.

Parts per trillion (ppt) or Nanograms per liter (nanograms/l) - one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in $10,000,000,000.

Variances & Exemptions (V&E) - State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

Action Level (AL) - the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Treatment Technique (TT) - (mandatory language) a treatment technique is a required process intended to reduce the level of a contaminant in drinking water.

Maximum Contaminant Level - (mandatory language) The "Maximum Allowed" (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal - (mandatory language) The "Goal" (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. LGs allow for a margin of safety.

Water Quality Monitoring

The City of Zillah routinely monitors for constituents in your drinking water according to Federal and State laws. This table shows the results of our monitoring for the period of January 1st to December 31st, 2019. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some constituents. It's important to remember that the presence of these constituents does not necessarily pose a health risk.

TEST RESULTS						
Contaminant	Violation Y/N	Level Detected	Unit Measurement	MCLG	MCL	Likely Source of Contamination
Total Coliform Bacteria **All monthly tests were good except:** **Total Positive test results on 7/18/19 at one site. 7/22/19 Re-test was done at the positive site and 3 additional sites. All tests came back negative.** **Total Positive test results on one site 11/20/19. 11/21/19 Re-test was done at the positive site and 3 more additional sites. All tests came back negative.**	N Y N Y N			0	(systems that collect 40 or more samples per month) 5% of monthly samples are positive; (systems that collect fewer than 40 samples per month) 1 positive monthly sample	Naturally present in the environment

(I.O.C.) Inorganic Contaminants

I.O.C. test was taken on Wippco Well. (S03) All test results were good and did not exceed the MCL.

Total Coliform Monitoring

Total Coliform: The Total Coliform Rule requires water systems to meet a stricter limit for coliform bacteria. Coliform bacteria are usually harmless, but their presence in water can be an indication of disease-causing bacteria. When coliform bacteria are found, special follow-up tests are done to determine if harmful bacteria are present in the water supply. If this limit is

exceeded, the water supplier must notify the public by newspaper, television, or radio.

Nitrate Monitoring

Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, you should ask for advice from your health care provider.

Nitrates: As a precaution, we always notify physicians and health care providers in this area if there is ever a higher than normal level of nitrates in the water supply.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

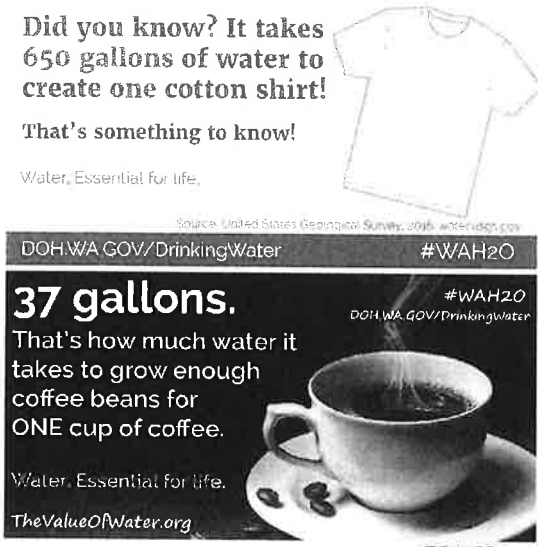
GENERAL HEALTH EFFECTS INFORMATION

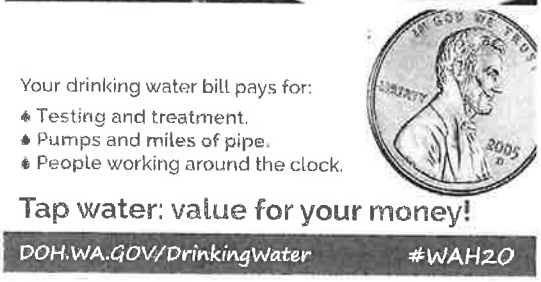
Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

We at the City of Zillah also work around the clock to provide top quality water to every tap. We ask that all our customers help us protect our water sources, which are the heart of our community, our way of life, and our children's future.

"CONSERVATION EDUCATION"
"Ways you can help Save Water!"

1. Fix leaky faucets and plumbing joints.
2. Install aerators on every faucet and reduce water flow to less than 1 gallon per minute.
3. Insulate water pipes to avoid wasting water while waiting for hot water to flow.
4. Turn off the water while brushing your teeth & while shaving. **Save about 10 gallons a day.**
5. Install water-saving shower heads or flow restrictors.
6. Take shorter showers. A standard showerhead uses 2.5 gallons per minute, so a shorter shower can add up in savings. Turn the water off while washing your hair and **save 150 gallons per month.**
7. When taking a bath, start filling the tub with the drain already plugged instead of waiting first for the water to get warm. Adjust the temperature as the tub begins to fill. An average bath **uses 70 gallons** when filled to the brim.
8. Capture the water while waiting for hot water to come down the pipes when showering or bathing and use this water for indoor plants or your garden.





17.
COLIFORM MONITORING PLAN

HLA
Engineering and Land Surveying, Inc.

Coliform Monitoring Plan for: City of Zillah

A. System Information

Water System Name	County	System I.D. Number
ZILLAH, CITY OF	YAKIMA	99800 W
Attach copy of current WFI		
Number of Routine Samples Required Monthly by Regulation: 3	Number of Sample Sites Needed to Represent the Distribution System: 3	

B. Routine and Repeat Sample Locations

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites
X1. Zillah City Hall 503 1st. Ave. Zillah	1-1. 513 First Ave.
Faucet in meeting room	1-2. 503 First Ave.
	1-3. 119 First Ave.
X2. 119 First Ave.	2-1. 119 First Ave.
Kitchen sink	2-2. 503 First Ave.
	2-3 513 First Ave.
X3. 513 First Ave.	3-1. 503 First Ave
	3-2. 119 First Ave.
	3-3. 513 First Ave.
X4. 411 Baker Dr.	4-1. 501 Baker Dr.
	4-2. 627 Westwind Dr.
	4-3. 411 Baker Dr.
X5. 707 Fountain Blvd.	5-1. 8001 Vialago Pkwy.
	5-2. 713 Merwin Ct.
	5-3. 707 Fountain Blvd.

If the number of Routine samples needed to cover the distribution system requires more than three Routine sites, attach additional sheets as needed.

C. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1, X2, X3, X5	July	X1, X2, X3
February	X1, X2, X3, X5	August	X1, X2, X3
March	X1, X2, X3, X5	September	X1, X2, X3, X5
April	X1, X2, X3, X5	October	X1, X2, X3, X5
May	X1, X2, X3, X5	November	X1, X2, X3, X5
June	X1, X2, X3	December	X1, X2, X3, X5

D. Month Following Unsatisfactory Samples

Location/Address for <u>Routine</u> Sample Site(s) Unsatisfactory the Previous Month	Location/Address for the five <u>Routine</u> Sample Sites
X1. Zillah City Hall 503 First Ave.	1. 503 First Ave.
	2. 511 First Ave.
	3. 119 First Ave.
	4. 605 Rainier (Rainier Well)
	5. 113 First Ave.
X2. 119 First Ave.	1. 119 First Ave.
	2. 511 First Ave.
	3. 513 First Ave.
	4. 113 First Ave.
	5. 605 Rainier (Rainier Well)
X3. 513 First Ave.	1. 513 First Ave.
	2. 119 First Ave.
	3. 511 First Ave.

	4. 503 First Ave. 5. 605 Rainier Ave. (Rainier Well)
X4. 411 Baker Dr.	1. 411 Baker Dr. 2. 501 Baker Dr. 3. 627 Westwind Dr. 4. 605 Rainier (Rainier Well)
X5. 707 Fountain Blvd.	1. 707 Fountain Blvd. 2. 8001 Vialago Pkwy. 3. 713 Merwin Ct. 4. 605 Rainier (Rainier Well)

E. Preparation Information

System Name		Date Plan Completed	Dates Modified
City of Zillah		March 2006	March 2018, June 2023
Name of Plan Preparer	**Position**		**Daytime Phone #**
John Simmons	Water Dist. Manager 2		(509) 221-8493
State Reviewer		**Date Last Review**	

F. System Map

CITY OF ZILLAH

Water System Plan Update

2021 COLIFORM MONITORING PLAN MAP

N
W E
S

0 400 800 1600

LEGEND

ZILLAH CITY LIMITS

ZILLAH UGA BOUNDARY

ROUTINE SAMPLE SITE

REPEAT SAMPLE SITE

HLA Engineering and Land Surveying, Inc.

2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

6/5/23
P:\Projects\2019\19202\2021 WSP FIGURES.dwg

18.
WATER QUALITY MONITORING SCHEDULE

HLA
Engineering and Land Surveying, Inc.

Water Quality Monitoring Schedule

System: ZILLAH CITY OF **PWS ID: 99800 W** **Region: EASTERN**
Contact: John T Simmons **Group: A - Comm** **County: YAKIMA**

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

	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
Coliform Monitoring Population	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200
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 2018 - Dec 2020	standard - 3 year	08/27/2020		
Asbestos	0	Jan 2020 - Dec 2028	waiver - 9 year	11/08/1999		

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.

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S01 *Rainier Ave* *Well* *Use - Permanent* *Susceptility - High*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Nitrate	1	Jan 2020 - Dec 2020	R&C - 1 year	10/21/2020		
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/13/2016	Sep 2025	
Conductivity	1	Jan 2020 - Dec 2022	standard - 3 year	09/13/2016	Mar 2021	
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	05/17/2017	May 2023	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	06/20/2018		
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	06/20/2018		
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year	06/14/2001		
Radium 226 + 228	1	Jan 2014 - Dec 2022	Baseline - 9 year	05/28/2014		
Gross Alpha	1	Jan 2020 - Dec 2022	standard - 3 year	05/28/2014	***May 2020***	***Past Due***

Source S02 *Third Ave* *Well* *Use - Permanent* *Susceptility - High*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2020 - Mar 2020	increased - quarterly	10/21/2020	
Nitrate	1	Apr 2020 - Jun 2020	increased - quarterly	10/21/2020	
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/18/2018	Sep 2027
Iron	1	Jan 2020 - Dec 2022	standard - 3 year	09/18/2018	Sep 2022
Manganese	1	Jan 2020 - Dec 2022	standard - 3 year	09/18/2018	Sep 2022
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	12/26/2018	Oct 2024
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	12/26/2018	
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	12/26/2018	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year	06/12/2001	

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S02	*Third Ave*	*Well*	*Use - Permanent*	*Susceptility - High*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	12/26/2018	Dec 2024
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	12/26/2018	Dec 2024

Source S03	*WIPPCO Well*	*Well*	*Use - Permanent*	*Susceptility - High*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2020 - Dec 2020	R&C - 1 year	12/18/2019	***Dec 2020***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/13/2016	Sep 2025
Iron	1	Jan 2020 - Dec 2022	standard - 3 year	09/26/2019	Mar 2021
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	04/25/2016	Apr 2022
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	06/20/2018	
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	06/20/2018	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year	06/14/2001	
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	07/27/2020	
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	07/27/2020	

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2020
Submit CCR certification form to ODW (Community systems only):	10/01/2020
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2020
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

Eastern Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Stan Hoffman: (509) 329-2132: or Stan.Hoffman@doh.wa.gov
For questions regarding DBPs:	Stan Hoffman: (509) 329-2132 or Stan.Hoffman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Joseph Perkins: (509) 329-2134 or Joseph.Perkins@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.

19.
SOURCE SAMPLE CHEMICAL ANALYSIS RESULTS (IOC, NITRATE, VOC, SOC, AND RADIONUCLIDE)

HLA
Engineering and Land Surveying, Inc.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
3	37G185	151	27201	12/30/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
3	37G185	151	27056	12/28/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	151	24762	11/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
3	37G185	163	15228	7/27/2020	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	151	38439	12/18/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	105	32237	9/26/2019	IOC	INORGANIC CONTAMINANTS	IOC_SHORT	INORGANIC SHORT FORM	No
3	37G185	151	38136	12/11/2018	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	89	86355	6/20/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
3	37G185	89	86355	6/20/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
3	37G185	151	36092	12/6/2017	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	151	36555	12/19/2016	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	105	27534	9/13/2016	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	37G185	151	15911	6/13/2016	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	89	75912	4/25/2016	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	151	6594	3/21/2016	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	151	28811	9/21/2015	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	151	24652	9/22/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	28	48515	7/22/2014	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	151	23025	9/23/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	105	21573	9/25/2012	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	28	45765	9/25/2012	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	151	19644	9/21/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	105	20096	9/23/2010	IOC	INORGANIC CONTAMINANTS	IOC_SHORT	INORGANIC SHORT FORM	No
3	37G185	151	10938	6/15/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	89	78985	4/12/2010	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	89	88210	6/22/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
3	37G185	89	88210	6/22/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
3	37G185	151	10829	6/22/2009	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	151	18954	9/30/2008	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	28	36957	12/12/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	28	96091	9/24/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	105	17627	9/20/2007	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	37G185	28	51022	6/27/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	151	17395	9/19/2006	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	89	72923	4/17/2006	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	151	16293	9/8/2005	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	28	1882	12/2/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	105	17156	9/23/2004	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	28	26145	6/8/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	105	4582	3/24/2004	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	105	16084	9/25/2003	IOC	INORGANIC CONTAMINANTS	AR	ARSENIC	No
3	37G185	105	16007	9/25/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	107	25500	7/24/2003	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	14	47942	9/12/2002	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	81	85846	9/12/2002	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	81	76818	6/14/2001	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No
3	37G185	81	76817	6/14/2001	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	23	68502	6/13/2001	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	37G185	14	39782	6/12/2001	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	37G185	81	67860	2/3/2000	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	37G185	81	67861	2/3/2000	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	**37G185**	**81**	**62753**	**6/11/1999**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
3	37G185	81	56533	8/24/1998	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No
3	37G185	81	51851	1/23/1998	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	37G185	81	43994	3/13/1997	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	66	24143	11/20/1992	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
3	37G185	54	3088	1/29/1991	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	37G185	54	1035	3/27/1989	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	37G151	151	22839	10/21/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	17912	8/25/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	9622	5/19/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	5533	3/23/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	38851	12/30/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	32138	9/26/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	89	87044	12/26/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
2	37G151	89	87044	12/26/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
2	37G151	28	91471	12/26/2018	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
2	37G151	89	78279	12/26/2018	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	**37G151**	**105**	**29910**	**9/18/2018**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
2	37G151	151	28810	9/21/2015	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	24651	9/22/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	23024	9/23/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	105	21572	9/25/2012	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	19643	9/21/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	**37G151**	**105**	**20094**	**9/23/2010**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC_SHORT**	**INORGANIC SHORT FORM**	**Yes**
2	37G151	28	42193	9/23/2010	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
2	37G151	89	79983	9/23/2010	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	37G151	151	10937	6/15/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	89	88209	6/22/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
2	37G151	89	88209	6/22/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
2	37G151	151	10828	6/22/2009	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	151	18953	9/30/2008	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	28	99091	9/24/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
2	**37G151**	**105**	**17626**	**9/20/2007**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
2	37G151	28	34118	3/28/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
2	37G151	151	17568	9/20/2006	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	89	73873	9/20/2006	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	37G151	151	16291	9/8/2005	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	28	3211	11/4/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
2	37G151	105	17157	9/23/2004	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	28	23012	5/25/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
2	37G151	105	16083	9/25/2003	IOC	INORGANIC CONTAMINANTS	AR	ARSENIC	No
2	37G151	105	16006	9/25/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	107	25499	7/24/2003	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	37G151	14	47941	9/12/2002	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	81	85845	9/12/2002	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	37G151	14	39781	6/12/2001	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2	37G151	23	68503	6/12/2001	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
2	37G151	81	76815	6/12/2001	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No
2	37G151	81	76816	6/12/2001	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	37G151	14	31914	3/16/2000	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
2	**37G151**	**81**	**67858**	**2/3/2000**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
2	37G151	81	67859	2/3/2000	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	**37G151**	**81**	**62752**	**6/11/1999**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
2	37G151	81	56532	8/24/1998	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No
2	**37G151**	**81**	**51850**	**1/23/1998**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
2	37G151	81	43993	3/13/1997	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	**37G151**	**66**	**24142**	**11/20/1992**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
2	37G151	54	2883	11/27/1990	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2	**37G151**	**51**	**11544**	**3/29/1989**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
2	37G151	54	1034	3/27/1989	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	151	22838	10/21/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	151	1141	1/16/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
1	37G150	151	34445	10/23/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	151	9356	4/19/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	89	86354	6/20/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
1	37G150	89	86354	6/20/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
1	37G150	151	36091	12/6/2017	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	89	76903	5/17/2017	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	151	34351	11/16/2016	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	105	27533	9/13/2016	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
1	37G150	151	35529	11/19/2015	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	151	29558	11/17/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	28	48281	5/28/2014	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	151	28106	11/21/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	151	26000	11/27/2012	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	28	45274	7/3/2012	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	151	25734	12/7/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	89	70558	5/26/2011	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	151	25473	12/14/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	105	19708	9/23/2010	IOC	INORGANIC CONTAMINANTS	IOC_SHORT	INORGANIC SHORT FORM	No
1	37G150	28	42034	8/30/2010	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	151	20719	10/20/2009	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	89	88211	6/22/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
1	37G150	89	88211	6/22/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
1	37G150	151	22793	11/19/2008	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	28	96957	12/12/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	28	36091	9/24/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	105	17628	9/20/2007	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
1	37G150	28	51021	6/27/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	28	50512	6/25/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	151	21379	11/13/2006	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	89	73993	10/11/2006	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	151	16292	9/8/2005	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	28	3123	10/6/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	105	17158	9/23/2004	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	28	25724	4/20/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	105	4583	3/24/2004	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	105	21005	11/17/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	105	11950	8/13/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	107	25498	7/24/2003	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	149	2973	5/13/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	149	1363	2/6/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	85844	9/12/2002	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	14	45390	5/8/2002	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	76820	6/14/2001	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No
1	37G150	81	76819	6/14/2001	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	23	68504	6/13/2001	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
1	37G150	14	39780	6/12/2001	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	14	33107	5/24/2000	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	67856	2/3/2000	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
1	37G150	81	67857	2/3/2000	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	105	216	1/10/2000	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	63563	7/26/1999	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	**37G150**	**81**	**62751**	**6/11/1999**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
1	37G150	81	56710	8/28/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	14	22029	8/28/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	56531	8/24/1998	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No

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Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
1	37G150	81	54426	5/13/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	**37G150**	**81**	**51848**	**1/23/1998**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
1	37G150	81	45888	6/19/1997	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	45887	6/19/1997	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	43992	3/13/1997	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	81	41315	11/5/1996	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	41317	11/5/1996	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	41316	11/5/1996	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	37G150	81	41204	10/31/1996	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1	**37G150**	**66**	**24141**	**11/20/1992**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
1	37G150	54	2882	11/27/1990	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1	37G150	54	1033	3/27/1989	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No

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20.
DISTRIBUTION SYSTEM CHEMICAL ANALYSIS RESULTS (BACTERIOLOGICAL, LEAD AND COPPER)

HLA
Engineering and Land Surveying, Inc.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		151	3466	2/24/2021	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	3465	2/24/2021	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	3467	2/24/2021	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1610	1/26/2021	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1609	1/26/2021	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1611	1/26/2021	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		**151**	**27204**	**12/30/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		**151**	**27205**	**12/30/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		**151**	**27206**	**12/30/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		151	27200	12/30/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		**151**	**27202**	**12/30/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		**151**	**27203**	**12/30/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		**151**	**27053**	**12/28/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		**151**	**27051**	**12/28/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		151	27052	12/28/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		**151**	**24765**	**11/18/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		151	24763	11/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	24764	11/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	24520	11/16/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		**151**	**24518**	**11/16/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		151	24519	11/16/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	22836	10/21/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	22835	10/21/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	22837	10/21/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		154	6091	9/29/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	20545	9/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	20546	9/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	20544	9/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		105	18204	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18203	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18201	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18200	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18207	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18202	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18205	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18206	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18199	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18208	8/27/2020	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		151	17909	8/25/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	17907	8/25/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	17908	8/25/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	15227	7/27/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	15225	7/27/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	15226	7/27/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	12474	6/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	12476	6/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	12475	6/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9621	5/19/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9620	5/19/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9619	5/19/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	7707	4/22/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	7679	4/22/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	7678	4/22/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	5530	3/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	5531	3/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	5532	3/23/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2905	2/12/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2907	2/12/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2906	2/12/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1139	1/16/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		**151**	**1138**	**1/16/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		**151**	**1140**	**1/16/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		**151**	**1004**	**1/15/2020**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		151	1006	1/15/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1005	1/15/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	38437	12/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	38436	12/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	38438	12/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36643	11/21/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36640	11/21/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36641	11/21/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36642	11/21/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36499	11/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		**151**	**36497**	**11/20/2019**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		151	36498	11/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	34471	10/23/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	34442	10/23/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	34444	10/23/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	32137	9/26/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	32136	9/26/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	32135	9/26/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	29005	8/27/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	29003	8/27/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	29004	8/27/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No

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DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		151	23640	7/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	23637	7/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	23654	7/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	23639	7/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		**151**	**23238**	**7/18/2019**	**MICRO**	**MICROBIOLOGICAL**	**COLI_AP**	**ABSENCE / PRESENCE**	**Yes**
Dist		151	23240	7/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	23239	7/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	16442	6/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	16443	6/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	16444	6/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	11982	5/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	11981	5/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	11983	5/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9392	4/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9394	4/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9393	4/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		105	25942	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25944	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25937	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25941	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25939	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25946	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25943	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25938	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25940	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	25945	8/28/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20422	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20417	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20420	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20419	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20418	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20415	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20414	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20421	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20413	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	20416	8/14/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16926	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16927	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16923	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16925	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16924	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16918	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16920	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16921	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16919	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	16922	8/24/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19402	10/6/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19403	10/6/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19401	10/6/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19396	9/25/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19394	9/25/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19400	9/25/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19399	9/25/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19398	9/25/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19395	9/25/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19397	9/25/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22158	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22156	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22161	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22162	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22164	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22157	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22155	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22160	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22163	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	22159	11/22/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70494	7/5/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70222	6/21/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70029	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70037	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70036	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70031	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70032	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70033	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70028	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70030	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70034	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	70035	6/20/2000	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		119	95625	11/8/1999	IOC	INORGANIC CONTAMINANTS	ASB	ASBESTOS	No
Dist		81	63621	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63626	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63616	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63623	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63618	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		81	63624	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63622	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63617	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63619	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63625	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	63620	7/28/1999	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56865	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56867	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56866	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56869	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56871	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56862	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56872	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56863	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56870	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56864	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	56868	8/27/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		**51**	**11545**	**3/29/1989**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
Dist		52	14472	7/7/1987	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
Dist		**51**	**9037**	**5/19/1986**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
Dist		51	7427	8/8/1984	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
Dist		51	4886	10/5/1981	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
Dist		101	497	3/2/1981	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
Dist		51	2346	6/11/1976	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

21.
LEAD AND COPPER CERTIFICATION FORM AND CONSUMER NOTICE EXAMPLE

HLA
Engineering and Land Surveying, Inc.

1008 W. Ahtanum Rd.
Union Gap, WA 98903
(509) 452-7707
Fax: (509) 452-7773

Billing Code: 04180
Batch #: 012857

CASCADE ANALYTICAL, INC.

3019 G.S. Center Rd.
Wenatchee, WA 98801
(509) 662-1888
Fax: (509) 662-8183

LCR TEST PANEL Lead and Copper
Distribution System • Report of Analyses

	System Group Type: (Circle one) A X B Other: (Specify)
Water System ID Number 99000W	System Name: City of Zillah
Source: S93 (Distribution Samples)	County: Yakima
	Consecutive System? _____YES _____NO
Send Report to: City of Zillah PO Box 475 Zillah, WA 98953	Bill to: (Client Name) City of Zillah PO Box 475 Zillah, WA 98953
Sample Purpose: (Check Appropriate Box) [X] RC - Routine/Compliance (satisfies monitoring requirements) [ ] C - Confirmation (confirmation of chemical result) [ ] I - Investigative (does not satisfy monitoring requirements) [ ] O - Other (specify)	Date Received: (MM/DD/YY) 8 / 27 / 20 Date Analyzed: (MM/DD/YY) 9 / 2 / 20 Date Reported: (MM/DD/YY) 9 / 2 / 20 COMMENTS:

(DOH #) Analyte	(0023) Copper	(0009) Lead
State Reporting Level (SRL)	0.02 mg/l	0.001 mg/l
Regulatory Action Level	1.3 mg/l	0.015 mg/l
Analytical Method/Analyst's Initials	EPA 200.8/ RLK	EPA 200.8/ RLK

Lab Sample Number	Date Collected	Sample Location	Copper (mg/L)	Lead (mg/L)
10518199	8/27/20	120 First Ave	0.0156	0.001870
10518200	8/27/20	103 Second Ave	0.0494	0.000210
10518201	8/27/20	303 Second Ave	0.206	0.000550
10518202	8/27/20	1604 Second Ave	0.343	0.000350
10518203	8/27/20	627 Westwind Dr	0.146	0.000140
10518204	8/27/20	105 Hamilton Dr	0.00174	0.002420
10518205	8/27/20	1400 Kagley Way	0.0113	0.000390
10518206	8/27/20	111 Northstone Pkwy	0.0449	0.000440
10518207	8/27/20	211 Fourth Ave	0.198	0.000320
10518208	8/27/20	1301 Cutler Way	0.0879	0.000250

NOTES:

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

Action Level: The concentration of the 90th percentile sample of all six-month period distribution samples collected that, if exceeded, signals the system is in violation.

NA: Not Analyzed: In the results column, indicates this compound was not included in the current analysis.

ND (Not Detected): In the results column, indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.00X): Indicates the compound was not detected in the sample at or above the concentration indicated. (for labs using their own reporting level)

Comments:

Andy Schut
Lab Manager/Yakima

Lead and Copper Consumer Notice certification form

All Group A water systems that conduct lead and copper monitoring must provide individual sampling results to the persons at each sample location. (CFR 141.85 (d))

Notification of Results: The water system must provide the consumer notice as soon as possible, but no later than 30 days after learning the results.

Community water systems: You must provide individual sampling results to all residences for which you received lead and copper samples. In multi-unit structures, only notify each unit tested.

Nontransient noncommunity water systems (NTNCs): You must notify all consumers who use water from the sample tap, even if they do not receive a water bill. With prior approval from DOH, NTNC water systems can post the notice in public areas.

Certification to the state: DOH must receive a sample copy of one consumer notice and a signed certification form (below) within 90 days after the end of the monitoring period.

To meet this reporting requirement, you may:

- Use the DOH Consumer Notice Template.
- Use the applicable EPA Consumer Notice template.
- Prepare your own Consumer Notice in conjunction with the state.

If you choose to produce your own Consumer Notice, it must include all of the following:

1. The sample results of the tap tested.
2. An explanation of the health effects of lead.
3. Steps consumers can take to reduce exposure to lead in drinking water.
4. The water system's contact information.
5. The maximum contaminant level goal (MCLG) and action level for lead, and the definitions of these two terms.

If you are responsible for multiple water systems, you can send to the Office of Drinking Water:

- A list of the water systems you provided Consumer Notices to, with name and PWS ID number.
- Send one copy of the Consumer Notice you used.
- Send one completed certification form (below).

Lead and Copper Results: Consumer Notification Certification Form

The water system must complete this section. The signature below certifies that the notice contains all required elements.

Complete the following items (check all that apply):

☐ I mailed/delivered all Consumer Notices to the water users at all of the lead and copper sampling locations within 30 days of receiving the lead and copper results from the laboratory.

☐ **(For NTNC systems ONLY)** Notice posted at _____ on ___ / ___ / ____ within 30 days of receiving the lead and copper results from the laboratory. (***Only By Department Approval***)

_____ _____

Water System PWS ID

_____ _____ _____

Signature of owner or operator Position Date

Send a copy of the completed notice and this certification form to: Washington State Department of Health, Office of Drinking Water, Water Quality Section,PO Box 47822, Olympia WA 98504-7822 or fax to (360) 236-2252.

DOH Form 331-462-F

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

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The _____ Water System, I.D. _____, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at _____

are: **lead** _____ **mg/L and copper** _____ **mg/L.**

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: _____
(owner or operator)

at ( ) - or _____
(phone number) (address)

This notice is sent to you by _____ Water System on ___/___/_____

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Sistema comunitario de agua
AVISO al CONSUMIDOR
Resultados de las muestras de agua para plomo y cobre

El sistema de agua _____ número de identificación _____, le presenta con los resultados de plomo y cobre en la muestra de agua colectada en su ubicación. Por favor, comparta los resultados con todos quienes usan o beben el agua.

Los resultados para: _____

son: _____ **mg/L de plomo y ___ mg/L de cobre.**

El límite del nivel máximo de contaminantes (LNMC) distingue entre niveles de contaminantes por debajo de lo cual no hay riesgos para la salud conocidos o esperados. Los LNMC toman en cuenta el margen de seguridad. Los límites regulatorios para plomo y cobre se llaman niveles de acción. Se considera sobrepasar los límites cuando la concentración del nivel de plomo o cobre en más de10 por ciento de las muestras de agua potable excede un nivel de acción.

- El LNMC para plomo es "0" y el nivel de acción es 15 ppb (o .015 mg/L).
- El LNMC y nivel de acción para cobre es 1,300 ppb (or 1.3 mg/L).

Sobrepasar los niveles de acción de plomo o cobre provocará tratamiento de control u otros requisitos. Avisaremos a todos los usuarios de agua si nuestro sistema excede el nivel de acción de plomo.

Para más información, por favor contacte: _____
(dueño o operador)

a ( ) - o _____
(número de teléfono) (dirección)

El sistema de agua _____le mandó este aviso en la fecha ___/___/___.

Como entra en el agua el plomo

La fuente de plomo en agua potable más frecuente son las líneas de distribución de agua o plomería residencial en vez de la fuente del sistema de agua. Fuentes de plomería incluyen tuberías de plomo, soldadura de plomo, grifos, válvulas, y otros componentes hechos de latón. Plomo de otras fuentes (tal como pintura a base de plomo y polvo o tierra contaminada) puede aumentar la exposición total de una persona, que se suma con los efectos del plomo en agua.

Efectos potenciales a la salud del plomo

El mayor riesgo de exposición a plomo es para bebés, niños, y mujeres embarazadas. Plomo puede causar problemas serios de salud si entra demasiado en el cuerpo. Los huesos almacenan plomo y eso puede descargar más adelante en la vida. Plomo puede dañar al cerebro y los riñones y causar interferencia con la producción de células rojas sanguinas que portan oxígeno, lo cual puede resultar en un QI disminuido en niños. Durante el embarazo, el niño recibe plomo de los huesos de la madre, que puede afectar al desarrollo cerebral. Niveles bajos de plomo pueden afectar a adultos con alta presión sanguina o con problemas de riñón.

Como entra en el agua el cobre

Cobre es un mineral y componente natural de sedimentos. En las cantidades correctas, es un nutriente esencial para humanos y plantas. En el estado de Washington, la mayoría del cobre en el agua potable viene de la corrosión de la plomería del hogar. Fuentes de plomería pueden incluir tuberías y accesorios. Cobre de la corrosión de plomería puede acumularse durante la noche.

Efectos potenciales a la salud del cobre

Aunque cobre es un mineral esencial en la dieta, demasiado cobre puede provocar problemas de salud. Cobre tiene una ancha distribución a través de los tejidos corporales, pero se acumula ante todo en el hígado y los riñones. Una sola dosis de 15 mg de cobre puede causar nausea, vómitos, diarrea, y calambres intestinales. Casos severos de intoxicación de cobre han resultado en anemia y a la disrupción del funcionamiento del hígado y riñón. Los individuos con las enfermedades de Wilson o Menke corren mayor riesgo de la exposición al cobre.

Como puede reducir exposición:

- Cuando el agua no ha corrido durante varias horas, enjuagar las tuberías dejando correr agua fría hasta que el agua se nota bastante más fría antes de usarla para beber o cocinar. **(Mientras más tiempo está el agua estancada en las tuberías, más disueltos estarán los metales que puede contener).**
- Use solo agua fría para beber, cocinar y preparar el biberón de fórmula para el bebé. Agua caliente puede contener altos niveles de plomo o cobre.
- Limpie las pantallas de filtro y los aireadores del grifo para quitar las partículas acumuladas.
- Si está construyendo o remodelando, solo use materiales "sin plomo" o con tubería de bajo plomo. Evite usar tuberías de cobre o accesorios de latón para lugares donde el agua se va a consumir o usar para preparar comida (como en la cocina o el grifo del baño).

22.
DEPARTMENT OF HEALTH SANITARY SURVEY

HLA
Engineering and Land Surveying, Inc.

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
EASTERN DRINKING WATER REGIONAL OPERATIONS
16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830
TDD Relay 1-800-833-6388

October 15, 2018

John T. Simmons, PW Director
City of Zillah
PO BOX 475
Zillah, Washington 98953

Subject: Zillah, City of Water System; PWS # 99800 W; Yakima County
Routine Sanitary Survey Inspection Report – Survey Date: September 11, 2018

Dear Mr. Simmons:

Thank you and Dorey, for your time and meeting with me to complete the Routine Sanitary Survey of the City's water system. This letter and survey report documents our observations and information collected during the survey.

I listed defects in your water system facilities or operations that need your immediate attention below as *significant deficiencies* or *significant findings*.

- **Significant Deficiency**, if left unaddressed, has the potential of causing an immediate or potential risk to the health of the water system customers.
- **Significant Finding** is a problem that imparts a serious but less direct public health threat than a significant deficiency. If left unaddressed, a significant finding creates a risk to the physical safety, security or reliability of the public water supply.

Significant Findings

Reservoirs - Complete or have completed the inspections of the reservoir roofs. Answer the questions **72 through 75 on checklist Page 7 and 8 of 9**. Confirm the findings corrected recently during the last survey have not degraded.

Please give this item a high priority for completion. Within forty-five (45) days of the date of this letter you must correct the *Significant Deficiencies* and *Significant Findings*, or provide a corrective action plan for completing this action.

We have logged this item and the completion date into the Department of Health's (DOH) sanitary survey database. Ensuring your system completes each corrective action is a high priority for the Office of Drinking Water. Failure to complete each of these corrections within the designated time may result in enforcement action.

After completing this required correction action, please email verification of completion, including photographs and supporting narrative to: ero.sanitarysurveys@doh.wa.gov, or mail it to Attn: Mark Steward, Sanitary Survey Program Manager, at the address listed on our letterhead. In your transmittal, please reference your water system's name, PWS ID#, and date when you corrected this item.

If you believe, you have good cause and need additional time to correct any significant deficiency or significant finding, please contact **Mark Steward, Sanitary Survey Program Manager**, at **(509) 329-2136.**

Discussion – we also discussed and reviewed the following items:

A. S01, S02, and S03 – These wells are undergoing improvements to the pump houses and converting the existing source pumps for S01 and S03 to submersible pumps. Review the **Questions 22 through 25, checklist pages 4 and 5 of 9**, and confirm the wells remained sealed watertight. You can provide photographs of each wellhead with the Construction Completion Report, your consultant must submit to our office for closing out the project.

B. I provided some links below for your information.
* SENTRY: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx
* ODW home page: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx

C. **Revised Total Coliform Rule (RTCR)**. General information on the rule and change in the requirements for Routine Coliform Sampling. Review the enclosed information packet on the RTCR. Note the new requirements for:
* Level 1 Assessment – Coliform detected in both routine and repeat coliform samples,
* Level 2 Assessments – E.Coli detected or second Level 1 Assessment required within a specific period.
* Change in Repeat and Follow-up sampling requirements.
http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Coliform/RevisedTotalColiformRuleRTCR

D. **Groundwater Rule (GWR)**. General information on the rule and additional requirements triggered when a coliform sample tests positive for coliform. DOH will use the raw water source samples to evaluate whether additional samples or a more robust source treatment is necessary.
* Coliform Monitoring Plan:
http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Coliform/PreparingaColiformMonitoringPlan/LargeorMultipleSource

E. **Lead and Copper Rule (LCR)**. Review the information enclosed on the LCR. The information includes the Public Notice and Certification templates we created for providing notice to the residents recently sampled for Lead and Copper.
http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/LeadandCopperRule

By completing this sanitary survey, your water system met the requirements in WAC 246-290-416. We will notify you of your next sanitary survey in three to five years. Please note you should not interpret satisfying the requirements of the sanitary survey as meeting other applicable local, state or federal statutes, ordinances and regulations. Similarly, you must address other DOH requirements and or directives separately from the sanitary survey.

As provided by WAC 246-290-990 (3)(c), a fee is charged to help recover the cost of conducting

a sanitary survey. The Department of Health's (DOH) total cost to complete this sanitary survey is $1,070.50. The office of Drinking Water has used state and federal funds to pay $509.50 of this amount. An invoice for the remaining amount due of $561.00 is enclosed.

If you have any questions regarding this letter, please contact me at (509) 329-2120 or by email Andres.cervantes@doh.wa.gov.

Sincerely,

Andres R. Cervantes, PE
Regional Engineer, Eastern Regional Office
Office of Drinking Water
Division of Environmental Health

Enclosures: Invoice
Checklist
Photos

cc: Yakima Health District
Mark Steward, DOH Sanitary Survey Program Manager

Washington State Department of Health

Office of Drinking Water
Third Party Sanitary Survey Form (Checklist)

System Name:	**City of zillah**			Survey Date:	**September 11, 2018**
PWS ID#:	**99800 W**	County:	**Yakima**	System Type:	**A-COMM**
Persons Attending Inspection:	**John Simmons**				
	Darlene "Dolly" Meyer				
Inspector's Name:	**Andres R Cervantes**				

PART A: SUMMARY OF SIGNIFICANT DEFICIENCIES AND SIGNIFICANT FINDINGS

The following is a completed sanitary survey checklist and summary of inspection findings. This completed sanitary survey checklist is the basis for the cover letter you receive from your local health jurisdiction or from the WA Dept. of Health (DOH). The cover letter documents any significant deficiencies or significant findings that must be corrected. The cover letter may also summarize observations concerning compliance with certain rules, and offer recommendations you can use to make improvements to the operation and management of your water system. Contact your DOH regional office with any questions you have about this survey.

Bolded and highlighted checklist items represent significant deficiencies that, if left uncorrected, create a significant public health risk. Highlighted checklist items represent significant findings that, if left uncorrected, create a significant risk to the physical safety, security, or reliability of the public drinking water supply. You will be required to take some sort of corrective action for each checklist answer that is **bolded and highlighted**, or highlighted.

Significant deficiencies and significant findings identified during this sanitary survey:

Reservoirs:

Inspect the roofs of the reservoirs.

Answer Questions-72 - 75, on Checklist pages 6 & 7 of 9, (boxes highlighted yellow).

Confirm question noted, and provide photographs of the hatch, lock, gasket under hatch, vent, screens, entry points / ports for controls, site gages, etc.

Significant deficiencies or significant findings identified in the previous sanitary survey that remain unaddressed:

Observations and recommendations identified during this survey

S01, S02, and S03 under repair and improvements. Provide photographs of improvements with construction completion report. Confirm Questions 22 - 25 on Checklist pages 4 & 5 of 9, (boxes highlighted in yellow) are not Defficiencies.

Revised Total Coliform Rule: General information on rule and requirements triggered when a coliform sample tests positive for coliform.

* Specifically, Level 1 and 2 assessments and reporting requirements.

Lead and Copper Rule: General information on rule and public notification requirements for sampling sites.

* Specifically, site specific public notices and certification.

Water Use Efficiency: (WUE) General information on rule and requirements. Requirements include annual monitoring for source water production and reporting to websit.

PART B: GENERAL WATER SYSTEM DESCRIPTION

Provide a general description of the water system including changes, updates, connections, source(s), storage, number of pressure zones, treatment, and control system(s) and alarm(s). Make corrections and updates to the purveyor's water facilities inventory form (WFI).

3 permanent Sources

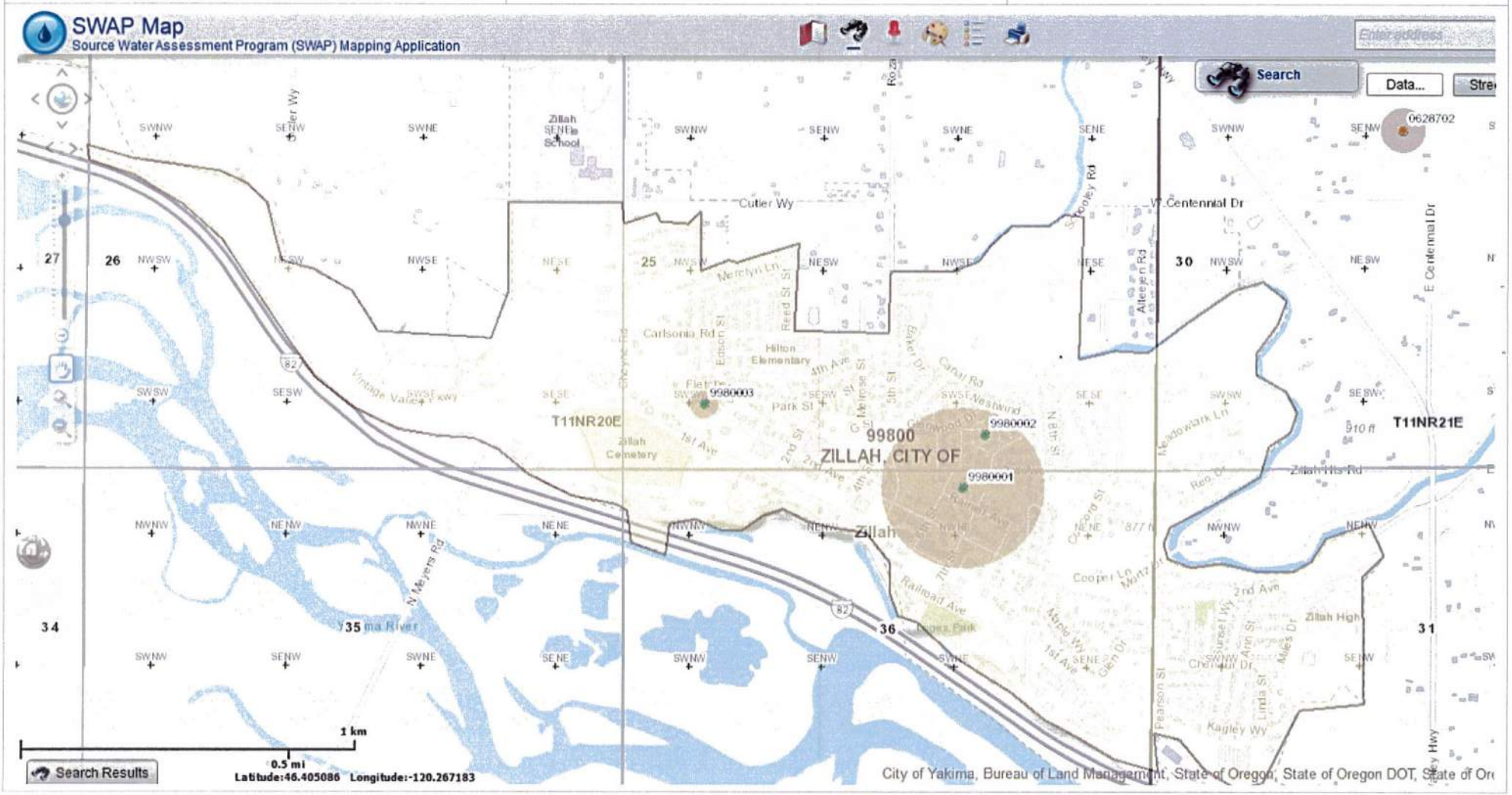
- **S01- Rainier Well, Well #1**
- **S02 - 3rd Street Well, Well #2**
- **S03 - Wippco Well, Well #3**

4 Reservoirs

- **Reservoir 1 (Elevated Steel Tank) 75,000 G**
- **Reservoir 2 (Steel Stand Pipe) - 783,000-G**
- **Reservoir 3 (Steel Tank) - 600,000 G**

2 Presssure zones - Each supplied by a reservoir

- **ZONE - 1 Booster Staion, Reservoirs**
- **ZONE - 2 Constant Pressure Booster Station**



PART C: OPERATIONS and MANAGEMENT	
1. Was the system operator, who is most knowledgeable about the system's day-to-day operations, present for the survey?	☒Yes ☐No ☐NA
2. Were water system records available for your review?	☒Yes ☐No ☐Partial
3. Has the purveyor developed and implemented either a Small Water System Management Program or a Water System Plan?	☒Yes ☐No
3a. If no, are the following planning documents complete and up to date:	
Service Area and Facility Map	☐Yes ☐No ☐Partial
Cross-Connection Control Program	☐Yes ☐No ☐Partial
Source Water Protection Program	☐Yes ☐No ☐Partial
Emergency Response Plan	☐Yes ☐No ☐Partial
Operation and Maintenance Program	☐Yes ☐No ☐Partial
Coliform Monitoring Plan	☐Yes ☐No ☐Partial
Component Inventory and Assessment	☐Yes ☐No ☐Partial
Asset Replacement and Other System Improvements	☐Yes ☐No ☐Partial
Budget	☐Yes ☐No ☐Partial
4. Does the purveyor plan to make capital improvements in the next 1-3 years? If yes, describe below	☒Yes ☐No
5. Is there a backup operator available if the regular one is not available? If yes, provide contact info below	☒Yes ☐No
6. Were the water system's current and future water quality monitoring requirements reviewed?	☒Yes ☐No
7. Was water quality sample results and trends reviewed with the purveyor?	☒Yes ☐No
8. Does the system have emergency power?	☒Yes ☐No
9. Does the system experience frequent power outages (>2 per year)? If yes, explain below	☐Yes ☒No
10. Does the system experience frequent water outages (>2 per year)? If yes, explain below	☐Yes ☒No
11. Does there appear to be adequate reliability provided for this system? If no, explain below	☒Yes ☐No

Describe the general level of planning and management documents developed by this water system and any recommendations for additional development, including updates, system management practices and processes, water rates, etc.

Approved WSP on file with the department.

PART D: SOURCES (This page may be reproduced to add more sources)		
12. Did you observe a source connected to the water system that is NOT listed on the WFI and in active use?	☐Yes ☒No	
12a. If so, has the source received written DOH approval? (confirm with DOH post-survey)	☐Yes ☒No	
13. DOH Source Number:	**S01**	**S02**
14. Source Name from the WFI: (For example, North Well; Well #2; ABC334.)	Well #1	Well #2
15. Dept of Ecology Well Tag Number: (Use Well tag ID#, None or Not readable)	AEP 506	AEP 507
16. Source Use: P - Permanent S - Seasonal E - Emergency	P	P
17. If this is an emergency source, should it be disconnected?	☐Yes ☒No ☐NA	☐Yes ☒No ☐NA
18. *Is the source a potential GWI source?*	☐*Yes* ☒*No*	☐*Yes* ☒*No*
WELL (if there is no well, skip to question 34)		
19. Is the Sanitary Control Area (SCA) free of unmitigated potential sources of contamination?	☒Yes ☐No	☒Yes ☐No
20. Is the wellhead located in a pit or vault?	☐Yes ☒No	☐Yes ☒No
21. Is the wellhead at risk of submergence?	☐Yes ☒No	☐Yes ☒No
22. Is the well cap sealed, watertight, and free of unprotected openings?	☒Yes ☐No	☒Yes ☐No
23. Is the well casing free of any unprotected openings?	☒Yes ☐No	☒Yes ☐No
24. Is there a vent on the well?	☒Yes ☐No	☒Yes ☐No
24a. If yes, is the vent protected? (24 non-corrodible mesh screen or slots)	☒Yes ☐No	☒Yes ☐No
25. Are conduits and junction boxes sealed to prevent contaminant entry?	☒Yes ☐No	☒Yes ☐No
26. Is the well unreasonably at risk to physical damage?	☐Yes ☒No	☐Yes ☒No
27. Is there a raw water source sample tap?	☒Yes ☐No	☒Yes ☐No
28. Is the source metered?	☒Yes ☐No	☒Yes ☐No
28a. If yes, is the source meter read at least monthly?	☒Yes ☐No	☒Yes ☐No
28b. If yes, are the water production records maintained?	☒Yes ☐No	☒Yes ☐No
29. Is the wellhouse properly constructed and maintained? If no, explain below	☒Yes ☐No	☒Yes ☐No
30. Is there any evidence of infestation by rodents or other pests?	☐Yes ☒No	☐Yes ☒No
31. Is the wellhouse and well adequately protected from unauthorized access and tampering?	☒Yes ☐No	☒Yes ☐No
32. **Is there a pump control valve or vacuum relief valve without an air gap on the valve discharge pipe?**	☐Yes ☐No ☒NA	☐Yes ☐No ☒NA
33. **Are the source pump and pump controls operational and adequate to prevent chronic water outages or premature pump failure?** If no explain below	☒Yes ☐No	☒Yes ☐No
SPRING (if there is no spring, skip to question 41)		
34. Is the springbox (structure, hatch, and overflow) constructed to prevent the entry of contaminants or direct surface drainage? If yes, describe below.	☐Yes ☐No	☐Yes ☐No
35. Is there a raw water source sample tap?	☐Yes ☐No	☐Yes ☐No
36. Is the source metered?	☐Yes ☐No	☐Yes ☐No
36a. If yes, is the source meter read at least monthly?	☐Yes ☐No	☐Yes ☐No
36b. If yes, are the water production records maintained?	☐Yes ☐No	☐Yes ☐No
37. Is the springhouse properly constructed and maintained? If no, explain below	☐Yes ☐No	☐Yes ☐No
38. Is there any evidence of infestation by rodents or other pests?	☐Yes ☐No	☐Yes ☐No
39. Is the springhouse and spring box adequately protected from unauthorized access?	☐Yes ☐No	☐Yes ☐No
40. **Is the Sanitary Control Area (SCA) free of unmitigated potential sources of contamination?**	☐Yes ☐No	☐Yes ☐No

Describe and evaluate the source facilities including maintenance, operations, sanitary and security observations and any major change made to the source such as pump replacement, deepening or reconstruction:

No Treatment

Both under construction for improvements to the pumphouse.

S01 being converted from vertical motor and turbine pump to a submersible.

Provide photographs and construction completion report when work on sources is finished and tested.

PART D: SOURCES (This page may be reproduced to add more sources)					
12. Did you observe a source connected to the water system that is NOT listed on the WFI and in active use?				☐Yes ☒No	
12a. If so, has the source received written DOH approval? (confirm with DOH post-survey)				☐Yes ☒No	
13. DOH Source Number:				**S03**	**S**
14. Source Name from the WFI: (For example, North Well; Well #2; ABC334.)				Well #3	
15. Dept of Ecology Well Tag Number: (Use Well tag ID#, None or Not readable)				AEP 508	
16. Source Use:	P - Permanent	S - Seasonal	E - Emergency	P	
17. If this is an emergency source, should it be disconnected?				☐Yes ☐No ☐NA	☐Yes ☐No ☐NA
18. *Is the source a potential GWI source?*				☐*Yes* ☐*No*	☐*Yes* ☐*No*
WELL (if there is no well, skip to question 34)					
19. Is the Sanitary Control Area (SCA) free of unmitigated potential sources of contamination?				☒Yes ☐No	☐Yes ☐No
20. Is the wellhead located in a pit or vault?				☐Yes ☒No	☐Yes ☐No
21. Is the wellhead at risk of submergence?				☐Yes ☒No	☐Yes ☐No
22. Is the well cap sealed, watertight, and free of unprotected openings?				☒Yes ☐No	☐Yes ☐No
23. Is the well casing free of any unprotected openings?				☒Yes ☐No	☐Yes ☐No
24. Is there a vent on the well?				☒Yes ☐No	☐Yes ☐No
24a. If yes, is the vent protected? (24 non-corrodible mesh screen or slots)				☒Yes ☐No	☐Yes ☐No
25. Are conduits and junction boxes sealed to prevent contaminant entry?				☐Yes ☒No	☐Yes ☐No
26. Is the well unreasonably at risk to physical damage?				☐Yes ☒No	☐Yes ☐No
27. Is there a raw water source sample tap?				☒Yes ☐No	☐Yes ☐No
28. Is the source metered?				☒Yes ☐No	☐Yes ☐No
28a. If yes, is the source meter read at least monthly?				☒Yes ☐No	☐Yes ☐No
28b. If yes, are the water production records maintained?				☒Yes ☐No	☐Yes ☐No
29. Is the wellhouse properly constructed and maintained? If no, explain below				☒Yes ☐No	☐Yes ☐No
30. Is there any evidence of infestation by rodents or other pests?				☐Yes ☒No	☐Yes ☐No
31. Is the wellhouse and well adequately protected from unauthorized access and tampering?				☒Yes ☐No	☐Yes ☐No
32. Is there a pump control valve or vacuum relief valve without an air gap on the valve discharge pipe?				☐Yes ☐No ☒NA	☐Yes ☐No ☐NA
33. Are the source pump and pump controls operational and adequate to prevent chronic water outages or premature pump failure? If no explain below				☒Yes ☐No	☐Yes ☐No
SPRING (if there is no spring, skip to question 41)					
34. Is the springbox (structure, hatch, and overflow) constructed to prevent the entry of contaminants or direct surface drainage? If yes, describe below.				☐Yes ☐No	☐Yes ☐No
35. Is there a raw water source sample tap?				☐Yes ☐No	☐Yes ☐No
36. Is the source metered?				☐Yes ☐No	☐Yes ☐No
36a. If yes, is the source meter read at least monthly?				☐Yes ☐No	☐Yes ☐No
36b. If yes, are the water production records maintained?				☐Yes ☐No	☐Yes ☐No
37. Is the springhouse properly constructed and maintained? If no, explain below				☐Yes ☐No	☐Yes ☐No
38. Is there any evidence of infestation by rodents or other pests?				☐Yes ☐No	☐Yes ☐No
39. Is the springhouse and spring box adequately protected from unauthorized access?				☐Yes ☐No	☐Yes ☐No
40. **Is the Sanitary Control Area (SCA) free of unmitigated potential sources of contamination?**				☐Yes ☐No	☐Yes ☐No

Describe and evaluate the source facilities including maintenance, operations, sanitary and security observations and any major change made to the source such as pump replacement, deepening or reconstruction:

No Treatment

Under construction for improvements to the pumphouse and source. Converting vertical motor and turbine pump with submersible.

Provide photographs and construction completion report when work on sources is finished and tested.

PART E: DISINFECTION *(if no disinfection, answer question 41 and skip rest of Part E)*

41. *Does the operator batch chlorinate the source, the distribution system, or the reservoir just before collecting routine or repeat coliform samples? If yes, provide details below.*	☐ *Yes* ☒ *No*
42. Did you observe disinfection treatment connected to the water system in active use that is NOT listed on the WFI? If yes, explain below	☐ Yes ☒ No
43. Is ultraviolet light (UV) used for disinfecting a drinking water source? If no, skip to question 46.	☐ Yes ☒ No
44. Is the UV unit sized for the maximum flow rate, and is there a UV transmittance sensor controlling a solenoid valve or other device to shut off supply if the UV light fails?	☐ Yes ☐ No

45. Describe the UV equipment including:

UV manufacturer and model number: Rated capacity (gpm):

Cleaning frequency of quartz sleeve : Mo/Yr UV light last replaced:

46. Is there continuous chlorination? If no, skip to Part F	☐ Yes ☐ No

46a. If yes, please measure the free chlorine residual from a representative location in the distribution system.

Location description:	Free chlorine residual:

47. **Is there a water supply line plumbed directly into a chlorine solution tank without a reduced pressure backflow assembly on the supply line?**	☐ **Yes** ☐ No
48. Is there a post-treatment sample tap?	☐ Yes ☐ No
49. Does the chlorine compound meet NSF/ANSI Standard 60? - household bleach is exempted	☐ Yes ☐ No
50. Is a backup chemical feed pump or spare parts for the operating chemical feed pump available onsite?	☐ Yes ☐ No
51. According to the operator, is there a DOH requirement for Chlorine Contact Time? If no, skip to Part F	☐ Yes ☐ No

51a. *If yes, measure and record the free chlorine residual at the CT6 compliance location:*
Describe compliance sampling location below – location must be prior to the first service connection downstream of chlorine addition.

52. *Is the chlorine pump and pump controls constructed and maintained to provide uninterrupted, reliable CT6 treatment? If no, describe below.*	☐ *Yes* ☐ *No*

Describe the chlorination facilities including purpose for chlorination, concerns with maintenance or operations, purveyor's record keeping of monthly reports, and sanitary and security observations:
No treatment at the sources

PART F: TREATMENT

53. Is there any treatment other than chlorination or UV in use? If no, skip Part F.	☐ Yes ☒ No
54. Did you observe a treatment process connected to the water system in active use that is NOT listed on the WFI? If yes, describe below.	☐ Yes ☐ No
55. **Is there a water supply line plumbed directly into a chemical solution tank (e.g., fluoride saturator) without a reduced pressure backflow assembly on the supply line?**	☐ **Yes** ☐ No ☐ NA
56. Are primary contaminant treatment facilities (e.g., nitrate, corrosion control, arsenic) operating properly? If no, describe below	☐ Yes ☐ **No**
57. Do the water treatment chemicals meet NSF/ANSI Standard 60?	☐ Yes ☐ No ☐ NA
58. Is there a post-treatment sample tap?	☐ Yes ☐ No

Describe the treatment facilities including purpose for treatment, concerns with maintenance or operations, purveyor's record keeping of monthly reports, and sanitary and security observations:

PART G: BOOSTER PUMPING FACILITIES and CONTROLS

59. Are there any booster pumps in use? If no, skip Part G	☒ Yes ☐ No
60. Are the booster pumps in good working condition? If no, explain below	☒ Yes ☐ No
61. Are pump and pump controls operational and adequate to prevent chronic water outages or premature pump failure? If no explain below	☒ Yes ☐ **No**
62. If there is a booster pump house/pump station, is it secure against unauthorized entry? If no, explain below	☒ Yes ☐ **No** ☐ NA
63. Is the booster pump house/pump station properly constructed and maintained? If no, explain below	☐ Yes ☐ No

Describe and evaluate the pump facilities and controls including maintenance, operations, sanitary and security observations:
Pumphouse, pumps, controls in good condition. Zone 1 Booster, low use at this time.

PART H: PRESSURE TANKS

64. Are there any pressure tanks in use? If no, skip Part H	☐Yes ☒No
65. For systems using an air compressor, is the compressor an oil-free type or does it use food-grade oil?	☐Yes ☐No ☐NA
66. Are valves present to isolate pressure tanks for maintenance or repair?	☐Yes ☐No
67. Is there an ASME pressure relief valve installed between each pressure tank and any shutoff valve? (see DOH publication #331-429)	☐Yes ☐No
68. Are the pressure tanks in good working condition? If no, explain below	☐Yes ☐No
Describe and evaluate the pressure tanks including maintenance, operational, sanitary and security observations:	

PART I: FINISHED WATER STORAGE

69. Is there a finished water storage tank in use? If no, skip Part I	☒Yes ☐No
70. If unable to physically inspect the storage tank hatch, vent, roof, or overflow outlet, select the method you discussed with the purveyor to document their condition:	
a ☐ Reviewed and discussed maintenance records and recent photos	
b ☒ Photos will be taken and mailed by purveyor; additional follow-up required by DOH	
c ☐ Purveyor unable or unwilling to document; additional follow-up required by DOH	

Insert Tank Names	Reservoir 1	Reservoir 2
71. Is the storage tank protected from unauthorized entry or vandalism? If no, explain below	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
72. Is the reservoir roof free of any unprotected openings? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☒unk
73. Is the access hatch constructed and sealed to prevent the entry of contaminants? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☒unk
74. If able to open hatch, is the stored water free of visible contaminants? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☒unk
75. Is there a dedicated air vent on the storage tank?	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
75a. If yes, is the air vent constructed to prevent the entry of contaminants? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☒unk
76. Is the overflow line constructed to prevent contaminants from entering the tank? If no, explain below	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
77. Does the overflow line discharge near ground level?	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
78. Is the overflow line discharge area protected from potential erosion?	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
79. Does the overflow line discharge into a storm drain or surface water?	☒Yes ☐No ☐unk	☐Yes ☒No ☐unk
79a. If yes, is there an air gap at the discharge of the overflow OR does the overflow drop at least 34 vertical feet measured from the overflow connection to the reservoir down to the receiving water body?	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
80. Does the overflow line discharge directly into a sanitary sewer without an air gap?	☐Yes ☒No ☐unk	☐Yes ☒No ☐unk
81. Can the reservoir be isolated from the rest of the water system and be drained through a dedicated drain line?	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
82. When was the tank inspected last? Explain below if necessary		
83. What is the tank cleaning frequency? Explain below if necessary	Routinely	Routinely
84. Does the tank size, operation, and internal piping configuration appear to provide adequate water turnover (i.e. separate inlet/outlet, baffling or mixing to reduce stagnant water)? If no, explain below	☒Yes ☐No ☐unk	☒Yes ☐No ☐unk
85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling?	☐Yes ☒No	☐Yes ☒No

Describe and evaluate the finished water storage facilities including volume, operational drawdown, configuration of the inlet/outlet piping, any concerns about operations and maintenance, and sanitary and security observations:

Provide photographs for self inspection.

PART I: FINISHED WATER STORAGE

69. Is there a finished water storage tank in use? If no, skip Part I	☒Yes ☐No

70. If unable to physically inspect the storage tank hatch, vent, roof, or overflow outlet, select the method you discussed with the purveyor to document their condition:

a ☒ Reviewed and discussed maintenance records and recent photos

b ☐ Photos will be taken and mailed by purveyor; additional follow-up required by DOH

c ☐ Purveyor unable or unwilling to document; additional follow-up required by DOH

Insert Tank Names	Reservoir 3	
71. Is the storage tank protected from unauthorized entry or vandalism? If no, explain below	☒Yes ☐No ☐unk	☐Yes ☐No ☐unk
72. Is the reservoir roof free of any unprotected openings? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☐unk
73. Is the access hatch constructed and sealed to prevent the entry of contaminants? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☐unk
74. If able to open hatch, is the stored water free of visible contaminants? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☐unk
75. Is there a dedicated air vent on the storage tank?	☒Yes ☐No ☐unk	☐Yes ☐No ☐unk
75a. If yes, is the air vent constructed to prevent the entry of contaminants? If no, explain below	☐Yes ☐No ☒unk	☐Yes ☐No ☐unk
76. Is the overflow line constructed to prevent contaminants from entering the tank? If no, explain below	☒Yes ☐No ☐unk	☐Yes ☐No ☐unk
77. Does the overflow line discharge near ground level?	☒Yes ☐No ☐unk	☐Yes ☐No ☐unk
78. Is the overflow line discharge area protected from potential erosion?	☒Yes ☐No ☐unk	☐Yes ☐No ☐unk
79. Does the overflow line discharge into a storm drain or surface water?	☐Yes ☐No ☐unk	☐Yes ☐No ☐unk
79a. If yes, is there an air gap at the discharge of the overflow OR does the overflow drop at least 34 vertical feet measured from the overflow connection to the reservoir down to the receiving water body?	☐Yes ☐No ☐unk	☐Yes ☐No ☐unk
80. Does the overflow line discharge directly into a sanitary sewer without an air gap?	☐Yes ☒No ☐unk	☐Yes ☐No ☐unk
81. Can the reservoir be isolated from the rest of the water system and be drained through a dedicated drain line?	☒Yes ☐No ☐unk	☐Yes ☐No ☐unk
82. When was the tank inspected last? Explain below if necessary		
83. What is the tank cleaning frequency? Explain below if necessary	Routinely	
84. Does the tank size, operation, and internal piping configuration appear to provide adequate water turnover (i.e. separate inlet/outlet, baffling or mixing to reduce stagnant water)? If no, explain below	☒Yes ☐No ☐unk	☐Yes ☐No ☐unk
85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling?	☐Yes ☒No	☐Yes ☐No

Describe and evaluate the finished water storage facilities including volume, operational drawdown, configuration of the inlet/outlet piping, any concerns about operations and maintenance, and sanitary and security observations:

Provide photographs for self inspection.

PART J: DISTRIBUTION SYSTEM

86. Is a complete, up to date and accurate map of the distribution system maintained?	☒Yes ☐No
87. *Does the system provide adequate pressure throughout the distribution system? If no, explain below.*	☒Yes ☐No
88. Are proper procedures followed for disinfection of new construction or repairs?	☒Yes ☐No
89. *Are there any air relief or vacuum relief valves subject to submersion?*	☒Yes ☐No
90. Does the purveyor seasonally or annually flush the distribution system? If yes, describe below	☐Yes ☐No
91. Does the purveyor exercise its distribution system valves? If yes, describe below	☒Yes ☐No

Describe and evaluate the distribution system including maintenance, operational, sanitary and security observations:

Flushing and valve turning completed on as needed basis.

PART K: CROSS CONNECTION CONTROL (CCC)	
92. Does the water system serve a single connection? If yes, refer the purveyor to the Uniform Plumbing Code and skip Part K	☐Yes ☒No
93. Is the water system known to serve one or more high health hazard premises, such as those listed in Table 9 in WAC 246-290-490? If yes, describe the premise(s) below.	☒Yes ☐No
94. Has the purveyor established the legal authority to implement a CCC program (i.e., formally adopted an ordinance, resolution, by-laws, or other document defining the purveyor's CCC program requirements, and empowering the purveyor to enforce them)?	☒Yes ☐No
95. Has the purveyor designated a CCC Specialist (CCS) to be in responsible charge of the CCC program?	☒Yes ☐No
95a. If yes, has the CCS conducted a hazard evaluation to identify high health hazard premises?	☒Yes ☐No
95b. If yes, has the purveyor completed installation of a backflow prevention assembly on the service line to each identified high health hazard premise?	☒Yes ☐No ☐NA
96. Has each testable backflow prevention assembly installed for premises isolation been tested by a DOH certified backflow assembly tester (BAT) within the past 12 months?	☒Yes ☐No ☐NA
97. Did you observe the end of a hose connected to the potable water system submerged in a pool, hot tub, watering trough, or other non-potable body of water observed during the survey?	☐Yes ☒No
98. <u>This question only applies to a facility operating a sewage dump station</u>: Is there a sewage dump station without a reduced pressure backflow assembly on the water supply at the dump station?	☐Yes ☒No ☐NA
Additional cross connection control program comments:	

PART L: OPERATOR	
99. Is the operator of the water system certified?	☒Yes ☐No
100. Describe the operator's certification level (if certified), duration of employment with this water system, relationship with the system (e.g., contract operator, SMA, direct hire employee, volunteer, temporary, or owner), and duties and responsibilities. **WDM 2**	
101. Does the operator conduct self-inspections of the water system? If yes, describe frequency and scope of these self-inspections below.	☒Yes ☐No
102. *Is the operator performing measurements and calibration of water treatment monitoring equipment consistent with manufacturer recommendations? If no, describe below.*	☒Yes ☐No ☐NA
103. *Is the operator using proper inputs to treatment plant operations reports, such as correct volume, peak flow rate, time, and making the proper calculations? If no, describe below.*	☒Yes ☐No ☐NA
104. *Does the operator take compliance water quality samples at the proper location? If no, describe below.*	☒Yes ☐No ☐NA
Additional operator comments:	

PART M: FIELD NOTES AND OTHER
Descriptions of any water quality tests, physical measurements, or simple repairs completed during the inspection:

PART N: SUPPLEMENTAL NOTES AND SAFETY CONCERNS
Supplemental comments from other parts of the checklist, and documentation of field safety concerns:

If you need this publication in an alternative format, call 800.525.0127 (TDD/TTY call 711). This and other publications are available at www.doh.wa.gov/drinkingwater.

Photo-1: S01 (Well #1) Rainier Well

DOE ID

→ AEP 506

Photo-2: S01

Telemetry Panel – Controls

Photo-3: S01 - SCA

Site under construction – Converting from above ground motor and turbine pump to submersible.

Required: Provide photographs with Const. Comp. Rept.

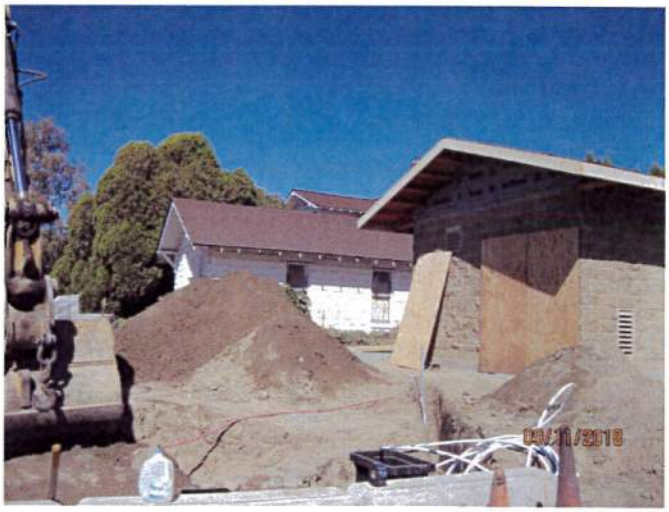


Photo-4: S01 - SCA

Site under construction – Old pumphouse to be removed. New pumphouse – brick building for discharge piping, appurtenances, and controls.

Photo-5: S01 - SCA

Site under construction – Residential area.

Photo-6: S01 – SCA

Converting to submersible pump – Old pump motor, cooling box modification. Source sealed up.

Photo-7: S01 – SCA

Converting to submersible pump – Old pump motor base. Old port for vent, plugged and sealed.

Photo-8: S01 - New Pumphouse

Discharge to System

- → Pre-treatment sample tap
  - ⇉ Pressure gage
  - ⇉ Photo-11
- → Check valve (white)
  - ⇉ Weighted
- → Air Release Valve
  - ⇉ Air gapped
- → Post-treatment sample tap
  - ⇉ Pressure gage
  - ⇉ Photo-10

Photo-9: S01 - New Pumphouse

Discharge to System

- → Air Release Valve
  - ⇉ Air gapped
- → Post-treatment sample tap
  - ⇉ Pressure gage
  - ⇉ Photo-10

Photo-10: S01 - New Pumphouse

Discharge to System

- → Exit point from pumphouse
- → Post-treatment sample tap
  - ⇉ Pressure gage

System does not currently treat

Photo-11: S01 - New Pumphouse

Discharge to System

- → Entry point from well
- → Pre-treatment sample tap
  - ⇉ Pressure gage

Photo-12: S02 (Well #2) 3rd Street Well - SCA

Shared site with Reservoir 1

→ Site under construction – Source improvements

Photo-13: S02 (Well #2) 3rd Street Well

Wellhead (AEP 507)

→ Screened air vent

→ Electrical controls

Discharge to system

→ Discharges to mechanical sand filter

→ Post treatment sample tap after filter

→ Top line from filter to distribution

Photo-14: S02 (Well #2) 3rd Street Well

Discharge to system

→ Discharges to mechanical sand filter

→ By-Pass line

Treatment – Sand filter

→ LAKOS

⇉ Top line out to supply

Photo-15: S02 (Well #2) 3rd Street Well

Wellhead

→ Screened air vent

→ Electrical controls

Photo-16: S02 (Well #2) 3rd Street Well

Top line from Sand filter

→ Source Meter

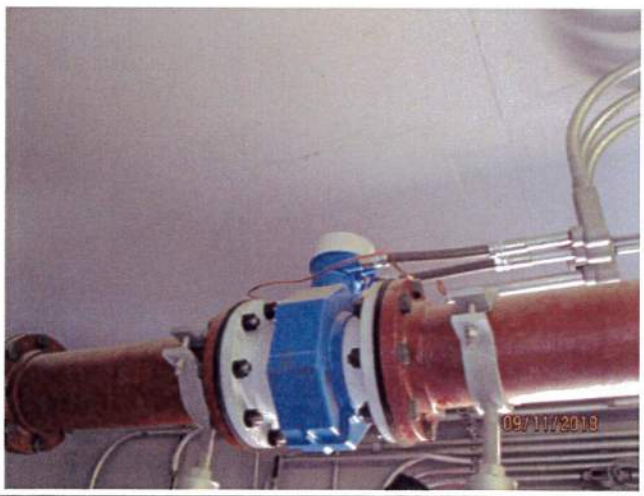


Photo-17: S02 (Well #2) 3rd Street Well

Supply line from well

→ Pressure gage

→ Raw Water Sample tap

⇉ Pre-Filter

Photo-18: S02 (Well #2)
3rd Street Well
Electrical control box
- → Wiring harness to well
- ⇉ Grommet in place
- ⇉ Sealed

Photo-19: S02 (Well #2)
3rd Street Well
Electrical control box
- → Alternate view Photo-18
- → Wiring harness to well
- ⇉ Grommet in place

Photo-20: S03 (Well #3) WIPPCO Well - SCA
SCA – Apartment complex grassy area

Photo-21: S03 (Well #3) WIPPCO Well - SCA
SCA – Apartment complex grassy area

Photo-22: S03 (Well #3) WIPPCO Well - SCA
New Pumphouse

Photo-23: S03 (Well #3) WIPPCO Well - SCA
New Pumphouse

Photo-24: S03 (Well #3) Wippco Well

Old Pump motor (AEP 508)

Required: Provide photographs and Const. Comp. Rept.

Photo-25: S03

Well #3

Wippco Well

Old Pump motor

→ Pump Specs

→ US Motors

Required:

- Provide photographs and Const. Comp. Rept. after completing improvements.

Photo-26: S03 (Well #3) WIPPCO Well

Supply to system – source meter, sample tap

Photo-27: S03 (Well #3) WIPPCO Well - SCA

Pump Motor Base – Sealed watertight

Photo-28: S03

Well #3

Wippco Well

Pump motor base

→ Static Water Level gage

→ Sealed watertight

Photo-29: S03

Well #3

Wippco Well

Generator connector

Photo-30: Reservoir #2

Reservoir Specs - Plaque

- → 1963
- → Welded Steel standpipe
  - ⇉ Horton Tank
  - ⇉ 783,000 G (roughly)

Photo-31:

Reservoir #2

Welded Steel standpipe

- ⇉ Access cage
- ⇉ Locked
- → Antenna Array

Required:

- Inspection of the roof

Photo-32: Reservoir #2

Roof

- → Antenna Array

Photo-33:

Reservoir #2

Access ladder

- → Locked
- → Cage
  - ⇉ No landings

Required:

- Inspection of roof

Photo-34: Reservoir #2

Overflow

- → Manhole at reservoir
- → Pipe screened and air gapped

Photo-35: Reservoir #1

Elevated steel reservoir – Fill / Supply line

→ 75,000 - G

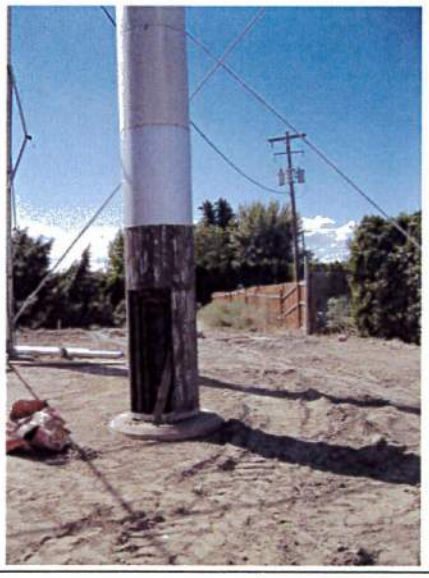


Photo-36: Reservoir #1

Fill / Supply line

Required: Inspection of the roof

Photo-37: Reservoir #1

Access Ladder – Locked

Photo-38:

Reservoir #3

Welded Steel

→ 600,000 - G

Access Ladder

→ Caged

→ No landings

⇉ Locked

Required:

- Inspection of the roof

Photo-39:

Reservoir #3

Steel welded tank

→ Lower access manway

⇉ Bolted w/ gasket

→ Overflow

⇉ Screened

Required:

- Inspection of the roof

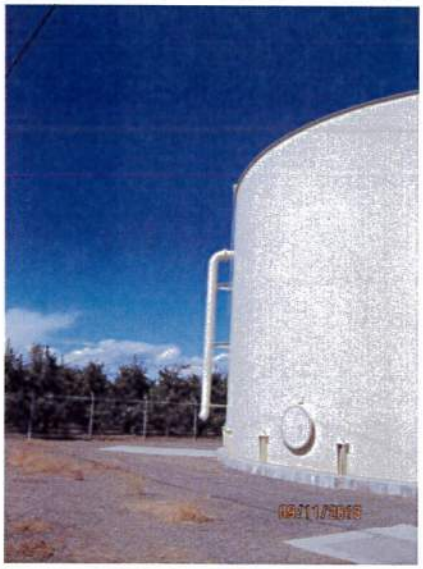


Photo-40: Reservoir

Access pipe for site gage / target

Required: Inspect and check gap for chord – seal if necessary

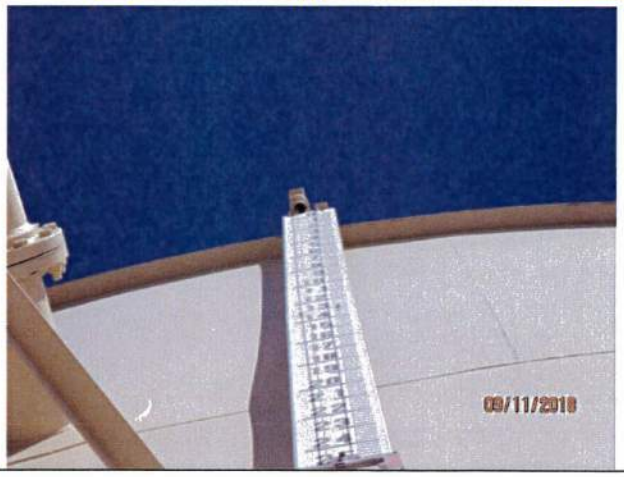


Photo-41:

Reservoir #3

Steel welded tank

→ Overflow

⇉ Screened

Required:

- Inspection of the roof

23.
COMPUTER PRINTOUT OF HYDRAULIC ANALYSIS RESULTS

HLA
Engineering and Land Surveying, Inc.

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
H-2	Zone-1	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-3	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-4	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-5	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-6	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-7	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-8	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-9	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-10	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-11	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
J-1	Zone-1	5	True	500.00	4,614.56	-50.00	4,064.57	20.0	20.0	20.0
J-2	Zone-1	5	True	500.00	4,572.01	200.00	4,272.01	20.0	20.0	20.0
J-4	Zone-1	5	True	500.00	2,783.90	525.96	2,809.86	20.0	20.0	20.0
J-5	Zone-1	26	True	500.00	6,184.32	500.16	6,184.48	20.0	39.0	20.0
J-6	Zone-1	5	True	500.00	2,170.19	501.81	2,172.01	20.0	20.0	20.0
J-7	Zone-1	8	True	500.00	5,645.12	500.16	5,645.28	20.0	20.9	20.0
J-8	Zone-1	26	True	500.00	5,245.69	503.32	5,249.01	20.0	44.4	20.0
J-10	Zone-1	25	True	500.00	5,609.10	500.66	5,609.76	20.0	22.0	20.0
J-11	Zone-1	9	True	500.00	3,529.32	500.00	3,529.32	20.0	20.6	20.0
J-12	Zone-1	5	True	500.00	3,137.43	501.32	3,138.74	20.0	20.0	20.0
J-13	Zone-1	10	True	500.00	5,029.67	500.49	5,030.16	20.0	45.8	20.0
J-14	Zone-1	5	True	500.00	1,841.84	501.41	1,843.25	20.0	20.0	20.0
J-15	Zone-1	6	True	500.00	5,666.62	500.00	5,666.62	20.0	20.0	20.0
J-16	Zone-1	6	True	500.00	6,094.15	500.00	6,094.15	20.0	20.0	20.0
J-17	Zone-1	6	True	500.00	2,633.58	500.82	2,634.40	20.0	20.0	20.0
J-18	Zone-1	12	True	500.00	2,987.43	503.36	2,990.80	20.0	20.0	20.0
J-19	Zone-1	5	True	500.00	2,113.72	501.81	2,115.53	20.0	20.0	20.0
J-20	Zone-1	5	True	500.00	2,947.79	500.73	2,948.52	20.0	20.0	20.0
J-21	Zone-1	12	True	500.00	2,916.98	500.85	2,917.82	20.0	20.0	20.0
J-22	Zone-1	12	True	500.00	2,809.11	501.01	2,810.12	20.0	20.0	20.0
J-23	Zone-1	12	True	500.00	2,548.25	501.15	2,549.40	20.0	20.0	20.0
J-24	Zone-1	6	True	500.00	5,101.51	500.82	5,102.34	20.0	20.0	20.0
J-25	Zone-1	6	True	500.00	3,388.63	501.32	3,389.95	20.0	20.0	20.0
J-26	Zone-1	5	True	500.00	3,250.95	500.85	3,251.80	20.0	20.0	20.0
J-27	Zone-1	11	True	500.00	3,522.89	527.84	3,550.73	20.0	20.0	20.0
J-28	Zone-1	11	True	500.00	2,963.10	502.71	2,965.80	20.0	20.0	20.0
J-29	Zone-1	14	True	500.00	2,371.48	500.00	2,371.48	20.0	28.1	20.0
J-37	Zone-1	4	True	500.00	1,347.67	501.15	1,348.82	20.0	20.0	20.0

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-38	Zone-1	7	True	500.00	1,605.63	500.49	1,606.13	20.0	20.9	20.0
J-39	Zone-1	8	True	500.00	1,934.58	500.49	1,935.08	20.0	26.5	20.0
J-40	Zone-1	5	True	500.00	1,663.38	501.48	1,664.86	20.0	20.0	20.0
J-41	Zone-1	5	True	500.00	1,434.77	502.80	1,437.57	20.0	20.0	20.0
J-42	Zone-1	5	True	500.00	1,567.73	501.48	1,569.21	20.0	20.0	20.0
J-43	Zone-1	7	True	500.00	2,005.05	500.00	2,005.05	20.0	24.8	20.0
J-44	Zone-1	7	True	500.00	3,245.88	500.00	3,245.88	20.0	21.2	20.0
J-45	Zone-1	6	True	500.00	5,610.84	500.71	5,611.55	20.0	20.0	20.0
J-46	Zone-1	14	True	500.00	5,168.92	500.00	5,168.92	20.0	25.9	20.0
J-47	Zone-1	10	True	500.00	4,623.36	502.12	4,625.48	20.0	62.8	20.0
J-48	Zone-1	9	True	500.00	4,744.87	500.71	4,745.58	20.0	34.8	20.0
J-49	Zone-1	4	True	500.00	5,003.92	503.11	5,007.02	20.0	20.0	20.0
J-50	Zone-1	6	True	500.00	5,104.82	533.26	5,138.08	20.0	20.0	20.0
J-51	Zone-1	5	True	500.00	3,575.30	500.71	3,576.01	20.0	20.0	20.0
J-53	Zone-1	8	True	500.00	4,844.77	504.14	4,848.91	20.0	21.3	20.0
J-54	Zone-1	3	True	500.00	670.82	500.00	670.82	20.0	20.0	20.0
J-55	Zone-1	9	True	500.00	5,395.07	503.18	5,398.25	20.0	28.0	20.0
J-56	Zone-1	9	True	500.00	5,187.38	501.18	5,188.55	20.0	29.3	20.0
J-57	Zone-1	9	True	500.00	5,020.92	501.20	5,022.12	20.0	31.7	20.0
J-58	Zone-1	9	True	500.00	4,440.42	500.82	4,441.25	20.0	25.9	20.0
J-59	Zone-1	19	True	500.00	3,754.45	500.66	3,755.11	20.0	23.5	20.0
J-60	Zone-1	8	True	500.00	3,271.87	500.99	3,272.85	20.0	24.2	20.0
J-61	Zone-1	13	True	500.00	3,114.37	500.00	3,114.37	20.0	25.3	20.0
J-62	Zone-1	6	True	500.00	5,296.45	500.16	5,296.61	20.0	20.0	20.0
J-63	Zone-1	5	True	500.00	2,306.87	501.32	2,308.19	20.0	20.0	20.0
J-64	Zone-1	9	True	500.00	5,445.97	501.60	5,447.57	20.0	27.1	20.0
J-65	Zone-1	9	True	500.00	5,229.02	500.94	5,229.96	20.0	27.0	20.0
J-66	Zone-1	17	True	500.00	3,277.85	501.32	3,279.17	20.0	20.0	20.0
J-67	Zone-1	5	True	500.00	3,119.61	500.00	3,119.61	20.0	20.0	20.0
J-68	Zone-1	8	True	500.00	5,395.15	500.00	5,395.15	20.0	21.0	20.0
J-69	Zone-1	6	True	500.00	5,869.51	502.14	5,871.65	20.0	20.0	20.0
J-70	Zone-1	25	True	500.00	5,949.87	526.34	5,976.21	20.0	28.0	20.0
J-71	Zone-1	17	True	500.00	2,446.19	526.89	2,473.08	20.0	20.0	20.0
J-75	Zone-1	9	True	500.00	3,762.70	501.98	3,764.68	20.0	20.0	20.0
J-76	Zone-1	8	True	500.00	6,523.30	500.66	6,523.96	20.0	24.7	20.0
J-77	Zone-1	5	True	500.00	6,269.38	525.89	6,295.27	20.0	20.0	20.0
J-78	Zone-1	5	True	500.00	5,219.41	500.99	5,220.40	20.0	20.0	20.0
J-79	Zone-1	5	True	500.00	5,181.84	500.82	5,182.67	20.0	20.0	20.0
J-80	Zone-1	5	True	500.00	5,751.34	501.39	5,752.72	20.0	20.0	20.0
J-81	Zone-1	5	True	500.00	5,399.14	501.48	5,400.62	20.0	20.0	20.0
J-82	Zone-1	5	True	500.00	5,245.40	501.72	5,247.12	20.0	20.0	20.0
J-84	Zone-1	4	True	500.00	2,850.64	500.00	2,850.64	20.0	20.0	20.0
J-85	Zone-1	5	True	500.00	3,879.75	528.79	3,908.53	20.0	20.0	20.0
J-86	Zone-1	6	True	500.00	5,932.57	504.38	5,936.95	20.0	20.0	20.0
J-87	Zone-1	7	True	500.00	6,054.50	500.49	6,055.00	20.0	25.6	20.0
J-88	Zone-1	4	True	500.00	2,424.03	500.66	2,424.69	20.0	20.0	20.0

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-89	Zone-1	4	True	500.00	1,944.42	501.32	1,945.74	20.0	20.0	20.0
J-90	Zone-1	5	True	500.00	3,940.35	500.66	3,941.00	20.0	20.0	20.0
J-91	Zone-1	24	True	500.00	6,112.42	500.00	6,112.42	20.0	20.1	20.0
J-92	Zone-1	5	True	500.00	5,981.85	500.82	5,982.67	20.0	20.0	20.0
J-93	Zone-1	5	True	500.00	4,228.52	500.00	4,228.52	20.0	20.0	20.0
J-94	Zone-1	22	True	500.00	8,014.24	500.00	8,014.24	20.0	20.8	20.0
J-95	Zone-1	12	True	500.00	4,475.33	501.81	4,477.14	20.0	20.0	20.0
J-96	Zone-1	7	True	500.00	3,577.77	501.65	3,579.42	20.0	28.3	20.0
J-97	Zone-2	2	True	500.00	1,464.32	500.12	1,464.43	20.0	20.0	20.0
J-98	Zone-2	24	True	500.00	2,561.36	500.00	2,561.36	20.0	21.7	20.0
J-99	Zone-2	19	True	500.00	2,311.54	500.00	2,311.54	20.0	22.6	20.0
J-100	Zone-2	20	True	500.00	1,157.65	500.00	1,157.65	20.0	20.2	20.0
J-101	Zone-2	3	True	500.00	924.17	500.49	924.67	20.0	20.0	20.0
J-102	Zone-2	3	True	500.00	758.15	501.48	759.63	20.0	20.0	20.0
J-105	Zone-2	3	True	500.00	738.39	500.99	739.38	20.0	20.0	20.0
J-106	Zone-1	4	True	500.00	2,184.76	500.49	2,185.25	20.0	20.0	20.0
J-107	Zone-1	4	True	500.00	2,474.01	502.64	2,476.64	20.0	20.0	20.0
J-108	Zone-1	4	True	500.00	3,114.33	503.11	3,117.44	20.0	20.0	20.0
J-109	Zone-1	4	True	500.00	1,945.51	500.00	1,945.51	20.0	20.0	20.0
J-110	Zone-1	4	True	500.00	2,075.13	500.82	2,075.95	20.0	20.0	20.0
J-111	Zone-1	5	True	500.00	3,122.54	500.82	3,123.37	20.0	20.0	20.0
J-112	Zone-1	5	True	500.00	6,408.21	500.66	6,408.87	20.0	20.0	20.0
J-113	Zone-1	6	True	500.00	7,266.28	500.00	7,266.28	20.0	20.0	20.0
J-114	Zone-1	6	True	500.00	7,373.72	500.85	7,374.56	20.0	20.0	20.0
J-115	Zone-1	5	True	500.00	6,966.23	500.99	6,967.22	20.0	20.0	20.0
J-116	Zone-1	4	True	500.00	3,056.34	503.29	3,059.64	20.0	20.0	20.0
J-117	Zone-1	13	True	500.00	1,889.47	500.66	1,890.13	20.0	39.5	20.0
J-118	Zone-1	5	True	500.00	793.04	500.99	794.03	20.0	33.4	20.0
J-120	Zone-1	5	True	500.00	642.11	500.82	642.93	20.0	25.6	20.0

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-121	Zone-1	5	True	500.00	558.64	500.00	558.64	20.0	20.9	20.0
J-122	Zone-1	5	True	500.00	505.48	500.66	506.13	20.0	27.8	20.0
J-123	Zone-1	5	True	500.00	7,293.84	502.12	7,295.96	20.0	20.0	20.0
J-124	Zone-1	6	True	500.00	6,187.39	500.49	6,187.88	20.0	20.0	20.0
J-125	Zone-1	5	True	500.00	4,928.35	504.24	4,932.59	20.0	20.0	20.0
J-126	Zone-1	5	True	500.00	6,506.78	506.35	6,513.13	20.0	20.0	20.0
J-127	Zone-1	5	True	500.00	6,025.33	509.43	6,034.76	20.0	20.0	20.0
J-128	Zone-1	5	True	500.00	3,906.34	500.71	3,907.05	20.0	20.0	20.0
J-129	Zone-1	13	True	500.00	3,092.04	573.43	3,165.47	20.0	20.0	20.0
J-130	Zone-1	12	True	500.00	5,613.04	502.17	5,615.21	20.0	20.0	20.0
J-133	Zone-1	4	True	500.00	1,674.04	503.29	1,677.33	20.0	20.0	20.0
J-134	Zone-1	12	True	500.00	5,497.52	502.87	5,500.39	20.0	20.0	20.0
J-135	Zone-1	5	True	500.00	6,058.40	504.45	6,062.85	20.0	20.0	20.0
J-141	Zone-1	5	True	500.00	6,652.01	505.88	6,657.89	20.0	20.0	20.0
J-142	Zone-1	5	True	500.00	7,924.69	501.48	7,926.17	20.0	20.0	20.0
J-143	Zone-1	6	True	500.00	7,746.22	500.66	7,746.88	20.0	20.0	20.0
J-144	Zone-1	13	True	500.00	1,477.46	501.65	1,479.11	20.0	39.5	20.0
J-145	Zone-1	5	True	500.00	746.96	500.99	747.95	20.0	21.7	20.0
J-146	Zone-1	7	True	500.00	7,946.10	500.49	7,946.59	20.0	24.8	20.0
J-147	Zone-1	7	True	500.00	8,420.89	500.00	8,420.89	20.0	20.8	20.0
J-148	Zone-1	4	True	500.00	7,592.56	500.00	7,592.56	20.0	20.0	20.0
J-149	Zone-1	19	True	500.00	5,115.18	501.81	5,116.99	20.0	20.0	20.0
J-150	Zone-1	4	True	500.00	4,391.00	502.64	4,393.64	20.0	20.0	20.0
J-151	Zone-1	3	True	500.00	1,154.40	500.00	1,154.40	20.0	20.0	20.0

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-152	Zone-1	13	True	500.00	1,291.49	525.96	1,317.45	20.0	20.0	20.0
J-153	Zone-1	6	True	500.00	1,900.72	525.96	1,926.69	20.0	21.7	20.0
J-154	Zone-1	6	True	500.00	2,127.72	500.00	2,127.72	20.0	26.9	20.0
J-155	Zone-1	6	True	500.00	2,707.32	500.00	2,707.32	20.0	27.8	20.0
J-156	Zone-1	4	True	500.00	2,382.76	525.96	2,408.72	20.0	20.0	20.0
J-157	Zone-1	4	True	500.00	3,680.86	525.96	3,706.82	20.0	20.0	20.0
J-158	Zone-1	6	True	500.00	4,296.75	500.82	4,297.57	20.0	22.8	20.0
J-159	Zone-1	4	True	500.00	3,419.42	500.33	3,419.75	20.0	20.0	20.0
J-160	Zone-1	4	True	500.00	4,901.76	500.82	4,902.59	20.0	20.0	20.0
J-161	Zone-1	4	True	500.00	4,574.22	500.49	4,574.72	20.0	20.0	20.0
J-162	Zone-1	4	True	500.00	4,449.69	500.82	4,450.52	20.0	20.0	20.0
J-164	Zone-1	19	True	500.00	4,880.89	500.99	4,881.88	20.0	20.0	20.0
J-165	Zone-1	6	True	500.00	4,529.54	501.48	4,531.02	20.0	21.9	20.0
J-166	Zone-1	4	True	500.00	3,629.37	501.11	3,630.48	20.0	20.0	20.0
J-167	Zone-1	17	True	500.00	3,392.18	501.15	3,393.34	20.0	20.0	20.0
J-168	Zone-1	4	True	500.00	3,372.00	500.99	3,372.99	20.0	20.0	20.0
J-169	Zone-1	4	True	500.00	3,533.23	500.66	3,533.89	20.0	20.0	20.0
J-170	Zone-1	6	True	500.00	3,327.72	500.00	3,327.72	20.0	22.2	20.0
J-171	Zone-1	6	True	500.00	2,685.81	526.13	2,711.94	20.0	21.3	20.0
J-172	Zone-1	6	True	500.00	2,016.69	500.71	2,017.40	20.0	22.2	20.0
J-173	Zone-1	4	True	500.00	1,754.23	500.00	1,754.23	20.0	20.0	20.0
J-174	Zone-1	4	True	500.00	2,997.95	525.51	3,023.46	20.0	20.0	20.0
J-175	Zone-1	4	True	500.00	2,686.39	502.47	2,688.86	20.0	20.0	20.0
J-176	Zone-1	4	True	500.00	2,771.87	501.32	2,773.19	20.0	20.0	20.0

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-177	Zone-1	4	True	500.00	3,032.97	501.81	3,034.78	20.0	20.0	20.0
J-178	Zone-1	4	True	500.00	2,629.25	501.98	2,631.23	20.0	20.0	20.0
J-179	Zone-1	4	True	500.00	2,266.69	500.82	2,267.51	20.0	20.0	20.0
J-180	Zone-1	6	True	500.00	2,083.19	502.47	2,085.66	20.0	22.5	20.0
J-181	Zone-1	3	True	500.00	1,770.53	500.66	1,771.19	20.0	20.0	20.0
J-183	Zone-1	13	True	500.00	1,583.98	500.99	1,584.97	20.0	20.0	20.0
J-184	Zone-1	21	True	500.00	1,918.18	501.93	1,920.11	20.0	20.1	20.0
J-185	Zone-1	4	True	500.00	2,159.42	500.66	2,160.08	20.0	20.0	20.0
J-186	Zone-1	4	True	500.00	4,059.27	501.32	4,060.58	20.0	20.0	20.0
J-187	Zone-1	4	True	500.00	4,080.04	501.65	4,081.69	20.0	20.0	20.0
J-188	Zone-1	4	True	500.00	2,573.46	500.00	2,573.46	20.0	20.0	20.0
J-189	Zone-1	4	True	500.00	3,851.53	500.82	3,852.35	20.0	20.0	20.0
J-190	Zone-1	4	True	500.00	3,044.81	500.66	3,045.47	20.0	20.0	20.0
J-191	Zone-1	4	True	500.00	3,377.88	500.00	3,377.88	20.0	20.0	20.0
J-192	Zone-1	24	True	500.00	7,687.47	500.82	7,688.30	20.0	20.9	20.0
J-197	Zone-1	19	True	500.00	524.33	500.82	525.15	20.0	20.5	20.0
J-198	Zone-1	3	False	500.00	323.40	500.82	324.22	20.0	20.0	20.0
J-199	Zone-1	3	True	500.00	5,082.83	501.76	5,084.60	20.0	20.0	20.0
J-200	Zone-1	4	True	500.00	4,491.65	500.00	4,491.65	20.0	20.0	20.0
J-201	Zone-1	4	True	500.00	3,877.58	500.00	3,877.58	20.0	20.0	20.0
J-202	Zone-1	25	True	500.00	4,312.88	501.15	4,314.04	20.0	21.1	20.0
J-203	Zone-1	13	True	500.00	3,166.34	501.98	3,168.31	20.0	20.0	20.0
J-205	Zone-1	5	True	500.00	4,977.55	502.99	4,980.54	20.0	20.0	20.0
J-206	Zone-1	5	True	500.00	4,735.25	507.71	4,742.95	20.0	20.0	20.0

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-207	Zone-1	7	True	500.00	1,947.97	500.16	1,948.14	20.0	25.7	20.0
J-208	Zone-1	6	True	500.00	6,177.13	501.15	6,178.28	20.0	20.0	20.0
J-211	Zone-1	12	True	500.00	3,715.69	502.12	3,717.80	20.0	20.0	20.0
J-212	Zone-1	5	True	500.00	2,913.45	500.00	2,913.45	20.0	20.0	20.0
J-213	Zone-1	5	True	500.00	3,143.97	502.12	3,146.09	20.0	20.0	20.0
J-214	Zone-1	25	True	500.00	5,656.53	500.00	5,656.53	20.0	40.5	20.0
J-215	Zone-1	8	True	500.00	5,374.71	500.71	5,375.41	20.0	26.3	20.0
J-216	Zone-1	24	True	500.00	5,130.91	500.00	5,130.91	20.0	21.7	20.0
J-217	Zone-1	8	True	500.00	3,567.95	500.00	3,567.95	20.0	23.0	20.0
J-218	Zone-1	11	True	500.00	3,001.14	501.41	3,002.55	20.0	20.0	20.0
J-219	Zone-1	5	True	500.00	2,687.75	500.00	2,687.75	20.0	20.0	20.0
J-220	Zone-1	5	True	500.00	2,315.02	502.82	2,317.84	20.0	20.0	20.0
J-222	Zone-1	9	True	500.00	5,626.17	500.00	5,626.17	20.0	29.1	20.0
J-223	Zone-1	8	True	500.00	5,220.44	500.00	5,220.44	20.0	20.9	20.0
J-224	Zone-1	26	True	500.00	5,378.84	500.00	5,378.84	20.0	40.5	20.0
J-225	Zone-1	5	True	500.00	2,328.67	501.91	2,330.58	20.0	20.0	20.0
J-226	Zone-1	25	True	500.00	5,527.67	500.00	5,527.67	20.0	24.3	20.0
J-227	Zone-1	8	True	500.00	3,154.59	500.49	3,155.09	20.0	23.0	20.0
J-228	Zone-1	5	True	500.00	2,235.34	500.66	2,235.99	20.0	20.0	20.0
J-229	Zone-1	6	True	500.00	6,116.68	500.16	6,116.84	20.0	20.0	20.0
J-230	Zone-1	6	True	500.00	6,017.17	500.33	6,017.50	20.0	20.0	20.0
J-231	Zone-1	6	True	500.00	5,890.89	500.24	5,891.13	20.0	20.0	20.0
J-232	Zone-1	7	True	500.00	1,607.97	501.15	1,609.13	20.0	20.4	20.0
J-237	Zone-1	6	True	500.00	2,086.43	501.48	2,087.91	20.0	26.5	20.0

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Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-238	Zone-1	4	True	500.00	1,815.63	501.15	1,816.78	20.0	20.0	20.0
J-239	Zone-1	3	True	500.00	2,092.54	500.49	2,093.03	20.0	20.0	20.0
J-240	Zone-1	4	True	500.00	1,266.14	500.82	1,266.97	20.0	20.0	20.0
J-241	Zone-1	21	True	500.00	2,442.78	500.82	2,443.60	20.0	31.5	20.0
J-242	Zone-1	6	True	500.00	1,530.05	500.99	1,531.03	20.0	24.3	20.0
J-243	Zone-1	3	True	500.00	1,023.23	501.32	1,024.55	20.0	20.0	20.0
J-245	Zone-1	5	True	500.00	793.07	500.00	793.07	20.0	30.2	20.0
J-246	Zone-1	5	True	500.00	793.09	500.33	793.42	20.0	23.5	20.0
J-247	Zone-1	3	True	500.00	775.54	500.66	776.20	20.0	20.0	20.0
J-250	Zone-1	5	True	500.00	680.24	500.33	680.57	20.0	30.4	20.0
J-251	Zone-1	3	False	500.00	484.23	500.49	484.73	20.0	20.0	20.0
J-254	Zone-1	5	True	500.00	558.63	500.82	559.46	20.0	26.5	20.0
J-255	Zone-1	3	True	500.00	729.48	500.00	729.48	20.0	20.0	20.0
J-256	Zone-1	38	True	500.00	4,263.80	500.66	4,264.45	20.0	25.6	20.0
J-259	Zone-1	4	True	500.00	1,783.13	500.33	1,783.46	20.0	20.0	20.0
J-260	Zone-1	6	True	500.00	4,116.97	500.00	4,116.97	20.0	23.5	20.0
J-269	Zone-1	25	True	500.00	5,976.51	501.15	5,977.66	20.0	46.6	20.0
J-272	Zone-1	10	True	500.00	6,186.15	500.00	6,186.15	20.0	40.9	20.0
J-274	Zone-1	7	True	500.00	2,968.47	500.00	2,968.47	20.0	21.3	20.0
J-275	Zone-1	5	True	500.00	2,968.48	500.00	2,968.48	20.0	20.0	20.0
J-284	Zone-1	6	True	500.00	5,148.81	503.32	5,152.12	20.0	20.0	20.0
J-297	Zone-1	7	True	500.00	2,763.01	500.00	2,763.01	20.0	22.0	20.0
J-3	Zone-1	20	True	500.00	4,780.59	-150.00	4,130.59	20.0	20.0	20.0
J-279	Zone-1	4	True	500.00	2,380.20	500.00	2,380.20	20.0	20.0	20.0
J-280	Zone-1	26	True	500.00	6,369.56	500.00	6,369.56	20.0	42.7	20.0

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Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-281	Zone-1	9	True	500.00	4,954.40	500.00	4,954.40	20.0	28.7	20.0
J-278	Zone-1	7	True	500.00	3,458.67	500.00	3,458.67	20.0	28.7	20.0
J-282	Zone-1	7	True	500.00	2,812.29	503.01	2,815.30	20.0	22.6	20.0
J-285	Zone-1	4	True	500.00	2,595.86	500.00	2,595.86	20.0	20.0	20.0
J-286	Zone-1	4	True	500.00	2,619.92	500.00	2,619.92	20.0	20.0	20.0
J-287	Zone-1	5	True	500.00	3,230.55	504.61	3,235.17	20.0	20.0	20.0
J-290	Zone-1	4	True	500.00	4,785.14	501.76	4,786.90	20.0	20.0	20.0
J-291	Zone-1	7	True	500.00	1,957.26	501.65	1,958.91	20.0	25.5	20.0
J-292	Zone-1	5	True	500.00	1,717.91	500.00	1,717.91	20.0	20.0	20.0
J-293	Zone-1	5	True	500.00	1,764.50	500.66	1,765.16	20.0	20.0	20.0
J-294	Zone-1	6	True	500.00	5,591.60	500.00	5,591.60	20.0	20.0	20.0
J-297	Zone-2	3	True	500.00	812.59	500.33	812.92	20.0	20.0	20.0
J-298	Zone-2	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
J-299	Zone-1	7	True	500.00	2,166.81	500.00	2,166.81	20.0	22.2	20.0
J-300	Zone-1	5	True	500.00	1,893.67	500.24	1,893.90	20.0	20.0	20.0
J-301	Zone-2	12	True	500.00	2,602.99	500.00	2,602.99	20.0	22.6	20.0
J-302	Zone-1	4	True	500.00	1,009.56	500.33	1,009.89	20.0	20.0	20.0
J-303	Zone-1	6	True	500.00	1,009.60	501.48	1,011.08	20.0	21.8	20.0
J-304	Zone-1	6	True	500.00	3,544.71	525.96	3,570.67	20.0	23.3	20.0
J-305	Zone-1	13	True	500.00	1,209.04	525.96	1,235.01	20.0	20.0	20.0
J-308	Zone-1	4	True	500.00	1,981.44	501.32	1,982.76	20.0	20.0	20.0
J-309	Zone-1	7	True	500.00	2,854.33	501.81	2,856.14	20.0	21.4	20.0
J-310	Zone-1	7	True	500.00	2,887.98	502.64	2,890.62	20.0	20.8	20.0
J-311	Zone-1	7	True	500.00	2,968.47	500.00	2,968.47	20.0	20.3	20.0

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Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-312	Zone-1	4	True	500.00	2,095.53	502.96	2,098.50	20.0	20.0	20.0
J-313	Zone-1	4	True	500.00	1,960.53	501.15	1,961.68	20.0	20.0	20.0
J-314	Zone-1	4	True	500.00	1,936.29	500.00	1,936.29	20.0	20.0	20.0
J-315	Zone-1	26	True	500.00	6,245.83	500.00	6,245.83	20.0	45.9	20.0
J-316	Zone-1	6	True	500.00	5,271.27	500.00	5,271.27	20.0	20.0	20.0
J-317	Zone-1	7	True	500.00	4,535.36	500.00	4,535.36	20.0	20.0	20.0
J-318	Zone-1	10	True	500.00	4,680.72	500.00	4,680.72	20.0	52.5	20.0
J-319	Zone-1	10	True	500.00	4,881.45	500.00	4,881.45	20.0	49.1	20.0
J-320	Zone-1	10	True	500.00	4,959.76	500.00	4,959.76	20.0	45.9	20.0
J-321	Zone-1	6	True	500.00	4,041.32	500.00	4,041.32	20.0	20.0	20.0
J-322	Zone-1	6	True	500.00	1,009.57	500.00	1,009.57	20.0	25.1	20.0
J-323	<None>	5	True	500.00	3,954.21	500.00	3,954.21	20.0	20.0	20.0
J-324	Zone-1	6	True	500.00	3,561.26	500.00	3,561.26	20.0	20.0	20.0
J-325	Zone-1	4	True	500.00	2,830.83	500.00	2,830.83	20.0	20.0	20.0
J-326	Zone-1	4	True	500.00	3,398.01	500.00	3,398.01	20.0	20.0	20.0
J-327	Zone-1	6	True	500.00	3,369.23	500.00	3,369.23	20.0	21.8	20.0
J-329	Zone-1	4	True	500.00	3,047.18	500.00	3,047.18	20.0	20.0	20.0
J-330	Zone-1	26	True	500.00	5,146.73	500.00	5,146.73	20.0	44.9	20.0
J-331	Zone-1	25	True	500.00	4,108.41	500.00	4,108.41	20.0	20.7	20.0
J-334	Zone-1	7	True	500.00	3,377.62	500.00	3,377.62	20.0	26.8	20.0
J-335	Zone-1	7	True	500.00	3,377.69	500.00	3,377.69	20.0	25.8	20.0
J-336	Zone-1	7	True	500.00	3,377.77	500.00	3,377.77	20.0	23.6	20.0
J-337	Zone-1	7	True	500.00	3,209.93	500.00	3,209.93	20.0	22.2	20.0
J-338	Zone-1	7	True	500.00	3,165.59	500.00	3,165.59	20.0	22.2	20.0

Active Scenario: 2021 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-339	Zone-1	7	True	500.00	3,122.94	500.00	3,122.94	20.0	22.2	20.0
J-340	Zone-1	7	True	500.00	3,080.91	500.00	3,080.91	20.0	22.2	20.0
J-341	Zone-1	7	True	500.00	3,005.76	500.00	3,005.76	20.0	22.2	20.0
J-342	Zone-1	7	True	500.00	2,967.18	500.00	2,967.18	20.0	22.2	20.0
J-343	Zone-1	7	True	500.00	2,948.86	500.00	2,948.86	20.0	22.2	20.0
J-344	Zone-1	5	True	500.00	2,933.43	500.00	2,933.43	20.0	20.0	20.0
J-346	Zone-1	7	True	500.00	4,241.52	500.00	4,241.52	20.0	28.7	20.0
J-347	Zone-1	9	True	500.00	4,073.09	500.00	4,073.09	20.0	28.7	20.0
J-348	Zone-1	9	True	500.00	3,920.30	500.00	3,920.30	20.0	28.7	20.0
J-349	Zone-1	8	True	500.00	3,784.49	500.00	3,784.49	20.0	28.7	20.0
J-350	Zone-1	7	True	500.00	3,678.92	500.00	3,678.92	20.0	28.7	20.0
J-351	Zone-1	7	True	500.00	3,578.45	500.00	3,578.45	20.0	28.7	20.0
J-352	<None>	5	True	500.00	3,403.63	500.00	3,403.63	20.0	20.0	20.0
J-353	<None>	5	True	500.00	3,352.26	500.00	3,352.26	20.0	20.0	20.0
J-354	<None>	5	True	500.00	3,301.61	500.00	3,301.61	20.0	20.0	20.0
J-355	<None>	5	True	500.00	3,084.20	500.00	3,084.20	20.0	20.0	20.0

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
142	J-1	855.0	Zone-1	-550.00	962.3	46.4
143	J-2	865.0	Zone-1	-300.00	954.0	38.5
387	J-3	818.0	Zone-1	-650.00	985.7	72.5
144	J-4	842.0	Zone-1	25.96	1,040.4	85.8
145	J-5	820.5	Zone-1	0.16	1,040.4	95.1
146	J-6	820.0	Zone-1	1.81	1,023.4	88.0
147	J-7	818.0	Zone-1	0.16	1,023.4	88.9
148	J-8	810.0	Zone-1	3.32	1,028.5	94.5
149	J-10	816.0	Zone-1	0.66	1,021.2	88.8
150	J-11	819.0	Zone-1	0.00	1,021.2	87.5
151	J-12	820.0	Zone-1	1.32	1,021.2	87.0
152	J-13	810.0	Zone-1	0.49	1,028.4	94.5
153	J-14	810.0	Zone-1	1.41	1,017.1	89.6
154	J-15	819.0	Zone-1	0.00	1,017.1	85.7
155	J-16	819.0	Zone-1	0.00	1,016.9	85.6
156	J-17	824.0	Zone-1	0.82	992.1	72.7
157	J-18	824.0	Zone-1	3.36	990.7	72.1
158	J-19	838.0	Zone-1	1.81	989.2	65.4
159	J-20	841.0	Zone-1	0.73	990.4	64.6
160	J-21	841.0	Zone-1	0.85	989.5	64.3
161	J-22	842.0	Zone-1	1.01	988.7	63.5
162	J-23	845.0	Zone-1	1.15	988.7	62.2
163	J-24	834.0	Zone-1	0.82	995.0	69.6
164	J-25	835.0	Zone-1	1.32	990.9	67.5
165	J-26	832.0	Zone-1	0.85	989.5	68.1
166	J-27	835.0	Zone-1	27.84	987.6	66.0
167	J-28	835.0	Zone-1	2.71	987.2	65.8
168	J-29	852.0	Zone-1	0.00	979.4	55.1
170	J-37	872.0	Zone-1	1.15	979.2	46.4
171	J-38	870.0	Zone-1	0.49	979.2	47.2
172	J-39	857.0	Zone-1	0.49	979.2	52.9
173	J-40	860.0	Zone-1	1.48	978.4	51.2
174	J-41	862.0	Zone-1	2.80	977.1	49.8
175	J-42	860.0	Zone-1	1.48	975.5	50.0
176	J-43	840.0	Zone-1	0.00	974.8	58.3
177	J-44	845.0	Zone-1	0.00	974.1	55.9
178	J-45	816.0	Zone-1	0.71	1,018.0	87.4
179	J-46	764.5	Zone-1	0.00	1,033.1	116.2
180	J-47	776.0	Zone-1	2.12	1,028.4	109.2
181	J-48	764.5	Zone-1	0.71	1,028.7	114.3
182	J-49	780.0	Zone-1	3.11	1,023.4	105.3
183	J-50	809.0	Zone-1	33.26	1,018.0	90.4
184	J-51	822.0	Zone-1	0.71	990.3	72.8
186	J-53	819.0	Zone-1	4.14	990.3	74.1
187	J-54	819.0	Zone-1	0.00	990.9	74.4
188	J-55	817.0	Zone-1	3.18	985.4	72.9
189	J-56	818.0	Zone-1	1.18	984.2	71.9

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
190	J-57	819.0	Zone-1	1.20	980.5	69.9
191	J-58	820.0	Zone-1	0.82	980.2	69.3
192	J-59	830.0	Zone-1	0.66	979.8	64.8
193	J-60	845.0	Zone-1	0.99	979.4	58.2
194	J-61	850.0	Zone-1	0.00	979.3	55.9
195	J-62	821.0	Zone-1	0.16	985.2	71.0
196	J-63	823.0	Zone-1	1.32	978.3	67.2
197	J-64	824.0	Zone-1	1.60	978.3	66.8
198	J-65	826.0	Zone-1	0.94	976.2	65.0
199	J-66	850.0	Zone-1	1.32	976.2	54.6
200	J-67	858.0	Zone-1	0.00	976.2	51.1
201	J-68	815.0	Zone-1	0.00	984.9	73.5
202	J-69	817.0	Zone-1	2.14	979.4	70.3
203	J-70	826.0	Zone-1	26.34	975.1	64.5
204	J-71	803.0	Zone-1	26.89	984.8	78.7
206	J-75	808.0	Zone-1	1.98	975.4	72.4
207	J-76	817.0	Zone-1	0.66	975.2	68.5
208	J-77	822.0	Zone-1	25.89	970.2	64.1
209	J-78	828.0	Zone-1	0.99	969.8	61.4
210	J-79	840.0	Zone-1	0.82	969.3	56.0
211	J-80	830.0	Zone-1	1.39	966.2	58.9
212	J-81	833.0	Zone-1	1.48	966.2	57.6
213	J-82	827.0	Zone-1	1.72	967.3	60.7
214	J-84	808.0	Zone-1	0.00	968.0	69.2
215	J-85	809.0	Zone-1	28.79	962.3	66.3
216	J-86	861.0	Zone-1	4.38	962.4	43.9
217	J-87	838.0	Zone-1	0.49	962.4	53.8
218	J-88	850.0	Zone-1	0.66	961.7	48.3
219	J-89	865.0	Zone-1	1.32	961.0	41.5
220	J-90	860.0	Zone-1	0.66	960.2	43.4
221	J-91	850.0	Zone-1	0.00	960.4	47.8
222	J-92	855.0	Zone-1	0.82	960.0	45.4
223	J-93	863.0	Zone-1	0.00	959.2	41.6
224	J-94	863.0	Zone-1	0.00	953.8	39.3
225	J-95	870.0	Zone-1	1.81	958.4	38.2
226	J-96	870.0	Zone-1	1.65	956.4	37.4
227	J-97	892.0	Zone-2	0.12	1,010.9	51.5
228	J-98	897.0	Zone-2	0.00	1,010.9	49.3
229	J-99	895.0	Zone-2	0.00	1,010.9	50.2
230	J-100	900.5	Zone-2	0.00	1,010.9	47.8
231	J-101	901.0	Zone-2	0.49	1,010.9	47.6
232	J-102	901.0	Zone-2	1.48	1,010.9	47.6
233	J-105	890.0	Zone-2	0.99	1,010.9	52.3
234	J-106	859.0	Zone-1	0.49	956.6	42.2
235	J-107	860.0	Zone-1	2.64	956.3	41.7
236	J-108	825.0	Zone-1	3.11	956.3	56.8
237	J-109	860.0	Zone-1	0.00	956.8	41.9

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
238	J-110	860.5	Zone-1	0.82	957.0	41.7
239	J-111	855.0	Zone-1	0.82	957.1	44.2
240	J-112	862.0	Zone-1	0.66	955.1	40.3
241	J-113	861.0	Zone-1	0.00	961.4	43.4
242	J-114	861.0	Zone-1	0.85	959.9	42.8
243	J-115	861.0	Zone-1	0.99	958.2	42.1
244	J-116	835.0	Zone-1	3.29	956.4	52.5
245	J-117	818.0	Zone-1	0.66	955.7	59.6
246	J-118	832.0	Zone-1	0.99	955.7	53.5
248	J-120	850.0	Zone-1	0.82	955.7	45.8
249	J-121	861.0	Zone-1	0.00	955.7	41.0
250	J-122	845.0	Zone-1	0.66	955.7	47.9
251	J-123	826.0	Zone-1	2.12	961.3	58.5
252	J-124	850.0	Zone-1	0.49	961.2	48.1
253	J-125	838.0	Zone-1	4.24	960.7	53.1
254	J-126	821.0	Zone-1	6.35	960.3	60.3
255	J-127	815.0	Zone-1	9.43	960.9	63.1
256	J-128	804.0	Zone-1	0.71	960.8	67.8
257	J-129	800.0	Zone-1	73.43	960.6	69.5
258	J-130	792.0	Zone-1	2.17	959.2	72.3
259	J-133	817.0	Zone-1	3.29	957.8	60.9
260	J-134	822.0	Zone-1	2.87	957.8	58.8
261	J-135	826.0	Zone-1	4.45	956.1	56.3
267	J-141	810.0	Zone-1	5.88	954.5	62.5
268	J-142	814.0	Zone-1	1.48	954.4	60.8
269	J-143	816.0	Zone-1	0.66	952.8	59.2
270	J-144	818.0	Zone-1	1.65	954.8	59.2
271	J-145	859.0	Zone-1	0.99	954.8	41.5
272	J-146	820.0	Zone-1	0.49	950.2	56.3
273	J-147	819.0	Zone-1	0.00	950.0	56.7
274	J-148	850.0	Zone-1	0.00	948.6	42.6
275	J-149	813.0	Zone-1	1.81	953.6	60.8
276	J-150	812.0	Zone-1	2.64	951.4	60.3
277	J-151	805.0	Zone-1	0.00	949.6	62.6
278	J-152	808.0	Zone-1	25.96	949.6	61.3
279	J-153	799.0	Zone-1	25.96	949.6	65.2
280	J-154	787.0	Zone-1	0.00	949.6	70.3
281	J-155	785.0	Zone-1	0.00	949.6	71.2
282	J-156	782.0	Zone-1	25.96	949.6	72.5
283	J-157	799.0	Zone-1	25.96	949.6	65.1
284	J-158	801.0	Zone-1	0.82	949.7	64.4
285	J-159	802.0	Zone-1	0.33	949.4	63.8
286	J-160	807.0	Zone-1	0.82	950.0	61.9
287	J-161	830.0	Zone-1	0.49	949.7	51.8
288	J-162	835.0	Zone-1	0.82	949.7	49.6
290	J-164	847.0	Zone-1	0.99	949.6	44.4
291	J-165	845.0	Zone-1	1.48	949.2	45.1

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
292	J-166	825.0	Zone-1	1.11	949.4	53.8
293	J-167	817.0	Zone-1	1.15	949.3	57.2
294	J-168	815.0	Zone-1	0.99	949.3	58.1
295	J-169	810.0	Zone-1	0.66	949.3	60.3
296	J-170	800.0	Zone-1	0.00	949.5	64.7
297	J-171	802.0	Zone-1	26.13	949.4	63.8
298	J-172	800.0	Zone-1	0.71	949.4	64.7
299	J-173	805.0	Zone-1	0.00	949.4	62.5
300	J-174	830.0	Zone-1	25.51	949.2	51.6
301	J-175	843.0	Zone-1	2.47	949.1	45.9
302	J-176	835.0	Zone-1	1.32	949.1	49.4
303	J-177	820.0	Zone-1	1.81	949.1	55.9
304	J-178	822.0	Zone-1	1.98	948.9	54.9
305	J-179	851.0	Zone-1	0.82	948.7	42.3
306	J-180	819.0	Zone-1	2.47	948.8	56.2
307	J-181	819.0	Zone-1	0.66	948.8	56.1
309	J-183	841.0	Zone-1	0.99	948.7	46.6
310	J-184	837.0	Zone-1	1.93	948.7	48.3
311	J-185	857.0	Zone-1	0.66	948.7	39.7
312	J-186	860.0	Zone-1	1.32	949.0	38.5
313	J-187	862.0	Zone-1	1.65	948.7	37.5
314	J-188	861.0	Zone-1	0.00	948.7	37.9
315	J-189	868.0	Zone-1	0.82	948.5	34.8
316	J-190	863.0	Zone-1	0.66	948.6	37.0
317	J-191	862.0	Zone-1	0.00	948.4	37.4
318	J-192	861.0	Zone-1	0.82	947.7	37.5
319	J-197	855.0	Zone-1	0.82	949.8	41.0
320	J-198	856.0	Zone-1	0.82	949.8	40.6
321	J-199	867.0	Zone-1	1.76	948.0	35.0
322	J-200	868.0	Zone-1	0.00	948.1	34.7
323	J-201	865.0	Zone-1	0.00	948.2	36.0
324	J-202	818.0	Zone-1	1.15	1,021.2	87.9
325	J-203	820.5	Zone-1	1.98	1,021.2	86.8
327	J-205	812.0	Zone-1	2.99	971.3	68.9
328	J-206	827.0	Zone-1	7.71	964.5	59.5
329	J-207	845.0	Zone-1	0.16	982.4	59.4
330	J-208	845.0	Zone-1	1.15	961.2	50.3
331	J-211	764.5	Zone-1	2.12	1,029.5	114.7
332	J-212	760.5	Zone-1	0.00	1,032.7	117.8
333	J-213	758.0	Zone-1	2.12	1,034.4	119.6
334	J-214	759.5	Zone-1	0.00	1,036.8	120.0
335	J-215	765.0	Zone-1	0.71	1,034.9	116.8
336	J-216	779.0	Zone-1	0.00	1,024.8	106.4
337	J-217	763.0	Zone-1	0.00	1,024.8	113.3
338	J-218	770.0	Zone-1	1.41	1,024.8	110.3
339	J-219	767.0	Zone-1	0.00	1,024.8	111.5
340	J-220	760.0	Zone-1	2.82	1,024.8	114.6

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
342	J-222	821.0	Zone-1	0.00	1,040.4	94.9
343	J-223	818.0	Zone-1	0.00	1,023.4	88.9
344	J-224	819.0	Zone-1	0.00	1,028.5	90.7
345	J-225	828.0	Zone-1	1.91	1,028.5	86.8
346	J-226	818.0	Zone-1	0.00	1,024.4	89.3
347	J-227	821.0	Zone-1	0.49	1,024.4	88.0
348	J-228	828.0	Zone-1	0.66	1,024.4	85.0
349	J-229	819.5	Zone-1	0.16	1,016.6	85.3
350	J-230	819.0	Zone-1	0.33	1,017.4	85.8
351	J-231	819.0	Zone-1	0.24	1,017.3	85.8
352	J-232	865.0	Zone-1	1.15	979.2	49.4
353	J-237	820.0	Zone-1	1.48	955.9	58.8
354	J-238	852.0	Zone-1	1.15	956.1	45.0
355	J-239	861.0	Zone-1	0.49	956.2	41.2
356	J-240	859.0	Zone-1	0.82	956.2	42.1
357	J-241	860.0	Zone-1	0.82	956.3	41.7
358	J-242	825.0	Zone-1	0.99	955.9	56.6
359	J-243	835.0	Zone-1	1.32	955.9	52.3
361	J-245	824.0	Zone-1	0.00	955.7	57.0
362	J-246	835.0	Zone-1	0.33	955.7	52.2
363	J-247	840.0	Zone-1	0.66	955.7	50.1
366	J-250	839.0	Zone-1	0.33	955.7	50.5
367	J-251	863.0	Zone-1	0.49	955.7	40.1
369	J-254	843.0	Zone-1	0.82	955.7	48.8
370	J-255	863.0	Zone-1	0.00	954.8	39.7
371	J-256	843.0	Zone-1	0.66	949.8	46.2
374	J-259	803.0	Zone-1	0.33	949.6	63.4
375	J-260	800.0	Zone-1	0.00	949.7	64.8
378	J-269	763.0	Zone-1	1.15	1,039.3	119.5
380	J-272	819.0	Zone-1	0.00	1,040.7	95.9
381	J-274	772.0	Zone-1	0.00	1,039.3	115.6
382	J-275	790.0	Zone-1	0.00	1,039.3	107.8
394	J-278	770.0	Zone-1	0.00	1,039.3	116.5
389	J-279	890.0	Zone-1	0.00	956.3	28.7
390	J-280	820.0	Zone-1	0.00	1,042.6	96.3
391	J-281	770.0	Zone-1	0.00	1,039.3	116.5
395	J-282	780.0	Zone-1	3.01	1,039.3	112.2
384	J-284	830.0	Zone-1	3.32	1,005.4	75.9
397	J-285	790.0	Zone-1	0.00	1,039.3	107.8
398	J-286	790.0	Zone-1	0.00	1,039.3	107.8
399	J-287	790.0	Zone-1	4.61	1,039.3	107.8
736	J-290	846.0	Zone-1	1.76	949.4	44.8
773	J-291	848.0	Zone-1	1.65	981.7	57.8
776	J-292	863.0	Zone-1	0.00	982.0	51.5
778	J-293	860.0	Zone-1	0.66	982.1	52.8
782	J-294	821.0	Zone-1	0.00	1,040.4	94.9
386	J-297	885.0	Zone-1	0.00	956.3	30.9

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
800	J-297	895.0	Zone-2	0.33	1,010.9	50.2
805	J-298	897.0	Zone-2	(N/A)	(N/A)	(N/A)
816	J-299	840.0	Zone-1	0.00	984.5	62.5
819	J-300	845.0	Zone-1	0.24	984.5	60.4
822	J-301	895.0	Zone-2	0.00	1,111.3	93.6
838	J-302	846.0	Zone-1	0.33	979.2	57.6
840	J-303	840.0	Zone-1	1.48	979.2	60.2
842	J-304	795.5	Zone-1	25.96	949.6	66.7
845	J-305	800.0	Zone-1	25.96	949.6	64.7
851	J-308	786.0	Zone-1	1.32	1,039.3	109.6
853	J-309	783.2	Zone-1	1.81	1,039.3	110.8
856	J-310	785.5	Zone-1	2.64	1,039.3	109.8
859	J-311	782.2	Zone-1	0.00	1,039.3	111.2
862	J-312	783.0	Zone-1	2.96	1,039.3	110.9
864	J-313	782.0	Zone-1	1.15	1,039.3	111.3
866	J-314	780.0	Zone-1	0.00	1,039.3	112.2
877	J-315	812.9	Zone-1	0.00	1,041.3	98.8
881	J-316	817.7	Zone-1	0.00	987.2	73.3
915	J-317	878.0	Zone-1	0.00	1,028.4	65.1
917	J-318	800.0	Zone-1	0.00	1,028.4	98.8
919	J-319	805.0	Zone-1	0.00	1,028.3	96.6
921	J-320	811.4	Zone-1	0.00	1,028.3	93.8
925	J-321	808.0	Zone-1	0.00	1,028.3	95.3
938	J-322	826.0	Zone-1	0.00	979.2	66.3
979	J-323	812.2	<None>	0.00	962.1	64.9
988	J-324	815.0	Zone-1	0.00	1,028.5	92.4
990	J-325	865.6	Zone-1	0.00	948.4	35.8
994	J-326	850.0	Zone-1	0.00	948.4	42.6
997	J-327	857.0	Zone-1	0.00	948.4	39.5
1002	J-329	857.2	Zone-1	0.00	948.5	39.5
1006	J-330	810.0	Zone-1	0.00	1,028.4	94.5
1009	J-331	813.5	Zone-1	0.00	1,028.5	93.0
1016	J-334	774.4	Zone-1	0.00	1,039.3	114.6
1019	J-335	770.0	Zone-1	0.00	1,039.3	116.5
1021	J-336	770.0	Zone-1	0.00	1,039.3	116.5
1023	J-337	770.0	Zone-1	0.00	1,039.3	116.5
1025	J-338	770.0	Zone-1	0.00	1,039.3	116.5
1027	J-339	770.0	Zone-1	0.00	1,039.3	116.5
1029	J-340	770.0	Zone-1	0.00	1,039.3	116.5
1031	J-341	770.0	Zone-1	0.00	1,039.3	116.5
1033	J-342	770.0	Zone-1	0.00	1,039.3	116.5
1035	J-343	770.0	Zone-1	0.00	1,039.3	116.5
1037	J-344	775.0	Zone-1	0.00	1,039.3	114.3
1040	J-346	770.0	Zone-1	0.00	1,039.3	116.5
1043	J-347	770.0	Zone-1	0.00	1,039.3	116.5
1046	J-348	770.0	Zone-1	0.00	1,039.3	116.5
1049	J-349	770.0	Zone-1	0.00	1,039.3	116.5

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1052	J-350	770.0	Zone-1	0.00	1,039.3	116.5
1055	J-351	770.0	Zone-1	0.00	1,039.3	116.5
1058	J-352	770.0	<None>	0.00	1,039.3	116.5
1061	J-353	770.0	<None>	0.00	1,039.3	116.5
1064	J-354	770.0	<None>	0.00	1,039.3	116.5
1067	J-355	770.0	<None>	0.00	1,039.3	116.5

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
412	P-9	155	J-10	J-202	8.0	Ductile Iron	4.45	0.03	0.000
413	P-10	165	J-202	J-11	8.0	Ductile Iron	3.29	0.02	0.000
414	P-11	281	J-11	J-203	8.0	Ductile Iron	5.00	0.03	0.000
415	P-12	297	J-203	J-12	8.0	Ductile Iron	3.02	0.02	0.000
416	P-13	382	J-12	J-11	8.0	Ductile Iron	1.70	0.01	0.000
417	P-16	359	J-15	J-14	6.0	Ductile Iron	1.41	0.02	0.000
418	P-17	131	J-15	J-16	8.0	Ductile Iron	264.42	1.69	0.002
419	P-18	298	J-16	J-45	8.0	Ductile Iron	-387.47	2.47	0.004
420	P-19	396	J-45	J-50	8.0	Ductile Iron	-26.96	0.17	0.000
421	P-20	801	J-50	J-49	8.0	Ductile Iron	-537.85	3.43	0.007
422	P-22	883	J-47	J-46	8.0	Ductile Iron	-476.47	3.04	0.005
423	P-23	288	J-47	J-48	8.0	Ductile Iron	-199.44	1.27	0.001
424	P-25	486	J-24	J-17	6.0	Ductile Iron	214.57	2.43	0.006
425	P-26	253	J-17	J-18	6.0	Ductile Iron	213.75	2.43	0.006
426	P-27	650	J-18	J-19	6.0	Ductile Iron	127.20	1.44	0.002
427	P-28	256	J-19	J-23	6.0	Ductile Iron	125.39	1.42	0.002
428	P-29	476	J-23	J-28	6.0	Ductile Iron	152.53	1.73	0.003
429	P-30	216	J-28	J-27	6.0	Ductile Iron	-119.42	1.36	0.002
430	P-31	224	J-27	J-26	6.0	Ductile Iron	-262.36	2.98	0.008
431	P-32	191	J-26	J-25	6.0	Ductile Iron	-242.86	2.76	0.007
432	P-33	281	J-25	J-24	6.0	Ductile Iron	-349.46	3.97	0.014
433	P-34	251	J-18	J-20	6.0	Ductile Iron	83.18	0.94	0.001
434	P-35	326	J-20	J-25	6.0	Ductile Iron	-105.27	1.19	0.002
435	P-36	190	J-20	J-21	6.0	Ductile Iron	187.73	2.13	0.005
436	P-37	370	J-21	J-26	6.0	Ductile Iron	20.34	0.23	0.000
437	P-38	231	J-21	J-22	6.0	Ductile Iron	166.54	1.89	0.004
438	P-39	424	J-22	J-27	6.0	Ductile Iron	137.23	1.56	0.003
439	P-40	224	J-22	J-23	6.0	Ductile Iron	28.30	0.32	0.000
440	P-44	230	J-68	J-62	8.0	Ductile Iron	-202.26	1.29	0.001
441	P-45	220	J-62	J-55	8.0	Ductile Iron	-202.43	1.29	0.001
443	P-47	418	J-53	J-24	8.0	Ductile Iron	-710.18	4.53	0.011
444	P-48	306	J-25	J-54	4.0	Ductile Iron	0.00	0.00	0.000
445	P-49	207	J-55	J-56	8.0	Ductile Iron	499.73	3.19	0.006
446	P-50	429	J-56	J-27	6.0	Ductile Iron	-252.33	2.86	0.008
447	P-51	302	J-56	J-57	8.0	Ductile Iron	750.88	4.79	0.012
448	P-52	209	J-57	J-58	8.0	Ductile Iron	203.41	1.30	0.001
449	P-53	373	J-58	J-59	8.0	Ductile Iron	202.59	1.29	0.001
450	P-54	370	J-59	J-60	8.0	Ductile Iron	201.93	1.29	0.001
451	P-55	137	J-60	J-61	8.0	Ductile Iron	198.62	1.27	0.001
452	P-56	164	J-63	J-64	6.0	Ductile Iron	-1.32	0.01	0.000
453	P-57	311	J-57	J-64	8.0	Ductile Iron	546.27	3.49	0.007
454	P-58	341	J-64	J-69	6.0	Ductile Iron	-157.07	1.78	0.003
455	P-59	350	J-69	J-68	8.0	Ductile Iron	-852.26	5.44	0.016
456	P-60	391	J-69	J-76	8.0	Ductile Iron	693.06	4.42	0.011
457	P-61	351	J-76	J-70	8.0	Ductile Iron	120.17	0.77	0.000
458	P-62	209	J-70	J-65	8.0	Ductile Iron	-465.30	2.97	0.005
459	P-63	484	J-65	J-66	8.0	Ductile Iron	-23.41	0.15	0.000

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
460	P-64	288	J-66	J-67	6.0	Ductile Iron	-24.72	0.28	0.000
461	P-65	460	J-64	J-65	8.0	Ductile Iron	442.83	2.83	0.005
462	P-66	335	J-70	J-77	8.0	Ductile Iron	816.72	5.21	0.015
463	P-67	249	J-77	J-78	8.0	Ductile Iron	243.26	1.55	0.002
464	P-68	311	J-78	J-79	8.0	Ductile Iron	242.27	1.55	0.002
465	P-69	423	J-77	J-82	8.0	Ductile Iron	547.57	3.50	0.007
466	P-70	158	J-82	J-81	8.0	Ductile Iron	545.85	3.48	0.007
467	P-72	1,290	J-50	J-71	6.0	Ductile Iron	477.63	5.42	0.026
470	P-77	283	J-75	J-76	6.0	Ductile Iron	66.24	0.75	0.001
471	P-78	436	J-75	J-84	6.0	Ductile Iron	382.52	4.34	0.017
472	P-79	331	J-84	J-85	6.0	Ductile Iron	382.52	4.34	0.017
474	P-81	426	J-76	J-205	8.0	Ductile Iron	638.47	4.08	0.009
475	P-82	748	J-205	J-206	8.0	Ductile Iron	635.48	4.06	0.009
476	P-83	354	J-206	J-123	8.0	Ductile Iron	627.78	4.01	0.009
479	P-87	357	J-29	J-39	8.0	Ductile Iron	160.68	1.03	0.001
480	P-88	278	J-39	J-38	8.0	Ductile Iron	2.29	0.01	0.000
481	P-90	360	J-38	J-37	8.0	Ductile Iron	1.15	0.01	0.000
483	P-96	247	J-39	J-40	6.0	Ductile Iron	157.90	1.79	0.003
484	P-97	395	J-40	J-41	6.0	Ductile Iron	156.42	1.77	0.003
485	P-98	497	J-41	J-42	6.0	Ductile Iron	153.62	1.74	0.003
486	P-99	240	J-42	J-43	6.0	Ductile Iron	152.13	1.73	0.003
487	P-100	213	J-43	J-44	6.0	Ductile Iron	152.13	1.73	0.003
488	P-101	217	J-44	J-67	6.0	Ductile Iron	-279.76	3.17	0.010
489	P-102	275	J-67	J-61	6.0	Ductile Iron	-304.48	3.45	0.011
490	P-103	113	J-61	J-29	6.0	Ductile Iron	-105.86	1.20	0.002
491	P-104	224	J-44	J-79	6.0	Ductile Iron	431.89	4.90	0.021
492	P-105	64	J-79	J-80	6.0	Ductile Iron	673.34	7.64	0.049
493	P-106	394	J-80	J-81	6.0	Ductile Iron	29.15	0.33	0.000
494	P-107	414	J-80	J-87	8.0	Ductile Iron	642.81	4.10	0.009
495	P-108	242	J-87	J-88	6.0	Ductile Iron	137.76	1.56	0.003
496	P-109	279	J-88	J-89	6.0	Ductile Iron	137.10	1.56	0.003
497	P-110	311	J-89	J-90	6.0	Ductile Iron	135.79	1.54	0.003
498	P-111	240	J-90	J-95	6.0	Ductile Iron	252.52	2.87	0.008
499	P-112	51	J-95	J-96	6.0	Ductile Iron	597.24	6.78	0.039
500	P-114	346	J-97	J-98	6.0	Ductile Iron	-0.12	0.00	0.000
501	P-115	296	J-98	J-99	8.0	Ductile Iron	3.29	0.02	0.000
502	P-116	396	J-99	J-100	6.0	Ductile Iron	3.29	0.04	0.000
503	P-117	247	J-100	J-101	6.0	Ductile Iron	3.29	0.04	0.000
504	P-118	321	J-101	J-102	6.0	Ductile Iron	1.48	0.02	0.000
506	P-122	291	J-87	J-91	8.0	Ductile Iron	540.71	3.45	0.007
507	P-123	345	J-91	J-90	8.0	Ductile Iron	117.39	0.75	0.000
508	P-124	86	J-91	J-92	8.0	Ductile Iron	423.32	2.70	0.004
509	P-125	275	J-92	J-93	8.0	Ductile Iron	346.53	2.21	0.003
510	P-126	284	J-93	J-95	8.0	Ductile Iron	346.53	2.21	0.003
511	P-127	428	J-92	J-114	8.0	Ductile Iron	75.96	0.48	0.000
512	P-128	472	J-87	J-86	8.0	Ductile Iron	-36.16	0.23	0.000
513	P-129	501	J-86	J-81	8.0	Ductile Iron	-573.52	3.66	0.008

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
514	P-130	146	J-86	J-113	8.0	Ductile Iron	532.98	3.40	0.007
515	P-131	82	J-113	J-114	8.0	Ductile Iron	916.61	5.85	0.018
516	P-132	82	J-114	J-115	8.0	Ductile Iron	991.73	6.33	0.021
517	P-133	227	J-115	J-112	8.0	Ductile Iron	798.07	5.09	0.014
518	P-134	184	J-112	T-1	8.0	Ductile Iron	797.42	5.09	0.014
519	P-135	90	J-2	J-94	8.0	Ductile Iron	300.00	1.91	0.002
520	P-136	78	J-94	T-1	8.0	Ductile Iron	882.92	5.64	0.017
521	P-137	328	J-94	J-96	8.0	Ductile Iron	-582.92	3.72	0.008
522	P-138	234	J-96	J-106	6.0	Ductile Iron	-77.08	0.87	0.001
523	P-139	211	J-106	J-109	6.0	Ductile Iron	-77.58	0.88	0.001
524	P-140	214	J-109	J-110	6.0	Ductile Iron	-77.58	0.88	0.001
525	P-141	190	J-110	J-111	6.0	Ductile Iron	-78.40	0.89	0.001
526	P-142	231	J-111	J-115	6.0	Ductile Iron	-192.67	2.19	0.005
527	P-143	380	J-111	J-116	6.0	Ductile Iron	113.44	1.29	0.002
528	P-144	270	J-116	J-108	6.0	Ductile Iron	67.89	0.77	0.001
529	P-145	789	J-108	J-107	6.0	Ductile Iron	-19.84	0.23	0.000
536	P-152	258	J-135	J-134	8.0	Ductile Iron	-541.22	3.45	0.007
537	P-153	356	J-134	J-126	8.0	Ductile Iron	-547.38	3.49	0.007
538	P-154	360	J-126	J-123	8.0	Ductile Iron	-330.08	2.11	0.003
539	P-155	306	J-133	J-134	6.0	Ductile Iron	-3.29	0.04	0.000
540	P-156	128	J-113	J-1	8.0	Ductile Iron	-550.00	3.51	0.007
541	P-157	232	J-113	J-124	8.0	Ductile Iron	166.37	1.06	0.001
542	P-158	368	J-124	J-125	8.0	Ductile Iron	227.89	1.45	0.001
543	P-159	326	J-125	J-126	8.0	Ductile Iron	223.66	1.43	0.001
544	P-160	28	J-124	J-208	8.0	Ductile Iron	-62.02	0.40	0.000
545	P-162	318	J-208	J-123	8.0	Ductile Iron	-63.17	0.40	0.000
546	P-163	257	J-123	J-127	8.0	Ductile Iron	232.41	1.48	0.001
547	P-164	307	J-127	J-128	8.0	Ductile Iron	138.54	0.88	0.001
548	P-165	372	J-128	J-129	8.0	Ductile Iron	137.84	0.88	0.001
549	P-166	304	J-129	J-130	4.0	Ductile Iron	64.41	1.64	0.005
550	P-167	380	J-130	J-127	8.0	Ductile Iron	-438.17	2.80	0.005
551	P-170	797	J-130	J-141	8.0	Ductile Iron	500.40	3.19	0.006
552	P-171	215	J-141	J-149	8.0	Ductile Iron	404.37	2.58	0.004
553	P-172	560	J-149	J-150	8.0	Ductile Iron	402.55	2.57	0.004
554	P-173	215	J-135	J-142	8.0	Ductile Iron	579.03	3.70	0.008
555	P-174	162	J-142	J-143	8.0	Ductile Iron	667.70	4.26	0.010
556	P-175	837	J-143	J-144	6.0	Ductile Iron	-133.01	1.51	0.002
557	P-176	525	J-144	J-145	6.0	Ductile Iron	0.99	0.01	0.000
558	P-177	371	J-144	J-117	6.0	Ductile Iron	-135.65	1.54	0.002
559	P-178	487	J-117	J-108	6.0	Ductile Iron	-84.62	0.96	0.001
560	P-179	525	J-117	J-118	6.0	Ductile Iron	5.11	0.06	0.000
562	P-182	291	J-120	J-121	6.0	Ductile Iron	1.98	0.02	0.000
563	P-183	261	J-121	J-122	6.0	Ductile Iron	1.15	0.01	0.000
564	P-184	185	J-143	J-146	8.0	Ductile Iron	800.06	5.11	0.014
565	P-185	91	J-146	J-147	10.0	Ductile Iron	602.63	2.46	0.003
566	P-186	497	J-147	J-148	10.0	Ductile Iron	602.63	2.46	0.003
567	P-187	381	J-148	T-2	10.0	Ductile Iron	602.63	2.46	0.003

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
568	P-190	643	J-192	J-199	12.0	Ductile Iron	-353.33	1.00	0.000
569	P-191	416	J-199	J-200	12.0	Ductile Iron	-355.10	1.01	0.000
570	P-192	587	J-200	J-201	12.0	Ductile Iron	-142.05	0.40	0.000
571	P-193	64	J-201	J-191	6.0	Ductile Iron	-142.05	1.61	0.003
573	P-195	70	J-189	J-200	6.0	Ductile Iron	213.04	2.42	0.006
574	P-197	303	J-197	J-198	4.0	Ductile Iron	0.82	0.02	0.000
575	P-199	230	J-164	J-162	8.0	Ductile Iron	-68.74	0.44	0.000
577	P-201	157	J-162	J-161	8.0	Ductile Iron	-69.57	0.44	0.000
578	P-202	484	J-161	J-160	8.0	Ductile Iron	-141.86	0.91	0.001
579	P-203	130	J-160	J-158	8.0	Ductile Iron	257.24	1.64	0.002
580	P-204	381	J-150	J-160	8.0	Ductile Iron	399.92	2.55	0.004
581	P-205	751	J-158	J-159	4.0	Ductile Iron	17.85	0.46	0.000
582	P-206	313	J-161	J-166	6.0	Ductile Iron	71.80	0.81	0.001
583	P-207	354	J-166	J-167	6.0	Ductile Iron	55.63	0.63	0.000
584	P-208	341	J-167	J-174	6.0	Ductile Iron	41.41	0.47	0.000
585	P-209	297	J-167	J-168	6.0	Ductile Iron	13.06	0.15	0.000
586	P-210	522	J-168	J-176	6.0	Ductile Iron	37.56	0.43	0.000
587	P-211	148	J-168	J-169	6.0	Ductile Iron	-25.48	0.29	0.000
588	P-212	505	J-169	J-177	6.0	Ductile Iron	46.99	0.53	0.000
589	P-213	176	J-169	J-159	6.0	Ductile Iron	-73.13	0.83	0.001
590	P-214	69	J-159	J-170	6.0	Ductile Iron	-55.61	0.63	0.000
591	P-215	234	J-170	J-171	8.0	Ductile Iron	26.84	0.17	0.000
592	P-216	507	J-171	J-172	8.0	Ductile Iron	0.71	0.00	0.000
593	P-218	478	J-170	J-157	8.0	Ductile Iron	-82.45	0.53	0.000
594	P-220	155	J-152	J-151	6.0	Ductile Iron	0.00	0.00	0.000
595	P-222	255	J-153	J-154	8.0	Ductile Iron	-26.29	0.17	0.000
596	P-223	398	J-154	J-155	8.0	Ductile Iron	-26.29	0.17	0.000
597	P-224	384	J-155	J-156	8.0	Ductile Iron	25.96	0.17	0.000
599	P-226	670	J-165	J-174	6.0	Ductile Iron	16.05	0.18	0.000
600	P-227	231	J-174	J-175	6.0	Ductile Iron	31.95	0.36	0.000
601	P-228	415	J-165	J-186	10.0	Ductile Iron	258.16	1.05	0.001
602	P-229	737	J-186	J-175	6.0	Ductile Iron	-37.43	0.42	0.000
603	P-230	277	J-175	J-176	6.0	Ductile Iron	-7.95	0.09	0.000
604	P-231	288	J-176	J-177	6.0	Ductile Iron	28.29	0.32	0.000
605	P-232	297	J-177	J-178	6.0	Ductile Iron	73.46	0.83	0.001
606	P-233	933	J-178	J-179	6.0	Ductile Iron	31.88	0.36	0.000
607	P-234	272	J-179	J-188	6.0	Ductile Iron	11.28	0.13	0.000
608	P-235	192	J-188	J-187	6.0	Ductile Iron	-35.28	0.40	0.000
609	P-236	312	J-187	J-186	10.0	Ductile Iron	-294.27	1.20	0.001
610	P-237	333	J-187	J-189	10.0	Ductile Iron	257.34	1.05	0.001
611	P-239	244	J-189	J-190	6.0	Ductile Iron	-16.66	0.19	0.000
612	P-240	407	J-190	J-188	6.0	Ductile Iron	-46.57	0.53	0.000
613	P-241	272	J-190	J-185	6.0	Ductile Iron	-52.67	0.60	0.000
614	P-242	415	J-185	J-179	6.0	Ductile Iron	-19.77	0.22	0.000
615	P-243	314	J-185	J-184	6.0	Ductile Iron	-33.56	0.38	0.000
616	P-244	193	J-184	J-183	6.0	Ductile Iron	-17.75	0.20	0.000
617	P-245	625	J-183	J-180	6.0	Ductile Iron	-18.73	0.21	0.000

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
618	P-246	480	J-184	J-181	6.0	Ductile Iron	-17.74	0.20	0.000
620	P-248	378	J-181	J-180	6.0	Ductile Iron	-18.40	0.21	0.000
621	P-249	308	J-180	J-178	6.0	Ductile Iron	-39.61	0.45	0.000
622	P-253	160	J-48	J-211	6.0	Ductile Iron	-200.15	2.27	0.005
623	P-254	394	J-64	J-70	6.0	Ductile Iron	257.59	2.92	0.008
624	P-255	363	J-172	J-173	8.0	Ductile Iron	0.00	0.00	0.000
625	P-256	319	J-212	J-213	6.0	Ductile Iron	-202.26	2.30	0.005
626	P-257	446	J-213	J-214	6.0	Ductile Iron	-204.38	2.32	0.005
627	P-258	336	J-214	J-215	8.0	Ductile Iron	477.18	3.05	0.005
628	P-259	337	J-215	J-46	8.0	Ductile Iron	476.47	3.04	0.005
629	P-260	606	J-212	J-211	6.0	Ductile Iron	202.26	2.30	0.005
630	P-261	217	J-49	J-216	8.0	Ductile Iron	-540.96	3.45	0.007
631	P-262	403	J-216	J-217	8.0	Ductile Iron	4.24	0.03	0.000
632	P-263	289	J-217	J-218	8.0	Ductile Iron	4.24	0.03	0.000
633	P-264	264	J-218	J-219	8.0	Ductile Iron	2.82	0.02	0.000
634	P-265	505	J-219	J-220	8.0	Ductile Iron	2.82	0.02	0.000
635	P-266	519	J-216	J-47	8.0	Ductile Iron	-545.20	3.48	0.007
636	P-267	1,780	J-4	J-222	10.0	Ductile Iron	-25.96	0.11	0.000
637	P-268	220	J-222	J-5	10.0	Ductile Iron	-25.96	0.11	0.000
639	P-270	120	J-7	J-223	10.0	Ductile Iron	1.81	0.01	0.000
640	P-271	230	J-6	J-223	6.0	Ductile Iron	-1.81	0.02	0.000
641	P-272	1,307	J-5	J-224	10.0	Ductile Iron	1,139.59	4.66	0.009
642	P-274	990	J-224	J-225	8.0	Ductile Iron	1.91	0.01	0.000
643	P-273	708	J-224	J-226	10.0	Ductile Iron	901.26	3.68	0.006
644	P-275	167	J-226	J-7	10.0	Ductile Iron	900.10	3.68	0.006
645	P-276	410	J-226	J-227	8.0	Ductile Iron	1.15	0.01	0.000
646	P-277	580	J-227	J-228	8.0	Ductile Iron	0.66	0.00	0.000
647	P-278	27	J-16	J-229	8.0	Ductile Iron	651.90	4.16	0.010
650	P-282	656	J-230	J-10	10.0	Ductile Iron	-893.02	3.65	0.006
652	P-284	23	J-230	J-231	8.0	Ductile Iron	266.07	1.70	0.002
653	P-285	121	J-231	J-15	8.0	Ductile Iron	265.84	1.70	0.002
654	P-286	790	J-60	J-232	2.0	Ductile Iron	2.32	0.24	0.000
655	P-288	123	J-232	J-38	8.0	Ductile Iron	1.17	0.01	0.000
656	P-295	227	J-117	J-237	6.0	Ductile Iron	-56.79	0.64	0.000
657	P-296	385	J-237	J-238	6.0	Ductile Iron	-60.58	0.69	0.001
658	P-297	259	J-238	J-239	6.0	Ductile Iron	-61.74	0.70	0.001
659	P-298	192	J-239	J-240	6.0	Ductile Iron	0.82	0.01	0.000
660	P-299	152	J-239	J-241	6.0	Ductile Iron	-63.05	0.72	0.001
661	P-300	140	J-237	J-242	6.0	Ductile Iron	2.31	0.03	0.000
662	P-301	355	J-242	J-243	6.0	Ductile Iron	1.32	0.01	0.000
665	P-304	332	J-245	J-246	8.0	Ductile Iron	0.99	0.01	0.000
666	P-305	424	J-246	J-247	8.0	Ductile Iron	0.66	0.00	0.000
670	P-309	100	J-250	J-120	6.0	Ductile Iron	2.80	0.03	0.000
671	P-310	128	J-122	J-251	6.0	Ductile Iron	0.49	0.01	0.000
673	P-313	143	J-121	J-254	6.0	Ductile Iron	0.82	0.01	0.000
674	P-314	158	J-145	J-255	8.0	Ductile Iron	0.00	0.00	0.000
675	P-317	411	J-146	J-256	8.0	Ductile Iron	196.94	1.26	0.001

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
676	P-318	150	J-256	J-164	8.0	Ductile Iron	194.63	1.24	0.001
677	P-319	204	J-197	J-256	4.0	Ductile Iron	-1.65	0.04	0.000
678	P-320	257	J-142	J-141	8.0	Ductile Iron	-90.16	0.58	0.000
681	P-323	174	J-153	J-259	8.0	Ductile Iron	0.33	0.00	0.000
682	P-324	341	J-157	J-260	8.0	Ductile Iron	-108.41	0.69	0.000
683	P-325	490	J-260	J-152	6.0	Ductile Iron	25.96	0.29	0.000
685	P-327	44	J-260	J-158	8.0	Ductile Iron	-238.56	1.52	0.001
689	P-188	441	J-192	T-2	12.0	Ductile Iron	352.51	1.00	0.000
690	P-372	337	J-229	J-284	8.0	Ductile Iron	1,278.36	8.16	0.033
691	P-373	313	J-284	J-24	8.0	Ductile Iron	1,275.04	8.14	0.033
694	P-41	200	J-51	J-53	8.0	Ductile Iron	-0.71	0.00	0.000
695	P-377	78	J-3	J-68	8.0	Ductile Iron	650.00	4.15	0.010
702	P-376	550	J-297	J-279	12.0	Ductile Iron	89.76	0.25	0.000
703	P-378	375	J-241	J-279	12.0	Ductile Iron	-86.35	0.24	0.000
704	P-379	110	J-279	PMP-2	12.0	Ductile Iron	3.41	0.01	0.000
709	P-396	1,299	J-269	J-281	12.0	Ductile Iron	17.51	0.05	0.000
712	P-350	70	J-272	J-5	12.0	Ductile Iron	1,165.72	3.31	0.004
717	P-383	1,746	J-214	J-269	12.0	Ductile Iron	-681.56	1.93	0.001
724	P-395	508	J-285	J-282	8.0	Ductile Iron	-1.27	0.01	0.000
725	P-397	1,472	J-285	J-286	8.0	Ductile Iron	1.27	0.01	0.000
726	P-398	634	J-286	J-275	8.0	Ductile Iron	1.27	0.01	0.000
727	P-399	1,161	J-275	J-287	12.0	Ductile Iron	-12.89	0.04	0.000
732	P-404	92	T-4	PMP-3	12.0	Ductile Iron	1,865.95	5.29	0.009
733	P-405	151	PMP-3	J-280	12.0	Ductile Iron	1,865.95	5.29	0.009
737	P-409	325	J-164	J-290	10.0	Ductile Iron	262.39	1.07	0.001
738	P-410	335	J-290	J-165	10.0	Ductile Iron	275.69	1.13	0.001
739	P-411	285	J-290	J-166	6.0	Ductile Iron	-15.07	0.17	0.000
742	P-412	427	J-107	J-241	8.0	Ductile Iron	-22.47	0.14	0.000
745	P-413	1,247	J-116	J-135	6.0	Ductile Iron	42.26	0.48	0.000
748	P-414	219	J-118	J-250	6.0	Ductile Iron	3.13	0.04	0.000
749	P-415	318	J-245	J-118	6.0	Ductile Iron	-0.99	0.01	0.000
750	P-416	406	J-71	J-75	6.0	Ductile Iron	450.74	5.11	0.023
769	P-280	252	J-229	J-230	10.0	Ductile Iron	-626.62	2.56	0.003
770	P-418	184	J-255	T-2	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)
771	P-419	1,219	J-251	J-255	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
772	P-420	851	J-181	J-173	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
774	P-421	251	J-207	J-291	6.0	Ductile Iron	142.94	1.62	0.003
775	P-422	255	J-291	J-29	6.0	Ductile Iron	266.54	3.02	0.009
777	P-423	639	J-291	J-292	8.0	Ductile Iron	-125.25	0.80	0.000
779	P-424	245	J-292	J-293	8.0	Ductile Iron	-125.25	0.80	0.000
780	P-425	639	J-293	J-207	8.0	Ductile Iron	-125.91	0.80	0.000
788	P-431	474	J-224	J-8	12.0	PVC	236.43	0.67	0.000
789	P-432	151	J-259	J-151	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
801	P-436	282	J-101	J-297	6.0	Ductile Iron	1.32	0.01	0.000
802	P-437	282	J-297	J-105	6.0	Ductile Iron	0.99	0.01	0.000
807	P-440	193	J-298	J-98	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
808	P-441	413	J-297	J-298	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
814	P-442	504	J-96	J-297	12.0	Ductile Iron	89.76	0.25	0.000
817	P-443	300	J-28	J-299	6.0	Ductile Iron	269.25	3.06	0.009
818	P-444	242	J-299	J-207	6.0	Ductile Iron	269.01	3.05	0.009
820	P-445	239	J-299	J-300	8.0	Ductile Iron	0.24	0.00	0.000
823	P-447	60	PMP-2	J-301	12.0	Ductile Iron	3.41	0.01	0.000
839	P-449	715	J-38	J-302	6.0	Ductile Iron	1.81	0.02	0.000
841	P-450	290	J-302	J-303	10.0	Ductile Iron	1.48	0.01	0.000
843	P-451	276	J-155	J-304	8.0	Ductile Iron	-52.26	0.33	0.000
844	P-452	118	J-304	J-260	8.0	Ductile Iron	-104.19	0.67	0.000
846	P-453	800	J-304	J-305	6.0	Ductile Iron	25.96	0.29	0.000
852	P-456	339	J-282	J-308	6.0	Ductile Iron	1.32	0.01	0.000
855	P-458	520	J-309	J-282	12.0	Ductile Iron	5.60	0.02	0.000
857	P-459	732	J-275	J-310	12.0	Ductile Iron	14.17	0.04	0.000
858	P-460	381	J-310	J-309	12.0	Ductile Iron	10.38	0.03	0.000
860	P-461	353	J-274	J-311	12.0	Ductile Iron	0.00	0.00	0.000
861	P-462	327	J-311	J-275	12.0	Ductile Iron	0.00	0.00	0.000
863	P-463	289	J-309	J-312	6.0	Ductile Iron	2.96	0.03	0.000
865	P-464	389	J-310	J-313	6.0	Ductile Iron	1.15	0.01	0.000
867	P-465	424	J-311	J-314	6.0	Ductile Iron	0.00	0.00	0.000
878	P-466	165	J-272	J-315	12.0	Ductile Iron	-1,165.72	3.31	0.004
879	P-467	1,354	J-315	J-269	12.0	Ductile Iron	700.22	1.99	0.002
880	P-468	156	J-280	J-315	12.0	Ductile Iron	1,865.95	5.29	0.008
882	P-469	155	J-55	J-316	8.0	Ductile Iron	-705.34	4.50	0.011
883	P-470	280	J-316	J-53	8.0	Ductile Iron	-705.34	4.50	0.011
884	P-471	113	J-54	J-316	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
907	P-472	119	J-272	T-4	12.0	Ductile Iron	0.00	0.00	0.000
916	P-473	266	J-47	J-317	12.0	Ductile Iron	128.60	0.36	0.000
918	P-474	285	J-317	J-318	12.0	Ductile Iron	128.60	0.36	0.000
920	P-475	370	J-318	J-319	12.0	Ductile Iron	128.60	0.36	0.000
922	P-476	213	J-13	J-320	12.0	PVC	232.62	0.66	0.000
923	P-477	677	J-320	J-45	6.0	Ductile Iron	361.22	4.10	0.015
924	P-478	143	J-319	J-320	12.0	Ductile Iron	128.60	0.36	0.000
926	P-479	349	J-319	J-321	8.0	Ductile Iron	0.00	0.00	0.000
939	P-480	1,012	J-303	J-322	10.0	Ductile Iron	0.00	0.00	0.000
943	P-481	471	J-305	J-156	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
944	P-482	199	J-305	J-170	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
946	P-483	60	J-301	PRV-1	12.0	Ductile Iron	3.41	0.01	0.000
947	P-484	305	PRV-1	J-98	12.0	Ductile Iron	3.41	0.01	0.000
955	P-486	61	J-322	H-2	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
957	P-488	150	J-294	J-222	10.0	Ductile Iron	0.00	0.00	0.000
959	P-489	70	J-65	H-3	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
961	P-490	54	H-4	J-212	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
963	P-491	52	J-282	H-5	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
965	P-492	45	J-15	H-6	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
967	P-493	44	H-7	J-121	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
969	P-494	46	J-239	H-8	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2021 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
971	P-495	60	H-9	J-170	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
973	P-496	181	J-97	H-10	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
975	P-497	48	J-220	H-11	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
980	P-498	445	J-85	J-323	12.0	Ductile Iron	353.73	1.00	0.000
981	P-499	397	J-323	J-127	8.0	Ductile Iron	353.73	2.26	0.003
986	P-502	436	J-7	J-10	10.0	Ductile Iron	898.13	3.67	0.005
991	P-504	366	J-191	J-325	6.0	Ductile Iron	-27.73	0.31	0.000
992	P-505	243	J-325	J-189	6.0	Ductile Iron	-60.13	0.68	0.001
998	P-509	340	J-325	J-327	8.0	Ductile Iron	32.40	0.21	0.000
999	P-510	253	J-327	J-326	8.0	Ductile Iron	-81.92	0.52	0.000
1000	P-511	114	J-327	J-191	8.0	Ductile Iron	114.32	0.73	0.000
1003	P-512	351	J-326	J-329	8.0	Ductile Iron	-81.92	0.52	0.000
1004	P-513	286	J-329	J-190	8.0	Ductile Iron	-81.92	0.52	0.000
1005	P-514	176	J-324	J-10	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
1007	P-6	335	J-8	J-330	12.0	PVC	233.11	0.66	0.000
1008	P-5	378	J-330	J-13	12.0	PVC	233.11	0.66	0.000
1010	P-503	418	J-8	J-331	8.0	PVC	0.00	0.00	0.000
1011	P-532	180	J-331	J-324	8.0	PVC	0.00	0.00	0.000
1017	P-400	533	J-287	J-334	12.0	Ductile Iron	-17.51	0.05	0.000
1018	P-531	264	J-334	J-278	12.0	Ductile Iron	-17.51	0.05	0.000
1020	P-515	360	J-334	J-335	12.0	PVC	0.00	0.00	0.000
1022	P-516	268	J-335	J-336	12.0	PVC	0.00	0.00	0.000
1026	P-518	297	J-337	J-338	12.0	PVC	0.00	0.00	0.000
1028	P-519	298	J-338	J-339	12.0	PVC	0.00	0.00	0.000
1030	P-520	306	J-339	J-340	12.0	PVC	0.00	0.00	0.000
1034	P-522	315	J-341	J-342	12.0	PVC	0.00	0.00	0.000
1036	P-523	154	J-342	J-343	12.0	PVC	0.00	0.00	0.000
1038	P-524	132	J-343	J-344	12.0	PVC	0.00	0.00	0.000
1041	P-387	907	J-281	J-346	12.0	Ductile Iron	17.51	0.05	0.000
1044	P-525	288	J-346	J-347	12.0	Ductile Iron	17.51	0.05	0.000
1047	P-526	300	J-347	J-348	12.0	Ductile Iron	17.51	0.05	0.000
1050	P-527	302	J-348	J-349	12.0	Ductile Iron	17.51	0.05	0.000
1053	P-528	259	J-349	J-350	12.0	Ductile Iron	17.51	0.05	0.000
1056	P-529	270	J-350	J-351	12.0	Ductile Iron	17.51	0.05	0.000
1057	P-530	354	J-351	J-278	12.0	Ductile Iron	17.51	0.05	0.000
1059	P-517	305	J-336	J-352	12.0	PVC	0.00	0.00	0.000
1062	P-533	295	J-352	J-353	12.0	PVC	0.00	0.00	0.000
1065	P-534	305	J-353	J-354	12.0	PVC	0.00	0.00	0.000
1066	P-535	294	J-354	J-337	12.0	PVC	0.00	0.00	0.000
1068	P-521	295	J-340	J-355	12.0	PVC	0.00	0.00	0.000
1069	P-536	285	J-355	J-341	12.0	PVC	0.00	0.00	0.000

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
945	PRV-1	895.3	12.0	1,010.9	50.0	3.41	1,111.3	1,010.9	100.39

Active Scenario: 2021 MD FF

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Design) (gpm)	Flow (Total) (gpm)	Pump Head (ft)
407	PMP-2	895.0	ALTEEJAN BOOSTER PUMP max day	On	956.3	1,111.3	1,500.00	3.41	155.00
408	PMP-3	820.0	Cutler Way Booster Pump Future	On	848.6	1,044.0	3,000.00	1,865.95	195.36

Active Scenario: 2021 MD FF

ID	Label	Zone	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Initial) (ft)	Elevation (Maximum) (ft)	Diameter (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
402	T-1	Zone-1	873.9	950.5	952.5	976.9	22.00	-1,680.33	952.5
403	T-2	Zone-1	868.6	922.6	947.5	972.6	35.83	-955.13	947.5
405	T-4	Zone-1	821.0	821.0	849.5	850.0	60.00	1,865.94	849.5

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
142	J-1	855.0	Zone-1	-550.00	971.5	50.4
143	J-2	865.0	Zone-1	-300.00	970.4	45.6
387	J-3	818.0	Zone-1	-650.00	972.8	67.0
144	J-4	842.0	Zone-1	44.14	969.7	55.2
145	J-5	820.5	Zone-1	0.28	969.7	64.6
146	J-6	820.0	Zone-1	3.08	969.8	64.8
147	J-7	818.0	Zone-1	0.28	969.8	65.7
148	J-8	810.0	Zone-1	5.64	969.8	69.1
149	J-10	816.0	Zone-1	1.12	969.8	66.5
150	J-11	819.0	Zone-1	0.00	969.8	65.3
151	J-12	820.0	Zone-1	2.24	969.8	64.8
152	J-13	810.0	Zone-1	0.84	969.8	69.1
153	J-14	810.0	Zone-1	2.40	969.9	69.2
154	J-15	819.0	Zone-1	0.00	969.9	65.3
155	J-16	819.0	Zone-1	0.00	969.9	65.3
156	J-17	824.0	Zone-1	1.40	970.4	63.3
157	J-18	824.0	Zone-1	5.72	970.4	63.3
158	J-19	838.0	Zone-1	3.08	970.4	57.3
159	J-20	841.0	Zone-1	1.24	970.4	56.0
160	J-21	841.0	Zone-1	1.44	970.4	56.0
161	J-22	842.0	Zone-1	1.72	970.4	55.6
162	J-23	845.0	Zone-1	1.96	970.4	54.3
163	J-24	834.0	Zone-1	1.40	970.4	59.0
164	J-25	835.0	Zone-1	2.24	970.4	58.6
165	J-26	832.0	Zone-1	1.44	970.4	59.9
166	J-27	835.0	Zone-1	47.33	970.4	58.6
167	J-28	835.0	Zone-1	4.60	970.4	58.6
168	J-29	852.0	Zone-1	0.00	970.6	51.3
170	J-37	872.0	Zone-1	1.96	970.6	42.6
171	J-38	870.0	Zone-1	0.84	970.6	43.5
172	J-39	857.0	Zone-1	0.84	970.6	49.1
173	J-40	860.0	Zone-1	2.52	970.6	47.8
174	J-41	862.0	Zone-1	4.76	970.6	47.0
175	J-42	860.0	Zone-1	2.52	970.6	47.8
176	J-43	840.0	Zone-1	0.00	970.6	56.5
177	J-44	845.0	Zone-1	0.00	970.6	54.3
178	J-45	816.0	Zone-1	1.20	969.8	66.5
179	J-46	764.5	Zone-1	0.00	969.7	88.8
180	J-47	776.0	Zone-1	3.60	969.7	83.8
181	J-48	764.5	Zone-1	1.20	969.7	88.8
182	J-49	780.0	Zone-1	5.28	969.8	82.1
183	J-50	809.0	Zone-1	56.55	969.8	69.6
184	J-51	822.0	Zone-1	1.20	970.6	64.3
186	J-53	819.0	Zone-1	7.04	970.6	65.6
187	J-54	819.0	Zone-1	0.00	970.4	65.5
188	J-55	817.0	Zone-1	5.40	970.9	66.6
189	J-56	818.0	Zone-1	2.00	970.8	66.1

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
190	J-57	819.0	Zone-1	2.04	970.7	65.6
191	J-58	820.0	Zone-1	1.40	970.7	65.2
192	J-59	830.0	Zone-1	1.12	970.7	60.9
193	J-60	845.0	Zone-1	1.68	970.6	54.3
194	J-61	850.0	Zone-1	0.00	970.6	52.2
195	J-62	821.0	Zone-1	0.28	971.5	65.1
196	J-63	823.0	Zone-1	2.24	970.7	63.9
197	J-64	824.0	Zone-1	2.72	970.7	63.5
198	J-65	826.0	Zone-1	1.60	970.6	62.6
199	J-66	850.0	Zone-1	2.24	970.6	52.2
200	J-67	858.0	Zone-1	0.00	970.6	48.7
201	J-68	815.0	Zone-1	0.00	972.1	68.0
202	J-69	817.0	Zone-1	3.64	971.1	66.7
203	J-70	826.0	Zone-1	44.77	970.6	62.6
204	J-71	803.0	Zone-1	45.71	969.9	72.2
206	J-75	808.0	Zone-1	3.36	970.1	70.1
207	J-76	817.0	Zone-1	1.12	970.6	66.5
208	J-77	822.0	Zone-1	44.01	970.6	64.3
209	J-78	828.0	Zone-1	1.68	970.6	61.7
210	J-79	840.0	Zone-1	1.40	970.6	56.5
211	J-80	830.0	Zone-1	2.36	970.5	60.8
212	J-81	833.0	Zone-1	2.52	970.6	59.5
213	J-82	827.0	Zone-1	2.92	970.6	62.1
214	J-84	808.0	Zone-1	0.00	970.0	70.1
215	J-85	809.0	Zone-1	48.94	969.9	69.6
216	J-86	861.0	Zone-1	7.44	970.6	47.4
217	J-87	838.0	Zone-1	0.84	970.5	57.3
218	J-88	850.0	Zone-1	1.12	970.5	52.1
219	J-89	865.0	Zone-1	2.24	970.5	45.6
220	J-90	860.0	Zone-1	1.12	970.4	47.8
221	J-91	850.0	Zone-1	0.00	970.5	52.1
222	J-92	855.0	Zone-1	1.40	970.5	50.0
223	J-93	863.0	Zone-1	0.00	970.4	46.5
224	J-94	863.0	Zone-1	0.00	970.2	46.4
225	J-95	870.0	Zone-1	3.08	970.4	43.4
226	J-96	870.0	Zone-1	2.80	970.3	43.4
227	J-97	892.0	Zone-2	0.20	1,010.9	51.5
228	J-98	897.0	Zone-2	0.00	1,010.9	49.3
229	J-99	895.0	Zone-2	0.00	1,010.9	50.2
230	J-100	900.5	Zone-2	0.00	1,010.9	47.8
231	J-101	901.0	Zone-2	0.84	1,010.9	47.6
232	J-102	901.0	Zone-2	2.52	1,010.9	47.6
233	J-105	890.0	Zone-2	1.68	1,010.9	52.3
234	J-106	859.0	Zone-1	0.84	970.3	48.1
235	J-107	860.0	Zone-1	4.48	970.2	47.7
236	J-108	825.0	Zone-1	5.28	970.2	62.8
237	J-109	860.0	Zone-1	0.00	970.3	47.7

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
238	J-110	860.5	Zone-1	1.40	970.3	47.5
239	J-111	855.0	Zone-1	1.40	970.3	49.9
240	J-112	862.0	Zone-1	1.12	970.2	46.8
241	J-113	861.0	Zone-1	0.00	970.6	47.4
242	J-114	861.0	Zone-1	1.44	970.5	47.4
243	J-115	861.0	Zone-1	1.68	970.3	47.3
244	J-116	835.0	Zone-1	5.60	970.2	58.5
245	J-117	818.0	Zone-1	1.12	970.1	65.8
246	J-118	832.0	Zone-1	1.68	970.1	59.8
248	J-120	850.0	Zone-1	1.40	970.1	52.0
249	J-121	861.0	Zone-1	0.00	970.1	47.2
250	J-122	845.0	Zone-1	1.12	970.1	54.1
251	J-123	826.0	Zone-1	3.60	970.1	62.4
252	J-124	850.0	Zone-1	0.84	970.3	52.0
253	J-125	838.0	Zone-1	7.20	970.2	57.2
254	J-126	821.0	Zone-1	10.80	970.1	64.5
255	J-127	815.0	Zone-1	16.03	969.9	67.0
256	J-128	804.0	Zone-1	1.20	969.8	71.7
257	J-129	800.0	Zone-1	124.83	969.7	73.4
258	J-130	792.0	Zone-1	3.69	969.9	77.0
259	J-133	817.0	Zone-1	5.60	970.0	66.2
260	J-134	822.0	Zone-1	4.88	970.0	64.1
261	J-135	826.0	Zone-1	7.56	970.0	62.3
267	J-141	810.0	Zone-1	10.00	969.8	69.2
268	J-142	814.0	Zone-1	2.52	969.9	67.5
269	J-143	816.0	Zone-1	1.12	969.9	66.6
270	J-144	818.0	Zone-1	2.80	970.0	65.8
271	J-145	859.0	Zone-1	1.68	970.0	48.0
272	J-146	820.0	Zone-1	0.84	969.9	64.9
273	J-147	819.0	Zone-1	0.00	969.9	65.3
274	J-148	850.0	Zone-1	0.00	970.0	51.9
275	J-149	813.0	Zone-1	3.08	969.7	67.8
276	J-150	812.0	Zone-1	4.48	969.5	68.1
277	J-151	805.0	Zone-1	0.00	969.0	70.9
278	J-152	808.0	Zone-1	44.14	969.0	69.6
279	J-153	799.0	Zone-1	44.14	968.9	73.5
280	J-154	787.0	Zone-1	0.00	968.9	78.7
281	J-155	785.0	Zone-1	0.00	968.9	79.6
282	J-156	782.0	Zone-1	44.14	968.9	80.9
283	J-157	799.0	Zone-1	44.14	969.1	73.6
284	J-158	801.0	Zone-1	1.40	969.2	72.8
285	J-159	802.0	Zone-1	0.56	969.2	72.3
286	J-160	807.0	Zone-1	1.40	969.4	70.2
287	J-161	830.0	Zone-1	0.84	969.5	60.4
288	J-162	835.0	Zone-1	1.40	969.6	58.2
290	J-164	847.0	Zone-1	1.68	969.6	53.1
291	J-165	845.0	Zone-1	2.52	969.6	53.9

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
292	J-166	825.0	Zone-1	1.88	969.5	62.5
293	J-167	817.0	Zone-1	1.96	969.5	66.0
294	J-168	815.0	Zone-1	1.68	969.4	66.8
295	J-169	810.0	Zone-1	1.12	969.4	69.0
296	J-170	800.0	Zone-1	0.00	969.1	73.2
297	J-171	802.0	Zone-1	44.42	969.1	72.3
298	J-172	800.0	Zone-1	1.20	969.1	73.2
299	J-173	805.0	Zone-1	0.00	969.1	71.0
300	J-174	830.0	Zone-1	43.37	969.5	60.4
301	J-175	843.0	Zone-1	4.20	969.5	54.7
302	J-176	835.0	Zone-1	2.24	969.5	58.2
303	J-177	820.0	Zone-1	3.08	969.5	64.7
304	J-178	822.0	Zone-1	3.36	969.6	63.8
305	J-179	851.0	Zone-1	1.40	969.7	51.3
306	J-180	819.0	Zone-1	4.20	969.6	65.2
307	J-181	819.0	Zone-1	1.12	969.6	65.2
309	J-183	841.0	Zone-1	1.68	969.6	55.6
310	J-184	837.0	Zone-1	3.28	969.6	57.4
311	J-185	857.0	Zone-1	1.12	969.7	48.7
312	J-186	860.0	Zone-1	2.24	969.7	47.4
313	J-187	862.0	Zone-1	2.80	969.7	46.6
314	J-188	861.0	Zone-1	0.00	969.7	47.0
315	J-189	868.0	Zone-1	1.40	969.7	44.0
316	J-190	863.0	Zone-1	1.12	969.7	46.2
317	J-191	862.0	Zone-1	0.00	969.8	46.6
318	J-192	861.0	Zone-1	1.40	970.0	47.1
319	J-197	855.0	Zone-1	1.40	969.7	49.6
320	J-198	856.0	Zone-1	1.40	969.7	49.2
321	J-199	867.0	Zone-1	3.00	969.9	44.5
322	J-200	868.0	Zone-1	0.00	969.8	44.1
323	J-201	865.0	Zone-1	0.00	969.8	45.4
324	J-202	818.0	Zone-1	1.96	969.8	65.7
325	J-203	820.5	Zone-1	3.36	969.8	64.6
327	J-205	812.0	Zone-1	5.08	970.5	68.6
328	J-206	827.0	Zone-1	13.10	970.2	62.0
329	J-207	845.0	Zone-1	0.28	970.5	54.3
330	J-208	845.0	Zone-1	1.96	970.3	54.2
331	J-211	764.5	Zone-1	3.60	969.7	88.8
332	J-212	760.5	Zone-1	0.00	969.7	90.5
333	J-213	758.0	Zone-1	3.60	969.7	91.6
334	J-214	759.5	Zone-1	0.00	969.7	91.0
335	J-215	765.0	Zone-1	1.20	969.7	88.6
336	J-216	779.0	Zone-1	0.00	969.7	82.5
337	J-217	763.0	Zone-1	0.00	969.7	89.5
338	J-218	770.0	Zone-1	2.40	969.7	86.4
339	J-219	767.0	Zone-1	0.00	969.7	87.7
340	J-220	760.0	Zone-1	4.80	969.7	90.7

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
342	J-222	821.0	Zone-1	0.00	969.7	64.3
343	J-223	818.0	Zone-1	0.00	969.8	65.7
344	J-224	819.0	Zone-1	0.00	969.8	65.2
345	J-225	828.0	Zone-1	3.24	969.8	61.3
346	J-226	818.0	Zone-1	0.00	969.8	65.7
347	J-227	821.0	Zone-1	0.84	969.8	64.4
348	J-228	828.0	Zone-1	1.12	969.8	61.3
349	J-229	819.5	Zone-1	0.28	969.9	65.1
350	J-230	819.0	Zone-1	0.56	969.9	65.3
351	J-231	819.0	Zone-1	0.40	969.9	65.3
352	J-232	865.0	Zone-1	1.96	970.6	45.7
353	J-237	820.0	Zone-1	2.52	970.1	65.0
354	J-238	852.0	Zone-1	1.96	970.2	51.1
355	J-239	861.0	Zone-1	0.84	970.2	47.3
356	J-240	859.0	Zone-1	1.40	970.2	48.1
357	J-241	860.0	Zone-1	1.40	970.2	47.7
358	J-242	825.0	Zone-1	1.68	970.1	62.8
359	J-243	835.0	Zone-1	2.24	970.1	58.5
361	J-245	824.0	Zone-1	0.00	970.1	63.2
362	J-246	835.0	Zone-1	0.56	970.1	58.5
363	J-247	840.0	Zone-1	1.12	970.1	56.3
366	J-250	839.0	Zone-1	0.56	970.1	56.7
367	J-251	863.0	Zone-1	0.84	970.1	46.3
369	J-254	843.0	Zone-1	1.40	970.1	55.0
370	J-255	863.0	Zone-1	0.00	970.0	46.3
371	J-256	843.0	Zone-1	1.12	969.7	54.8
374	J-259	803.0	Zone-1	0.56	968.9	71.8
375	J-260	800.0	Zone-1	0.00	969.1	73.2
378	J-269	763.0	Zone-1	1.96	969.7	89.4
380	J-272	819.0	Zone-1	0.00	969.7	65.2
381	J-274	772.0	Zone-1	0.00	969.7	85.5
382	J-275	790.0	Zone-1	0.00	969.7	77.7
394	J-278	770.0	Zone-1	0.00	969.7	86.4
389	J-279	890.0	Zone-1	0.00	970.2	34.7
390	J-280	820.0	Zone-1	0.00	969.7	64.8
391	J-281	770.0	Zone-1	0.00	969.7	86.4
395	J-282	780.0	Zone-1	5.12	969.7	82.1
384	J-284	830.0	Zone-1	5.64	970.1	60.6
397	J-285	790.0	Zone-1	0.00	969.7	77.7
398	J-286	790.0	Zone-1	0.00	969.7	77.7
399	J-287	790.0	Zone-1	7.84	969.7	77.7
736	J-290	846.0	Zone-1	3.00	969.6	53.5
773	J-291	848.0	Zone-1	2.80	970.5	53.0
776	J-292	863.0	Zone-1	0.00	970.5	46.5
778	J-293	860.0	Zone-1	1.12	970.5	47.8
782	J-294	821.0	Zone-1	0.00	969.7	64.3
386	J-297	885.0	Zone-1	0.00	970.3	36.9

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
800	J-297	895.0	Zone-2	0.56	1,010.9	50.2
805	J-298	897.0	Zone-2	(N/A)	(N/A)	(N/A)
816	J-299	840.0	Zone-1	0.00	970.5	56.5
819	J-300	845.0	Zone-1	0.40	970.5	54.3
822	J-301	895.0	Zone-2	0.00	1,096.6	87.2
838	J-302	846.0	Zone-1	0.56	970.6	53.9
840	J-303	840.0	Zone-1	2.52	970.6	56.5
842	J-304	795.5	Zone-1	44.14	969.0	75.1
845	J-305	800.0	Zone-1	44.14	968.8	73.0
851	J-308	786.0	Zone-1	2.24	969.7	79.5
853	J-309	783.2	Zone-1	3.08	969.7	80.7
856	J-310	785.5	Zone-1	4.48	969.7	79.7
859	J-311	782.2	Zone-1	0.00	969.7	81.1
862	J-312	783.0	Zone-1	5.04	969.7	80.8
864	J-313	782.0	Zone-1	1.96	969.7	81.2
866	J-314	780.0	Zone-1	0.00	969.7	82.1
877	J-315	812.9	Zone-1	0.00	969.7	67.9
881	J-316	817.7	Zone-1	0.00	970.8	66.2
915	J-317	878.0	Zone-1	0.00	969.7	39.7
917	J-318	800.0	Zone-1	0.00	969.7	73.4
919	J-319	805.0	Zone-1	0.00	969.8	71.3
921	J-320	811.4	Zone-1	0.00	969.8	68.5
925	J-321	808.0	Zone-1	0.00	969.8	70.0
938	J-322	826.0	Zone-1	0.00	970.6	62.5
979	J-323	812.2	<None>	0.00	969.9	68.2
988	J-324	815.0	Zone-1	0.00	969.8	67.0
990	J-325	865.6	Zone-1	0.00	969.8	45.1
994	J-326	850.0	Zone-1	0.00	969.8	51.8
997	J-327	857.0	Zone-1	0.00	969.8	48.8
1002	J-329	857.2	Zone-1	0.00	969.7	48.7
1006	J-330	810.0	Zone-1	0.00	969.8	69.1
1009	J-331	813.5	Zone-1	0.00	969.8	67.6
1016	J-334	774.4	Zone-1	0.00	969.7	84.5
1019	J-335	770.0	Zone-1	0.00	969.7	86.4
1021	J-336	770.0	Zone-1	0.00	969.7	86.4
1023	J-337	770.0	Zone-1	0.00	969.7	86.4
1025	J-338	770.0	Zone-1	0.00	969.7	86.4
1027	J-339	770.0	Zone-1	0.00	969.7	86.4
1029	J-340	770.0	Zone-1	0.00	969.7	86.4
1031	J-341	770.0	Zone-1	0.00	969.7	86.4
1033	J-342	770.0	Zone-1	0.00	969.7	86.4
1035	J-343	770.0	Zone-1	0.00	969.7	86.4
1037	J-344	775.0	Zone-1	0.00	969.7	84.2
1040	J-346	770.0	Zone-1	0.00	969.7	86.4
1043	J-347	770.0	Zone-1	0.00	969.7	86.4
1046	J-348	770.0	Zone-1	0.00	969.7	86.4
1049	J-349	770.0	Zone-1	0.00	969.7	86.4

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1052	J-350	770.0	Zone-1	0.00	969.7	86.4
1055	J-351	770.0	Zone-1	0.00	969.7	86.4
1058	J-352	770.0	<None>	0.00	969.7	86.4
1061	J-353	770.0	<None>	0.00	969.7	86.4
1064	J-354	770.0	<None>	0.00	969.7	86.4
1067	J-355	770.0	<None>	0.00	969.7	86.4

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
412	P-9	155	J-10	J-202	8.0	Ductile Iron	7.56	0.05	0.000
413	P-10	165	J-202	J-11	8.0	Ductile Iron	5.60	0.04	0.000
414	P-11	281	J-11	J-203	8.0	Ductile Iron	3.05	0.02	0.000
415	P-12	297	J-203	J-12	8.0	Ductile Iron	-0.31	0.00	0.000
416	P-13	382	J-12	J-11	8.0	Ductile Iron	-2.55	0.02	0.000
417	P-16	359	J-15	J-14	6.0	Ductile Iron	2.40	0.03	0.000
418	P-17	131	J-15	J-16	8.0	Ductile Iron	-19.83	0.13	0.000
419	P-18	298	J-16	J-45	8.0	Ductile Iron	80.89	0.52	0.000
420	P-19	396	J-45	J-50	8.0	Ductile Iron	58.06	0.37	0.000
421	P-20	801	J-50	J-49	8.0	Ductile Iron	21.30	0.14	0.000
422	P-22	883	J-47	J-46	8.0	Ductile Iron	21.48	0.14	0.000
423	P-23	288	J-47	J-48	8.0	Ductile Iron	14.02	0.09	0.000
424	P-25	486	J-24	J-17	6.0	Ductile Iron	-9.82	0.11	0.000
425	P-26	253	J-17	J-18	6.0	Ductile Iron	-11.22	0.13	0.000
426	P-27	650	J-18	J-19	6.0	Ductile Iron	-8.61	0.10	0.000
427	P-28	256	J-19	J-23	6.0	Ductile Iron	-11.69	0.13	0.000
428	P-29	476	J-23	J-28	6.0	Ductile Iron	-13.89	0.16	0.000
429	P-30	216	J-28	J-27	6.0	Ductile Iron	8.95	0.10	0.000
430	P-31	224	J-27	J-26	6.0	Ductile Iron	21.72	0.25	0.000
431	P-32	191	J-26	J-25	6.0	Ductile Iron	16.51	0.19	0.000
432	P-33	281	J-25	J-24	6.0	Ductile Iron	18.65	0.21	0.000
433	P-34	251	J-18	J-20	6.0	Ductile Iron	-8.32	0.09	0.000
434	P-35	326	J-20	J-25	6.0	Ductile Iron	4.38	0.05	0.000
435	P-36	190	J-20	J-21	6.0	Ductile Iron	-13.94	0.16	0.000
436	P-37	370	J-21	J-26	6.0	Ductile Iron	-3.78	0.04	0.000
437	P-38	231	J-21	J-22	6.0	Ductile Iron	-11.61	0.13	0.000
438	P-39	424	J-22	J-27	6.0	Ductile Iron	-13.10	0.15	0.000
439	P-40	224	J-22	J-23	6.0	Ductile Iron	-0.23	0.00	0.000
440	P-44	230	J-68	J-62	8.0	Ductile Iron	321.12	2.05	0.003
441	P-45	220	J-62	J-55	8.0	Ductile Iron	320.84	2.05	0.003
443	P-47	418	J-53	J-24	8.0	Ductile Iron	145.72	0.93	0.001
444	P-48	306	J-25	J-54	4.0	Ductile Iron	0.00	0.00	0.000
445	P-49	207	J-55	J-56	8.0	Ductile Iron	161.48	1.03	0.001
446	P-50	429	J-56	J-27	6.0	Ductile Iron	73.20	0.83	0.001
447	P-51	302	J-56	J-57	8.0	Ductile Iron	86.28	0.55	0.000
448	P-52	209	J-57	J-58	8.0	Ductile Iron	57.74	0.37	0.000
449	P-53	373	J-58	J-59	8.0	Ductile Iron	56.34	0.36	0.000
450	P-54	370	J-59	J-60	8.0	Ductile Iron	55.22	0.35	0.000
451	P-55	137	J-60	J-61	8.0	Ductile Iron	52.52	0.34	0.000
452	P-56	164	J-63	J-64	6.0	Ductile Iron	-2.24	0.03	0.000
453	P-57	311	J-57	J-64	8.0	Ductile Iron	26.49	0.17	0.000
454	P-58	341	J-64	J-69	6.0	Ductile Iron	-95.24	1.08	0.001
455	P-59	350	J-69	J-68	8.0	Ductile Iron	-328.88	2.10	0.003
456	P-60	391	J-69	J-76	8.0	Ductile Iron	230.00	1.47	0.001
457	P-61	351	J-76	J-70	8.0	Ductile Iron	11.99	0.08	0.000
458	P-62	209	J-70	J-65	8.0	Ductile Iron	-55.10	0.35	0.000
459	P-63	484	J-65	J-66	8.0	Ductile Iron	19.77	0.13	0.000

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
460	P-64	288	J-66	J-67	6.0	Ductile Iron	17.53	0.20	0.000
461	P-65	460	J-64	J-65	8.0	Ductile Iron	76.47	0.49	0.000
462	P-66	335	J-70	J-77	8.0	Ductile Iron	62.62	0.40	0.000
463	P-67	249	J-77	J-78	8.0	Ductile Iron	15.42	0.10	0.000
464	P-68	311	J-78	J-79	8.0	Ductile Iron	13.74	0.09	0.000
465	P-69	423	J-77	J-82	8.0	Ductile Iron	3.19	0.02	0.000
466	P-70	158	J-82	J-81	8.0	Ductile Iron	0.27	0.00	0.000
467	P-72	1,290	J-50	J-71	6.0	Ductile Iron	-19.79	0.22	0.000
470	P-77	283	J-75	J-76	6.0	Ductile Iron	-110.41	1.25	0.002
471	P-78	436	J-75	J-84	6.0	Ductile Iron	41.55	0.47	0.000
472	P-79	331	J-84	J-85	6.0	Ductile Iron	41.55	0.47	0.000
474	P-81	426	J-76	J-205	8.0	Ductile Iron	106.49	0.68	0.000
475	P-82	748	J-205	J-206	8.0	Ductile Iron	101.41	0.65	0.000
476	P-83	354	J-206	J-123	8.0	Ductile Iron	88.31	0.56	0.000
479	P-87	357	J-29	J-39	8.0	Ductile Iron	11.27	0.07	0.000
480	P-88	278	J-39	J-38	8.0	Ductile Iron	6.82	0.04	0.000
481	P-90	360	J-38	J-37	8.0	Ductile Iron	1.96	0.01	0.000
483	P-96	247	J-39	J-40	6.0	Ductile Iron	3.61	0.04	0.000
484	P-97	395	J-40	J-41	6.0	Ductile Iron	1.09	0.01	0.000
485	P-98	497	J-41	J-42	6.0	Ductile Iron	-3.67	0.04	0.000
486	P-99	240	J-42	J-43	6.0	Ductile Iron	-6.19	0.07	0.000
487	P-100	213	J-43	J-44	6.0	Ductile Iron	-6.19	0.07	0.000
488	P-101	217	J-44	J-67	6.0	Ductile Iron	-26.75	0.30	0.000
489	P-102	275	J-67	J-61	6.0	Ductile Iron	-9.22	0.10	0.000
490	P-103	113	J-61	J-29	6.0	Ductile Iron	43.30	0.49	0.000
491	P-104	224	J-44	J-79	6.0	Ductile Iron	20.56	0.23	0.000
492	P-105	64	J-79	J-80	6.0	Ductile Iron	32.90	0.37	0.000
493	P-106	394	J-80	J-81	6.0	Ductile Iron	-14.70	0.17	0.000
494	P-107	414	J-80	J-87	8.0	Ductile Iron	45.24	0.29	0.000
495	P-108	242	J-87	J-88	6.0	Ductile Iron	22.73	0.26	0.000
496	P-109	279	J-88	J-89	6.0	Ductile Iron	21.61	0.25	0.000
497	P-110	311	J-89	J-90	6.0	Ductile Iron	19.37	0.22	0.000
498	P-111	240	J-90	J-95	6.0	Ductile Iron	47.60	0.54	0.000
499	P-112	51	J-95	J-96	6.0	Ductile Iron	116.20	1.32	0.002
500	P-114	346	J-97	J-98	6.0	Ductile Iron	-0.20	0.00	0.000
501	P-115	296	J-98	J-99	8.0	Ductile Iron	5.60	0.04	0.000
502	P-116	396	J-99	J-100	6.0	Ductile Iron	5.60	0.06	0.000
503	P-117	247	J-100	J-101	6.0	Ductile Iron	5.60	0.06	0.000
504	P-118	321	J-101	J-102	6.0	Ductile Iron	2.52	0.03	0.000
506	P-122	291	J-87	J-91	8.0	Ductile Iron	78.89	0.50	0.000
507	P-123	345	J-91	J-90	8.0	Ductile Iron	29.35	0.19	0.000
508	P-124	86	J-91	J-92	8.0	Ductile Iron	49.54	0.32	0.000
509	P-125	275	J-92	J-93	8.0	Ductile Iron	71.68	0.46	0.000
510	P-126	284	J-93	J-95	8.0	Ductile Iron	71.68	0.46	0.000
511	P-127	428	J-92	J-114	8.0	Ductile Iron	-23.54	0.15	0.000
512	P-128	472	J-87	J-86	8.0	Ductile Iron	-57.23	0.37	0.000
513	P-129	501	J-86	J-81	8.0	Ductile Iron	16.94	0.11	0.000

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
514	P-130	146	J-86	J-113	8.0	Ductile Iron	-81.61	0.52	0.000
515	P-131	82	J-113	J-114	8.0	Ductile Iron	250.67	1.60	0.002
516	P-132	82	J-114	J-115	8.0	Ductile Iron	225.69	1.44	0.001
517	P-133	227	J-115	J-112	8.0	Ductile Iron	176.75	1.13	0.001
518	P-134	184	J-112	T-1	8.0	Ductile Iron	175.63	1.12	0.001
519	P-135	90	J-2	J-94	8.0	Ductile Iron	300.00	1.91	0.002
520	P-136	78	J-94	T-1	8.0	Ductile Iron	350.95	2.24	0.003
521	P-137	328	J-94	J-96	8.0	Ductile Iron	-50.95	0.33	0.000
522	P-138	234	J-96	J-106	6.0	Ductile Iron	-2.29	0.03	0.000
523	P-139	211	J-106	J-109	6.0	Ductile Iron	-3.13	0.04	0.000
524	P-140	214	J-109	J-110	6.0	Ductile Iron	-3.13	0.04	0.000
525	P-141	190	J-110	J-111	6.0	Ductile Iron	-4.53	0.05	0.000
526	P-142	231	J-111	J-115	6.0	Ductile Iron	-47.25	0.54	0.000
527	P-143	380	J-111	J-116	6.0	Ductile Iron	41.33	0.47	0.000
528	P-144	270	J-116	J-108	6.0	Ductile Iron	6.90	0.08	0.000
529	P-145	789	J-108	J-107	6.0	Ductile Iron	-22.00	0.25	0.000
536	P-152	258	J-135	J-134	8.0	Ductile Iron	-85.26	0.54	0.000
537	P-153	356	J-134	J-126	8.0	Ductile Iron	-95.74	0.61	0.000
538	P-154	360	J-126	J-123	8.0	Ductile Iron	-22.98	0.15	0.000
539	P-155	306	J-133	J-134	6.0	Ductile Iron	-5.60	0.06	0.000
540	P-156	128	J-113	J-1	8.0	Ductile Iron	-550.00	3.51	0.007
541	P-157	232	J-113	J-124	8.0	Ductile Iron	217.72	1.39	0.001
542	P-158	368	J-124	J-125	8.0	Ductile Iron	90.77	0.58	0.000
543	P-159	326	J-125	J-126	8.0	Ductile Iron	83.57	0.53	0.000
544	P-160	28	J-124	J-208	8.0	Ductile Iron	126.11	0.80	0.000
545	P-162	318	J-208	J-123	8.0	Ductile Iron	124.15	0.79	0.000
546	P-163	257	J-123	J-127	8.0	Ductile Iron	185.88	1.19	0.001
547	P-164	307	J-127	J-128	8.0	Ductile Iron	104.76	0.67	0.000
548	P-165	372	J-128	J-129	8.0	Ductile Iron	103.56	0.66	0.000
549	P-166	304	J-129	J-130	4.0	Ductile Iron	-21.27	0.54	0.001
550	P-167	380	J-130	J-127	8.0	Ductile Iron	-57.70	0.37	0.000
551	P-170	797	J-130	J-141	8.0	Ductile Iron	32.74	0.21	0.000
552	P-171	215	J-141	J-149	8.0	Ductile Iron	123.86	0.79	0.000
553	P-172	560	J-149	J-150	8.0	Ductile Iron	120.78	0.77	0.000
554	P-173	215	J-135	J-142	8.0	Ductile Iron	106.53	0.68	0.000
555	P-174	162	J-142	J-143	8.0	Ductile Iron	2.89	0.02	0.000
556	P-175	837	J-143	J-144	6.0	Ductile Iron	-29.77	0.34	0.000
557	P-176	525	J-144	J-145	6.0	Ductile Iron	1.68	0.02	0.000
558	P-177	371	J-144	J-117	6.0	Ductile Iron	-34.25	0.39	0.000
559	P-178	487	J-117	J-108	6.0	Ductile Iron	-23.62	0.27	0.000
560	P-179	525	J-117	J-118	6.0	Ductile Iron	8.68	0.10	0.000
562	P-182	291	J-120	J-121	6.0	Ductile Iron	3.36	0.04	0.000
563	P-183	261	J-121	J-122	6.0	Ductile Iron	1.96	0.02	0.000
564	P-184	185	J-143	J-146	8.0	Ductile Iron	31.54	0.20	0.000
565	P-185	91	J-146	J-147	10.0	Ductile Iron	-97.49	0.40	0.000
566	P-186	497	J-147	J-148	10.0	Ductile Iron	-97.49	0.40	0.000
567	P-187	381	J-148	T-2	10.0	Ductile Iron	-97.49	0.40	0.000

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
568	P-190	643	J-192	J-199	12.0	Ductile Iron	169.51	0.48	0.000
569	P-191	416	J-199	J-200	12.0	Ductile Iron	166.51	0.47	0.000
570	P-192	587	J-200	J-201	12.0	Ductile Iron	67.49	0.19	0.000
571	P-193	64	J-201	J-191	6.0	Ductile Iron	67.49	0.77	0.001
573	P-195	70	J-189	J-200	6.0	Ductile Iron	-99.02	1.12	0.001
574	P-197	303	J-197	J-198	4.0	Ductile Iron	1.40	0.04	0.000
575	P-199	230	J-164	J-162	8.0	Ductile Iron	99.40	0.63	0.000
577	P-201	157	J-162	J-161	8.0	Ductile Iron	98.00	0.63	0.000
578	P-202	484	J-161	J-160	8.0	Ductile Iron	112.72	0.72	0.000
579	P-203	130	J-160	J-158	8.0	Ductile Iron	227.62	1.45	0.001
580	P-204	381	J-150	J-160	8.0	Ductile Iron	116.30	0.74	0.000
581	P-205	751	J-158	J-159	4.0	Ductile Iron	-4.33	0.11	0.000
582	P-206	313	J-161	J-166	6.0	Ductile Iron	-15.56	0.18	0.000
583	P-207	354	J-166	J-167	6.0	Ductile Iron	28.64	0.33	0.000
584	P-208	341	J-167	J-174	6.0	Ductile Iron	-5.38	0.06	0.000
585	P-209	297	J-167	J-168	6.0	Ductile Iron	32.07	0.36	0.000
586	P-210	522	J-168	J-176	6.0	Ductile Iron	-20.98	0.24	0.000
587	P-211	148	J-168	J-169	6.0	Ductile Iron	51.37	0.58	0.000
588	P-212	505	J-169	J-177	6.0	Ductile Iron	-35.11	0.40	0.000
589	P-213	176	J-169	J-159	6.0	Ductile Iron	85.36	0.97	0.001
590	P-214	69	J-159	J-170	6.0	Ductile Iron	80.47	0.91	0.001
591	P-215	234	J-170	J-171	8.0	Ductile Iron	45.62	0.29	0.000
592	P-216	507	J-171	J-172	8.0	Ductile Iron	1.20	0.01	0.000
593	P-218	478	J-170	J-157	8.0	Ductile Iron	34.85	0.22	0.000
594	P-220	155	J-152	J-151	6.0	Ductile Iron	0.00	0.00	0.000
595	P-222	255	J-153	J-154	8.0	Ductile Iron	-44.70	0.29	0.000
596	P-223	398	J-154	J-155	8.0	Ductile Iron	-44.70	0.29	0.000
597	P-224	384	J-155	J-156	8.0	Ductile Iron	44.14	0.28	0.000
599	P-226	670	J-165	J-174	6.0	Ductile Iron	36.43	0.41	0.000
600	P-227	231	J-174	J-175	6.0	Ductile Iron	-12.33	0.14	0.000
601	P-228	415	J-165	J-186	10.0	Ductile Iron	-64.85	0.26	0.000
602	P-229	737	J-186	J-175	6.0	Ductile Iron	36.09	0.41	0.000
603	P-230	277	J-175	J-176	6.0	Ductile Iron	19.56	0.22	0.000
604	P-231	288	J-176	J-177	6.0	Ductile Iron	-3.66	0.04	0.000
605	P-232	297	J-177	J-178	6.0	Ductile Iron	-41.85	0.47	0.000
606	P-233	933	J-178	J-179	6.0	Ductile Iron	-24.71	0.28	0.000
607	P-234	272	J-179	J-188	6.0	Ductile Iron	-23.28	0.26	0.000
608	P-235	192	J-188	J-187	6.0	Ductile Iron	-3.29	0.04	0.000
609	P-236	312	J-187	J-186	10.0	Ductile Iron	103.18	0.42	0.000
610	P-237	333	J-187	J-189	10.0	Ductile Iron	-109.27	0.45	0.000
611	P-239	244	J-189	J-190	6.0	Ductile Iron	15.20	0.17	0.000
612	P-240	407	J-190	J-188	6.0	Ductile Iron	19.99	0.23	0.000
613	P-241	272	J-190	J-185	6.0	Ductile Iron	34.73	0.39	0.000
614	P-242	415	J-185	J-179	6.0	Ductile Iron	2.83	0.03	0.000
615	P-243	314	J-185	J-184	6.0	Ductile Iron	30.78	0.35	0.000
616	P-244	193	J-184	J-183	6.0	Ductile Iron	14.31	0.16	0.000
617	P-245	625	J-183	J-180	6.0	Ductile Iron	12.63	0.14	0.000

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
618	P-246	480	J-184	J-181	6.0	Ductile Iron	13.19	0.15	0.000
620	P-248	378	J-181	J-180	6.0	Ductile Iron	12.07	0.14	0.000
621	P-249	308	J-180	J-178	6.0	Ductile Iron	20.50	0.23	0.000
622	P-253	160	J-48	J-211	6.0	Ductile Iron	12.82	0.15	0.000
623	P-254	394	J-64	J-70	6.0	Ductile Iron	40.30	0.46	0.000
624	P-255	363	J-172	J-173	8.0	Ductile Iron	0.00	0.00	0.000
625	P-256	319	J-212	J-213	6.0	Ductile Iron	9.22	0.10	0.000
626	P-257	446	J-213	J-214	6.0	Ductile Iron	5.62	0.06	0.000
627	P-258	336	J-214	J-215	8.0	Ductile Iron	-20.28	0.13	0.000
628	P-259	337	J-215	J-46	8.0	Ductile Iron	-21.48	0.14	0.000
629	P-260	606	J-212	J-211	6.0	Ductile Iron	-9.22	0.10	0.000
630	P-261	217	J-49	J-216	8.0	Ductile Iron	16.02	0.10	0.000
631	P-262	403	J-216	J-217	8.0	Ductile Iron	7.20	0.05	0.000
632	P-263	289	J-217	J-218	8.0	Ductile Iron	7.20	0.05	0.000
633	P-264	264	J-218	J-219	8.0	Ductile Iron	4.80	0.03	0.000
634	P-265	505	J-219	J-220	8.0	Ductile Iron	4.80	0.03	0.000
635	P-266	519	J-216	J-47	8.0	Ductile Iron	8.82	0.06	0.000
636	P-267	1,780	J-4	J-222	10.0	Ductile Iron	-44.14	0.18	0.000
637	P-268	220	J-222	J-5	10.0	Ductile Iron	-44.14	0.18	0.000
639	P-270	120	J-7	J-223	10.0	Ductile Iron	3.08	0.01	0.000
640	P-271	230	J-6	J-223	6.0	Ductile Iron	-3.08	0.03	0.000
641	P-272	1,307	J-5	J-224	10.0	Ductile Iron	-50.24	0.21	0.000
642	P-274	990	J-224	J-225	8.0	Ductile Iron	3.24	0.02	0.000
643	P-273	708	J-224	J-226	10.0	Ductile Iron	-68.61	0.28	0.000
644	P-275	167	J-226	J-7	10.0	Ductile Iron	-70.57	0.29	0.000
645	P-276	410	J-226	J-227	8.0	Ductile Iron	1.96	0.01	0.000
646	P-277	580	J-227	J-228	8.0	Ductile Iron	1.12	0.01	0.000
647	P-278	27	J-16	J-229	8.0	Ductile Iron	-100.72	0.64	0.000
650	P-282	656	J-230	J-10	10.0	Ductile Iron	82.61	0.34	0.000
652	P-284	23	J-230	J-231	8.0	Ductile Iron	-17.03	0.11	0.000
653	P-285	121	J-231	J-15	8.0	Ductile Iron	-17.43	0.11	0.000
654	P-286	790	J-60	J-232	2.0	Ductile Iron	1.02	0.10	0.000
655	P-288	123	J-232	J-38	8.0	Ductile Iron	-0.94	0.01	0.000
656	P-295	227	J-117	J-237	6.0	Ductile Iron	-20.43	0.23	0.000
657	P-296	385	J-237	J-238	6.0	Ductile Iron	-26.87	0.30	0.000
658	P-297	259	J-238	J-239	6.0	Ductile Iron	-28.83	0.33	0.000
659	P-298	192	J-239	J-240	6.0	Ductile Iron	1.40	0.02	0.000
660	P-299	152	J-239	J-241	6.0	Ductile Iron	-31.07	0.35	0.000
661	P-300	140	J-237	J-242	6.0	Ductile Iron	3.92	0.04	0.000
662	P-301	355	J-242	J-243	6.0	Ductile Iron	2.24	0.03	0.000
665	P-304	332	J-245	J-246	8.0	Ductile Iron	1.68	0.01	0.000
666	P-305	424	J-246	J-247	8.0	Ductile Iron	1.12	0.01	0.000
670	P-309	100	J-250	J-120	6.0	Ductile Iron	4.76	0.05	0.000
671	P-310	128	J-122	J-251	6.0	Ductile Iron	0.84	0.01	0.000
673	P-313	143	J-121	J-254	6.0	Ductile Iron	1.40	0.02	0.000
674	P-314	158	J-145	J-255	8.0	Ductile Iron	0.00	0.00	0.000
675	P-317	411	J-146	J-256	8.0	Ductile Iron	128.19	0.82	0.000

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
676	P-318	150	J-256	J-164	8.0	Ductile Iron	124.27	0.79	0.000
677	P-319	204	J-197	J-256	4.0	Ductile Iron	-2.80	0.07	0.000
678	P-320	257	J-142	J-141	8.0	Ductile Iron	101.12	0.65	0.000
681	P-323	174	J-153	J-259	8.0	Ductile Iron	0.56	0.00	0.000
682	P-324	341	J-157	J-260	8.0	Ductile Iron	-9.29	0.06	0.000
683	P-325	490	J-260	J-152	6.0	Ductile Iron	44.14	0.50	0.000
685	P-327	44	J-260	J-158	8.0	Ductile Iron	-230.55	1.47	0.001
689	P-188	441	J-192	T-2	12.0	Ductile Iron	-170.91	0.48	0.000
690	P-372	337	J-229	J-284	8.0	Ductile Iron	-167.14	1.07	0.001
691	P-373	313	J-284	J-24	8.0	Ductile Iron	-172.78	1.10	0.001
694	P-41	200	J-51	J-53	8.0	Ductile Iron	-1.20	0.01	0.000
695	P-377	78	J-3	J-68	8.0	Ductile Iron	650.00	4.15	0.010
702	P-376	550	J-297	J-279	12.0	Ductile Iron	64.74	0.18	0.000
703	P-378	375	J-241	J-279	12.0	Ductile Iron	-58.94	0.17	0.000
704	P-379	110	J-279	PMP-2	12.0	Ductile Iron	5.80	0.02	0.000
709	P-396	1,299	J-269	J-281	12.0	Ductile Iron	29.76	0.08	0.000
712	P-350	70	J-272	J-5	12.0	Ductile Iron	-5.82	0.02	0.000
717	P-383	1,746	J-214	J-269	12.0	Ductile Iron	25.90	0.07	0.000
724	P-395	508	J-285	J-282	8.0	Ductile Iron	3.81	0.02	0.000
725	P-397	1,472	J-285	J-286	8.0	Ductile Iron	-3.81	0.02	0.000
726	P-398	634	J-286	J-275	8.0	Ductile Iron	-3.81	0.02	0.000
727	P-399	1,161	J-275	J-287	12.0	Ductile Iron	-21.92	0.06	0.000
732	P-404	92	T-4	PMP-3	12.0	Ductile Iron	0.00	0.00	0.000
733	P-405	151	PMP-3	J-280	12.0	Ductile Iron	0.00	0.00	0.000
737	P-409	325	J-164	J-290	10.0	Ductile Iron	23.18	0.09	0.000
738	P-410	335	J-290	J-165	10.0	Ductile Iron	-25.90	0.11	0.000
739	P-411	285	J-290	J-166	6.0	Ductile Iron	46.08	0.52	0.000
742	P-412	427	J-107	J-241	8.0	Ductile Iron	-26.48	0.17	0.000
745	P-413	1,247	J-116	J-135	6.0	Ductile Iron	28.83	0.33	0.000
748	P-414	219	J-118	J-250	6.0	Ductile Iron	5.32	0.06	0.000
749	P-415	318	J-245	J-118	6.0	Ductile Iron	-1.68	0.02	0.000
750	P-416	406	J-71	J-75	6.0	Ductile Iron	-65.50	0.74	0.001
769	P-280	252	J-229	J-230	10.0	Ductile Iron	66.15	0.27	0.000
770	P-418	184	J-255	T-2	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)
771	P-419	1,219	J-251	J-255	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
772	P-420	851	J-181	J-173	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
774	P-421	251	J-207	J-291	6.0	Ductile Iron	-15.32	0.17	0.000
775	P-422	255	J-291	J-29	6.0	Ductile Iron	-32.03	0.36	0.000
777	P-423	639	J-291	J-292	8.0	Ductile Iron	13.91	0.09	0.000
779	P-424	245	J-292	J-293	8.0	Ductile Iron	13.91	0.09	0.000
780	P-425	639	J-293	J-207	8.0	Ductile Iron	12.79	0.08	0.000
788	P-431	474	J-224	J-8	12.0	PVC	15.13	0.04	0.000
789	P-432	151	J-259	J-151	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
801	P-436	282	J-101	J-297	6.0	Ductile Iron	2.24	0.03	0.000
802	P-437	282	J-297	J-105	6.0	Ductile Iron	1.68	0.02	0.000
807	P-440	193	J-298	J-98	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
808	P-441	413	J-297	J-298	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
814	P-442	504	J-96	J-297	12.0	Ductile Iron	64.74	0.18	0.000
817	P-443	300	J-28	J-299	6.0	Ductile Iron	-27.43	0.31	0.000
818	P-444	242	J-299	J-207	6.0	Ductile Iron	-27.83	0.32	0.000
820	P-445	239	J-299	J-300	8.0	Ductile Iron	0.40	0.00	0.000
823	P-447	60	PMP-2	J-301	12.0	Ductile Iron	5.80	0.02	0.000
839	P-449	715	J-38	J-302	6.0	Ductile Iron	3.08	0.03	0.000
841	P-450	290	J-302	J-303	10.0	Ductile Iron	2.52	0.01	0.000
843	P-451	276	J-155	J-304	8.0	Ductile Iron	-88.84	0.57	0.000
844	P-452	118	J-304	J-260	8.0	Ductile Iron	-177.12	1.13	0.001
846	P-453	800	J-304	J-305	6.0	Ductile Iron	44.14	0.50	0.000
852	P-456	339	J-282	J-308	6.0	Ductile Iron	2.24	0.03	0.000
855	P-458	520	J-309	J-282	12.0	Ductile Iron	3.55	0.01	0.000
857	P-459	732	J-275	J-310	12.0	Ductile Iron	18.11	0.05	0.000
858	P-460	381	J-310	J-309	12.0	Ductile Iron	11.67	0.03	0.000
860	P-461	353	J-274	J-311	12.0	Ductile Iron	0.00	0.00	0.000
861	P-462	327	J-311	J-275	12.0	Ductile Iron	0.00	0.00	0.000
863	P-463	289	J-309	J-312	6.0	Ductile Iron	5.04	0.06	0.000
865	P-464	389	J-310	J-313	6.0	Ductile Iron	1.96	0.02	0.000
867	P-465	424	J-311	J-314	6.0	Ductile Iron	0.00	0.00	0.000
878	P-466	165	J-272	J-315	12.0	Ductile Iron	5.82	0.02	0.000
879	P-467	1,354	J-315	J-269	12.0	Ductile Iron	5.82	0.02	0.000
880	P-468	156	J-280	J-315	12.0	Ductile Iron	0.00	0.00	0.000
882	P-469	155	J-55	J-316	8.0	Ductile Iron	153.96	0.98	0.001
883	P-470	280	J-316	J-53	8.0	Ductile Iron	153.96	0.98	0.001
884	P-471	113	J-54	J-316	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
907	P-472	119	J-272	T-4	12.0	Ductile Iron	0.00	0.00	0.000
916	P-473	266	J-47	J-317	12.0	Ductile Iron	-30.28	0.09	0.000
918	P-474	285	J-317	J-318	12.0	Ductile Iron	-30.28	0.09	0.000
920	P-475	370	J-318	J-319	12.0	Ductile Iron	-30.28	0.09	0.000
922	P-476	213	J-13	J-320	12.0	PVC	8.65	0.02	0.000
923	P-477	677	J-320	J-45	6.0	Ductile Iron	-21.63	0.25	0.000
924	P-478	143	J-319	J-320	12.0	Ductile Iron	-30.28	0.09	0.000
926	P-479	349	J-319	J-321	8.0	Ductile Iron	0.00	0.00	0.000
939	P-480	1,012	J-303	J-322	10.0	Ductile Iron	0.00	0.00	0.000
943	P-481	471	J-305	J-156	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
944	P-482	199	J-305	J-170	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
946	P-483	60	J-301	PRV-1	12.0	Ductile Iron	5.80	0.02	0.000
947	P-484	305	PRV-1	J-98	12.0	Ductile Iron	5.80	0.02	0.000
955	P-486	61	J-322	H-2	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
957	P-488	150	J-294	J-222	10.0	Ductile Iron	0.00	0.00	0.000
959	P-489	70	J-65	H-3	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
961	P-490	54	H-4	J-212	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
963	P-491	52	J-282	H-5	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
965	P-492	45	J-15	H-6	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
967	P-493	44	H-7	J-121	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
969	P-494	46	J-239	H-8	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
971	P-495	60	H-9	J-170	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2021 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
973	P-496	181	J-97	H-10	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
975	P-497	48	J-220	H-11	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
980	P-498	445	J-85	J-323	12.0	Ductile Iron	-7.39	0.02	0.000
981	P-499	397	J-323	J-127	8.0	Ductile Iron	-7.39	0.05	0.000
986	P-502	436	J-7	J-10	10.0	Ductile Iron	-73.93	0.30	0.000
991	P-504	366	J-191	J-325	6.0	Ductile Iron	12.94	0.15	0.000
992	P-505	243	J-325	J-189	6.0	Ductile Iron	26.86	0.30	0.000
998	P-509	340	J-325	J-327	8.0	Ductile Iron	-13.91	0.09	0.000
999	P-510	253	J-327	J-326	8.0	Ductile Iron	40.63	0.26	0.000
1000	P-511	114	J-327	J-191	8.0	Ductile Iron	-54.54	0.35	0.000
1003	P-512	351	J-326	J-329	8.0	Ductile Iron	40.63	0.26	0.000
1004	P-513	286	J-329	J-190	8.0	Ductile Iron	40.63	0.26	0.000
1005	P-514	176	J-324	J-10	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
1007	P-6	335	J-8	J-330	12.0	PVC	9.49	0.03	0.000
1008	P-5	378	J-330	J-13	12.0	PVC	9.49	0.03	0.000
1010	P-503	418	J-8	J-331	8.0	PVC	0.00	0.00	0.000
1011	P-532	180	J-331	J-324	8.0	PVC	0.00	0.00	0.000
1017	P-400	533	J-287	J-334	12.0	Ductile Iron	-29.76	0.08	0.000
1018	P-531	264	J-334	J-278	12.0	Ductile Iron	-29.76	0.08	0.000
1020	P-515	360	J-334	J-335	12.0	PVC	0.00	0.00	0.000
1022	P-516	268	J-335	J-336	12.0	PVC	0.00	0.00	0.000
1026	P-518	297	J-337	J-338	12.0	PVC	0.00	0.00	0.000
1028	P-519	298	J-338	J-339	12.0	PVC	0.00	0.00	0.000
1030	P-520	306	J-339	J-340	12.0	PVC	0.00	0.00	0.000
1034	P-522	315	J-341	J-342	12.0	PVC	0.00	0.00	0.000
1036	P-523	154	J-342	J-343	12.0	PVC	0.00	0.00	0.000
1038	P-524	132	J-343	J-344	12.0	PVC	0.00	0.00	0.000
1041	P-387	907	J-281	J-346	12.0	Ductile Iron	29.76	0.08	0.000
1044	P-525	288	J-346	J-347	12.0	Ductile Iron	29.76	0.08	0.000
1047	P-526	300	J-347	J-348	12.0	Ductile Iron	29.76	0.08	0.000
1050	P-527	302	J-348	J-349	12.0	Ductile Iron	29.76	0.08	0.000
1053	P-528	259	J-349	J-350	12.0	Ductile Iron	29.76	0.08	0.000
1056	P-529	270	J-350	J-351	12.0	Ductile Iron	29.76	0.08	0.000
1057	P-530	354	J-351	J-278	12.0	Ductile Iron	29.76	0.08	0.000
1059	P-517	305	J-336	J-352	12.0	PVC	0.00	0.00	0.000
1062	P-533	295	J-352	J-353	12.0	PVC	0.00	0.00	0.000
1065	P-534	305	J-353	J-354	12.0	PVC	0.00	0.00	0.000
1066	P-535	294	J-354	J-337	12.0	PVC	0.00	0.00	0.000
1068	P-521	295	J-340	J-355	12.0	PVC	0.00	0.00	0.000
1069	P-536	285	J-355	J-341	12.0	PVC	0.00	0.00	0.000

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
945	PRV-1	895.3	12.0	1,010.9	50.0	5.80	1,096.6	1,010.9	85.70

Active Scenario: 2021 PHD

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Design) (gpm)	Flow (Total) (gpm)	Pump Head (ft)
407	PMP-2	895.0	ALTEEJAN BOOSTER PUMP pk hr	On	970.2	1,096.6	339.00	5.80	126.39
408	PMP-3	820.0	Cutler Way Booster Pump Future	Off	849.5	969.7	3,000.00	0.00	0.00

Active Scenario: 2021 PHD

ID	Label	Zone	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Initial) (ft)	Elevation (Maximum) (ft)	Diameter (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
402	T-1	Zone-1	873.9	950.5	970.0	976.9	22.00	-526.58	970.0
403	T-2	Zone-1	868.6	922.6	970.0	972.6	35.83	268.39	970.0
405	T-4	Zone-1	821.0	821.0	849.5	850.0	60.00	0.00	849.5

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
H-2	Zone-1	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-3	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-4	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-5	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-6	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-7	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-8	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-9	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-10	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
H-11	<None>	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
J-1	Zone-1	5	True	500.00	4,641.96	-50.00	4,091.96	20.0	20.0	20.0
J-2	Zone-1	19	True	500.00	4,645.51	200.00	4,345.51	20.0	20.0	20.0
J-4	Zone-1	4	True	500.00	3,089.69	532.33	3,122.02	20.0	20.0	20.0
J-5	Zone-1	10	True	500.00	7,095.80	500.21	7,096.00	20.0	39.2	20.0
J-6	Zone-1	5	True	500.00	2,226.75	502.05	2,228.80	20.0	20.0	20.0
J-7	Zone-1	8	True	500.00	5,972.98	500.21	5,973.18	20.0	20.9	20.0
J-8	Zone-1	26	True	500.00	5,779.90	504.13	5,784.03	20.0	43.7	20.0
J-10	Zone-1	25	True	500.00	5,913.11	500.82	5,913.93	20.0	22.0	20.0
J-11	Zone-1	24	True	500.00	3,634.05	500.00	3,634.05	20.0	20.7	20.0
J-12	Zone-1	6	True	500.00	3,213.04	501.64	3,214.68	20.0	20.0	20.0
J-13	Zone-1	25	True	500.00	5,513.45	501.88	5,515.33	20.0	45.2	20.0
J-14	Zone-1	5	True	500.00	1,873.51	504.53	1,878.04	20.0	20.0	20.0
J-15	Zone-1	6	True	500.00	5,924.07	500.00	5,924.07	20.0	20.0	20.0
J-16	Zone-1	6	True	500.00	6,401.22	501.51	6,402.73	20.0	20.0	20.0
J-17	Zone-1	12	True	500.00	2,656.49	501.03	2,657.51	20.0	20.0	20.0
J-18	Zone-1	5	True	500.00	3,008.20	503.78	3,011.98	20.0	20.0	20.0
J-19	Zone-1	5	True	500.00	2,133.74	502.26	2,135.99	20.0	20.0	20.0
J-20	Zone-1	5	True	500.00	2,972.67	500.91	2,973.58	20.0	20.0	20.0
J-21	Zone-1	5	True	500.00	2,942.89	501.05	2,943.94	20.0	20.0	20.0
J-22	Zone-1	11	True	500.00	2,834.59	501.26	2,835.85	20.0	20.0	20.0
J-23	Zone-1	12	True	500.00	2,576.44	501.44	2,577.88	20.0	20.0	20.0
J-24	Zone-1	6	True	500.00	5,200.71	501.03	5,201.74	20.0	20.0	20.0
J-25	Zone-1	6	True	500.00	3,418.41	501.44	3,419.85	20.0	20.0	20.0
J-26	Zone-1	5	True	500.00	3,273.22	501.05	3,274.27	20.0	20.0	20.0
J-27	Zone-1	10	True	500.00	3,548.76	534.46	3,583.22	20.0	20.0	20.0
J-28	Zone-1	5	True	500.00	2,985.37	503.02	2,988.39	20.0	20.0	20.0
J-29	Zone-1	8	True	500.00	2,394.93	500.00	2,394.93	20.0	28.1	20.0
J-37	Zone-1	4	True	500.00	1,351.35	501.44	1,352.79	20.0	20.0	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-38	Zone-1	7	True	500.00	1,612.48	500.62	1,613.10	20.0	20.9	20.0
J-39	Zone-1	8	True	500.00	1,950.17	500.62	1,950.79	20.0	26.5	20.0
J-40	Zone-1	5	True	500.00	1,674.00	501.85	1,675.85	20.0	20.0	20.0
J-41	Zone-1	5	True	500.00	1,443.00	503.28	1,446.28	20.0	20.0	20.0
J-42	Zone-1	5	True	500.00	1,579.66	501.64	1,581.30	20.0	20.0	20.0
J-43	Zone-1	23	True	500.00	2,024.13	500.00	2,024.13	20.0	24.7	20.0
J-44	Zone-1	7	True	500.00	3,263.93	500.00	3,263.93	20.0	21.2	20.0
J-45	Zone-1	6	True	500.00	5,881.96	500.88	5,882.84	20.0	20.0	20.0
J-46	Zone-1	6	True	500.00	5,621.47	501.51	5,622.98	20.0	20.0	20.0
J-47	Zone-1	10	True	500.00	5,030.46	513.54	5,044.00	20.0	62.5	20.0
J-48	Zone-1	8	True	500.00	5,179.51	500.88	5,180.39	20.0	28.7	20.0
J-49	Zone-1	6	True	500.00	5,178.06	503.52	5,181.57	20.0	20.0	20.0
J-50	Zone-1	6	True	500.00	5,302.80	533.76	5,336.57	20.0	20.0	20.0
J-51	Zone-1	5	True	500.00	3,606.26	500.88	3,607.13	20.0	20.0	20.0
J-53	Zone-1	8	True	500.00	4,895.60	504.60	4,900.20	20.0	21.3	20.0
J-54	Zone-1	3	True	500.00	672.22	500.00	672.22	20.0	20.0	20.0
J-55	Zone-1	25	True	500.00	5,446.83	503.75	5,450.58	20.0	27.9	20.0
J-56	Zone-1	25	True	500.00	5,233.58	501.46	5,235.04	20.0	29.1	20.0
J-57	Zone-1	9	True	500.00	5,047.90	501.49	5,049.40	20.0	31.7	20.0
J-58	Zone-1	9	True	500.00	4,466.45	501.03	4,467.47	20.0	25.8	20.0
J-59	Zone-1	8	True	500.00	3,781.52	500.82	3,782.34	20.0	23.4	20.0
J-60	Zone-1	20	True	500.00	3,288.66	501.23	3,289.90	20.0	24.3	20.0
J-61	Zone-1	8	True	500.00	3,131.23	500.00	3,131.23	20.0	25.4	20.0
J-62	Zone-1	6	True	500.00	5,325.25	500.21	5,325.46	20.0	20.0	20.0
J-63	Zone-1	5	True	500.00	2,323.35	501.64	2,324.99	20.0	20.0	20.0
J-64	Zone-1	9	True	500.00	5,467.50	501.79	5,469.29	20.0	27.0	20.0
J-65	Zone-1	25	True	500.00	5,243.72	501.17	5,244.89	20.0	27.0	20.0
J-66	Zone-1	16	True	500.00	3,297.80	501.44	3,299.23	20.0	20.0	20.0
J-67	Zone-1	16	True	500.00	3,139.31	500.00	3,139.31	20.0	20.0	20.0
J-68	Zone-1	25	True	500.00	5,416.46	500.00	5,416.46	20.0	21.0	20.0
J-69	Zone-1	6	True	500.00	5,885.23	502.87	5,888.10	20.0	20.0	20.0
J-70	Zone-1	8	True	500.00	5,971.04	532.58	6,003.63	20.0	27.8	20.0
J-71	Zone-1	17	True	500.00	2,458.53	531.83	2,490.36	20.0	20.0	20.0
J-75	Zone-1	5	True	500.00	3,754.23	529.88	3,784.11	20.0	20.0	20.0
J-76	Zone-1	8	True	500.00	6,552.43	502.21	6,554.65	20.0	24.4	20.0
J-77	Zone-1	5	True	500.00	6,267.13	532.23	6,299.36	20.0	20.0	20.0
J-78	Zone-1	5	True	500.00	5,226.09	501.23	5,227.32	20.0	20.0	20.0
J-79	Zone-1	5	True	500.00	5,191.01	501.03	5,192.03	20.0	20.0	20.0
J-80	Zone-1	5	True	500.00	5,756.44	501.73	5,758.17	20.0	20.0	20.0
J-81	Zone-1	5	True	500.00	5,407.50	501.85	5,409.34	20.0	20.0	20.0
J-82	Zone-1	5	True	500.00	5,253.33	501.93	5,255.26	20.0	20.0	20.0
J-84	Zone-1	18	True	500.00	2,847.12	500.00	2,847.12	20.0	20.0	20.0
J-85	Zone-1	12	True	500.00	3,849.94	535.84	3,885.78	20.0	20.0	20.0
J-86	Zone-1	5	True	500.00	5,940.81	504.89	5,945.70	20.0	20.0	20.0
J-87	Zone-1	7	True	500.00	6,075.80	500.62	6,076.41	20.0	25.5	20.0
J-88	Zone-1	5	True	500.00	2,447.57	500.82	2,448.39	20.0	20.0	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-89	Zone-1	4	True	500.00	1,970.55	501.64	1,972.19	20.0	20.0	20.0
J-90	Zone-1	14	True	500.00	3,973.20	500.82	3,974.02	20.0	20.0	20.0
J-91	Zone-1	6	True	500.00	6,137.81	500.00	6,137.81	20.0	20.1	20.0
J-92	Zone-1	5	True	500.00	6,008.38	501.03	6,009.41	20.0	20.0	20.0
J-93	Zone-1	4	True	500.00	4,269.06	500.00	4,269.06	20.0	20.0	20.0
J-94	Zone-1	7	True	500.00	8,160.96	500.00	8,160.96	20.0	20.8	20.0
J-95	Zone-1	12	True	500.00	4,528.28	502.26	4,530.54	20.0	20.0	20.0
J-96	Zone-1	8	True	500.00	3,701.86	501.85	3,703.71	20.0	28.3	20.0
J-97	Zone-2	3	True	500.00	1,464.16	500.15	1,464.31	20.0	20.0	20.0
J-98	Zone-2	24	True	500.00	2,557.38	505.28	2,562.67	20.0	21.7	20.0
J-99	Zone-2	19	True	500.00	2,307.96	500.00	2,307.96	20.0	22.6	20.0
J-100	Zone-2	20	True	500.00	1,151.54	500.00	1,151.54	20.0	20.2	20.0
J-101	Zone-2	3	True	500.00	918.10	505.81	923.91	20.0	20.0	20.0
J-102	Zone-2	3	True	500.00	753.82	501.85	755.66	20.0	20.0	20.0
J-105	Zone-2	3	True	500.00	734.84	501.23	736.07	20.0	20.0	20.0
J-106	Zone-1	4	True	500.00	2,209.95	500.62	2,210.56	20.0	20.0	20.0
J-107	Zone-1	4	True	500.00	2,500.12	503.08	2,503.19	20.0	20.0	20.0
J-108	Zone-1	4	True	500.00	3,135.93	503.66	3,139.60	20.0	20.0	20.0
J-109	Zone-1	4	True	500.00	1,968.94	500.00	1,968.94	20.0	20.0	20.0
J-110	Zone-1	4	True	500.00	2,103.13	501.03	2,104.15	20.0	20.0	20.0
J-111	Zone-1	12	True	500.00	3,153.38	501.03	3,154.41	20.0	20.0	20.0
J-112	Zone-1	5	True	500.00	6,496.57	500.82	6,497.39	20.0	20.0	20.0
J-113	Zone-1	5	True	500.00	7,248.68	501.81	7,250.49	20.0	20.0	20.0
J-114	Zone-1	5	True	500.00	7,379.04	500.91	7,379.95	20.0	20.0	20.0
J-115	Zone-1	5	True	500.00	7,008.77	501.23	7,010.00	20.0	20.0	20.0
J-116	Zone-1	12	True	500.00	3,083.79	503.90	3,087.69	20.0	20.0	20.0
J-117	Zone-1	29	True	500.00	1,912.54	501.61	1,914.15	20.0	39.5	20.0
J-118	Zone-1	5	True	500.00	800.01	501.23	801.24	20.0	33.4	20.0
J-120	Zone-1	5	True	500.00	647.07	501.03	648.10	20.0	25.6	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-121	Zone-1	5	True	500.00	562.73	500.00	562.73	20.0	20.9	20.0
J-122	Zone-1	5	True	500.00	509.12	500.82	509.94	20.0	27.8	20.0
J-123	Zone-1	5	True	500.00	7,207.15	502.64	7,209.78	20.0	20.0	20.0
J-124	Zone-1	6	True	500.00	6,143.52	500.62	6,144.14	20.0	20.0	20.0
J-125	Zone-1	5	True	500.00	4,906.60	506.04	4,912.63	20.0	20.0	20.0
J-126	Zone-1	5	True	500.00	6,452.03	530.65	6,482.69	20.0	20.0	20.0
J-127	Zone-1	5	True	500.00	5,916.95	510.86	5,927.81	20.0	20.0	20.0
J-128	Zone-1	14	True	500.00	3,803.95	585.56	3,889.52	20.0	20.0	20.0
J-129	Zone-1	4	True	500.00	3,023.53	605.10	3,128.63	20.0	20.0	20.0
J-130	Zone-1	12	True	500.00	5,555.40	503.62	5,559.02	20.0	20.0	20.0
J-133	Zone-1	10	True	500.00	1,679.60	503.90	1,683.49	20.0	20.0	20.0
J-134	Zone-1	5	True	500.00	5,474.61	503.37	5,477.98	20.0	20.0	20.0
J-135	Zone-1	5	True	500.00	6,035.09	505.13	6,040.21	20.0	20.0	20.0
J-141	Zone-1	5	True	500.00	6,610.57	506.24	6,616.81	20.0	20.0	20.0
J-142	Zone-1	5	True	500.00	7,880.38	501.85	7,882.22	20.0	20.0	20.0
J-143	Zone-1	5	True	500.00	7,729.31	500.82	7,730.13	20.0	20.0	20.0
J-144	Zone-1	21	True	500.00	1,497.19	502.05	1,499.24	20.0	39.5	20.0
J-145	Zone-1	5	True	500.00	754.01	501.23	755.24	20.0	21.7	20.0
J-146	Zone-1	22	True	500.00	7,913.39	500.62	7,914.01	20.0	25.1	20.0
J-147	Zone-1	7	True	500.00	8,382.46	505.28	8,387.74	20.0	21.1	20.0
J-148	Zone-1	19	True	500.00	7,641.08	500.00	7,641.08	20.0	20.0	20.0
J-149	Zone-1	5	True	500.00	5,097.97	502.05	5,100.02	20.0	20.0	20.0
J-150	Zone-1	4	True	500.00	4,367.77	503.08	4,370.85	20.0	20.0	20.0
J-151	Zone-1	3	True	500.00	1,171.88	500.00	1,171.88	20.0	20.0	20.0

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J-152	Zone-1	3	True	500.00	1,313.49	500.00	1,313.49	20.0	20.0	20.0
J-153	Zone-1	6	True	500.00	1,882.14	532.33	1,914.47	20.0	21.7	20.0
J-154	Zone-1	6	True	500.00	2,104.42	500.00	2,104.42	20.0	26.9	20.0
J-155	Zone-1	6	True	500.00	2,670.27	500.00	2,670.27	20.0	27.8	20.0
J-156	Zone-1	4	True	500.00	2,349.79	555.53	2,405.33	20.0	20.0	20.0
J-157	Zone-1	4	True	500.00	3,642.38	532.33	3,674.71	20.0	20.0	20.0
J-158	Zone-1	6	True	500.00	4,252.54	501.03	4,253.56	20.0	22.8	20.0
J-159	Zone-1	4	True	500.00	3,387.47	500.41	3,387.88	20.0	20.0	20.0
J-160	Zone-1	4	True	500.00	4,858.79	501.03	4,859.82	20.0	20.0	20.0
J-161	Zone-1	4	True	500.00	4,551.20	500.65	4,551.85	20.0	20.0	20.0
J-162	Zone-1	4	True	500.00	4,432.53	501.03	4,433.56	20.0	20.0	20.0
J-164	Zone-1	4	True	500.00	4,864.11	501.18	4,865.29	20.0	20.0	20.0
J-165	Zone-1	6	True	500.00	4,520.67	501.85	4,522.51	20.0	21.9	20.0
J-166	Zone-1	4	True	500.00	3,623.16	501.17	3,624.33	20.0	20.0	20.0
J-167	Zone-1	4	True	500.00	3,384.83	501.44	3,386.26	20.0	20.0	20.0
J-168	Zone-1	4	True	500.00	3,360.09	501.23	3,361.32	20.0	20.0	20.0
J-169	Zone-1	4	True	500.00	3,513.58	500.82	3,514.40	20.0	20.0	20.0
J-170	Zone-1	6	True	500.00	3,288.39	500.00	3,288.39	20.0	22.2	20.0
J-171	Zone-1	6	True	500.00	2,651.28	532.53	2,683.81	20.0	21.3	20.0
J-172	Zone-1	6	True	500.00	1,988.47	500.88	1,989.35	20.0	22.2	20.0
J-173	Zone-1	4	True	500.00	1,727.30	527.77	1,755.07	20.0	20.0	20.0
J-174	Zone-1	4	True	500.00	2,992.46	531.76	3,024.22	20.0	20.0	20.0
J-175	Zone-1	4	True	500.00	2,685.95	502.87	2,688.83	20.0	20.0	20.0
J-176	Zone-1	4	True	500.00	2,768.57	501.64	2,770.21	20.0	20.0	20.0

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Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-177	Zone-1	4	True	500.00	3,028.81	502.26	3,031.07	20.0	20.0	20.0
J-178	Zone-1	4	True	500.00	2,632.94	502.26	2,635.20	20.0	20.0	20.0
J-179	Zone-1	4	True	500.00	2,280.06	501.03	2,281.09	20.0	20.0	20.0
J-180	Zone-1	6	True	500.00	2,092.08	502.87	2,094.95	20.0	22.4	20.0
J-181	Zone-1	3	True	500.00	1,775.83	500.82	1,776.65	20.0	20.0	20.0
J-183	Zone-1	3	True	500.00	1,591.68	501.23	1,592.91	20.0	20.0	20.0
J-184	Zone-1	22	True	500.00	1,926.20	502.20	1,928.40	20.0	20.1	20.0
J-185	Zone-1	4	True	500.00	2,173.55	500.88	2,174.43	20.0	20.0	20.0
J-186	Zone-1	4	True	500.00	4,057.72	501.64	4,059.36	20.0	20.0	20.0
J-187	Zone-1	4	True	500.00	4,085.52	502.05	4,087.57	20.0	20.0	20.0
J-188	Zone-1	4	True	500.00	2,592.08	500.00	2,592.08	20.0	20.0	20.0
J-189	Zone-1	4	True	500.00	3,870.38	501.03	3,871.41	20.0	20.0	20.0
J-190	Zone-1	4	True	500.00	3,063.65	500.82	3,064.47	20.0	20.0	20.0
J-191	Zone-1	4	True	500.00	3,404.38	500.00	3,404.38	20.0	20.0	20.0
J-192	Zone-1	6	True	500.00	7,766.54	501.03	7,767.57	20.0	20.9	20.0
J-197	Zone-1	19	True	500.00	530.49	501.03	531.52	20.0	20.5	20.0
J-198	Zone-1	3	False	500.00	326.22	501.03	327.25	20.0	20.0	20.0
J-199	Zone-1	4	True	500.00	5,132.60	501.99	5,134.59	20.0	20.0	20.0
J-200	Zone-1	4	True	500.00	4,529.14	500.00	4,529.14	20.0	20.0	20.0
J-201	Zone-1	3	True	500.00	3,908.75	500.00	3,908.75	20.0	20.0	20.0
J-202	Zone-1	8	True	500.00	4,454.31	501.44	4,455.75	20.0	21.1	20.0
J-203	Zone-1	6	True	500.00	3,244.77	502.26	3,247.02	20.0	20.0	20.0
J-205	Zone-1	5	True	500.00	4,974.17	503.72	4,977.89	20.0	20.0	20.0
J-206	Zone-1	5	True	500.00	4,724.82	507.92	4,732.74	20.0	20.0	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-207	Zone-1	8	True	500.00	1,967.82	500.21	1,968.02	20.0	25.6	20.0
J-208	Zone-1	5	True	500.00	6,132.97	504.38	6,137.35	20.0	20.0	20.0
J-211	Zone-1	5	True	500.00	3,809.53	506.04	3,815.57	20.0	20.0	20.0
J-212	Zone-1	5	True	500.00	3,002.48	504.53	3,007.01	20.0	20.0	20.0
J-213	Zone-1	5	True	500.00	3,241.19	503.77	3,244.96	20.0	20.0	20.0
J-214	Zone-1	25	True	500.00	6,336.96	502.26	6,339.22	20.0	34.1	20.0
J-215	Zone-1	9	True	500.00	5,888.88	500.88	5,889.76	20.0	20.0	20.0
J-216	Zone-1	10	True	500.00	5,389.32	512.33	5,401.65	20.0	20.0	20.0
J-217	Zone-1	7	True	500.00	3,643.05	500.75	3,643.81	20.0	23.0	20.0
J-218	Zone-1	11	True	500.00	3,059.93	501.76	3,061.69	20.0	20.0	20.0
J-219	Zone-1	5	True	500.00	2,735.46	503.02	2,738.48	20.0	20.0	20.0
J-220	Zone-1	5	True	500.00	2,355.45	507.55	2,363.00	20.0	20.0	20.0
J-222	Zone-1	9	True	500.00	6,593.56	500.00	6,593.56	20.0	29.1	20.0
J-223	Zone-1	7	True	500.00	5,489.75	509.01	5,498.75	20.0	20.9	20.0
J-224	Zone-1	26	True	500.00	5,936.96	500.00	5,936.96	20.0	39.9	20.0
J-225	Zone-1	5	True	500.00	2,420.97	502.37	2,423.34	20.0	20.0	20.0
J-226	Zone-1	25	True	500.00	5,869.08	500.00	5,869.08	20.0	24.3	20.0
J-227	Zone-1	8	True	500.00	3,248.31	500.62	3,248.92	20.0	23.0	20.0
J-228	Zone-1	5	True	500.00	2,300.87	500.82	2,301.69	20.0	20.0	20.0
J-229	Zone-1	6	True	500.00	6,422.60	500.21	6,422.81	20.0	20.0	20.0
J-230	Zone-1	6	True	500.00	6,322.51	500.41	6,322.92	20.0	20.0	20.0
J-231	Zone-1	6	True	500.00	6,178.95	500.29	6,179.25	20.0	20.0	20.0
J-232	Zone-1	7	True	500.00	1,614.87	501.44	1,616.31	20.0	20.4	20.0
J-237	Zone-1	6	True	500.00	2,100.86	501.85	2,102.71	20.0	26.5	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-238	Zone-1	3	True	500.00	1,832.18	501.44	1,833.62	20.0	20.0	20.0
J-239	Zone-1	4	True	500.00	2,114.62	500.62	2,115.23	20.0	20.0	20.0
J-240	Zone-1	3	True	500.00	1,281.37	501.03	1,282.39	20.0	20.0	20.0
J-241	Zone-1	7	True	500.00	2,510.26	501.03	2,511.29	20.0	31.4	20.0
J-242	Zone-1	6	True	500.00	1,541.41	501.23	1,542.64	20.0	24.3	20.0
J-243	Zone-1	3	True	500.00	1,030.45	501.64	1,032.09	20.0	20.0	20.0
J-245	Zone-1	5	True	500.00	800.04	500.00	800.04	20.0	30.1	20.0
J-246	Zone-1	5	True	500.00	800.05	500.41	800.46	20.0	23.3	20.0
J-247	Zone-1	3	True	500.00	779.89	500.82	780.71	20.0	20.0	20.0
J-250	Zone-1	5	True	500.00	685.69	500.41	686.10	20.0	30.4	20.0
J-251	Zone-1	3	False	500.00	487.71	500.62	488.33	20.0	20.0	20.0
J-254	Zone-1	5	True	500.00	562.73	501.03	563.76	20.0	26.5	20.0
J-255	Zone-1	3	True	500.00	736.34	500.00	736.34	20.0	20.0	20.0
J-256	Zone-1	20	True	500.00	4,260.92	500.82	4,261.74	20.0	25.6	20.0
J-259	Zone-1	4	True	500.00	1,767.15	500.41	1,767.56	20.0	20.0	20.0
J-260	Zone-1	6	True	500.00	4,074.33	500.00	4,074.33	20.0	23.5	20.0
J-269	Zone-1	28	True	500.00	6,779.40	501.44	6,780.84	20.0	41.1	20.0
J-272	Zone-1	10	True	500.00	7,097.56	500.00	7,097.56	20.0	41.1	20.0
J-274	Zone-1	6	True	500.00	3,096.93	505.28	3,102.21	20.0	20.8	20.0
J-275	Zone-1	4	True	500.00	3,097.13	500.00	3,097.13	20.0	20.0	20.0
J-284	Zone-1	6	True	500.00	5,298.30	504.45	5,302.75	20.0	20.0	20.0
J-297	Zone-1	8	True	500.00	2,843.96	500.00	2,843.96	20.0	22.0	20.0
J-3	Zone-1	20	True	500.00	4,800.23	-150.00	4,150.23	20.0	20.0	20.0
J-279	Zone-1	4	True	500.00	2,444.87	500.00	2,444.87	20.0	20.0	20.0
J-280	Zone-1	9	True	500.00	7,304.47	500.00	7,304.47	20.0	42.0	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-281	Zone-1	9	True	500.00	5,192.21	500.00	5,192.21	20.0	28.7	20.0
J-278	Zone-1	7	True	500.00	3,622.40	500.00	3,622.40	20.0	28.7	20.0
J-282	Zone-1	6	True	500.00	2,927.23	513.26	2,940.49	20.0	22.6	20.0
J-285	Zone-1	4	True	500.00	2,700.06	500.00	2,700.06	20.0	20.0	20.0
J-286	Zone-1	4	True	500.00	2,726.27	500.00	2,726.27	20.0	20.0	20.0
J-287	Zone-1	5	True	500.00	3,378.86	505.33	3,384.19	20.0	20.0	20.0
J-290	Zone-1	4	True	500.00	4,768.68	501.99	4,770.67	20.0	20.0	20.0
J-291	Zone-1	8	True	500.00	1,977.00	502.05	1,979.05	20.0	25.4	20.0
J-292	Zone-1	5	True	500.00	1,732.68	500.00	1,732.68	20.0	20.0	20.0
J-293	Zone-1	5	True	500.00	1,779.58	500.82	1,780.40	20.0	20.0	20.0
J-294	Zone-1	20	True	500.00	6,571.54	-550.00	5,521.54	20.0	20.0	20.0
J-297	Zone-2	3	True	500.00	808.12	500.41	808.53	20.0	20.0	20.0
J-298	Zone-2	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)	20.0
J-299	Zone-1	7	True	500.00	2,187.40	500.00	2,187.40	20.0	22.2	20.0
J-300	Zone-1	5	True	500.00	1,909.15	500.29	1,909.44	20.0	20.0	20.0
J-301	Zone-2	12	True	500.00	2,599.11	500.00	2,599.11	20.0	22.6	20.0
J-302	Zone-1	4	True	500.00	1,001.83	500.41	1,002.24	20.0	20.0	20.0
J-303	Zone-1	6	True	500.00	1,001.87	513.51	1,015.38	20.0	21.8	20.0
J-304	Zone-1	6	True	500.00	3,500.68	532.33	3,533.01	20.0	23.3	20.0
J-305	Zone-1	3	True	500.00	1,201.57	532.33	1,233.90	20.0	20.0	20.0
J-308	Zone-1	4	True	500.00	2,047.73	501.64	2,049.37	20.0	20.0	20.0
J-309	Zone-1	6	True	500.00	2,974.97	502.05	2,977.02	20.0	21.3	20.0
J-310	Zone-1	6	True	500.00	3,010.96	503.08	3,014.03	20.0	20.7	20.0
J-311	Zone-1	4	True	500.00	3,096.78	500.00	3,096.78	20.0	20.0	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-312	Zone-1	4	True	500.00	2,166.44	503.49	2,169.93	20.0	20.0	20.0
J-313	Zone-1	4	True	500.00	2,024.83	501.23	2,026.06	20.0	20.0	20.0
J-314	Zone-1	4	True	500.00	1,995.98	505.28	2,001.27	20.0	20.0	20.0
J-315	Zone-1	10	True	500.00	7,166.22	500.00	7,166.22	20.0	45.8	20.0
J-316	Zone-1	6	True	500.00	5,317.07	500.00	5,317.07	20.0	20.0	20.0
J-317	Zone-1	7	True	500.00	4,923.42	500.00	4,923.42	20.0	20.0	20.0
J-318	Zone-1	25	True	500.00	5,090.99	500.00	5,090.99	20.0	52.3	20.0
J-319	Zone-1	10	True	500.00	5,327.70	500.00	5,327.70	20.0	48.6	20.0
J-320	Zone-1	10	True	500.00	5,425.77	500.00	5,425.77	20.0	45.4	20.0
J-321	Zone-1	6	True	500.00	4,166.69	500.00	4,166.69	20.0	20.0	20.0
J-322	Zone-1	6	True	500.00	1,001.83	500.00	1,001.83	20.0	25.2	20.0
J-323	<None>	5	True	500.00	3,921.92	500.00	3,921.92	20.0	20.0	20.0
J-324	Zone-1	6	True	500.00	3,663.53	500.00	3,663.53	20.0	20.0	20.0
J-325	Zone-1	4	True	500.00	2,859.84	500.00	2,859.84	20.0	20.0	20.0
J-326	Zone-1	4	True	500.00	3,415.31	500.00	3,415.31	20.0	20.0	20.0
J-327	Zone-1	6	True	500.00	3,397.42	500.00	3,397.42	20.0	21.7	20.0
J-329	Zone-1	4	True	500.00	3,065.85	500.00	3,065.85	20.0	20.0	20.0
J-330	Zone-1	26	True	500.00	5,658.83	500.00	5,658.83	20.0	44.2	20.0
J-331	Zone-1	8	True	500.00	4,244.92	500.00	4,244.92	20.0	20.7	20.0
J-334	Zone-1	7	True	500.00	3,536.06	500.00	3,536.06	20.0	26.8	20.0
J-335	Zone-1	7	True	500.00	3,536.07	500.00	3,536.07	20.0	25.5	20.0
J-336	Zone-1	7	True	500.00	3,536.09	500.00	3,536.09	20.0	23.2	20.0
J-337	Zone-1	6	True	500.00	3,347.18	500.00	3,347.18	20.0	22.2	20.0
J-338	Zone-1	6	True	500.00	3,300.37	500.00	3,300.37	20.0	22.2	20.0

Active Scenario: 2041 MD FF

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)
J-339	Zone-1	6	True	500.00	3,255.29	500.00	3,255.29	20.0	22.2	20.0
J-340	Zone-1	6	True	500.00	3,210.82	500.00	3,210.82	20.0	22.2	20.0
J-341	Zone-1	6	True	500.00	3,131.21	500.00	3,131.21	20.0	22.2	20.0
J-342	Zone-1	6	True	500.00	3,090.31	500.00	3,090.31	20.0	22.2	20.0
J-343	Zone-1	6	True	500.00	3,070.87	500.00	3,070.87	20.0	22.2	20.0
J-344	Zone-1	4	True	500.00	3,054.40	500.00	3,054.40	20.0	20.0	20.0
J-346	Zone-1	8	True	500.00	4,440.39	500.00	4,440.39	20.0	28.7	20.0
J-347	Zone-1	7	True	500.00	4,267.85	500.00	4,267.85	20.0	28.7	20.0
J-348	Zone-1	7	True	500.00	4,108.37	500.00	4,108.37	20.0	28.7	20.0
J-349	Zone-1	7	True	500.00	3,965.47	500.00	3,965.47	20.0	28.7	20.0
J-350	Zone-1	7	True	500.00	3,854.71	500.00	3,854.71	20.0	28.7	20.0
J-351	Zone-1	7	True	500.00	3,748.79	500.00	3,748.79	20.0	28.7	20.0
J-352	<None>	5	True	500.00	3,547.12	500.00	3,547.12	20.0	20.0	20.0
J-353	<None>	5	True	500.00	3,493.31	500.00	3,493.31	20.0	20.0	20.0
J-354	<None>	5	True	500.00	3,440.16	500.00	3,440.16	20.0	20.0	20.0
J-355	<None>	4	True	500.00	3,210.82	500.00	3,210.82	20.0	20.0	20.0

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
142	J-1	855.0	Zone-1	-550.00	962.4	46.5
143	J-2	865.0	Zone-1	-300.00	955.5	39.2
387	J-3	818.0	Zone-1	-650.00	985.5	72.5
144	J-4	842.0	Zone-1	32.33	1,046.0	88.3
145	J-5	820.5	Zone-1	0.21	1,044.4	96.9
146	J-6	820.0	Zone-1	2.05	1,025.2	88.8
147	J-7	818.0	Zone-1	0.21	1,025.2	89.7
148	J-8	810.0	Zone-1	4.13	1,030.7	95.5
149	J-10	816.0	Zone-1	0.82	1,022.9	89.5
150	J-11	819.0	Zone-1	0.00	1,022.9	88.2
151	J-12	820.0	Zone-1	1.64	1,022.9	87.8
152	J-13	810.0	Zone-1	1.88	1,030.6	95.4
153	J-14	810.0	Zone-1	4.53	1,018.6	90.2
154	J-15	819.0	Zone-1	0.00	1,018.6	86.3
155	J-16	819.0	Zone-1	1.51	1,018.3	86.2
156	J-17	824.0	Zone-1	1.03	992.3	72.8
157	J-18	824.0	Zone-1	3.78	990.7	72.1
158	J-19	838.0	Zone-1	2.26	989.2	65.4
159	J-20	841.0	Zone-1	0.91	990.5	64.7
160	J-21	841.0	Zone-1	1.05	989.6	64.3
161	J-22	842.0	Zone-1	1.26	988.7	63.5
162	J-23	845.0	Zone-1	1.44	988.6	62.1
163	J-24	834.0	Zone-1	1.03	995.3	69.8
164	J-25	835.0	Zone-1	1.44	991.0	67.5
165	J-26	832.0	Zone-1	1.05	989.5	68.2
166	J-27	835.0	Zone-1	34.46	987.5	66.0
167	J-28	835.0	Zone-1	3.02	987.1	65.8
168	J-29	852.0	Zone-1	0.00	979.1	55.0
170	J-37	872.0	Zone-1	1.44	978.8	46.2
171	J-38	870.0	Zone-1	0.62	978.8	47.1
172	J-39	857.0	Zone-1	0.62	978.8	52.7
173	J-40	860.0	Zone-1	1.85	978.0	51.1
174	J-41	862.0	Zone-1	3.28	976.8	49.7
175	J-42	860.0	Zone-1	1.64	975.2	49.9
176	J-43	840.0	Zone-1	0.00	974.5	58.2
177	J-44	845.0	Zone-1	0.00	973.9	55.8
178	J-45	816.0	Zone-1	0.88	1,019.5	88.0
179	J-46	764.5	Zone-1	1.51	1,035.6	117.3
180	J-47	776.0	Zone-1	13.54	1,030.6	110.1
181	J-48	764.5	Zone-1	0.88	1,030.9	115.3
182	J-49	780.0	Zone-1	3.52	1,025.1	106.0
183	J-50	809.0	Zone-1	33.76	1,019.5	91.1
184	J-51	822.0	Zone-1	0.88	990.4	72.8
186	J-53	819.0	Zone-1	4.60	990.4	74.1
187	J-54	819.0	Zone-1	0.00	991.0	74.4
188	J-55	817.0	Zone-1	3.75	985.3	72.8
189	J-56	818.0	Zone-1	1.46	984.1	71.9

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
190	J-57	819.0	Zone-1	1.49	980.2	69.8
191	J-58	820.0	Zone-1	1.03	980.0	69.2
192	J-59	830.0	Zone-1	0.82	979.5	64.7
193	J-60	845.0	Zone-1	1.23	979.1	58.0
194	J-61	850.0	Zone-1	0.00	979.0	55.8
195	J-62	821.0	Zone-1	0.21	985.1	71.0
196	J-63	823.0	Zone-1	1.64	978.0	67.1
197	J-64	824.0	Zone-1	1.79	978.0	66.6
198	J-65	826.0	Zone-1	1.17	975.9	64.8
199	J-66	850.0	Zone-1	1.44	975.9	54.5
200	J-67	858.0	Zone-1	0.00	975.9	51.0
201	J-68	815.0	Zone-1	0.00	984.8	73.5
202	J-69	817.0	Zone-1	2.87	979.2	70.2
203	J-70	826.0	Zone-1	32.58	974.8	64.4
204	J-71	803.0	Zone-1	31.83	984.7	78.6
206	J-75	808.0	Zone-1	29.88	975.0	72.2
207	J-76	817.0	Zone-1	2.21	974.9	68.3
208	J-77	822.0	Zone-1	32.23	970.0	64.1
209	J-78	828.0	Zone-1	1.23	969.7	61.3
210	J-79	840.0	Zone-1	1.03	969.2	55.9
211	J-80	830.0	Zone-1	1.73	966.2	58.9
212	J-81	833.0	Zone-1	1.85	966.2	57.6
213	J-82	827.0	Zone-1	1.93	967.2	60.7
214	J-84	808.0	Zone-1	0.00	967.5	69.0
215	J-85	809.0	Zone-1	35.84	961.8	66.1
216	J-86	861.0	Zone-1	4.89	962.5	43.9
217	J-87	838.0	Zone-1	0.62	962.5	53.9
218	J-88	850.0	Zone-1	0.82	962.0	48.4
219	J-89	865.0	Zone-1	1.64	961.3	41.7
220	J-90	860.0	Zone-1	0.82	960.6	43.5
221	J-91	850.0	Zone-1	0.00	960.7	47.9
222	J-92	855.0	Zone-1	1.03	960.4	45.6
223	J-93	863.0	Zone-1	0.00	959.7	41.8
224	J-94	863.0	Zone-1	0.00	955.3	39.9
225	J-95	870.0	Zone-1	2.26	958.9	38.5
226	J-96	870.0	Zone-1	1.85	957.2	37.7
227	J-97	892.0	Zone-2	0.15	1,010.9	51.5
228	J-98	897.0	Zone-2	5.28	1,010.9	49.3
229	J-99	895.0	Zone-2	0.00	1,010.9	50.2
230	J-100	900.5	Zone-2	0.00	1,010.9	47.8
231	J-101	901.0	Zone-2	5.81	1,010.9	47.6
232	J-102	901.0	Zone-2	1.85	1,010.9	47.6
233	J-105	890.0	Zone-2	1.23	1,010.9	52.3
234	J-106	859.0	Zone-1	0.62	957.4	42.6
235	J-107	860.0	Zone-1	3.08	957.1	42.0
236	J-108	825.0	Zone-1	3.66	956.9	57.1
237	J-109	860.0	Zone-1	0.00	957.5	42.2

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
238	J-110	860.5	Zone-1	1.03	957.7	42.0
239	J-111	855.0	Zone-1	1.03	957.8	44.5
240	J-112	862.0	Zone-1	0.82	956.3	40.8
241	J-113	861.0	Zone-1	1.81	961.5	43.5
242	J-114	861.0	Zone-1	0.91	960.3	43.0
243	J-115	861.0	Zone-1	1.23	958.9	42.3
244	J-116	835.0	Zone-1	3.90	957.1	52.8
245	J-117	818.0	Zone-1	1.61	956.4	59.9
246	J-118	832.0	Zone-1	1.23	956.4	53.8
248	J-120	850.0	Zone-1	1.03	956.4	46.0
249	J-121	861.0	Zone-1	0.00	956.4	41.3
250	J-122	845.0	Zone-1	0.82	956.4	48.2
251	J-123	826.0	Zone-1	2.64	961.1	58.5
252	J-124	850.0	Zone-1	0.62	961.1	48.1
253	J-125	838.0	Zone-1	6.04	960.6	53.1
254	J-126	821.0	Zone-1	30.65	960.2	60.2
255	J-127	815.0	Zone-1	10.86	960.5	62.9
256	J-128	804.0	Zone-1	85.56	960.0	67.5
257	J-129	800.0	Zone-1	105.10	959.7	69.1
258	J-130	792.0	Zone-1	3.62	958.9	72.2
259	J-133	817.0	Zone-1	3.90	957.9	61.0
260	J-134	822.0	Zone-1	3.37	957.9	58.8
261	J-135	826.0	Zone-1	5.13	956.4	56.4
267	J-141	810.0	Zone-1	6.24	954.8	62.6
268	J-142	814.0	Zone-1	1.85	954.8	60.9
269	J-143	816.0	Zone-1	0.82	953.3	59.4
270	J-144	818.0	Zone-1	2.05	955.4	59.5
271	J-145	859.0	Zone-1	1.23	955.4	41.7
272	J-146	820.0	Zone-1	0.62	950.9	56.7
273	J-147	819.0	Zone-1	5.28	950.7	57.0
274	J-148	850.0	Zone-1	0.00	949.6	43.1
275	J-149	813.0	Zone-1	2.05	954.0	61.0
276	J-150	812.0	Zone-1	3.08	951.9	60.5
277	J-151	805.0	Zone-1	0.00	950.1	62.8
278	J-152	808.0	Zone-1	0.00	950.1	61.5
279	J-153	799.0	Zone-1	32.33	949.9	65.3
280	J-154	787.0	Zone-1	0.00	949.9	70.5
281	J-155	785.0	Zone-1	0.00	950.0	71.4
282	J-156	782.0	Zone-1	55.53	949.9	72.6
283	J-157	799.0	Zone-1	32.33	950.0	65.3
284	J-158	801.0	Zone-1	1.03	950.2	64.5
285	J-159	802.0	Zone-1	0.41	949.9	64.0
286	J-160	807.0	Zone-1	1.03	950.4	62.1
287	J-161	830.0	Zone-1	0.65	950.3	52.0
288	J-162	835.0	Zone-1	1.03	950.3	49.9
290	J-164	847.0	Zone-1	1.18	950.3	44.7
291	J-165	845.0	Zone-1	1.85	949.9	45.4

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
292	J-166	825.0	Zone-1	1.17	950.1	54.1
293	J-167	817.0	Zone-1	1.44	949.9	57.5
294	J-168	815.0	Zone-1	1.23	949.8	58.3
295	J-169	810.0	Zone-1	0.82	949.8	60.5
296	J-170	800.0	Zone-1	0.00	949.9	64.8
297	J-171	802.0	Zone-1	32.53	949.8	64.0
298	J-172	800.0	Zone-1	0.88	949.8	64.8
299	J-173	805.0	Zone-1	27.77	949.8	62.7
300	J-174	830.0	Zone-1	31.76	949.8	51.8
301	J-175	843.0	Zone-1	2.87	949.8	46.2
302	J-176	835.0	Zone-1	1.64	949.8	49.7
303	J-177	820.0	Zone-1	2.26	949.7	56.1
304	J-178	822.0	Zone-1	2.26	949.6	55.2
305	J-179	851.0	Zone-1	1.03	949.5	42.6
306	J-180	819.0	Zone-1	2.87	949.5	56.5
307	J-181	819.0	Zone-1	0.82	949.5	56.5
309	J-183	841.0	Zone-1	1.23	949.5	47.0
310	J-184	837.0	Zone-1	2.20	949.5	48.7
311	J-185	857.0	Zone-1	0.88	949.5	40.0
312	J-186	860.0	Zone-1	1.64	949.7	38.8
313	J-187	862.0	Zone-1	2.05	949.5	37.9
314	J-188	861.0	Zone-1	0.00	949.5	38.3
315	J-189	868.0	Zone-1	1.03	949.4	35.2
316	J-190	863.0	Zone-1	0.82	949.4	37.4
317	J-191	862.0	Zone-1	0.00	949.3	37.8
318	J-192	861.0	Zone-1	1.03	948.8	38.0
319	J-197	855.0	Zone-1	1.03	950.4	41.3
320	J-198	856.0	Zone-1	1.03	950.4	40.9
321	J-199	867.0	Zone-1	1.99	949.0	35.5
322	J-200	868.0	Zone-1	0.00	949.1	35.1
323	J-201	865.0	Zone-1	0.00	949.2	36.4
324	J-202	818.0	Zone-1	1.44	1,022.9	88.6
325	J-203	820.5	Zone-1	2.26	1,022.9	87.6
327	J-205	812.0	Zone-1	3.72	971.0	68.8
328	J-206	827.0	Zone-1	7.92	964.3	59.4
329	J-207	845.0	Zone-1	0.21	982.1	59.3
330	J-208	845.0	Zone-1	4.38	961.1	50.2
331	J-211	764.5	Zone-1	6.04	1,031.7	115.6
332	J-212	760.5	Zone-1	4.53	1,035.0	118.8
333	J-213	758.0	Zone-1	3.77	1,036.8	120.6
334	J-214	759.5	Zone-1	2.26	1,039.4	121.1
335	J-215	765.0	Zone-1	0.88	1,037.5	117.9
336	J-216	779.0	Zone-1	12.33	1,026.6	107.1
337	J-217	763.0	Zone-1	0.75	1,026.6	114.0
338	J-218	770.0	Zone-1	1.76	1,026.6	111.0
339	J-219	767.0	Zone-1	3.02	1,026.6	112.3
340	J-220	760.0	Zone-1	7.55	1,026.6	115.3

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
342	J-222	821.0	Zone-1	0.00	1,046.1	97.4
343	J-223	818.0	Zone-1	9.01	1,025.2	89.7
344	J-224	819.0	Zone-1	0.00	1,030.8	91.6
345	J-225	828.0	Zone-1	2.37	1,030.8	87.7
346	J-226	818.0	Zone-1	0.00	1,026.3	90.1
347	J-227	821.0	Zone-1	0.62	1,026.3	88.8
348	J-228	828.0	Zone-1	0.82	1,026.3	85.8
349	J-229	819.5	Zone-1	0.21	1,018.0	85.9
350	J-230	819.0	Zone-1	0.41	1,018.9	86.5
351	J-231	819.0	Zone-1	0.29	1,018.8	86.4
352	J-232	865.0	Zone-1	1.44	978.8	49.2
353	J-237	820.0	Zone-1	1.85	956.6	59.1
354	J-238	852.0	Zone-1	1.44	956.8	45.4
355	J-239	861.0	Zone-1	0.62	957.0	41.5
356	J-240	859.0	Zone-1	1.03	957.0	42.4
357	J-241	860.0	Zone-1	1.03	957.1	42.0
358	J-242	825.0	Zone-1	1.23	956.6	56.9
359	J-243	835.0	Zone-1	1.64	956.6	52.6
361	J-245	824.0	Zone-1	0.00	956.4	57.3
362	J-246	835.0	Zone-1	0.41	956.4	52.5
363	J-247	840.0	Zone-1	0.82	956.4	50.4
366	J-250	839.0	Zone-1	0.41	956.4	50.8
367	J-251	863.0	Zone-1	0.62	956.4	40.4
369	J-254	843.0	Zone-1	1.03	956.4	49.1
370	J-255	863.0	Zone-1	0.00	955.4	40.0
371	J-256	843.0	Zone-1	0.82	950.4	46.5
374	J-259	803.0	Zone-1	0.41	949.9	63.6
375	J-260	800.0	Zone-1	0.00	950.1	64.9
378	J-269	763.0	Zone-1	1.44	1,042.1	120.8
380	J-272	819.0	Zone-1	0.00	1,044.4	97.5
381	J-274	772.0	Zone-1	5.28	1,042.1	116.9
382	J-275	790.0	Zone-1	0.00	1,042.1	109.1
394	J-278	770.0	Zone-1	0.00	1,042.1	117.7
389	J-279	890.0	Zone-1	0.00	957.1	29.0
390	J-280	820.0	Zone-1	0.00	1,044.8	97.3
391	J-281	770.0	Zone-1	0.00	1,042.1	117.7
395	J-282	780.0	Zone-1	13.26	1,042.1	113.4
384	J-284	830.0	Zone-1	4.45	1,006.2	76.2
397	J-285	790.0	Zone-1	0.00	1,042.1	109.1
398	J-286	790.0	Zone-1	0.00	1,042.1	109.1
399	J-287	790.0	Zone-1	5.33	1,042.1	109.1
736	J-290	846.0	Zone-1	1.99	950.1	45.0
773	J-291	848.0	Zone-1	2.05	981.4	57.7
776	J-292	863.0	Zone-1	0.00	981.7	51.4
778	J-293	860.0	Zone-1	0.82	981.8	52.7
782	J-294	821.0	Zone-1	-1,050.00	1,047.1	97.8
386	J-297	885.0	Zone-1	0.00	957.2	31.2

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
800	J-297	895.0	Zone-2	0.41	1,010.9	50.2
805	J-298	897.0	Zone-2	(N/A)	(N/A)	(N/A)
816	J-299	840.0	Zone-1	0.00	984.3	62.4
819	J-300	845.0	Zone-1	0.29	984.3	60.3
822	J-301	895.0	Zone-2	0.00	1,112.1	93.9
838	J-302	846.0	Zone-1	0.41	978.8	57.5
840	J-303	840.0	Zone-1	13.51	978.8	60.1
842	J-304	795.5	Zone-1	32.33	950.0	66.8
845	J-305	800.0	Zone-1	32.33	949.9	64.9
851	J-308	786.0	Zone-1	1.64	1,042.1	110.8
853	J-309	783.2	Zone-1	2.05	1,042.1	112.0
856	J-310	785.5	Zone-1	3.08	1,042.1	111.0
859	J-311	782.2	Zone-1	0.00	1,042.1	112.4
862	J-312	783.0	Zone-1	3.49	1,042.1	112.1
864	J-313	782.0	Zone-1	1.23	1,042.1	112.5
866	J-314	780.0	Zone-1	5.28	1,042.1	113.4
877	J-315	812.9	Zone-1	0.00	1,044.5	100.2
881	J-316	817.7	Zone-1	0.00	987.1	73.3
915	J-317	878.0	Zone-1	0.00	1,030.6	66.0
917	J-318	800.0	Zone-1	0.00	1,030.6	99.8
919	J-319	805.0	Zone-1	0.00	1,030.6	97.6
921	J-320	811.4	Zone-1	0.00	1,030.6	94.8
925	J-321	808.0	Zone-1	0.00	1,030.6	96.3
938	J-322	826.0	Zone-1	0.00	978.8	66.1
979	J-323	812.2	<None>	0.00	961.7	64.7
988	J-324	815.0	Zone-1	0.00	1,030.7	93.3
990	J-325	865.6	Zone-1	0.00	949.3	36.2
994	J-326	850.0	Zone-1	0.00	949.3	43.0
997	J-327	857.0	Zone-1	0.00	949.3	39.9
1002	J-329	857.2	Zone-1	0.00	949.4	39.9
1006	J-330	810.0	Zone-1	0.00	1,030.7	95.5
1009	J-331	813.5	Zone-1	0.00	1,030.7	94.0
1016	J-334	774.4	Zone-1	0.00	1,042.1	115.8
1019	J-335	770.0	Zone-1	0.00	1,042.1	117.7
1021	J-336	770.0	Zone-1	0.00	1,042.1	117.7
1023	J-337	770.0	Zone-1	0.00	1,042.1	117.7
1025	J-338	770.0	Zone-1	0.00	1,042.1	117.7
1027	J-339	770.0	Zone-1	0.00	1,042.1	117.7
1029	J-340	770.0	Zone-1	0.00	1,042.1	117.7
1031	J-341	770.0	Zone-1	0.00	1,042.1	117.7
1033	J-342	770.0	Zone-1	0.00	1,042.1	117.7
1035	J-343	770.0	Zone-1	0.00	1,042.1	117.7
1037	J-344	775.0	Zone-1	0.00	1,042.1	115.6
1040	J-346	770.0	Zone-1	0.00	1,042.1	117.7
1043	J-347	770.0	Zone-1	0.00	1,042.1	117.7
1046	J-348	770.0	Zone-1	0.00	1,042.1	117.7
1049	J-349	770.0	Zone-1	0.00	1,042.1	117.7

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1052	J-350	770.0	Zone-1	0.00	1,042.1	117.7
1055	J-351	770.0	Zone-1	0.00	1,042.1	117.7
1058	J-352	770.0	<None>	0.00	1,042.1	117.7
1061	J-353	770.0	<None>	0.00	1,042.1	117.7
1064	J-354	770.0	<None>	0.00	1,042.1	117.7
1067	J-355	770.0	<None>	0.00	1,042.1	117.7

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
412	P-9	155	J-10	J-202	8.0	Ductile Iron	5.33	0.03	0.000
413	P-10	165	J-202	J-11	8.0	Ductile Iron	3.90	0.02	0.000
414	P-11	281	J-11	J-203	8.0	Ductile Iron	2.11	0.01	0.000
415	P-12	297	J-203	J-12	8.0	Ductile Iron	-0.14	0.00	0.000
416	P-13	382	J-12	J-11	8.0	Ductile Iron	-1.78	0.01	0.000
417	P-16	359	J-15	J-14	6.0	Ductile Iron	4.53	0.05	0.000
418	P-17	131	J-15	J-16	8.0	Ductile Iron	271.47	1.73	0.002
419	P-18	298	J-16	J-45	8.0	Ductile Iron	-398.58	2.54	0.004
420	P-19	396	J-45	J-50	8.0	Ductile Iron	-25.21	0.16	0.000
421	P-20	801	J-50	J-49	8.0	Ductile Iron	-549.17	3.51	0.007
422	P-22	883	J-47	J-46	8.0	Ductile Iron	-489.98	3.13	0.006
423	P-23	288	J-47	J-48	8.0	Ductile Iron	-199.24	1.27	0.001
424	P-25	486	J-24	J-17	6.0	Ductile Iron	221.03	2.51	0.006
425	P-26	253	J-17	J-18	6.0	Ductile Iron	220.00	2.50	0.006
426	P-27	650	J-18	J-19	6.0	Ductile Iron	130.82	1.48	0.002
427	P-28	256	J-19	J-23	6.0	Ductile Iron	128.57	1.46	0.002
428	P-29	476	J-23	J-28	6.0	Ductile Iron	156.06	1.77	0.003
429	P-30	216	J-28	J-27	6.0	Ductile Iron	-120.95	1.37	0.002
430	P-31	224	J-27	J-26	6.0	Ductile Iron	-269.57	3.06	0.009
431	P-32	191	J-26	J-25	6.0	Ductile Iron	-249.85	2.84	0.008
432	P-33	281	J-25	J-24	6.0	Ductile Iron	-359.77	4.08	0.015
433	P-34	251	J-18	J-20	6.0	Ductile Iron	85.40	0.97	0.001
434	P-35	326	J-20	J-25	6.0	Ductile Iron	-108.49	1.23	0.002
435	P-36	190	J-20	J-21	6.0	Ductile Iron	192.98	2.19	0.005
436	P-37	370	J-21	J-26	6.0	Ductile Iron	20.77	0.24	0.000
437	P-38	231	J-21	J-22	6.0	Ductile Iron	171.15	1.94	0.004
438	P-39	424	J-22	J-27	6.0	Ductile Iron	140.96	1.60	0.003
439	P-40	224	J-22	J-23	6.0	Ductile Iron	28.93	0.33	0.000
440	P-44	230	J-68	J-62	8.0	Ductile Iron	-210.82	1.35	0.001
441	P-45	220	J-62	J-55	8.0	Ductile Iron	-211.03	1.35	0.001
443	P-47	418	J-53	J-24	8.0	Ductile Iron	-727.67	4.64	0.012
444	P-48	306	J-25	J-54	4.0	Ductile Iron	0.00	0.00	0.000
445	P-49	207	J-55	J-56	8.0	Ductile Iron	507.42	3.24	0.006
446	P-50	429	J-56	J-27	6.0	Ductile Iron	-255.12	2.89	0.008
447	P-51	302	J-56	J-57	8.0	Ductile Iron	761.07	4.86	0.013
448	P-52	209	J-57	J-58	8.0	Ductile Iron	209.83	1.34	0.001
449	P-53	373	J-58	J-59	8.0	Ductile Iron	208.81	1.33	0.001
450	P-54	370	J-59	J-60	8.0	Ductile Iron	207.99	1.33	0.001
451	P-55	137	J-60	J-61	8.0	Ductile Iron	204.09	1.30	0.001
452	P-56	164	J-63	J-64	6.0	Ductile Iron	-1.64	0.02	0.000
453	P-57	311	J-57	J-64	8.0	Ductile Iron	549.74	3.51	0.007
454	P-58	341	J-64	J-69	6.0	Ductile Iron	-158.03	1.79	0.003
455	P-59	350	J-69	J-68	8.0	Ductile Iron	-860.82	5.49	0.016
456	P-60	391	J-69	J-76	8.0	Ductile Iron	699.93	4.47	0.011
457	P-61	351	J-76	J-70	8.0	Ductile Iron	107.68	0.69	0.000
458	P-62	209	J-70	J-65	8.0	Ductile Iron	-469.25	3.00	0.005
459	P-63	484	J-65	J-66	8.0	Ductile Iron	-25.29	0.16	0.000

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
460	P-64	288	J-66	J-67	6.0	Ductile Iron	-26.72	0.30	0.000
461	P-65	460	J-64	J-65	8.0	Ductile Iron	445.13	2.84	0.005
462	P-66	335	J-70	J-77	8.0	Ductile Iron	803.55	5.13	0.014
463	P-67	249	J-77	J-78	8.0	Ductile Iron	235.86	1.51	0.001
464	P-68	311	J-78	J-79	8.0	Ductile Iron	234.63	1.50	0.001
465	P-69	423	J-77	J-82	8.0	Ductile Iron	535.45	3.42	0.007
466	P-70	158	J-82	J-81	8.0	Ductile Iron	533.52	3.41	0.007
467	P-72	1,290	J-50	J-71	6.0	Ductile Iron	490.21	5.56	0.027
470	P-77	283	J-75	J-76	6.0	Ductile Iron	44.79	0.51	0.000
471	P-78	436	J-75	J-84	6.0	Ductile Iron	383.71	4.35	0.017
472	P-79	331	J-84	J-85	6.0	Ductile Iron	383.71	4.35	0.017
474	P-81	426	J-76	J-205	8.0	Ductile Iron	634.82	4.05	0.009
475	P-82	748	J-205	J-206	8.0	Ductile Iron	631.10	4.03	0.009
476	P-83	354	J-206	J-123	8.0	Ductile Iron	623.18	3.98	0.009
479	P-87	357	J-29	J-39	8.0	Ductile Iron	171.73	1.10	0.001
480	P-88	278	J-39	J-38	8.0	Ductile Iron	14.74	0.09	0.000
481	P-90	360	J-38	J-37	8.0	Ductile Iron	1.44	0.01	0.000
483	P-96	247	J-39	J-40	6.0	Ductile Iron	156.38	1.77	0.003
484	P-97	395	J-40	J-41	6.0	Ductile Iron	154.53	1.75	0.003
485	P-98	497	J-41	J-42	6.0	Ductile Iron	151.25	1.72	0.003
486	P-99	240	J-42	J-43	6.0	Ductile Iron	149.61	1.70	0.003
487	P-100	213	J-43	J-44	6.0	Ductile Iron	149.61	1.70	0.003
488	P-101	217	J-44	J-67	6.0	Ductile Iron	-276.26	3.13	0.009
489	P-102	275	J-67	J-61	6.0	Ductile Iron	-302.99	3.44	0.011
490	P-103	113	J-61	J-29	6.0	Ductile Iron	-98.89	1.12	0.001
491	P-104	224	J-44	J-79	6.0	Ductile Iron	425.87	4.83	0.021
492	P-105	64	J-79	J-80	6.0	Ductile Iron	659.48	7.48	0.047
493	P-106	394	J-80	J-81	6.0	Ductile Iron	29.67	0.34	0.000
494	P-107	414	J-80	J-87	8.0	Ductile Iron	628.08	4.01	0.009
495	P-108	242	J-87	J-88	6.0	Ductile Iron	130.65	1.48	0.002
496	P-109	279	J-88	J-89	6.0	Ductile Iron	129.83	1.47	0.002
497	P-110	311	J-89	J-90	6.0	Ductile Iron	128.19	1.45	0.002
498	P-111	240	J-90	J-95	6.0	Ductile Iron	236.34	2.68	0.007
499	P-112	51	J-95	J-96	6.0	Ductile Iron	556.86	6.32	0.034
500	P-114	346	J-97	J-98	6.0	Ductile Iron	-0.15	0.00	0.000
501	P-115	296	J-98	J-99	8.0	Ductile Iron	9.30	0.06	0.000
502	P-116	396	J-99	J-100	6.0	Ductile Iron	9.30	0.11	0.000
503	P-117	247	J-100	J-101	6.0	Ductile Iron	9.30	0.11	0.000
504	P-118	321	J-101	J-102	6.0	Ductile Iron	1.85	0.02	0.000
506	P-122	291	J-87	J-91	8.0	Ductile Iron	512.37	3.27	0.006
507	P-123	345	J-91	J-90	8.0	Ductile Iron	108.97	0.70	0.000
508	P-124	86	J-91	J-92	8.0	Ductile Iron	403.40	2.57	0.004
509	P-125	275	J-92	J-93	8.0	Ductile Iron	322.78	2.06	0.003
510	P-126	284	J-93	J-95	8.0	Ductile Iron	322.78	2.06	0.003
511	P-127	428	J-92	J-114	8.0	Ductile Iron	79.60	0.51	0.000
512	P-128	472	J-87	J-86	8.0	Ductile Iron	-15.56	0.10	0.000
513	P-129	501	J-86	J-81	8.0	Ductile Iron	-561.35	3.58	0.007

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
514	P-130	146	J-86	J-113	8.0	Ductile Iron	540.90	3.45	0.007
515	P-131	82	J-113	J-114	8.0	Ductile Iron	827.31	5.28	0.015
516	P-132	82	J-114	J-115	8.0	Ductile Iron	906.01	5.78	0.018
517	P-133	227	J-115	J-112	8.0	Ductile Iron	715.35	4.57	0.011
518	P-134	184	J-112	T-1	8.0	Ductile Iron	714.53	4.56	0.011
519	P-135	90	J-2	J-94	8.0	Ductile Iron	300.00	1.91	0.002
520	P-136	78	J-94	T-1	8.0	Ductile Iron	798.83	5.10	0.014
521	P-137	328	J-94	J-96	8.0	Ductile Iron	-498.83	3.18	0.006
522	P-138	234	J-96	J-106	6.0	Ductile Iron	-67.87	0.77	0.001
523	P-139	211	J-106	J-109	6.0	Ductile Iron	-68.48	0.78	0.001
524	P-140	214	J-109	J-110	6.0	Ductile Iron	-68.48	0.78	0.001
525	P-141	190	J-110	J-111	6.0	Ductile Iron	-69.51	0.79	0.001
526	P-142	231	J-111	J-115	6.0	Ductile Iron	-189.43	2.15	0.005
527	P-143	380	J-111	J-116	6.0	Ductile Iron	118.90	1.35	0.002
528	P-144	270	J-116	J-108	6.0	Ductile Iron	54.25	0.62	0.000
529	P-145	789	J-108	J-107	6.0	Ductile Iron	-34.78	0.39	0.000
536	P-152	258	J-135	J-134	8.0	Ductile Iron	-511.97	3.27	0.006
537	P-153	356	J-134	J-126	8.0	Ductile Iron	-519.24	3.31	0.006
538	P-154	360	J-126	J-123	8.0	Ductile Iron	-324.43	2.07	0.003
539	P-155	306	J-133	J-134	6.0	Ductile Iron	-3.90	0.04	0.000
540	P-156	128	J-113	J-1	8.0	Ductile Iron	-550.00	3.51	0.007
541	P-157	232	J-113	J-124	8.0	Ductile Iron	261.77	1.67	0.002
542	P-158	368	J-124	J-125	8.0	Ductile Iron	231.51	1.48	0.001
543	P-159	326	J-125	J-126	8.0	Ductile Iron	225.47	1.44	0.001
544	P-160	28	J-124	J-208	8.0	Ductile Iron	29.65	0.19	0.000
545	P-162	318	J-208	J-123	8.0	Ductile Iron	25.27	0.16	0.000
546	P-163	257	J-123	J-127	8.0	Ductile Iron	321.39	2.05	0.003
547	P-164	307	J-127	J-128	8.0	Ductile Iron	241.13	1.54	0.002
548	P-165	372	J-128	J-129	8.0	Ductile Iron	155.57	0.99	0.001
549	P-166	304	J-129	J-130	4.0	Ductile Iron	50.46	1.29	0.003
550	P-167	380	J-130	J-127	8.0	Ductile Iron	-417.27	2.66	0.004
551	P-170	797	J-130	J-141	8.0	Ductile Iron	464.11	2.96	0.005
552	P-171	215	J-141	J-149	8.0	Ductile Iron	396.18	2.53	0.004
553	P-172	560	J-149	J-150	8.0	Ductile Iron	394.13	2.52	0.004
554	P-173	215	J-135	J-142	8.0	Ductile Iron	567.60	3.62	0.007
555	P-174	162	J-142	J-143	8.0	Ductile Iron	627.45	4.00	0.009
556	P-175	837	J-143	J-144	6.0	Ductile Iron	-136.76	1.55	0.003
557	P-176	525	J-144	J-145	6.0	Ductile Iron	1.23	0.01	0.000
558	P-177	371	J-144	J-117	6.0	Ductile Iron	-140.05	1.59	0.003
559	P-178	487	J-117	J-108	6.0	Ductile Iron	-85.37	0.97	0.001
560	P-179	525	J-117	J-118	6.0	Ductile Iron	6.36	0.07	0.000
562	P-182	291	J-120	J-121	6.0	Ductile Iron	2.46	0.03	0.000
563	P-183	261	J-121	J-122	6.0	Ductile Iron	1.44	0.02	0.000
564	P-184	185	J-143	J-146	8.0	Ductile Iron	763.40	4.87	0.013
565	P-185	91	J-146	J-147	10.0	Ductile Iron	548.18	2.24	0.002
566	P-186	497	J-147	J-148	10.0	Ductile Iron	542.90	2.22	0.002
567	P-187	381	J-148	T-2	10.0	Ductile Iron	542.90	2.22	0.002

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
568	P-190	643	J-192	J-199	12.0	Ductile Iron	-285.18	0.81	0.000
569	P-191	416	J-199	J-200	12.0	Ductile Iron	-287.17	0.81	0.000
570	P-192	587	J-200	J-201	12.0	Ductile Iron	-114.70	0.33	0.000
571	P-193	64	J-201	J-191	6.0	Ductile Iron	-114.70	1.30	0.002
573	P-195	70	J-189	J-200	6.0	Ductile Iron	172.47	1.96	0.004
574	P-197	303	J-197	J-198	4.0	Ductile Iron	1.03	0.03	0.000
575	P-199	230	J-164	J-162	8.0	Ductile Iron	-40.35	0.26	0.000
577	P-201	157	J-162	J-161	8.0	Ductile Iron	-41.38	0.26	0.000
578	P-202	484	J-161	J-160	8.0	Ductile Iron	-107.11	0.68	0.000
579	P-203	130	J-160	J-158	8.0	Ductile Iron	282.91	1.81	0.002
580	P-204	381	J-150	J-160	8.0	Ductile Iron	391.05	2.50	0.004
581	P-205	751	J-158	J-159	4.0	Ductile Iron	17.37	0.44	0.000
582	P-206	313	J-161	J-166	6.0	Ductile Iron	65.08	0.74	0.001
583	P-207	354	J-166	J-167	6.0	Ductile Iron	61.18	0.69	0.001
584	P-208	341	J-167	J-174	6.0	Ductile Iron	33.59	0.38	0.000
585	P-209	297	J-167	J-168	6.0	Ductile Iron	26.16	0.30	0.000
586	P-210	522	J-168	J-176	6.0	Ductile Iron	25.85	0.29	0.000
587	P-211	148	J-168	J-169	6.0	Ductile Iron	-0.92	0.01	0.000
588	P-212	505	J-169	J-177	6.0	Ductile Iron	33.31	0.38	0.000
589	P-213	176	J-169	J-159	6.0	Ductile Iron	-35.04	0.40	0.000
590	P-214	69	J-159	J-170	6.0	Ductile Iron	-18.09	0.21	0.000
591	P-215	234	J-170	J-171	8.0	Ductile Iron	61.18	0.39	0.000
592	P-216	507	J-171	J-172	8.0	Ductile Iron	28.64	0.18	0.000
593	P-218	478	J-170	J-157	8.0	Ductile Iron	-79.26	0.51	0.000
594	P-220	155	J-152	J-151	6.0	Ductile Iron	0.00	0.00	0.000
595	P-222	255	J-153	J-154	8.0	Ductile Iron	-32.74	0.21	0.000
596	P-223	398	J-154	J-155	8.0	Ductile Iron	-32.74	0.21	0.000
597	P-224	384	J-155	J-156	8.0	Ductile Iron	55.53	0.35	0.000
599	P-226	670	J-165	J-174	6.0	Ductile Iron	26.32	0.30	0.000
600	P-227	231	J-174	J-175	6.0	Ductile Iron	28.14	0.32	0.000
601	P-228	415	J-165	J-186	10.0	Ductile Iron	223.47	0.91	0.000
602	P-229	737	J-186	J-175	6.0	Ductile Iron	-23.76	0.27	0.000
603	P-230	277	J-175	J-176	6.0	Ductile Iron	1.51	0.02	0.000
604	P-231	288	J-176	J-177	6.0	Ductile Iron	25.72	0.29	0.000
605	P-232	297	J-177	J-178	6.0	Ductile Iron	56.77	0.64	0.000
606	P-233	933	J-178	J-179	6.0	Ductile Iron	23.36	0.27	0.000
607	P-234	272	J-179	J-188	6.0	Ductile Iron	5.04	0.06	0.000
608	P-235	192	J-188	J-187	6.0	Ductile Iron	-32.38	0.37	0.000
609	P-236	312	J-187	J-186	10.0	Ductile Iron	-245.58	1.00	0.001
610	P-237	333	J-187	J-189	10.0	Ductile Iron	211.15	0.86	0.000
611	P-239	244	J-189	J-190	6.0	Ductile Iron	-11.25	0.13	0.000
612	P-240	407	J-190	J-188	6.0	Ductile Iron	-37.42	0.42	0.000
613	P-241	272	J-190	J-185	6.0	Ductile Iron	-40.45	0.46	0.000
614	P-242	415	J-185	J-179	6.0	Ductile Iron	-17.30	0.20	0.000
615	P-243	314	J-185	J-184	6.0	Ductile Iron	-24.04	0.27	0.000
616	P-244	193	J-184	J-183	6.0	Ductile Iron	-13.00	0.15	0.000
617	P-245	625	J-183	J-180	6.0	Ductile Iron	-14.23	0.16	0.000

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
618	P-246	480	J-184	J-181	6.0	Ductile Iron	-13.23	0.15	0.000
620	P-248	378	J-181	J-180	6.0	Ductile Iron	-14.05	0.16	0.000
621	P-249	308	J-180	J-178	6.0	Ductile Iron	-31.15	0.35	0.000
622	P-253	160	J-48	J-211	6.0	Ductile Iron	-200.12	2.27	0.005
623	P-254	394	J-64	J-70	6.0	Ductile Iron	259.21	2.94	0.008
624	P-255	363	J-172	J-173	8.0	Ductile Iron	27.77	0.18	0.000
625	P-256	319	J-212	J-213	6.0	Ductile Iron	-210.69	2.39	0.006
626	P-257	446	J-213	J-214	6.0	Ductile Iron	-214.47	2.43	0.006
627	P-258	336	J-214	J-215	8.0	Ductile Iron	492.37	3.14	0.006
628	P-259	337	J-215	J-46	8.0	Ductile Iron	491.49	3.14	0.006
629	P-260	606	J-212	J-211	6.0	Ductile Iron	206.16	2.34	0.005
630	P-261	217	J-49	J-216	8.0	Ductile Iron	-552.69	3.53	0.007
631	P-262	403	J-216	J-217	8.0	Ductile Iron	13.08	0.08	0.000
632	P-263	289	J-217	J-218	8.0	Ductile Iron	12.33	0.08	0.000
633	P-264	264	J-218	J-219	8.0	Ductile Iron	10.57	0.07	0.000
634	P-265	505	J-219	J-220	8.0	Ductile Iron	7.55	0.05	0.000
635	P-266	519	J-216	J-47	8.0	Ductile Iron	-578.10	3.69	0.008
636	P-267	1,780	J-4	J-222	10.0	Ductile Iron	-32.33	0.13	0.000
637	P-268	220	J-222	J-5	10.0	Ductile Iron	1,017.67	4.16	0.007
639	P-270	120	J-7	J-223	10.0	Ductile Iron	11.06	0.05	0.000
640	P-271	230	J-6	J-223	6.0	Ductile Iron	-2.05	0.02	0.000
641	P-272	1,307	J-5	J-224	10.0	Ductile Iron	1,226.21	5.01	0.010
642	P-274	990	J-224	J-225	8.0	Ductile Iron	2.37	0.02	0.000
643	P-273	708	J-224	J-226	10.0	Ductile Iron	941.17	3.84	0.006
644	P-275	167	J-226	J-7	10.0	Ductile Iron	939.73	3.84	0.006
645	P-276	410	J-226	J-227	8.0	Ductile Iron	1.44	0.01	0.000
646	P-277	580	J-227	J-228	8.0	Ductile Iron	0.82	0.01	0.000
647	P-278	27	J-16	J-229	8.0	Ductile Iron	668.54	4.27	0.010
650	P-282	656	J-230	J-10	10.0	Ductile Iron	-922.32	3.77	0.006
652	P-284	23	J-230	J-231	8.0	Ductile Iron	276.29	1.76	0.002
653	P-285	121	J-231	J-15	8.0	Ductile Iron	276.00	1.76	0.002
654	P-286	790	J-60	J-232	2.0	Ductile Iron	2.67	0.27	0.000
655	P-288	123	J-232	J-38	8.0	Ductile Iron	1.23	0.01	0.000
656	P-295	227	J-117	J-237	6.0	Ductile Iron	-62.65	0.71	0.001
657	P-296	385	J-237	J-238	6.0	Ductile Iron	-67.36	0.76	0.001
658	P-297	259	J-238	J-239	6.0	Ductile Iron	-68.80	0.78	0.001
659	P-298	192	J-239	J-240	6.0	Ductile Iron	1.03	0.01	0.000
660	P-299	152	J-239	J-241	6.0	Ductile Iron	-70.44	0.80	0.001
661	P-300	140	J-237	J-242	6.0	Ductile Iron	2.87	0.03	0.000
662	P-301	355	J-242	J-243	6.0	Ductile Iron	1.64	0.02	0.000
665	P-304	332	J-245	J-246	8.0	Ductile Iron	1.23	0.01	0.000
666	P-305	424	J-246	J-247	8.0	Ductile Iron	0.82	0.01	0.000
670	P-309	100	J-250	J-120	6.0	Ductile Iron	3.49	0.04	0.000
671	P-310	128	J-122	J-251	6.0	Ductile Iron	0.62	0.01	0.000
673	P-313	143	J-121	J-254	6.0	Ductile Iron	1.03	0.01	0.000
674	P-314	158	J-145	J-255	8.0	Ductile Iron	0.00	0.00	0.000
675	P-317	411	J-146	J-256	8.0	Ductile Iron	214.60	1.37	0.001

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
676	P-318	150	J-256	J-164	8.0	Ductile Iron	211.73	1.35	0.001
677	P-319	204	J-197	J-256	4.0	Ductile Iron	-2.05	0.05	0.000
678	P-320	257	J-142	J-141	8.0	Ductile Iron	-61.70	0.39	0.000
681	P-323	174	J-153	J-259	8.0	Ductile Iron	0.41	0.00	0.000
682	P-324	341	J-157	J-260	8.0	Ductile Iron	-111.59	0.71	0.000
683	P-325	490	J-260	J-152	6.0	Ductile Iron	0.00	0.00	0.000
685	P-327	44	J-260	J-158	8.0	Ductile Iron	-264.52	1.69	0.002
689	P-188	441	J-192	T-2	12.0	Ductile Iron	284.16	0.81	0.000
690	P-372	337	J-229	J-284	8.0	Ductile Iron	1,313.95	8.39	0.035
691	P-373	313	J-284	J-24	8.0	Ductile Iron	1,309.50	8.36	0.035
694	P-41	200	J-51	J-53	8.0	Ductile Iron	-0.88	0.01	0.000
695	P-377	78	J-3	J-68	8.0	Ductile Iron	650.00	4.15	0.010
702	P-376	550	J-297	J-279	12.0	Ductile Iron	124.05	0.35	0.000
703	P-378	375	J-241	J-279	12.0	Ductile Iron	-109.32	0.31	0.000
704	P-379	110	J-279	PMP-2	12.0	Ductile Iron	14.73	0.04	0.000
709	P-396	1,299	J-269	J-281	12.0	Ductile Iron	40.64	0.12	0.000
712	P-350	70	J-272	J-5	12.0	Ductile Iron	208.74	0.59	0.000
717	P-383	1,746	J-214	J-269	12.0	Ductile Iron	-709.10	2.01	0.002
724	P-395	508	J-285	J-282	8.0	Ductile Iron	4.44	0.03	0.000
725	P-397	1,472	J-285	J-286	8.0	Ductile Iron	-4.44	0.03	0.000
726	P-398	634	J-286	J-275	8.0	Ductile Iron	-4.44	0.03	0.000
727	P-399	1,161	J-275	J-287	12.0	Ductile Iron	-35.31	0.10	0.000
732	P-404	92	T-4	PMP-3	12.0	Ductile Iron	959.93	2.72	0.003
733	P-405	151	PMP-3	J-280	12.0	Ductile Iron	959.93	2.72	0.003
737	P-409	325	J-164	J-290	10.0	Ductile Iron	250.90	1.02	0.001
738	P-410	335	J-290	J-165	10.0	Ductile Iron	251.63	1.03	0.001
739	P-411	285	J-290	J-166	6.0	Ductile Iron	-2.72	0.03	0.000
742	P-412	427	J-107	J-241	8.0	Ductile Iron	-37.86	0.24	0.000
745	P-413	1,247	J-116	J-135	6.0	Ductile Iron	60.75	0.69	0.001
748	P-414	219	J-118	J-250	6.0	Ductile Iron	3.90	0.04	0.000
749	P-415	318	J-245	J-118	6.0	Ductile Iron	-1.23	0.01	0.000
750	P-416	406	J-71	J-75	6.0	Ductile Iron	458.38	5.20	0.024
769	P-280	252	J-229	J-230	10.0	Ductile Iron	-645.61	2.64	0.003
770	P-418	184	J-255	T-2	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)
771	P-419	1,219	J-251	J-255	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
772	P-420	851	J-181	J-173	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
774	P-421	251	J-207	J-291	6.0	Ductile Iron	145.36	1.65	0.003
775	P-422	255	J-291	J-29	6.0	Ductile Iron	270.63	3.07	0.009
777	P-423	639	J-291	J-292	8.0	Ductile Iron	-127.31	0.81	0.000
779	P-424	245	J-292	J-293	8.0	Ductile Iron	-127.31	0.81	0.000
780	P-425	639	J-293	J-207	8.0	Ductile Iron	-128.13	0.82	0.000
788	P-431	474	J-224	J-8	12.0	PVC	282.67	0.80	0.000
789	P-432	151	J-259	J-151	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
801	P-436	282	J-101	J-297	6.0	Ductile Iron	1.64	0.02	0.000
802	P-437	282	J-297	J-105	6.0	Ductile Iron	1.23	0.01	0.000
807	P-440	193	J-298	J-98	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
808	P-441	413	J-297	J-298	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
814	P-442	504	J-96	J-297	12.0	Ductile Iron	124.05	0.35	0.000
817	P-443	300	J-28	J-299	6.0	Ductile Iron	274.00	3.11	0.009
818	P-444	242	J-299	J-207	6.0	Ductile Iron	273.70	3.11	0.009
820	P-445	239	J-299	J-300	8.0	Ductile Iron	0.29	0.00	0.000
823	P-447	60	PMP-2	J-301	12.0	Ductile Iron	14.73	0.04	0.000
839	P-449	715	J-38	J-302	6.0	Ductile Iron	13.92	0.16	0.000
841	P-450	290	J-302	J-303	10.0	Ductile Iron	13.51	0.06	0.000
843	P-451	276	J-155	J-304	8.0	Ductile Iron	-88.27	0.56	0.000
844	P-452	118	J-304	J-260	8.0	Ductile Iron	-152.93	0.98	0.001
846	P-453	800	J-304	J-305	6.0	Ductile Iron	32.33	0.37	0.000
852	P-456	339	J-282	J-308	6.0	Ductile Iron	1.64	0.02	0.000
855	P-458	520	J-309	J-282	12.0	Ductile Iron	10.46	0.03	0.000
857	P-459	732	J-275	J-310	12.0	Ductile Iron	20.30	0.06	0.000
858	P-460	381	J-310	J-309	12.0	Ductile Iron	16.00	0.05	0.000
860	P-461	353	J-274	J-311	12.0	Ductile Iron	-5.28	0.01	0.000
861	P-462	327	J-311	J-275	12.0	Ductile Iron	-10.57	0.03	0.000
863	P-463	289	J-309	J-312	6.0	Ductile Iron	3.49	0.04	0.000
865	P-464	389	J-310	J-313	6.0	Ductile Iron	1.23	0.01	0.000
867	P-465	424	J-311	J-314	6.0	Ductile Iron	5.28	0.06	0.000
878	P-466	165	J-272	J-315	12.0	Ductile Iron	-208.74	0.59	0.000
879	P-467	1,354	J-315	J-269	12.0	Ductile Iron	751.18	2.13	0.002
880	P-468	156	J-280	J-315	12.0	Ductile Iron	959.93	2.72	0.002
882	P-469	155	J-55	J-316	8.0	Ductile Iron	-722.20	4.61	0.012
883	P-470	280	J-316	J-53	8.0	Ductile Iron	-722.20	4.61	0.012
884	P-471	113	J-54	J-316	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
907	P-472	119	J-272	T-4	12.0	Ductile Iron	0.00	0.00	0.000
916	P-473	266	J-47	J-317	12.0	Ductile Iron	97.59	0.28	0.000
918	P-474	285	J-317	J-318	12.0	Ductile Iron	97.59	0.28	0.000
920	P-475	370	J-318	J-319	12.0	Ductile Iron	97.59	0.28	0.000
922	P-476	213	J-13	J-320	12.0	PVC	276.66	0.78	0.000
923	P-477	677	J-320	J-45	6.0	Ductile Iron	374.25	4.25	0.016
924	P-478	143	J-319	J-320	12.0	Ductile Iron	97.59	0.28	0.000
926	P-479	349	J-319	J-321	8.0	Ductile Iron	0.00	0.00	0.000
939	P-480	1,012	J-303	J-322	10.0	Ductile Iron	0.00	0.00	0.000
943	P-481	471	J-305	J-156	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
944	P-482	199	J-305	J-170	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
946	P-483	60	J-301	PRV-1	12.0	Ductile Iron	14.73	0.04	0.000
947	P-484	305	PRV-1	J-98	12.0	Ductile Iron	14.73	0.04	0.000
955	P-486	61	J-322	H-2	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
957	P-488	150	J-294	J-222	10.0	Ductile Iron	1,050.00	4.29	0.007
959	P-489	70	J-65	H-3	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
961	P-490	54	H-4	J-212	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
963	P-491	52	J-282	H-5	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
965	P-492	45	J-15	H-6	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
967	P-493	44	H-7	J-121	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
969	P-494	46	J-239	H-8	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
971	P-495	60	H-9	J-170	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2041 MD FF

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
973	P-496	181	J-97	H-10	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
975	P-497	48	J-220	H-11	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
980	P-498	445	J-85	J-323	12.0	Ductile Iron	347.87	0.99	0.000
981	P-499	397	J-323	J-127	8.0	Ductile Iron	347.87	2.22	0.003
986	P-502	436	J-7	J-10	10.0	Ductile Iron	928.47	3.79	0.005
991	P-504	366	J-191	J-325	6.0	Ductile Iron	-22.44	0.25	0.000
992	P-505	243	J-325	J-189	6.0	Ductile Iron	-48.90	0.55	0.000
998	P-509	340	J-325	J-327	8.0	Ductile Iron	26.46	0.17	0.000
999	P-510	253	J-327	J-326	8.0	Ductile Iron	-65.80	0.42	0.000
1000	P-511	114	J-327	J-191	8.0	Ductile Iron	92.26	0.59	0.000
1003	P-512	351	J-326	J-329	8.0	Ductile Iron	-65.80	0.42	0.000
1004	P-513	286	J-329	J-190	8.0	Ductile Iron	-65.80	0.42	0.000
1005	P-514	176	J-324	J-10	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
1007	P-6	335	J-8	J-330	12.0	PVC	278.54	0.79	0.000
1008	P-5	378	J-330	J-13	12.0	PVC	278.54	0.79	0.000
1010	P-503	418	J-8	J-331	8.0	PVC	0.00	0.00	0.000
1011	P-532	180	J-331	J-324	8.0	PVC	0.00	0.00	0.000
1017	P-400	533	J-287	J-334	12.0	Ductile Iron	-40.64	0.12	0.000
1018	P-531	264	J-334	J-278	12.0	Ductile Iron	-40.64	0.12	0.000
1020	P-515	360	J-334	J-335	12.0	PVC	0.00	0.00	0.000
1022	P-516	268	J-335	J-336	12.0	PVC	0.00	0.00	0.000
1026	P-518	297	J-337	J-338	12.0	PVC	0.00	0.00	0.000
1028	P-519	298	J-338	J-339	12.0	PVC	0.00	0.00	0.000
1030	P-520	306	J-339	J-340	12.0	PVC	0.00	0.00	0.000
1034	P-522	315	J-341	J-342	12.0	PVC	0.00	0.00	0.000
1036	P-523	154	J-342	J-343	12.0	PVC	0.00	0.00	0.000
1038	P-524	132	J-343	J-344	12.0	PVC	0.00	0.00	0.000
1041	P-387	907	J-281	J-346	12.0	Ductile Iron	40.64	0.12	0.000
1044	P-525	288	J-346	J-347	12.0	Ductile Iron	40.64	0.12	0.000
1047	P-526	300	J-347	J-348	12.0	Ductile Iron	40.64	0.12	0.000
1050	P-527	302	J-348	J-349	12.0	Ductile Iron	40.64	0.12	0.000
1053	P-528	259	J-349	J-350	12.0	Ductile Iron	40.64	0.12	0.000
1056	P-529	270	J-350	J-351	12.0	Ductile Iron	40.64	0.12	0.000
1057	P-530	354	J-351	J-278	12.0	Ductile Iron	40.64	0.12	0.000
1059	P-517	305	J-336	J-352	12.0	PVC	0.00	0.00	0.000
1062	P-533	295	J-352	J-353	12.0	PVC	0.00	0.00	0.000
1065	P-534	305	J-353	J-354	12.0	PVC	0.00	0.00	0.000
1066	P-535	294	J-354	J-337	12.0	PVC	0.00	0.00	0.000
1068	P-521	295	J-340	J-355	12.0	PVC	0.00	0.00	0.000
1069	P-536	285	J-355	J-341	12.0	PVC	0.00	0.00	0.000

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
945	PRV-1	895.3	12.0	1,010.9	50.0	14.73	1,112.1	1,010.9	101.20

Active Scenario: 2041 MD FF

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Design) (gpm)	Flow (Total) (gpm)	Pump Head (ft)
407	PMP-2	895.0	ALTEEJAN BOOSTER PUMP max day	On	957.1	1,112.1	1,500.00	14.73	155.00
408	PMP-3	820.0	Cutler Way Booster Pump Future	On	845.8	1,045.2	3,000.00	959.93	199.40

Active Scenario: 2041 MD FF

ID	Label	Zone	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Initial) (ft)	Elevation (Maximum) (ft)	Diameter (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
402	T-1	Zone-1	873.9	950.5	954.2	976.9	22.00	-1,513.36	954.2
403	T-2	Zone-1	868.6	922.6	948.7	972.6	35.83	-827.05	948.7
405	T-4	Zone-1	821.0	821.0	846.1	850.0	60.00	959.92	846.1

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
142	J-1	855.0	Zone-1	-550.00	972.6	50.9
143	J-2	865.0	Zone-1	-300.00	970.6	45.7
387	J-3	818.0	Zone-1	-650.00	977.2	68.9
144	J-4	842.0	Zone-1	54.96	986.2	62.4
145	J-5	820.5	Zone-1	0.35	984.7	71.0
146	J-6	820.0	Zone-1	3.49	980.0	69.2
147	J-7	818.0	Zone-1	0.35	980.0	70.1
148	J-8	810.0	Zone-1	7.02	981.1	74.0
149	J-10	816.0	Zone-1	1.39	979.5	70.8
150	J-11	819.0	Zone-1	0.00	979.5	69.5
151	J-12	820.0	Zone-1	2.79	979.5	69.0
152	J-13	810.0	Zone-1	3.19	981.1	74.0
153	J-14	810.0	Zone-1	7.70	978.7	73.0
154	J-15	819.0	Zone-1	0.00	978.7	69.1
155	J-16	819.0	Zone-1	2.57	978.7	69.1
156	J-17	824.0	Zone-1	1.74	976.1	65.8
157	J-18	824.0	Zone-1	6.42	975.9	65.7
158	J-19	838.0	Zone-1	3.83	975.7	59.6
159	J-20	841.0	Zone-1	1.54	975.9	58.3
160	J-21	841.0	Zone-1	1.79	975.7	58.3
161	J-22	842.0	Zone-1	2.14	975.6	57.8
162	J-23	845.0	Zone-1	2.44	975.6	56.5
163	J-24	834.0	Zone-1	1.74	976.6	61.7
164	J-25	835.0	Zone-1	2.44	975.9	61.0
165	J-26	832.0	Zone-1	1.79	975.7	62.2
166	J-27	835.0	Zone-1	58.58	975.5	60.8
167	J-28	835.0	Zone-1	5.13	975.4	60.7
168	J-29	852.0	Zone-1	0.00	974.2	52.9
170	J-37	872.0	Zone-1	2.44	974.1	44.2
171	J-38	870.0	Zone-1	1.05	974.1	45.0
172	J-39	857.0	Zone-1	1.05	974.1	50.7
173	J-40	860.0	Zone-1	3.14	974.0	49.3
174	J-41	862.0	Zone-1	5.58	973.8	48.3
175	J-42	860.0	Zone-1	2.79	973.5	49.1
176	J-43	840.0	Zone-1	0.00	973.4	57.7
177	J-44	845.0	Zone-1	0.00	973.4	55.5
178	J-45	816.0	Zone-1	1.49	978.7	70.4
179	J-46	764.5	Zone-1	2.57	982.2	94.2
180	J-47	776.0	Zone-1	23.01	981.0	88.7
181	J-48	764.5	Zone-1	1.49	981.1	93.7
182	J-49	780.0	Zone-1	5.98	979.6	86.4
183	J-50	809.0	Zone-1	57.39	978.4	73.3
184	J-51	822.0	Zone-1	1.49	976.3	66.7
186	J-53	819.0	Zone-1	7.82	976.3	68.0
187	J-54	819.0	Zone-1	0.00	975.9	67.9
188	J-55	817.0	Zone-1	6.37	976.0	68.8
189	J-56	818.0	Zone-1	2.49	975.5	68.1

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
190	J-57	819.0	Zone-1	2.54	974.6	67.3
191	J-58	820.0	Zone-1	1.74	974.5	66.9
192	J-59	830.0	Zone-1	1.39	974.4	62.5
193	J-60	845.0	Zone-1	2.09	974.2	55.9
194	J-61	850.0	Zone-1	0.00	974.2	53.7
195	J-62	821.0	Zone-1	0.35	976.2	67.2
196	J-63	823.0	Zone-1	2.79	974.2	65.4
197	J-64	824.0	Zone-1	3.04	974.2	65.0
198	J-65	826.0	Zone-1	1.99	973.7	63.9
199	J-66	850.0	Zone-1	2.44	973.7	53.5
200	J-67	858.0	Zone-1	0.00	973.7	50.1
201	J-68	815.0	Zone-1	0.00	976.5	69.9
202	J-69	817.0	Zone-1	4.88	974.7	68.2
203	J-70	826.0	Zone-1	55.39	973.5	63.8
204	J-71	803.0	Zone-1	54.11	974.3	74.1
206	J-75	808.0	Zone-1	50.80	973.3	71.5
207	J-76	817.0	Zone-1	3.76	973.5	67.7
208	J-77	822.0	Zone-1	54.80	972.7	65.2
209	J-78	828.0	Zone-1	2.09	972.7	62.6
210	J-79	840.0	Zone-1	1.74	972.6	57.4
211	J-80	830.0	Zone-1	2.94	972.2	61.5
212	J-81	833.0	Zone-1	3.14	972.2	60.2
213	J-82	827.0	Zone-1	3.29	972.3	62.9
214	J-84	808.0	Zone-1	0.00	972.2	71.0
215	J-85	809.0	Zone-1	60.93	971.4	70.2
216	J-86	861.0	Zone-1	8.32	971.8	47.9
217	J-87	838.0	Zone-1	1.05	971.7	57.9
218	J-88	850.0	Zone-1	1.39	971.6	52.6
219	J-89	865.0	Zone-1	2.79	971.5	46.1
220	J-90	860.0	Zone-1	1.39	971.4	48.2
221	J-91	850.0	Zone-1	0.00	971.4	52.5
222	J-92	855.0	Zone-1	1.74	971.4	50.4
223	J-93	863.0	Zone-1	0.00	971.2	46.8
224	J-94	863.0	Zone-1	0.00	970.4	46.5
225	J-95	870.0	Zone-1	3.83	971.1	43.7
226	J-96	870.0	Zone-1	3.14	970.7	43.6
227	J-97	892.0	Zone-2	0.25	1,010.9	51.5
228	J-98	897.0	Zone-2	8.98	1,010.9	49.3
229	J-99	895.0	Zone-2	0.00	1,010.9	50.2
230	J-100	900.5	Zone-2	0.00	1,010.9	47.8
231	J-101	901.0	Zone-2	9.88	1,010.9	47.6
232	J-102	901.0	Zone-2	3.14	1,010.9	47.5
233	J-105	890.0	Zone-2	2.09	1,010.9	52.3
234	J-106	859.0	Zone-1	1.05	970.7	48.3
235	J-107	860.0	Zone-1	5.23	970.4	47.8
236	J-108	825.0	Zone-1	6.23	970.4	62.9
237	J-109	860.0	Zone-1	0.00	970.8	47.9

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
238	J-110	860.5	Zone-1	1.74	970.8	47.7
239	J-111	855.0	Zone-1	1.74	970.8	50.1
240	J-112	862.0	Zone-1	1.39	970.5	46.9
241	J-113	861.0	Zone-1	3.08	971.7	47.9
242	J-114	861.0	Zone-1	1.54	971.4	47.8
243	J-115	861.0	Zone-1	2.09	971.0	47.6
244	J-116	835.0	Zone-1	6.62	970.5	58.6
245	J-117	818.0	Zone-1	2.74	970.3	65.9
246	J-118	832.0	Zone-1	2.09	970.3	59.8
248	J-120	850.0	Zone-1	1.74	970.3	52.0
249	J-121	861.0	Zone-1	0.00	970.3	47.3
250	J-122	845.0	Zone-1	1.39	970.3	54.2
251	J-123	826.0	Zone-1	4.48	971.1	62.8
252	J-124	850.0	Zone-1	1.05	971.3	52.5
253	J-125	838.0	Zone-1	10.27	971.1	57.6
254	J-126	821.0	Zone-1	52.11	970.9	64.9
255	J-127	815.0	Zone-1	18.46	970.7	67.4
256	J-128	804.0	Zone-1	145.46	970.1	71.9
257	J-129	800.0	Zone-1	178.67	969.9	73.5
258	J-130	792.0	Zone-1	6.15	970.4	77.2
259	J-133	817.0	Zone-1	6.62	970.6	66.5
260	J-134	822.0	Zone-1	5.73	970.6	64.3
261	J-135	826.0	Zone-1	8.72	970.4	62.5
267	J-141	810.0	Zone-1	10.61	970.1	69.3
268	J-142	814.0	Zone-1	3.14	970.2	67.6
269	J-143	816.0	Zone-1	1.39	970.1	66.7
270	J-144	818.0	Zone-1	3.49	970.2	65.9
271	J-145	859.0	Zone-1	2.09	970.2	48.1
272	J-146	820.0	Zone-1	1.05	970.0	64.9
273	J-147	819.0	Zone-1	8.98	970.0	65.3
274	J-148	850.0	Zone-1	0.00	970.0	51.9
275	J-149	813.0	Zone-1	3.49	969.9	67.9
276	J-150	812.0	Zone-1	5.23	969.4	68.1
277	J-151	805.0	Zone-1	0.00	968.7	70.8
278	J-152	808.0	Zone-1	0.00	968.7	69.5
279	J-153	799.0	Zone-1	54.96	968.3	73.2
280	J-154	787.0	Zone-1	0.00	968.3	78.4
281	J-155	785.0	Zone-1	0.00	968.3	79.3
282	J-156	782.0	Zone-1	94.40	968.2	80.6
283	J-157	799.0	Zone-1	54.96	968.7	73.4
284	J-158	801.0	Zone-1	1.74	968.8	72.6
285	J-159	802.0	Zone-1	0.70	968.8	72.2
286	J-160	807.0	Zone-1	1.74	969.1	70.1
287	J-161	830.0	Zone-1	1.11	969.4	60.3
288	J-162	835.0	Zone-1	1.74	969.4	58.2
290	J-164	847.0	Zone-1	2.01	969.5	53.0
291	J-165	845.0	Zone-1	3.14	969.5	53.9

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
292	J-166	825.0	Zone-1	1.99	969.4	62.5
293	J-167	817.0	Zone-1	2.44	969.3	65.9
294	J-168	815.0	Zone-1	2.09	969.2	66.7
295	J-169	810.0	Zone-1	1.39	969.1	68.8
296	J-170	800.0	Zone-1	0.00	968.7	73.0
297	J-171	802.0	Zone-1	55.31	968.6	72.1
298	J-172	800.0	Zone-1	1.49	968.6	72.9
299	J-173	805.0	Zone-1	47.20	968.5	70.8
300	J-174	830.0	Zone-1	54.00	969.3	60.3
301	J-175	843.0	Zone-1	4.88	969.3	54.7
302	J-176	835.0	Zone-1	2.79	969.3	58.1
303	J-177	820.0	Zone-1	3.83	969.3	64.6
304	J-178	822.0	Zone-1	3.83	969.4	63.8
305	J-179	851.0	Zone-1	1.74	969.6	51.3
306	J-180	819.0	Zone-1	4.88	969.5	65.1
307	J-181	819.0	Zone-1	1.39	969.5	65.1
309	J-183	841.0	Zone-1	2.09	969.5	55.6
310	J-184	837.0	Zone-1	3.74	969.5	57.3
311	J-185	857.0	Zone-1	1.50	969.6	48.7
312	J-186	860.0	Zone-1	2.79	969.6	47.4
313	J-187	862.0	Zone-1	3.49	969.6	46.6
314	J-188	861.0	Zone-1	0.00	969.6	47.0
315	J-189	868.0	Zone-1	1.74	969.7	44.0
316	J-190	863.0	Zone-1	1.39	969.7	46.1
317	J-191	862.0	Zone-1	0.00	969.7	46.6
318	J-192	861.0	Zone-1	1.74	969.9	47.1
319	J-197	855.0	Zone-1	1.74	969.7	49.6
320	J-198	856.0	Zone-1	1.74	969.7	49.2
321	J-199	867.0	Zone-1	3.39	969.8	44.5
322	J-200	868.0	Zone-1	0.00	969.8	44.0
323	J-201	865.0	Zone-1	0.00	969.8	45.3
324	J-202	818.0	Zone-1	2.44	979.5	69.9
325	J-203	820.5	Zone-1	3.83	979.5	68.8
327	J-205	812.0	Zone-1	6.33	972.8	69.6
328	J-206	827.0	Zone-1	13.46	971.6	62.6
329	J-207	845.0	Zone-1	0.35	974.6	56.1
330	J-208	845.0	Zone-1	7.44	971.3	54.6
331	J-211	764.5	Zone-1	10.27	981.3	93.8
332	J-212	760.5	Zone-1	7.70	982.0	95.8
333	J-213	758.0	Zone-1	6.42	982.4	97.1
334	J-214	759.5	Zone-1	3.85	983.1	96.7
335	J-215	765.0	Zone-1	1.49	982.6	94.2
336	J-216	779.0	Zone-1	20.96	980.0	86.9
337	J-217	763.0	Zone-1	1.28	979.9	93.9
338	J-218	770.0	Zone-1	2.99	979.9	90.8
339	J-219	767.0	Zone-1	5.13	979.9	92.1
340	J-220	760.0	Zone-1	12.83	979.9	95.2

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
342	J-222	821.0	Zone-1	0.00	986.2	71.5
343	J-223	818.0	Zone-1	15.31	980.0	70.1
344	J-224	819.0	Zone-1	0.00	981.2	70.2
345	J-225	828.0	Zone-1	4.03	981.2	66.3
346	J-226	818.0	Zone-1	0.00	980.2	70.2
347	J-227	821.0	Zone-1	1.05	980.2	68.9
348	J-228	828.0	Zone-1	1.39	980.2	65.9
349	J-229	819.5	Zone-1	0.35	978.7	68.9
350	J-230	819.0	Zone-1	0.70	978.8	69.1
351	J-231	819.0	Zone-1	0.50	978.8	69.1
352	J-232	865.0	Zone-1	2.44	974.1	47.2
353	J-237	820.0	Zone-1	3.14	970.3	65.0
354	J-238	852.0	Zone-1	2.44	970.4	51.2
355	J-239	861.0	Zone-1	1.05	970.4	47.3
356	J-240	859.0	Zone-1	1.74	970.4	48.2
357	J-241	860.0	Zone-1	1.74	970.4	47.8
358	J-242	825.0	Zone-1	2.09	970.3	62.9
359	J-243	835.0	Zone-1	2.79	970.3	58.5
361	J-245	824.0	Zone-1	0.00	970.3	63.3
362	J-246	835.0	Zone-1	0.70	970.3	58.5
363	J-247	840.0	Zone-1	1.39	970.3	56.4
366	J-250	839.0	Zone-1	0.70	970.3	56.8
367	J-251	863.0	Zone-1	1.05	970.3	46.4
369	J-254	843.0	Zone-1	1.74	970.3	55.1
370	J-255	863.0	Zone-1	0.00	970.2	46.4
371	J-256	843.0	Zone-1	1.39	969.7	54.8
374	J-259	803.0	Zone-1	0.70	968.3	71.5
375	J-260	800.0	Zone-1	0.00	968.7	73.0
378	J-269	763.0	Zone-1	2.44	983.8	95.5
380	J-272	819.0	Zone-1	0.00	984.6	71.7
381	J-274	772.0	Zone-1	8.98	983.7	91.6
382	J-275	790.0	Zone-1	0.00	983.7	83.8
394	J-278	770.0	Zone-1	0.00	983.7	92.5
389	J-279	890.0	Zone-1	0.00	970.4	34.8
390	J-280	820.0	Zone-1	0.00	984.5	71.2
391	J-281	770.0	Zone-1	0.00	983.7	92.5
395	J-282	780.0	Zone-1	22.54	983.6	88.1
384	J-284	830.0	Zone-1	7.57	977.6	63.8
397	J-285	790.0	Zone-1	0.00	983.7	83.8
398	J-286	790.0	Zone-1	0.00	983.7	83.8
399	J-287	790.0	Zone-1	9.06	983.7	83.8
736	J-290	846.0	Zone-1	3.39	969.5	53.5
773	J-291	848.0	Zone-1	3.49	974.5	54.7
776	J-292	863.0	Zone-1	0.00	974.6	48.3
778	J-293	860.0	Zone-1	1.39	974.6	49.6
782	J-294	821.0	Zone-1	-1,050.00	987.2	71.9
386	J-297	885.0	Zone-1	0.00	970.5	37.0

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
800	J-297	895.0	Zone-2	0.70	1,010.9	50.1
805	J-298	897.0	Zone-2	(N/A)	(N/A)	(N/A)
816	J-299	840.0	Zone-1	0.00	975.0	58.4
819	J-300	845.0	Zone-1	0.50	975.0	56.2
822	J-301	895.0	Zone-2	0.00	1,125.4	99.7
838	J-302	846.0	Zone-1	0.70	974.0	55.4
840	J-303	840.0	Zone-1	22.97	974.0	58.0
842	J-304	795.5	Zone-1	54.96	968.5	74.8
845	J-305	800.0	Zone-1	54.96	968.2	72.8
851	J-308	786.0	Zone-1	2.79	983.6	85.5
853	J-309	783.2	Zone-1	3.49	983.7	86.7
856	J-310	785.5	Zone-1	5.23	983.7	85.7
859	J-311	782.2	Zone-1	0.00	983.7	87.2
862	J-312	783.0	Zone-1	5.93	983.6	86.8
864	J-313	782.0	Zone-1	2.09	983.7	87.2
866	J-314	780.0	Zone-1	8.98	983.7	88.1
877	J-315	812.9	Zone-1	0.00	984.5	74.3
881	J-316	817.7	Zone-1	0.00	976.1	68.5
915	J-317	788.0	Zone-1	0.00	981.0	83.5
917	J-318	800.0	Zone-1	0.00	981.0	78.3
919	J-319	805.0	Zone-1	0.00	981.0	76.2
921	J-320	811.4	Zone-1	0.00	981.0	73.4
925	J-321	808.0	Zone-1	0.00	981.0	74.9
938	J-322	826.0	Zone-1	0.00	974.0	64.1
979	J-323	812.2	<None>	0.00	971.3	68.8
988	J-324	815.0	Zone-1	0.00	981.1	71.9
990	J-325	865.6	Zone-1	0.00	969.7	45.0
994	J-326	850.0	Zone-1	0.00	969.7	51.8
997	J-327	857.0	Zone-1	0.00	969.7	48.8
1002	J-329	857.2	Zone-1	0.00	969.7	48.7
1006	J-330	810.0	Zone-1	0.00	981.1	74.0
1009	J-331	813.5	Zone-1	0.00	981.1	72.5
1016	J-334	774.4	Zone-1	0.00	983.7	90.5
1019	J-335	770.0	Zone-1	0.00	983.7	92.5
1021	J-336	770.0	Zone-1	0.00	983.7	92.5
1023	J-337	770.0	Zone-1	0.00	983.7	92.5
1025	J-338	770.0	Zone-1	0.00	983.7	92.5
1027	J-339	770.0	Zone-1	0.00	983.7	92.5
1029	J-340	770.0	Zone-1	0.00	983.7	92.5
1031	J-341	770.0	Zone-1	0.00	983.7	92.5
1033	J-342	770.0	Zone-1	0.00	983.7	92.5
1035	J-343	770.0	Zone-1	0.00	983.7	92.5
1037	J-344	775.0	Zone-1	0.00	983.7	90.3
1040	J-346	770.0	Zone-1	0.00	983.7	92.5
1043	J-347	770.0	Zone-1	0.00	983.7	92.5
1046	J-348	770.0	Zone-1	0.00	983.7	92.5
1049	J-349	770.0	Zone-1	0.00	983.7	92.5

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1052	J-350	770.0	Zone-1	0.00	983.7	92.5
1055	J-351	770.0	Zone-1	0.00	983.7	92.5
1058	J-352	770.0	<None>	0.00	983.7	92.5
1061	J-353	770.0	<None>	0.00	983.7	92.5
1064	J-354	770.0	<None>	0.00	983.7	92.5
1067	J-355	770.0	<None>	0.00	983.7	92.5

Active Scenario: 2041 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
412	P-9	155	J-10	J-202	8.0	Ductile Iron	9.06	0.06	0.000
413	P-10	165	J-202	J-11	8.0	Ductile Iron	6.62	0.04	0.000
414	P-11	281	J-11	J-203	8.0	Ductile Iron	3.77	0.02	0.000
415	P-12	297	J-203	J-12	8.0	Ductile Iron	-0.07	0.00	0.000
416	P-13	382	J-12	J-11	8.0	Ductile Iron	-2.86	0.02	0.000
417	P-16	359	J-15	J-14	6.0	Ductile Iron	7.70	0.09	0.000
418	P-17	131	J-15	J-16	8.0	Ductile Iron	118.37	0.76	0.000
419	P-18	298	J-16	J-45	8.0	Ductile Iron	-8.92	0.06	0.000
420	P-19	396	J-45	J-50	8.0	Ductile Iron	151.95	0.97	0.001
421	P-20	801	J-50	J-49	8.0	Ductile Iron	-237.97	1.52	0.001
422	P-22	883	J-47	J-46	8.0	Ductile Iron	-221.95	1.42	0.001
423	P-23	288	J-47	J-48	8.0	Ductile Iron	-78.84	0.50	0.000
424	P-25	486	J-24	J-17	6.0	Ductile Iron	78.88	0.90	0.001
425	P-26	253	J-17	J-18	6.0	Ductile Iron	77.14	0.88	0.001
426	P-27	650	J-18	J-19	6.0	Ductile Iron	44.67	0.51	0.000
427	P-28	256	J-19	J-23	6.0	Ductile Iron	40.84	0.46	0.000
428	P-29	476	J-23	J-28	6.0	Ductile Iron	52.72	0.60	0.000
429	P-30	216	J-28	J-27	6.0	Ductile Iron	-52.86	0.60	0.000
430	P-31	224	J-27	J-26	6.0	Ductile Iron	-86.24	0.98	0.001
431	P-32	191	J-26	J-25	6.0	Ductile Iron	-84.70	0.96	0.001
432	P-33	281	J-25	J-24	6.0	Ductile Iron	-126.30	1.43	0.002
433	P-34	251	J-18	J-20	6.0	Ductile Iron	26.04	0.30	0.000
434	P-35	326	J-20	J-25	6.0	Ductile Iron	-39.16	0.44	0.000
435	P-36	190	J-20	J-21	6.0	Ductile Iron	63.66	0.72	0.001
436	P-37	370	J-21	J-26	6.0	Ductile Iron	3.33	0.04	0.000
437	P-38	231	J-21	J-22	6.0	Ductile Iron	58.53	0.66	0.001
438	P-39	424	J-22	J-27	6.0	Ductile Iron	42.06	0.48	0.000
439	P-40	224	J-22	J-23	6.0	Ductile Iron	14.33	0.16	0.000
440	P-44	230	J-68	J-62	8.0	Ductile Iron	189.12	1.21	0.001
441	P-45	220	J-62	J-55	8.0	Ductile Iron	188.77	1.20	0.001
443	P-47	418	J-53	J-24	8.0	Ductile Iron	-153.18	0.98	0.001
444	P-48	306	J-25	J-54	4.0	Ductile Iron	0.00	0.00	0.000
445	P-49	207	J-55	J-56	8.0	Ductile Iron	326.26	2.08	0.003
446	P-50	429	J-56	J-27	6.0	Ductile Iron	-16.86	0.19	0.000
447	P-51	302	J-56	J-57	8.0	Ductile Iron	340.62	2.17	0.003
448	P-52	209	J-57	J-58	8.0	Ductile Iron	116.22	0.74	0.000
449	P-53	373	J-58	J-59	8.0	Ductile Iron	114.48	0.73	0.000
450	P-54	370	J-59	J-60	8.0	Ductile Iron	113.08	0.72	0.000
451	P-55	137	J-60	J-61	8.0	Ductile Iron	109.16	0.70	0.000
452	P-56	164	J-63	J-64	6.0	Ductile Iron	-2.79	0.03	0.000
453	P-57	311	J-57	J-64	8.0	Ductile Iron	221.87	1.42	0.001
454	P-58	341	J-64	J-69	6.0	Ductile Iron	-101.27	1.15	0.001
455	P-59	350	J-69	J-68	8.0	Ductile Iron	-460.88	2.94	0.005
456	P-60	391	J-69	J-76	8.0	Ductile Iron	354.74	2.26	0.003
457	P-61	351	J-76	J-70	8.0	Ductile Iron	35.38	0.23	0.000
458	P-62	209	J-70	J-65	8.0	Ductile Iron	-203.81	1.30	0.001
459	P-63	484	J-65	J-66	8.0	Ductile Iron	-4.28	0.03	0.000

Active Scenario: 2041 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
460	P-64	288	J-66	J-67	6.0	Ductile Iron	-6.72	0.08	0.000
461	P-65	460	J-64	J-65	8.0	Ductile Iron	201.53	1.29	0.001
462	P-66	335	J-70	J-77	8.0	Ductile Iron	299.58	1.91	0.002
463	P-67	249	J-77	J-78	8.0	Ductile Iron	69.48	0.44	0.000
464	P-68	311	J-78	J-79	8.0	Ductile Iron	67.39	0.43	0.000
465	P-69	423	J-77	J-82	8.0	Ductile Iron	175.31	1.12	0.001
466	P-70	158	J-82	J-81	8.0	Ductile Iron	172.02	1.10	0.001
467	P-72	1,290	J-50	J-71	8.0	Ductile Iron	332.52	2.12	0.003
470	P-77	283	J-75	J-76	6.0	Ductile Iron	-63.64	0.72	0.001
471	P-78	436	J-75	J-84	8.0	Ductile Iron	291.26	1.86	0.003
472	P-79	331	J-84	J-85	8.0	Ductile Iron	291.26	1.86	0.003
474	P-81	426	J-76	J-205	8.0	Ductile Iron	251.95	1.61	0.002
475	P-82	748	J-205	J-206	8.0	Ductile Iron	245.62	1.57	0.002
476	P-83	354	J-206	J-123	8.0	Ductile Iron	232.16	1.48	0.001
479	P-87	357	J-29	J-39	8.0	Ductile Iron	90.58	0.58	0.000
480	P-88	278	J-39	J-38	8.0	Ductile Iron	27.76	0.18	0.000
481	P-90	360	J-38	J-37	8.0	Ductile Iron	2.44	0.02	0.000
483	P-96	247	J-39	J-40	6.0	Ductile Iron	61.78	0.70	0.001
484	P-97	395	J-40	J-41	6.0	Ductile Iron	58.64	0.67	0.001
485	P-98	497	J-41	J-42	6.0	Ductile Iron	53.07	0.60	0.000
486	P-99	240	J-42	J-43	6.0	Ductile Iron	50.28	0.57	0.000
487	P-100	213	J-43	J-44	6.0	Ductile Iron	50.28	0.57	0.000
488	P-101	217	J-44	J-67	6.0	Ductile Iron	-106.58	1.21	0.002
489	P-102	275	J-67	J-61	6.0	Ductile Iron	-113.30	1.29	0.002
490	P-103	113	J-61	J-29	6.0	Ductile Iron	-4.14	0.05	0.000
491	P-104	224	J-44	J-79	6.0	Ductile Iron	156.86	1.78	0.003
492	P-105	64	J-79	J-80	6.0	Ductile Iron	222.50	2.52	0.006
493	P-106	394	J-80	J-81	8.0	Ductile Iron	11.55	0.07	0.000
494	P-107	414	J-80	J-87	8.0	Ductile Iron	208.01	1.33	0.001
495	P-108	242	J-87	J-88	6.0	Ductile Iron	52.79	0.60	0.000
496	P-109	279	J-88	J-89	6.0	Ductile Iron	51.40	0.58	0.000
497	P-110	311	J-89	J-90	6.0	Ductile Iron	48.61	0.55	0.000
498	P-111	240	J-90	J-95	6.0	Ductile Iron	97.63	1.11	0.001
499	P-112	51	J-95	J-96	6.0	Ductile Iron	231.75	2.63	0.007
500	P-114	346	J-97	J-98	8.0	Ductile Iron	-0.25	0.00	0.000
501	P-115	296	J-98	J-99	8.0	Ductile Iron	15.81	0.10	0.000
502	P-116	396	J-99	J-100	6.0	Ductile Iron	15.81	0.18	0.000
503	P-117	247	J-100	J-101	6.0	Ductile Iron	15.81	0.18	0.000
504	P-118	321	J-101	J-102	6.0	Ductile Iron	3.14	0.04	0.000
506	P-122	291	J-87	J-91	8.0	Ductile Iron	198.37	1.27	0.001
507	P-123	345	J-91	J-90	8.0	Ductile Iron	50.41	0.32	0.000
508	P-124	86	J-91	J-92	8.0	Ductile Iron	147.96	0.94	0.001
509	P-125	275	J-92	J-93	8.0	Ductile Iron	137.96	0.88	0.001
510	P-126	284	J-93	J-95	8.0	Ductile Iron	137.96	0.88	0.001
511	P-127	428	J-92	J-114	8.0	Ductile Iron	8.26	0.05	0.000
512	P-128	472	J-87	J-86	8.0	Ductile Iron	-44.20	0.28	0.000
513	P-129	501	J-86	J-81	8.0	Ductile Iron	-180.44	1.15	0.001

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ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
514	P-130	146	J-86	J-113	8.0	Ductile Iron	127.92	0.82	0.000
515	P-131	82	J-113	J-114	8.0	Ductile Iron	404.37	2.58	0.004
516	P-132	82	J-114	J-115	8.0	Ductile Iron	411.10	2.62	0.004
517	P-133	227	J-115	J-112	8.0	Ductile Iron	318.71	2.03	0.003
518	P-134	184	J-112	T-1	8.0	Ductile Iron	317.31	2.03	0.003
519	P-135	90	J-2	J-94	8.0	Ductile Iron	300.00	1.91	0.002
520	P-136	78	J-94	T-1	8.0	Ductile Iron	484.16	3.09	0.006
521	P-137	328	J-94	J-96	8.0	Ductile Iron	-184.16	1.18	0.001
522	P-138	234	J-96	J-106	6.0	Ductile Iron	-14.29	0.16	0.000
523	P-139	211	J-106	J-109	6.0	Ductile Iron	-15.34	0.17	0.000
524	P-140	214	J-109	J-110	6.0	Ductile Iron	-15.34	0.17	0.000
525	P-141	190	J-110	J-111	6.0	Ductile Iron	-17.08	0.19	0.000
526	P-142	231	J-111	J-115	6.0	Ductile Iron	-90.30	1.02	0.001
527	P-143	380	J-111	J-116	6.0	Ductile Iron	71.48	0.81	0.001
528	P-144	270	J-116	J-108	6.0	Ductile Iron	42.43	0.48	0.000
529	P-145	789	J-108	J-107	6.0	Ductile Iron	1.63	0.02	0.000
536	P-152	258	J-135	J-134	8.0	Ductile Iron	-178.18	1.14	0.001
537	P-153	356	J-134	J-126	8.0	Ductile Iron	-190.53	1.22	0.001
538	P-154	360	J-126	J-123	8.0	Ductile Iron	-121.09	0.77	0.000
539	P-155	306	J-133	J-134	6.0	Ductile Iron	-6.62	0.08	0.000
540	P-156	128	J-113	J-1	8.0	Ductile Iron	-550.00	3.51	0.007
541	P-157	232	J-113	J-124	8.0	Ductile Iron	270.46	1.73	0.002
542	P-158	368	J-124	J-125	8.0	Ductile Iron	131.82	0.84	0.000
543	P-159	326	J-125	J-126	8.0	Ductile Iron	121.55	0.78	0.000
544	P-160	28	J-124	J-208	8.0	Ductile Iron	137.60	0.88	0.001
545	P-162	318	J-208	J-123	8.0	Ductile Iron	130.15	0.83	0.000
546	P-163	257	J-123	J-127	8.0	Ductile Iron	236.74	1.51	0.001
547	P-164	307	J-127	J-128	8.0	Ductile Iron	284.66	1.82	0.002
548	P-165	372	J-128	J-129	8.0	Ductile Iron	139.20	0.89	0.001
549	P-166	304	J-129	J-130	4.0	Ductile Iron	-39.47	1.01	0.002
550	P-167	380	J-130	J-127	8.0	Ductile Iron	-163.94	1.05	0.001
551	P-170	797	J-130	J-141	8.0	Ductile Iron	118.33	0.76	0.000
552	P-171	215	J-141	J-149	8.0	Ductile Iron	181.65	1.16	0.001
553	P-172	560	J-149	J-150	8.0	Ductile Iron	178.16	1.14	0.001
554	P-173	215	J-135	J-142	8.0	Ductile Iron	191.89	1.22	0.001
555	P-174	162	J-142	J-143	8.0	Ductile Iron	114.82	0.73	0.000
556	P-175	837	J-143	J-144	6.0	Ductile Iron	-30.56	0.35	0.000
557	P-176	525	J-144	J-145	6.0	Ductile Iron	2.09	0.02	0.000
558	P-177	371	J-144	J-117	6.0	Ductile Iron	-36.14	0.41	0.000
559	P-178	487	J-117	J-108	6.0	Ductile Iron	-34.57	0.39	0.000
560	P-179	525	J-117	J-118	6.0	Ductile Iron	10.81	0.12	0.000
562	P-182	291	J-120	J-121	6.0	Ductile Iron	4.18	0.05	0.000
563	P-183	261	J-121	J-122	6.0	Ductile Iron	2.44	0.03	0.000
564	P-184	185	J-143	J-146	8.0	Ductile Iron	143.98	0.92	0.001
565	P-185	91	J-146	J-147	10.0	Ductile Iron	-26.54	0.11	0.000
566	P-186	497	J-147	J-148	10.0	Ductile Iron	-35.52	0.15	0.000
567	P-187	381	J-148	T-2	10.0	Ductile Iron	-35.52	0.15	0.000

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ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
568	P-190	643	J-192	J-199	12.0	Ductile Iron	202.39	0.57	0.000
569	P-191	416	J-199	J-200	12.0	Ductile Iron	199.01	0.56	0.000
570	P-192	587	J-200	J-201	12.0	Ductile Iron	94.34	0.27	0.000
571	P-193	64	J-201	J-191	12.0	Ductile Iron	94.34	0.27	0.000
573	P-195	70	J-189	J-200	6.0	Ductile Iron	-104.66	1.19	0.002
574	P-197	303	J-197	J-198	8.0	Ductile Iron	1.74	0.01	0.000
575	P-199	230	J-164	J-162	8.0	Ductile Iron	123.37	0.79	0.000
577	P-201	157	J-162	J-161	8.0	Ductile Iron	121.63	0.78	0.000
578	P-202	484	J-161	J-160	8.0	Ductile Iron	137.44	0.88	0.001
579	P-203	130	J-160	J-158	8.0	Ductile Iron	308.63	1.97	0.002
580	P-204	381	J-150	J-160	8.0	Ductile Iron	172.94	1.10	0.001
581	P-205	751	J-158	J-159	4.0	Ductile Iron	1.24	0.03	0.000
582	P-206	313	J-161	J-166	6.0	Ductile Iron	-16.92	0.19	0.000
583	P-207	354	J-166	J-167	6.0	Ductile Iron	38.72	0.44	0.000
584	P-208	341	J-167	J-174	6.0	Ductile Iron	-6.73	0.08	0.000
585	P-209	297	J-167	J-168	6.0	Ductile Iron	43.01	0.49	0.000
586	P-210	522	J-168	J-176	6.0	Ductile Iron	-27.19	0.31	0.000
587	P-211	148	J-168	J-169	6.0	Ductile Iron	68.11	0.77	0.001
588	P-212	505	J-169	J-177	6.0	Ductile Iron	-46.03	0.52	0.000
589	P-213	176	J-169	J-159	6.0	Ductile Iron	112.75	1.28	0.002
590	P-214	69	J-159	J-170	6.0	Ductile Iron	113.29	1.29	0.002
591	P-215	234	J-170	J-171	8.0	Ductile Iron	104.00	0.66	0.000
592	P-216	507	J-171	J-172	8.0	Ductile Iron	48.70	0.31	0.000
593	P-218	478	J-170	J-157	8.0	Ductile Iron	9.29	0.06	0.000
594	P-220	155	J-152	J-151	8.0	Ductile Iron	0.00	0.00	0.000
595	P-222	255	J-153	J-154	8.0	Ductile Iron	-55.66	0.36	0.000
596	P-223	398	J-154	J-155	8.0	Ductile Iron	-55.66	0.36	0.000
597	P-224	384	J-155	J-156	8.0	Ductile Iron	94.40	0.60	0.000
599	P-226	670	J-165	J-174	6.0	Ductile Iron	46.60	0.53	0.000
600	P-227	231	J-174	J-175	6.0	Ductile Iron	-14.13	0.16	0.000
601	P-228	415	J-165	J-186	10.0	Ductile Iron	-71.55	0.29	0.000
602	P-229	737	J-186	J-175	6.0	Ductile Iron	45.65	0.52	0.000
603	P-230	277	J-175	J-176	6.0	Ductile Iron	26.64	0.30	0.000
604	P-231	288	J-176	J-177	6.0	Ductile Iron	-3.34	0.04	0.000
605	P-232	297	J-177	J-178	6.0	Ductile Iron	-53.21	0.60	0.000
606	P-233	933	J-178	J-179	6.0	Ductile Iron	-30.94	0.35	0.000
607	P-234	272	J-179	J-188	6.0	Ductile Iron	-29.12	0.33	0.000
608	P-235	192	J-188	J-187	6.0	Ductile Iron	-4.29	0.05	0.000
609	P-236	312	J-187	J-186	10.0	Ductile Iron	119.99	0.49	0.000
610	P-237	333	J-187	J-189	10.0	Ductile Iron	-127.76	0.52	0.000
611	P-239	244	J-189	J-190	6.0	Ductile Iron	14.45	0.16	0.000
612	P-240	407	J-190	J-188	6.0	Ductile Iron	24.83	0.28	0.000
613	P-241	272	J-190	J-185	6.0	Ductile Iron	43.28	0.49	0.000
614	P-242	415	J-185	J-179	6.0	Ductile Iron	3.56	0.04	0.000
615	P-243	314	J-185	J-184	6.0	Ductile Iron	38.21	0.43	0.000
616	P-244	193	J-184	J-183	6.0	Ductile Iron	17.93	0.20	0.000
617	P-245	625	J-183	J-180	6.0	Ductile Iron	15.84	0.18	0.000

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ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
618	P-246	480	J-184	J-181	6.0	Ductile Iron	16.54	0.19	0.000
620	P-248	378	J-181	J-180	6.0	Ductile Iron	15.15	0.17	0.000
621	P-249	308	J-180	J-178	6.0	Ductile Iron	26.11	0.30	0.000
622	P-253	160	J-48	J-211	6.0	Ductile Iron	-80.34	0.91	0.001
623	P-254	394	J-64	J-70	6.0	Ductile Iron	115.78	1.31	0.002
624	P-255	363	J-172	J-173	8.0	Ductile Iron	47.20	0.30	0.000
625	P-256	319	J-212	J-213	6.0	Ductile Iron	-98.30	1.12	0.001
626	P-257	446	J-213	J-214	6.0	Ductile Iron	-104.72	1.19	0.002
627	P-258	336	J-214	J-215	8.0	Ductile Iron	226.01	1.44	0.001
628	P-259	337	J-215	J-46	8.0	Ductile Iron	224.51	1.43	0.001
629	P-260	606	J-212	J-211	6.0	Ductile Iron	90.60	1.03	0.001
630	P-261	217	J-49	J-216	8.0	Ductile Iron	-243.94	1.56	0.002
631	P-262	403	J-216	J-217	8.0	Ductile Iron	22.24	0.14	0.000
632	P-263	289	J-217	J-218	8.0	Ductile Iron	20.95	0.13	0.000
633	P-264	264	J-218	J-219	8.0	Ductile Iron	17.97	0.11	0.000
634	P-265	505	J-219	J-220	8.0	Ductile Iron	12.83	0.08	0.000
635	P-266	519	J-216	J-47	8.0	Ductile Iron	-287.14	1.83	0.002
636	P-267	1,780	J-4	J-222	10.0	Ductile Iron	-54.96	0.22	0.000
637	P-268	220	J-222	J-5	10.0	Ductile Iron	995.04	4.06	0.007
639	P-270	120	J-7	J-223	10.0	Ductile Iron	18.80	0.08	0.000
640	P-271	230	J-6	J-223	6.0	Ductile Iron	-3.49	0.04	0.000
641	P-272	1,307	J-5	J-224	10.0	Ductile Iron	588.58	2.40	0.003
642	P-274	990	J-224	J-225	8.0	Ductile Iron	4.03	0.03	0.000
643	P-273	708	J-224	J-226	10.0	Ductile Iron	402.61	1.64	0.001
644	P-275	167	J-226	J-7	10.0	Ductile Iron	400.17	1.63	0.001
645	P-276	410	J-226	J-227	8.0	Ductile Iron	2.44	0.02	0.000
646	P-277	580	J-227	J-228	8.0	Ductile Iron	1.39	0.01	0.000
647	P-278	27	J-16	J-229	8.0	Ductile Iron	124.72	0.80	0.000
650	P-282	656	J-230	J-10	10.0	Ductile Iron	-370.56	1.51	0.001
652	P-284	23	J-230	J-231	8.0	Ductile Iron	126.56	0.81	0.000
653	P-285	121	J-231	J-15	8.0	Ductile Iron	126.07	0.80	0.000
654	P-286	790	J-60	J-232	2.0	Ductile Iron	1.83	0.19	0.000
655	P-288	123	J-232	J-38	8.0	Ductile Iron	-0.61	0.00	0.000
656	P-295	227	J-117	J-237	6.0	Ductile Iron	-15.11	0.17	0.000
657	P-296	385	J-237	J-238	6.0	Ductile Iron	-23.13	0.26	0.000
658	P-297	259	J-238	J-239	6.0	Ductile Iron	-25.57	0.29	0.000
659	P-298	192	J-239	J-240	6.0	Ductile Iron	1.74	0.02	0.000
660	P-299	152	J-239	J-241	6.0	Ductile Iron	-28.36	0.32	0.000
661	P-300	140	J-237	J-242	6.0	Ductile Iron	4.88	0.06	0.000
662	P-301	355	J-242	J-243	6.0	Ductile Iron	2.79	0.03	0.000
665	P-304	332	J-245	J-246	8.0	Ductile Iron	2.09	0.01	0.000
666	P-305	424	J-246	J-247	8.0	Ductile Iron	1.39	0.01	0.000
670	P-309	100	J-250	J-120	6.0	Ductile Iron	5.93	0.07	0.000
671	P-310	128	J-122	J-251	6.0	Ductile Iron	1.05	0.01	0.000
673	P-313	143	J-121	J-254	6.0	Ductile Iron	1.74	0.02	0.000
674	P-314	158	J-145	J-255	8.0	Ductile Iron	0.00	0.00	0.000
675	P-317	411	J-146	J-256	8.0	Ductile Iron	169.47	1.08	0.001

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ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
676	P-318	150	J-256	J-164	8.0	Ductile Iron	164.59	1.05	0.001
677	P-319	204	J-197	J-256	8.0	Ductile Iron	-3.49	0.02	0.000
678	P-320	257	J-142	J-141	8.0	Ductile Iron	73.93	0.47	0.000
681	P-323	174	J-153	J-259	8.0	Ductile Iron	0.70	0.00	0.000
682	P-324	341	J-157	J-260	8.0	Ductile Iron	-45.67	0.29	0.000
683	P-325	490	J-260	J-152	8.0	Ductile Iron	0.00	0.00	0.000
685	P-327	44	J-260	J-158	8.0	Ductile Iron	-305.64	1.95	0.002
689	P-188	441	J-192	T-2	12.0	Ductile Iron	-204.14	0.58	0.000
690	P-372	337	J-229	J-284	8.0	Ductile Iron	367.67	2.35	0.003
691	P-373	313	J-284	J-24	8.0	Ductile Iron	360.10	2.30	0.003
694	P-41	200	J-51	J-53	8.0	Ductile Iron	-1.49	0.01	0.000
695	P-377	78	J-3	J-68	8.0	Ductile Iron	650.00	4.15	0.010
702	P-376	550	J-297	J-279	8.0	Ductile Iron	58.74	0.37	0.000
703	P-378	375	J-241	J-279	12.0	Ductile Iron	-33.70	0.10	0.000
704	P-379	110	J-279	PMP-2	12.0	Ductile Iron	25.04	0.07	0.000
709	P-396	1,299	J-269	J-281	12.0	Ductile Iron	69.10	0.20	0.000
712	P-350	70	J-272	J-5	12.0	Ductile Iron	-406.12	1.15	0.001
717	P-383	1,746	J-214	J-269	12.0	Ductile Iron	-334.58	0.95	0.000
724	P-395	508	J-285	J-282	8.0	Ductile Iron	7.96	0.05	0.000
725	P-397	1,472	J-285	J-286	8.0	Ductile Iron	-7.96	0.05	0.000
726	P-398	634	J-286	J-275	8.0	Ductile Iron	-7.96	0.05	0.000
727	P-399	1,161	J-275	J-287	12.0	Ductile Iron	-60.03	0.17	0.000
732	P-404	92	T-4	PMP-3	12.0	Ductile Iron	0.00	0.00	0.000
733	P-405	151	PMP-3	J-280	12.0	Ductile Iron	0.00	0.00	0.000
737	P-409	325	J-164	J-290	10.0	Ductile Iron	39.21	0.16	0.000
738	P-410	335	J-290	J-165	10.0	Ductile Iron	-21.81	0.09	0.000
739	P-411	285	J-290	J-166	6.0	Ductile Iron	57.63	0.65	0.001
742	P-412	427	J-107	J-241	8.0	Ductile Iron	-3.59	0.02	0.000
745	P-413	1,247	J-116	J-135	6.0	Ductile Iron	22.42	0.25	0.000
748	P-414	219	J-118	J-250	6.0	Ductile Iron	6.62	0.08	0.000
749	P-415	318	J-245	J-118	6.0	Ductile Iron	-2.09	0.02	0.000
750	P-416	406	J-71	J-75	8.0	Ductile Iron	278.41	1.78	0.002
769	P-280	252	J-229	J-230	10.0	Ductile Iron	-243.30	0.99	0.001
770	P-418	184	J-255	T-2	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)
771	P-419	1,219	J-251	J-255	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
772	P-420	851	J-181	J-173	10.0	Ductile Iron	(N/A)	(N/A)	(N/A)
774	P-421	251	J-207	J-291	6.0	Ductile Iron	52.60	0.60	0.000
775	P-422	255	J-291	J-29	6.0	Ductile Iron	94.73	1.07	0.001
777	P-423	639	J-291	J-292	8.0	Ductile Iron	-45.61	0.29	0.000
779	P-424	245	J-292	J-293	8.0	Ductile Iron	-45.61	0.29	0.000
780	P-425	639	J-293	J-207	8.0	Ductile Iron	-47.00	0.30	0.000
788	P-431	474	J-224	J-8	12.0	PVC	181.94	0.52	0.000
789	P-432	151	J-259	J-151	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
801	P-436	282	J-101	J-297	6.0	Ductile Iron	2.79	0.03	0.000
802	P-437	282	J-297	J-105	6.0	Ductile Iron	2.09	0.02	0.000
807	P-440	193	J-298	J-98	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
808	P-441	413	J-297	J-298	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2041 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
814	P-442	504	J-96	J-297	6.0	Ductile Iron	58.74	0.67	0.001
817	P-443	300	J-28	J-299	6.0	Ductile Iron	100.45	1.14	0.001
818	P-444	242	J-299	J-207	6.0	Ductile Iron	99.96	1.13	0.001
820	P-445	239	J-299	J-300	8.0	Ductile Iron	0.50	0.00	0.000
823	P-447	60	PMP-2	J-301	12.0	Ductile Iron	25.04	0.07	0.000
839	P-449	715	J-38	J-302	6.0	Ductile Iron	23.66	0.27	0.000
841	P-450	290	J-302	J-303	10.0	Ductile Iron	22.97	0.09	0.000
843	P-451	276	J-155	J-304	8.0	Ductile Iron	-150.06	0.96	0.001
844	P-452	118	J-304	J-260	8.0	Ductile Iron	-259.98	1.66	0.002
846	P-453	800	J-304	J-305	6.0	Ductile Iron	54.96	0.62	0.000
852	P-456	339	J-282	J-308	6.0	Ductile Iron	2.79	0.03	0.000
855	P-458	520	J-309	J-282	12.0	Ductile Iron	17.37	0.05	0.000
857	P-459	732	J-275	J-310	12.0	Ductile Iron	34.11	0.10	0.000
858	P-460	381	J-310	J-309	12.0	Ductile Iron	26.79	0.08	0.000
860	P-461	353	J-274	J-311	12.0	Ductile Iron	-8.98	0.03	0.000
861	P-462	327	J-311	J-275	12.0	Ductile Iron	-17.97	0.05	0.000
863	P-463	289	J-309	J-312	6.0	Ductile Iron	5.93	0.07	0.000
865	P-464	389	J-310	J-313	6.0	Ductile Iron	2.09	0.02	0.000
867	P-465	424	J-311	J-314	6.0	Ductile Iron	8.98	0.10	0.000
878	P-466	165	J-272	J-315	12.0	Ductile Iron	406.11	1.15	0.001
879	P-467	1,354	J-315	J-269	12.0	Ductile Iron	406.11	1.15	0.001
880	P-468	156	J-280	J-315	12.0	Ductile Iron	0.00	0.00	0.000
882	P-469	155	J-55	J-316	8.0	Ductile Iron	-143.86	0.92	0.001
883	P-470	280	J-316	J-53	8.0	Ductile Iron	-143.86	0.92	0.001
884	P-471	113	J-54	J-316	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
907	P-472	119	J-272	T-4	12.0	Ductile Iron	0.00	0.00	0.000
916	P-473	266	J-47	J-317	12.0	Ductile Iron	-9.36	0.03	0.000
918	P-474	285	J-317	J-318	12.0	Ductile Iron	-9.36	0.03	0.000
920	P-475	370	J-318	J-319	12.0	Ductile Iron	-9.36	0.03	0.000
922	P-476	213	J-13	J-320	12.0	PVC	171.72	0.49	0.000
923	P-477	677	J-320	J-45	6.0	Ductile Iron	162.36	1.84	0.003
924	P-478	143	J-319	J-320	12.0	Ductile Iron	-9.36	0.03	0.000
926	P-479	349	J-319	J-321	8.0	Ductile Iron	0.00	0.00	0.000
939	P-480	1,012	J-303	J-322	10.0	Ductile Iron	0.00	0.00	0.000
943	P-481	471	J-305	J-156	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
944	P-482	199	J-305	J-170	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)
946	P-483	60	J-301	PRV-1	12.0	Ductile Iron	25.04	0.07	0.000
947	P-484	305	PRV-1	J-98	12.0	Ductile Iron	25.04	0.07	0.000
955	P-486	61	J-322	H-2	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
957	P-488	150	J-294	J-222	10.0	Ductile Iron	1,050.00	4.29	0.007
959	P-489	70	J-65	H-3	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
961	P-490	54	H-4	J-212	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
963	P-491	52	J-282	H-5	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
965	P-492	45	J-15	H-6	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
967	P-493	44	H-7	J-121	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
969	P-494	46	J-239	H-8	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
971	P-495	60	H-9	J-170	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)

Active Scenario: 2041 PHD

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
973	P-496	181	J-97	H-10	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
975	P-497	48	J-220	H-11	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)
980	P-498	445	J-85	J-323	12.0	Ductile Iron	230.33	0.65	0.000
981	P-499	397	J-323	J-127	8.0	Ductile Iron	230.33	1.47	0.001
986	P-502	436	J-7	J-10	10.0	Ductile Iron	381.02	1.56	0.001
991	P-504	366	J-191	J-325	6.0	Ductile Iron	18.33	0.21	0.000
992	P-505	243	J-325	J-189	6.0	Ductile Iron	39.29	0.45	0.000
998	P-509	340	J-325	J-327	8.0	Ductile Iron	-20.96	0.13	0.000
999	P-510	253	J-327	J-326	8.0	Ductile Iron	55.05	0.35	0.000
1000	P-511	114	J-327	J-191	8.0	Ductile Iron	-76.02	0.49	0.000
1003	P-512	351	J-326	J-329	8.0	Ductile Iron	55.05	0.35	0.000
1004	P-513	286	J-329	J-190	8.0	Ductile Iron	55.05	0.35	0.000
1005	P-514	176	J-324	J-10	8.0	PVC	(N/A)	(N/A)	(N/A)
1007	P-6	335	J-8	J-330	12.0	PVC	174.91	0.50	0.000
1008	P-5	378	J-330	J-13	12.0	PVC	174.91	0.50	0.000
1010	P-503	418	J-8	J-331	8.0	PVC	0.00	0.00	0.000
1011	P-532	180	J-331	J-324	8.0	PVC	0.00	0.00	0.000
1017	P-400	533	J-287	J-334	12.0	Ductile Iron	-69.10	0.20	0.000
1018	P-531	264	J-334	J-278	12.0	Ductile Iron	-69.10	0.20	0.000
1020	P-515	360	J-334	J-335	6.0	Ductile Iron	0.00	0.00	0.000
1022	P-516	268	J-335	J-336	6.0	Ductile Iron	0.00	0.00	0.000
1026	P-518	297	J-337	J-338	6.0	Ductile Iron	0.00	0.00	0.000
1028	P-519	298	J-338	J-339	6.0	Ductile Iron	0.00	0.00	0.000
1030	P-520	306	J-339	J-340	6.0	Ductile Iron	0.00	0.00	0.000
1034	P-522	315	J-341	J-342	6.0	Ductile Iron	0.00	0.00	0.000
1036	P-523	154	J-342	J-343	6.0	Ductile Iron	0.00	0.00	0.000
1038	P-524	132	J-343	J-344	6.0	Ductile Iron	0.00	0.00	0.000
1041	P-387	907	J-281	J-346	12.0	Ductile Iron	69.10	0.20	0.000
1044	P-525	288	J-346	J-347	12.0	Ductile Iron	69.10	0.20	0.000
1047	P-526	300	J-347	J-348	12.0	Ductile Iron	69.10	0.20	0.000
1050	P-527	302	J-348	J-349	12.0	Ductile Iron	69.10	0.20	0.000
1053	P-528	259	J-349	J-350	12.0	Ductile Iron	69.10	0.20	0.000
1056	P-529	270	J-350	J-351	12.0	Ductile Iron	69.10	0.20	0.000
1057	P-530	354	J-351	J-278	12.0	Ductile Iron	69.10	0.20	0.000
1059	P-517	305	J-336	J-352	6.0	Ductile Iron	0.00	0.00	0.000
1062	P-533	295	J-352	J-353	6.0	Ductile Iron	0.00	0.00	0.000
1065	P-534	305	J-353	J-354	6.0	Ductile Iron	0.00	0.00	0.000
1066	P-535	294	J-354	J-337	6.0	Ductile Iron	0.00	0.00	0.000
1068	P-521	295	J-340	J-355	6.0	Ductile Iron	0.00	0.00	0.000
1069	P-536	285	J-355	J-341	6.0	Ductile Iron	0.00	0.00	0.000

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
945	PRV-1	895.3	12.0	1,010.9	50.0	25.04	1,125.4	1,010.9	114.47

Active Scenario: 2041 PHD

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Design) (gpm)	Flow (Total) (gpm)	Pump Head (ft)
407	PMP-2	895.0	ALTEEJAN BOOSTER PUMP max day	On	970.4	1,125.4	1,500.00	25.04	155.00
408	PMP-3	820.0	Cutler Way Booster Pump Future	Off	849.5	984.5	3,000.00	0.00	0.00

Active Scenario: 2041 PHD

ID	Label	Zone	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Initial) (ft)	Elevation (Maximum) (ft)	Diameter (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
402	T-1	Zone-1	873.9	950.5	970.0	976.9	22.00	-801.48	970.0
403	T-2	Zone-1	868.6	922.6	970.0	972.6	35.83	239.66	970.0
405	T-4	Zone-1	821.0	821.0	849.5	850.0	60.00	0.00	849.5

24.
CITY OF ZILLAH DESIGN AND CONSTRUCTION STANDARDS

HLA
Engineering and Land Surveying, Inc.

Chapter 15.10
DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS

FOR PUBLIC WORKS IMPROVEMENTS

Sections:

15.10.010 General.

15.10.020 General plan requirements.

15.10.030 General requirements for all projects.

15.10.040 Water system improvements.

15.10.050 Sanitary sewer system improvements.

15.10.060 Stormwater improvements.

15.10.070 Street improvements.

15.10.010 General.

A. Enacting Authority. These design and construction standards are enacted by the city of Zillah, in accordance with state law, to protect and preserve the public health, safety, and general welfare.

B. Purpose. The purpose of these design and construction standards is to provide consistent requirements, standards, and specifications for the design and construction of public works infrastructure improvements by the city and by private developers.

C. State Environmental Policy Act (SEPA). These standards will not affect any considerations involving issues under the State Environmental Policy Act (SEPA). The city's responsible official will continue to make all necessary SEPA decisions when individual proposals are submitted.[1]

D. Conflicting Provisions. The standards, procedures, and requirements of these standards are the minimum necessary to promote the health, safety, and welfare of the residents of the city of Zillah. The city may adopt more rigorous or different standards, procedures, and requirements whenever necessary. If the provisions of these standards conflict with one another, or if a provision of these standards conflicts with the provisions of the city code or another ordinance of the city, the most restrictive provision or the provision imposing the highest standard shall prevail.

E. Severance. If any provision of these standards or its application to any person or circumstance is for any reason held to be invalid, the remainder of these standards or the application of the provisions is not affected.

F. Process.

1. Design Phase. Any person, firm, or corporation (the “developer”) who intends to plat land in accordance with the city of Zillah code and construct a public works improvement shall apply to the city director of public works. The request by the developer shall include a map showing the area to be served, the number and type of proposed units, or the type and size of the proposed facility and a general layout of the development.

Upon receipt of the design requirements from the director of public works, the developer shall employ a consulting engineer to prepare plans and specifications for the public works improvements in accordance with these construction standards and the Zillah Municipal Code. The developer or its consulting engineer shall submit three paper sets of plans and specifications for review by the city and/or the city’s engineer.

The city shall review the initial submittal and indicate corrections or additions or request additional information and return one “red lined” set to the developer. The developer shall make the required corrections and resubmit two paper sets and one electronic copy of revised plans and specifications to the city public works department.

When it has been determined the plans and specifications indicate compliance with city of Zillah standards, the developer shall submit the original plan tracings and specifications for final approval to the city. The cover sheet of the original plans shall contain an “APPROVED FOR CONSTRUCTION BY THE CITY OF ZILLAH” signature block. The city’s responsible official will sign the plans. Such approved plans and specifications shall not be changed, modified, or altered without authorization from the city public works director. The developer shall provide the city with a minimum of three copies of the approved plan set and specifications for use by city inspectors and city departments as required.

Upon receipt by the director of public works of the plan review fee, as discussed in subsection (H) of this section, the approved original plans and specifications will be returned to the developer.

2. Construction Phase. Before the developer’s contractor commences any work, he shall be required to attend a preconstruction conference with the city public works department, the city’s engineer, and utility companies as determined by the city of Zillah. The contractor will submit his insurance and construction schedule at this meeting.

All construction shall be inspected by the city of Zillah or its authorized agent. The contractor shall give a minimum of 10 days’ prior notice to the director of public works before the start of any construction activities.

After cleanup by the contractor and final inspection by the city, the city will calculate the inspection fees and submit them to the developer. The developer will pay the inspection fee, as discussed in subsection

(H) of this section, to the public works department.

G. Engineering Design Plan Requirements. All plans, specifications, engineering calculations, diagrams, and other relevant data shall be designed and prepared by a civil engineer licensed by the state of Washington (consultant), in accordance with ZMC 15.10.020, General plan requirements.

H. Plan Review and Inspection Fee. Plan review and inspection fees are hereby established to defray the administrative expense of plan review and inspection costs incurred by the city of Zillah.

The plan review and inspection fee shall be the total actual costs incurred by the city of Zillah, its agents, employees, and elected or appointed officials, for review and approval of the plans and specifications and for inspection of construction of the public works improvements. The fee shall include, but not be limited to, initial plan review, subsequent meetings with the developer, explanations to the developer's engineering consultant, reviews of revised plans, construction inspection, reinspections, and a final inspection prior to the expiration of the maintenance period.

The plan review fee shall be tabulated and sent to the developer and paid by the developer in full prior to the city releasing the approved original plans and specifications for construction or the issuance of a building permit.

The construction inspection fee shall be tabulated and sent to the developer and paid by the developer in full prior to the city issuing a certificate of occupancy or final acceptance of the public works improvements.

I. Record Drawings. The developer's consulting engineer shall maintain a neatly marked, full-sized print set of record drawings showing the final location and layout of all new construction of the public facilities. Prior to final acceptance by the city of Zillah, one set of reproducible record drawings and two sets of prints prepared by the developer's engineer and clearly marked "Record Drawings" shall be delivered to the director of public works for review and approval.

J. Transfer of Ownership. The developer shall complete a transfer of ownership form upon completion of the construction of the public works improvements and pending acceptance by the city. This form may be found in Appendix A. Appendix A is available at Zillah City Hall or on the city web site at www.cityofzillah.us.

K. Easements. Public utility easements shall be established for the location of new and future public improvements serving new land divisions and land developments. Easements shall also be granted across the front of new lots and existing lots to provide future utility access as required.

All easements required shall be prepared by the developer on the proper form and format for recording at the Yakima County auditor's office. The easement legal description shall be prepared by a land surveyor licensed in the state of Washington. The executed and notarized easement document shall be submitted to the director of public works for recording.

Ten-foot-wide utility easements shall be dedicated along the front of each lot in subdivisions and short subdivisions. Easements for new and/or future utility lines shall be a minimum of 16 feet wide, provided the width of the easements for buried utilities will be at least twice the depth of the planned excavation.

Utility easements shall be continuous and aligned from block to block within a subdivision and with easements in adjoining subdivisions to facilitate the extension and future extension of public utilities. (Ord. 1289 § 1 (Exh. A), 2011; Ord. 1213 § 1, 2009; Ord. 1202 § 2 (Exh. A), 2009)

15.10.020 General plan requirements.

All plans, specifications, engineering calculations, diagrams, and other relevant data shall be designed and prepared by a civil engineer licensed by the state of Washington.

A. General Plan Format.

1. Plan sheets and profile sheets or combined plan and profile sheets and detail sheets shall be on a sheet size of 24 inches by 36 inches or 22 inches by 34 inches.

2. Each sheet shall contain the following project information:

a. Project title and city project number, work order number, or LID number, if appropriate.

b. Quarter section, section, township, range.

c. Sheet title.

d. Page (of page) numbering.

e. Revision block.

f. Subdivision or short plat name.

3. The cover sheet shall contain the following:

a. Name, address, and phone number of the owner/developer;

b. Name, address, and phone number and stamp of the civil engineer preparing the plans (consultant);

c. “APPROVED FOR CONSTRUCTION BY THE CITY OF ZILLAH” signature block for city final approval of the plans;

d. “APPROVED FOR CONSTRUCTION BY THE CITY OF ZILLAH FIRE CHIEF” signature block;

e. Vicinity map showing the project site location;

f. An overall site plan with contours;

g. Table of contents;

h. Applicable project information; and

i. Utility locater: call 1-800-424-5555.

4. All plan sheets must have a north arrow preferably pointing to the top of the sheet or to the left, and must indicate the drawing scale. All engineering plans must be drawn to an appropriate engineer's scale. For profiles, the vertical scale shall be one inch equals two feet, one inch equals five feet, or one inch equals 10 feet. The horizontal scale shall be the same for both plan and profile and shall normally be one inch equals 20 feet. Plan and profile stationing shall generally read left to right.

5. The vertical datum for all plan submittals must be based on the city of Zillah datum. The benchmark used shall be referenced on the plans. An assumed datum will not be accepted.

6. Existing features and topography within the project construction limits must be shown on the plans. This shall include existing road width and surfacing, utility poles, existing underground utilities and surface appurtenances, significant trees, landscaping, and other elements that may affect design/construction.

7. Plan sheets shall indicate all adjacent property lines, right-of-way lines, and easements.

8. Plan sheets shall show all horizontal survey control as required to properly locate and tie the improvements in horizontal location.

B. Sanitary Sewer System Plan Requirements.

1. Show all existing and proposed sanitary sewer system features including, but not limited to, the following:

a. Sewer lines, gravity and force mains.

b. Side service, proposed locations.

c. Manholes.

d. Clean outs.

e. Pump stations.

2. Indicate all easements required for the sanitary sewer line extensions and laterals.

3. Provide an overall site plan of development with contours, to show that all lots/parcels will be served by the proposed sewer system at design depth for all new development.

4. Show the sanitary sewer system and water system on the same plan and profile for verification of minimum separation requirements. The design information for each may be on individual drawings for that system.

5. Slope, length, size, and pipe type shall be indicated for all lines and side sewers. Pipe length shall be measured from centerline of manholes. The minimum sewer line size allowed will be eight-inch diameter.

6. Provide a profile for each sanitary sewer line extension. Clearly indicate the vertical and horizontal scale. Show the profile on the same sheet with, and aligned underneath, the plan view as practical.

7. The plan and profile must show the location of all existing and proposed gas, water, irrigation, storm drain, and other utility crossings.

8. Generally show all vertical data in the profile view and all horizontal data in the plan view. It is not desirable to repeat the vertical data in the plan view unless it does not show in a profile.

9. Each manhole shall be uniquely numbered and shall be stationed off of a referenced centerline. Indicate rim and invert elevations in and out at all manholes. Indicate the length of each side sewer stub, the centerline stationing for each side sewer, and the size.

C. Water System Plan Requirements.

1. Show all existing and proposed water system features if known, including but not limited to:

a. Water mains.

b. Water valves.

c. Water meters.

d. Fire hydrants.

e. Blow offs.

f. Air and vacuum release valve assemblies.

g. Pressure reducing valves.

h. Fire sprinkler system lines.

i. Double check valves.

j. Post indicator valves.

k. Thrust blocking.

2. Indicate all easements required for the water main extensions and future extensions.

3. Show the water system and the sanitary sewer system on the same plan and profile view for verification of minimum separation requirements. The design information for each system may be on individual drawings for that system.

4. Show the length, size, and pipe type for all main extensions, fire sprinkler system services, and domestic services where applicable.

5. Identify all joint connections; provide detail of all nonstandard joints.

6. Show by station or dimension the location of all fire hydrants, tees, crosses, and services relative to centerlines or property lines.

7. A profile view shall be shown for all city water main extensions, aligned if practical with the plan view. Clearly indicate the horizontal and vertical scales.

8. Show the minimum cover and minimum separation on each sheet.

9. In the profile view, show all utilities crossing the proposed water main.

D. Stormwater System Plan Requirements.

1. Show all existing features if known and all proposed storm sewer (drain) system features, including but not limited to:

a. Storm drain mains and lines.

b. Catch basins.

c. Inlets.

d. Infiltration trenches.

e. Retention systems.

f. Biofiltration swales.

g. Culverts.

h. Streams.

i. Ditches.

j. Natural drainage swales.

k. Headwalls.

l. Oil/water separator assembly.

m. Other requirements of the Department of Ecology Stormwater Manual for Eastern Washington.

2. Indicate all easements required for the storm drainage system.

3. The plan shall clearly indicate the location of the storm drainage items stationed from a referenced centerline.

4. Show all horizontal measurements and control in the plan view.

5. Show slope, length, size, and pipe material for all storm drain mains and lines.

6. All catch basins and inlets shall be uniquely numbered and shall be clearly labeled. Stationing and offsets shall be indicated from referenced centerline. Show all proposed storm drain features within the right-of-way in a profile.

7. Indicate all grate, rim, and invert elevations in the profile view.

8. Provide stormwater runoff and drainage facilities sizing calculations as described in ZMC 15.10.060.

E. Street Plan Requirements.

1. Show all existing and proposed roadway improvements, including but not limited to:

a. Pavement.

b. Concrete curb and gutter.

c. Edge of pavement.

d. Sidewalk(s).

e. Utilities (manholes, power poles, pedestals, valves, water meters, etc.).

f. Sidewalk ramps.

g. Signs and barricades.

h. Driveways.

i. Rockery or retaining walls.

j. Mailboxes.

k. Monuments.

l. Streetlights, J-boxes and conduit runs.

m. Compliance with ADA requirements.

2. Show all right-of-way (R/W) lines, centerlines, and roadway widths for all rights-of-way.

3. Clearly differentiate between areas of existing pavement, areas of new pavement, and areas to be overlaid.

4. Provide a cross section or typical section of all rights-of-way indicating right-of-way width, centerline, pavement width, sidewalk, curb and gutter, pavement, and base thickness of proposed section.

5. Provide a plan and profile of all new public roadways or extensions of existing roadways. Provide topography within the R/W including utilities. Indicate all horizontal and vertical curve data, percent of grade, bearings, centerline stationing every 50 feet, finish grade elevations, and existing ground line. The profile of the existing centerline ground should extend a minimum of 100 feet before the beginning and at the end of the proposed improvements to show the gradient blend.

6. Align the profile view with the plan view, if practical. Clearly indicate the horizontal and the vertical scale.

7. Clearly label all profiles with respective street names and plan sheet reference numbers if drawn on separate sheets.

8. For developments where road work is required on an existing street, development plans are required to

include cross section of the existing street and spot elevations at proposed intersections and appurtenances to the project. (Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

15.10.030 General requirements for all projects.

A. Forward. The city of Zillah has adopted the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation (WSDOT), and the American Public Works Association (APWA) General Special Provisions (GSPs) for Division One General Requirements as the standard specifications governing all design and construction of public works improvements by the city and by private developers.[2]

All references hereinafter made to the "Standard Specifications" shall refer to the latest edition of the Standard Specifications described above. Except as may be amended, modified, or supplemented hereinafter, each section of the Standard Specifications shall be considered as much a part of these requirements as if they were actually set forth herein.

The Standard Specifications, general and project special provisions, and city standard plans and details contained in these city design and construction standards shall apply in their entirety to all city of Zillah public works projects. These standards have been prepared to form a compiled document intended to assist and inform developers, consultants, and contractors of the construction requirements to be used on proposed public works improvements.

The Standard Specifications, general and project special provisions, and city standard plans and details shall periodically be revised and updated. It shall be the responsibility of each user of this information to verify that he has the latest revisions prior to submitting any work covered by these specifications and details.

Developers and contractors are encouraged to contact the city of Zillah public works department to obtain a copy of these standards.

B. General. All work shall be done in accordance with the approved plans, the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation, latest edition, amendments, referenced codes and organizations, and these special provisions.

Note: The American Public Works Association (APWA) General Special Provisions (GSPs) to Division One of the WSDOT Standard Specifications amend Division One of the Standard Specifications for Road, Bridge, and Municipal Construction. These GSPs are available at www.wsdot.wa.gov/partners/apwa.

All materials incorporated into a proposed public works improvements project shall meet the requirements of Division Nine of the Standard Specifications or city of Zillah standards as shown in the standard plans and details and special provisions.

Any public works facility improvements or components that are not specifically addressed in these construction standards shall be designed by a professional engineer and provided to the city for review by the city engineer and city approval.

C. 1-01 Definitions and Terms – 1-01.3 Definitions. The terms defined in Section 1-01.3 of Division One of the Standard Specifications and the APWA GSPs shall be further described by the following:

This Section is supplemented with the following:

All references in the Standard Specifications to the terms “State”, “Department of Transportation”, “Washington State Transportation Commission”, “Commission”, “Secretary of Transportation”, “Secretary”, “Headquarters”, and “State Treasurer” shall be revised to read “Contracting Agency”.

All references to “State Materials Laboratory” shall be revised to read “Contracting Agency designated location”.

The venue of all causes of action arising from the advertisement, award, execution, and performance of the contract shall be in the Superior Court of the County where the Contracting Agency’s headquarters are located.

Additive: A supplemental unit of work or group of bid items, identified separately in the proposal, which may, at the discretion of the Contracting Agency, be awarded in addition to the base bid.

Alternate: One of two or more units of work or groups of bid items, identified separately in the proposal, from which the Contracting Agency may make a choice between different methods or material of construction for performing the same work.

City: Means the City of Zillah, a municipal corporation, as represented by its authorized officials, employees or agents.

Consultant: Means an engineer licensed in the State of Washington, employed by the Developer to design the improvement and prepare plans and specifications, perform construction staking, or similar services.

Contract Documents: Means the plans and specifications prepared by the Developer’s Consultant for the public works improvements contemplated and approved by the City.

Contractor: Means the person or firm employed by the Developer or under Contract with the City to do the construction of the public works improvements.

Contract Time: The period of time established by the terms and conditions of the contract within which the work must be physically completed.

Dates:

a. Bid Opening Date: The date on which the Contracting Agency publicly opens and reads the bids.

b. Award Date: The date of the formal decision of the Contracting Agency to accept the lowest responsible and responsive bidder for the work.

c. Contract Execution Date: The date the Contracting Agency officially binds the agency to the contract.

d. Notice to Proceed Date: The date stated in the Notice to Proceed on which the contract time begins.

e. Substantial Completion Date: The day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the operational and safety standpoint, and only minor incidental work, replacement of temporary substitute facilities, or correction or repair remains for the physical completion of the total contract.

f. Physical Completion Date: The day all of the work is physically completed on the project. All documentation required by the contract and required by law does not necessarily need to be furnished by the Contractor by this date.

g. Completion Date: The day all the work specified in the contract is completed and all the obligations of the Contractor under the contract are fulfilled by the Contractor. All documentation required by the contract and required by law must be furnished by the Contractor before establishment of this date.

h. Final Acceptance Date: The date on which the Contracting Agency accepts the work as complete.

Developer: Means the person or firm constructing the development and engaging the services of and employing consultants, and/or contractors and paying for the design and construction of the public works improvements to be transferred to the City.

Drawings: Means the construction plans prepared by the Developer's Consultant for the public works improvements contemplated. The terms "Contract Documents," "Plans," "Engineer's Plans," "Engineer's Drawings," "Working Drawings," and "Project Manual" are synonymous.

Engineer: Means the appointed City Engineer for the City of Zillah or his/her duly authorized agent or representative.

Notice of Award: The written notice from the Contracting Agency to the successful bidder signifying the Contracting Agency's acceptance of the bid.

Notice to Proceed: The written notice from the Contracting Agency or Engineer to the Contractor authorizing and directing the Contractor to proceed with the work and establishing the date on which

the contract time begins.

Owner: Means the City of Zillah acting through its legally established officials, boards, commissions, etc., as represented by its authorized officers, employees, or agents.

Public Works Director: Means an appointed planning official for the City per 17.06.010(E).

Standard Plans and Details: Means specific drawings adopted by the City of Zillah and revised from time to time which show frequently recurring components of work which have been standardized for use.

Standard Specifications: The Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation, and amendments, and the APWA GSP's for Division One that are, by this reference, made part of the Contract Documents. Except as may be amended, modified, or supplemented hereinafter, each section of the Standard Specifications shall be considered as much a part of these Contract Documents as if they were actually set forth herein.

Special Provisions: The Special Provisions supersede any conflicting provisions of the Standard Specifications for Road, Bridge, and Municipal Construction and the appended amendments to the Standard Specifications and are made a part of a Contract Document.

Traffic: Both vehicular and non-vehicular traffic, such as pedestrians, bicyclists, wheelchairs, and equestrian traffic.

Should any conflicts be encountered, the following interrelationships shall govern: The special provisions shall supersede the APWA GSPs, which shall supersede the WSDOT amendments, which shall supersede the Standard Specifications.

D. 1-04 Scope of the Work.

1. 1-04.4 Changes. The provisions of Section 1-04.4 of the Standard Specifications shall be modified as follows:

No changes in the work covered by the approved Contract Documents shall be made without having prior written approval of the Developer and the City.

2. 1-04.4(1) Minor Changes. The first sentence in the first paragraph is revised to read:

Payments or credits for changes amounting to $15,000 or less may be made under the bid item "Minor Change."

3. 1-04.11 Final Cleanup. The contractor shall perform final cleanup as provided in this section to the

developer's and city's satisfaction. The date of completion will not be established until this is done. The material sites and all ground the contractor occupied to do the work shall be left neat and presentable. The contractor shall:

a. Remove all rubbish, surplus materials, discarded materials, false work, temporary structures, equipment, and debris; and

b. Deposit in embankments, or remove from the project, all unneeded, over-sized rock left from grading, surfacing, or paving.

Partial cleanup shall be done by the contractor when he feels it is necessary or when, in the opinion of the city or developer, partial cleanup should be done prior to either major cleanup or final inspection.

4. 1-04.12 Waste Site (New Section). The following new section shall be added to the Standard Specifications:

Where there is additional waste excavation in excess of that needed for the project and in excess of that needed for compliance with requests of the Developer or City, the Contractor shall secure and operate his own waste site at his own expense. The Contractor shall also be required to secure and operate his own waste site at his own expense for the disposal of all unsuitable material, asphalt, concrete, debris, waste material, and any other objectionable material which is directed to waste.

The Contractor shall comply with the State of Washington's regulations regarding disposal of waste material as outlined in WAC 173-304-461.

E. 1-05 Control of Work.

1. 1-05.1 Authority of the Engineer. This section is supplemented with the following:

Unless otherwise expressly provided in the Contract Drawings, Specifications and Addenda, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Consultant and the City's right to reject the means and methods proposed by the Contractor which (1) will constitute or create a hazard to the work, or to persons or property; or (2) will not produce finished work in accordance with the terms of the approved Contract. Documented Approval of the Contractor's means and methods of construction or his failure to exercise his right to reject such means or methods shall not relieve the Contractor of the obligation to accomplish the result intended by the Contract Documents; nor shall the exercise of such right to reject create a cause for action for damages.

2. 1-05.3(1) Project Record Drawings (New Section). The following new section shall be added to the Standard Specifications:

The Contractor shall maintain a neatly marked, full-size set of as-built drawings showing the final location and layout of all new construction. Drawings shall be kept current weekly, with all field instruction, change orders, and construction adjustment.

Drawings shall be subject to the inspection of the Developer and the City at all times. Prior to acceptance of the work, the Contractor shall deliver to the Developer one set of neatly marked as-built drawings showing the information required above. The Developer shall have prepared and delivered to the City of Zillah the neatly marked Record Drawings in accordance with Section 9 of 15.10.010 Part 1 – General.

3. 1-05.5 Construction Staking (New Section). The following new section shall be added to the Standard Specifications:

The Consultant retained by the Developer will establish the line and grade of proposed construction by offset stakes. The Consultant will establish the centerline for minor structures and establish bench marks at convenient locations for use by the Contractor.

The Contractor shall establish grades from the Consultant's stakes at suitable intervals in accordance with good practice and acceptable to the City. Where new construction adjoins existing construction, the Contractor shall make such adjustments in grade as are necessary.

4. 1-05.6(1) Testing (New Section). The following new section shall be added to the Standard Specifications:

The Contractor/Developer shall be responsible for scheduling and paying for all material and compaction testing required by these Construction Standards for new public works improvements. All testing services shall be performed by an independent, certified testing firm and/or laboratory meeting the approval of the Engineer or City. The Contractor shall submit information relating to the qualifications of the proposed testing firm to the Engineer or City for review and approval prior to the preconstruction conference. The testing service shall provide copies of all test results to the Engineer or City immediately after completion. The testing frequencies listed below may be modified to assure compliance with the Specifications.

Trench Backfill

Copies of moisture-density curves for each type of material encountered and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency and at depths sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for each 100 linear feet of mainline pipeline trench and one (1) test for each street crossing. At alternating 100-foot

locations along the main trench line, tests shall be taken at 1-foot, 2-foot, and 3-foot depths below finish grade.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required trench backfill densities.

All trenches shall be backfilled and compacted to at least 95 percent of maximum density as determined by ASTM D 698 (Standard Proctor).

Roadway Subgrade (Embankment and Excavation Sections)

Copies of the moisture density curves for each type of material encountered and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of subgrade.

The Engineer or City may request additional tests be performed at the Contractor's expense, if test results do not meet the required subgrade densities. Subgrade compaction shall be as specified for Roadway Embankment in Section 2-03.3(14) Method "C."

Ballast and Crushed Surfacing

Copies of the moisture density curves and gradation for each type of material incorporated into the project and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of surface area for each lift of ballast or crushed surfacing.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required subgrade densities.

Compaction of ballast and crushed surfacing shall be as specified in SECTION 4-04.3(5).

Asphalt Paving

Copies of the reference maximum density test for each class of Hot Mix Asphalt pavement and copies of all test results shall be provided to the Engineer or City as construction progresses.

Density tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of surface

area for each lift of asphalt concrete pavement.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required subgrade densities.

Compaction of Hot Mix Asphalt pavement shall be as specified in SECTION 5-04.3(10) B.

Cement Concrete Curb, Gutter, and Sidewalk

A copy of the cement concrete design mix or certification from the concrete supplier that the concrete provided has been prepared to the strength requirement as specified elsewhere in these specifications.

Concrete strength cylinders shall be taken and tested for each truck load of concrete delivered to the job. All testing procedures shall be conducted in accordance with applicable Sections of Division 6-02 of the Standard Specifications.

Copies of all test results shall be provided to the Engineer or City as construction progresses.

5. 1-05.10 Guarantees (APWA). The following new section shall be added to the APWA GSP:

If, within two years (2) after the date of Final Acceptance of the Work, defective and unauthorized materials or work is discovered, the Developer/Contractor shall promptly, upon written request, return and in accordance with the instructions either correct such work, or if such work has been rejected, remove it from the Project Site and replace it with non-defective and authorized work, all without cost to the City. If the Contractor does not promptly comply with the written request to correct defective and unauthorized work, or if an emergency exists, the City reserves the right to have defective and unauthorized work corrected or rejected, removed, and replaced pursuant to the provisions of Section 1-05.7 of the APWA Division I GSP's of the Standard Specifications.

The Developer/Contractor agrees the above two-year limitation shall not exclude nor diminish any rights under any law to obtain damages and recover costs resulting from defective and unauthorized work discovered after two years.

The Developer shall post a bond for the successful operation and condition of all public improvements for a period of two (2) years following final inspection and acceptance in accordance with the Zillah Municipal Code. (17.26.090)

6. 1-05.16 Water and Power (APWA). Water shall be furnished and applied in accordance with the provisions of Sections 1-05.16 of the APWA Division One GSPs and 2-07 of the Standard Specifications modified as follows:

Water Supply: Water for use on the projects may be obtained/purchased from the City of Zillah and

the Contractor shall arrange for and convey the water from the nearest convenient hydrant or other source at his own expense. The hydrants shall be used in accordance with the City of Zillah Water Department regulations.

The City reserves the right to deny the use of fire hydrants where deemed inappropriate by the City.

F. 1-07 Legal Relation and Responsibilities to the Public.

1. 1-07.1 Laws to Be Observed. Amend the second sentence of the first paragraph to read:

The Contractor/Developer shall indemnify and save harmless the City of Zillah (including any agents, officers, employees, and representatives) against any claims that may arise because the Contractor (or any employee of the Contractor or subcontractor or material man) violated a legal requirement.

2. 1-07.5(3) State Department of Ecology. This section is supplemented with the following:

Comply with the requirements and special general conditions of the "General Permit for Storm Water Discharge Associated with Construction Activities" issued by the Washington State Department of Ecology to the Developer/Contractor for this project.

3. 1-07.5(4) Air Quality. In addition to the requirements of Section 1-07.5(4), the contractor shall comply with the environmental provisions of local air pollution authorities, Yakima regional clean air authority.

A method of dust control during construction shall be submitted to, and approved by, the Yakima regional clean air authority. A written copy of their approval shall be submitted to the public works director prior to commencement of construction. The contractor/developer shall designate a project coordinator for contact during construction regarding alleged air quality violations and other complaints.

4. 1-07.13 Contractor's Responsibility for Work. The following shall be added to this section of the Standard Specifications:

The Contractor is responsible for constructing and completing all work included in the Contract Documents and any other work directed by the Developer in a professional manner with first-class workmanship.

The Contractor shall keep the City of Zillah, the Developer, and the Consultant informed in writing of the address to which official correspondence is to be directed, the address and phone number of the person in charge of his field personnel, and the address and telephone number of the Contractor's representative who will be responsible and available outside of normal working hours for emergency repairs and the maintenance of traffic control and safety devices.

5. 1-07.17 Utilities and Similar Facilities. Section 1-07.17 is supplemented by the following:

It shall be the Contractor's responsibility to investigate and verify the presence and location of all utilities prior to construction.

The Contractor/Developer shall call for field location, not less than two nor more than ten business days before the scheduled date for commencement of excavation which may affect underground utility facilities, unless otherwise agreed upon by the parties involved. A business day is defined as any day other than Saturday, Sunday, or a legal local, state, or federal holiday. The phone number for the Northwest Utility Notification Center for Zillah is 1-800-424-5555. If no one-number locator service is available, notice shall be provided individually by the Contractor to those owners known to or suspected of having underground facilities within the area of proposed excavation.

The Contractor/Developer is alerted to the existence of RCW Chapter 19.122, a law relating to underground utilities. Any cost to the Contractor/Developer incurred as a result of this law shall be at the Contractor's/Developer's expense.

No excavation shall begin until all known facilities, in the vicinity of the excavation area, have been located and marked.

6. 1-07.18 Public Liability and Property Damage Insurance. The contractor shall obtain and maintain in full force and effect during the duration of this contract public liability and property damage insurance in accordance with Section 1-07.18 of the APWA Division One GSPs and as modified herein.

Prior to start of construction, the contractor/developer shall furnish the city of Zillah a certificate of insurance and the additional insured endorsements as evidence of compliance with these requirements. This certificate shall name the city of Zillah, its employees, agents, elected and appointed officials, engineering consultant, and all subcontractors as "additional insured" and shall stipulate that the policies named thereon cannot be canceled unless at least 45 days' written notice has been given to the city of Zillah. The certificate shall not contain the following or similar wording regarding cancellation notification: "Failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents, or representatives."

7. 1-07.23 Public Convenience and Safety. The provisions of Section 1-07.23 of the Standard Specifications are supplemented as follows:

At entrances to business properties and other private roads, driveways, bridges, or other such means as to provide access shall be provided by the Contractor. The Contractor shall maintain vehicular and pedestrian access to businesses at all times that businesses are open for business.

Upon failure of the Contractor to provide immediately and maintain adequate suitable access, when ordered to do so, the City shall be at liberty, without further notice to the Contractor or the Surety, to

provide the same and request payment for providing proper access, and the City assumes no liability connected therewith.

Any traffic restriction must have prior approval of the City of Zillah. Appropriate traffic control measures and signing are required during such temporary road closures.

It shall be the responsibility of the Contractor to secure the approval of and notify the Developer, City of Zillah, and the Police and Fire Departments at least 72 hours prior to closing any street, in addition to correlating the proposed closures with the City of Zillah to ensure proper detouring of traffic. When the street is re-opened, it shall again be the responsibility of the Contractor to notify the above named departments and persons.

8. 1-07.23(3) Notifying Property Owners (New Section). The following new section shall be added to the Standard Specifications:

When construction activities will affect ingress and egress to a property along the project alignment, the Contractor shall be responsible for notifying the occupant/occupants of the property 24 hours prior to the construction activity beginning. If personal contact with the occupant is not possible, the Contractor shall leave written notification.

9. 1-07.29 Safety Standards (New Section). The following new section shall be added to the Standard Specifications:

All work shall be performed in accordance with all applicable local, state, and federal health and safety codes, standards, regulations, and/or accepted industry standards. It shall be the responsibility of the Contractor to ensure that his work force and the public are adequately protected against any hazards.

The City of Zillah or Developer shall have the authority at all times to issue a stop work order at no penalty if, in their opinion, working conditions present an undue hazard to the public, property, or the work force. Such authority shall not, however, relieve the Contractor of responsibility for the maintenance of safe working conditions or assess any responsibility to the City or Developer for the identification of any or all unsafe conditions.

G. 1-08 Prosecution and Progress – 1-08.3 Progress Schedule. The provisions of Section 1-08.3 of the Standard Specifications, Division One shall be supplemented with the following:

Prior to the commencement of any work, a preconstruction conference shall be held. The Contractor or Developer shall contact the City of Zillah and set a date and time for the meeting. It shall be the responsibility of the Contractor/Developer to notify and invite all parties having an interest in the project to the meeting.

At this conference all points of the approved Plans and Specifications will be open to discussion

including scope, order and coordination of work, equipment lead time required means and methods of construction, inspection and reporting procedures, etc. The Contractor should satisfy himself that all provisions and intentions of the work are fully understood.

The Contractor shall prepare and submit to the City and Developer at the Preconstruction Conference a Construction Progress and Completion Schedule using a bar graph format. Items in the Schedule shall be arranged in the order and sequence in which they will be performed. The schedule shall be drawn to a time scale, shown along the base of the diagram, using an appropriate measurement per day with weekends and holidays indicated. The Construction Progress Schedule shall be continuously updated and, if necessary, redrawn upon the first working day of each month or upon issuance of any Change Order which substantially affects the scheduling. Copies (2 prints or 1 reproducible) of newly updated Schedules shall be forwarded to the City and Engineer, as directed, immediately upon preparation.

H. 1-10 Temporary Traffic Control. This section is supplemented with the following:

The provisions of the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways and amendments thereto published by the U.S. Department of Transportation, Federal Highway Administration, and WSDOT by this reference are made a part of these Documents.

1. 1-10.2(2) Traffic Control Plans. Delete the entire section and replace with the following:

The Contractor shall prepare a signing plan showing the necessary Class A and B construction signing, barricades, and traffic control devices required for the project and submit it to the Consultant and City for review no later than the preconstruction conference date. When the Class B signing for a particular area will be provided as detailed on one or more of the figures included in the MUTCD without modification, the Contractor may reference the applicable MUTCD figure at the appropriate location on the Plan. When this procedure is used, variable distances such as minimum length of taper must be specified by the Contractor.

The signing plan prepared by the Contractor shall provide for adequate warning within the limits of the project and on all streets, alleys, and driveways entering the project so that approaching traffic may turn left or right onto existing undisturbed streets before reaching the project. The Plan shall be prepared to create a minimum of inconvenience for pedestrian and vehicle traffic.

All modifications to the accepted signing plans shall be reviewed by the City.

2. 1-10.3(3)(A) Construction Signs. The first sentence of the first paragraph is revised to read:

All signs, barricades, flashers, cones, traffic safety drums, barricades, and other traffic control devices required by the approved traffic control plan(s), as well as any other appropriate signs

prescribed by the City or County, shall be furnished and maintained by the Contractor.

Open trenches shall be provided with proper barricades and at night they shall be distinctly indicated by adequately spaced lights.

(Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

15.10.040 Water system improvements.

A. General Requirements for Water System Improvements. All extensions and additions to the city of Zillah's domestic water system shall conform to the design and construction standards of the city of Zillah and the Washington State Department of Health (WSDOH) as follows:

All new lots and developments shall be served by a public water supply line to be maintained by the city of Zillah and located adjacent to the lot or development site. The water supply line shall be capable of providing sufficient flow and pressure to satisfy the fire flow and domestic service requirements of the proposed lots and development requirements.

Water lines shall be extended by the developer to the point where the adjoining property owner's responsibility for further extension begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner. In some cases, it will require dedication of an easement and a line extension across the property or extension across two or more sides of the developing property. Extensions will be consistent with and implement the city's adopted water comprehensive plan.

All new public domestic water mains shall be a minimum diameter of eight-inch. Fire hydrant runs less than 50 feet from the water main to the fire hydrant shall be a minimum of six-inch.

New water mains shall be located in existing or proposed streets and shall be offset from the street centerline and not located within a vehicle wheel path.

Larger public water mains may be required depending upon fire flow requirements as determined by the city of Zillah's public works director, fire chief, and/or city engineer.

Water main over sizing, above that required for the particular development being submitted, may be required by the city of Zillah to be installed for future extension. The cost of the materials only for the over sizing shall be reimbursed to the developer by the city. The developer shall submit actual material invoices showing the actual cost of the materials furnished and the cost of the same materials of the size required for the development.

All domestic water mains shall be looped, where possible. Temporary dead-end mains over 500 feet in length will only be allowed where future water main looping via public right-of-way will be assured. No permanent dead-end water mains over 500 feet in length will be allowed to be part of the city of Zillah's domestic water system.

Maximum valve spacing in public water mains will be 750 linear feet. Valves will be furnished and installed on all legs of new water main intersections.

All water service lines, meter box and meter setters shall be installed by the developer/contractor.

All new water meters shall be a minimum of three-fourths inch and shall be furnished and installed by the city of Zillah and paid for by developer.

Only one water service meter shall be served from each main tap. All taps shall be made under the supervision of the public works director or his designee.

Fire hydrants shall be spaced at least every 300 feet in all zones. Additional hydrants may be required to protect structures as determined by the fire chief and public works director. Additional fire hydrants required on a site may require a looped, on-site fire hydrant main. Easements will be provided for all on-site, public, looped water mains, in accordance with ZMC 15.10.010(K).

Water and sewer mains shall be separated in accordance with Section C1-9.1 of the Criteria for Sewage Works Design, August 2008, by the Washington State Department of Ecology.

The design of water mains and appurtenances is subject to review and approval by the city of Zillah director of public works. The director of public works may, at his discretion, adjust these standards as necessary to facilitate installation of water lines and appurtenances for the health, safety, and protection of the general public.

B. Irrigation Systems. The proposed development shall be served by a separate irrigation water distribution system with an individual service for each lot. The irrigation system shall be designed by a professional and constructed in accordance with Sunnyside Valley Irrigation District, the Zillah Irrigation District, and city of Zillah construction standards. All irrigation pipelines under roadways shall meet the requirements of Section 9-30.1(5)(A) (AWWA C900 or C905). Pipe not under the roadway may meet the requirements of Section 9-05.12 (PVC solid wall ASTM D3034 SDR35) or 9-15.1(2) (ASTM D1784, 200 psi, SDR21). All irrigation pipes shall be installed with a minimum cover of 30 inches pipe zone bedding and backfill per Standard Detail 55-5, and with a three-inch-wide magnetic marking tape eight inches above the pipe.

C. Special Provisions for Water System Improvements. The following sections of the WSDOT Standard Specifications have been amended or supplemented as described below and apply to public works improvements within the city of Zillah:

1. 7-09 Water Mains.

    a. 7-09.2 Materials. Section 7-09.2 of the Standard Specifications shall be revised as follows:

Water Main pipe shall be either:

Ductile Iron, conforming to the requirements of Section 9-30.1(1) of the Standard Specifications, except that it shall be Standard Thickness Class 52. Joints shall be rubber gasket, push-on type (Tyton Joint). Fittings shall be mechanical joint or flanged, as shown on the Plans, and shall conform to Section 9-30.2(1) of the Standard Specifications.

OR

Polyvinyl Chloride (PVC) Pipe conforming to the requirements of Section 9-30.1(5) A (AWWA C900 or C905). Fittings shall be the same as specified for Ductile Iron pipe. PVC pipe must be installed with size 12 Blue plastic coated solid copper tracer wire on the top of the pipe.

Delete entire aggregates subsection and replace with the following:

Bedding Materials (Flexible Pipes) 9-03.9(3) Crushed Surfacing Top Course

Bedding Materials (Rigid Pipes) 9-03.12(3) Gravel Backfill for Pipe Zone Bedding

Imported Select Backfill 9-03.9(3) Crushed Surfacing Base Course

b. 7-09.3(5) Grade and Alignment. The first sentence of the third paragraph is replaced with the following:

The depth of trenching for water mains shall be such to provide a minimum cover of 4 feet and a maximum cover of 6 feet, unless otherwise approved by the Director of Public Works.

c. 7-09.3(9) Bedding the Pipe. Add the following:

Imported pipe zone bedding for rigid pipe shall be Crushed Surfacing Top Course or Gravel Backfill, placed and compacted in layers per the Standard Specifications. Use as directed by the Engineer.

Imported pipe zone bedding for flexible pipe shall be Crushed Surfacing Top Course, placed and compacted per the Standard Specifications. Bedding shall be placed under all flexible pipes.

d. 7-09.3(10) Backfilling Trenches. Add the following:

Street crossing trenches and other locations where directed shall have the trench backfilled full depth with Imported Select Backfill. The Director of Public Works may require the use of Controlled Density Fill (CDF) for trench backfill in certain circumstances. The requirements for CDF are set forth in ZMC 15.10.070(B)(8), Section 8-30 of these Special Provisions.

Mechanical compaction to 95% of maximum density is required for all trenches. The Developer/Contractor shall be responsible for scheduling and paying for all testing required.

2. 7-12 Valves for Water Mains – 7-12.2 Materials. Add the following:

All valves sizes 3-inch through 10-inch shall be gate valves and shall conform to the latest revision of AWWA Resilient Seated Gate Valves Standard C509 and AWWA C104.

All gate valves shall have non-rising stems, open counterclockwise, and shall be provided with a 2-inch square AWWA operating nut. Gate valves 4-inch and larger shall have mechanical joint connections.

All valves sizes 12 inches and larger shall be butterfly valves suitable for direct burial and shall be rubber seated and conform to the latest revision of AWWA Standard C504 Class 150B and C104.

Valve operators shall be worm gear type, sealed, gasketed, and lubricated for underground service. All valves shall open counterclockwise and shall be provided with a 2-inch square AWWA operating nut.

Valve Boxes shall be two piece adjustable. The top section shall be similar to Olympic Foundry Model 940-B, or equal, 18-inches high. The bottom section shall be an Olympic Foundry Model R-36, or equal, 36-inches high. Extension sections shall be Olympic Foundry Model 044, or equal, 12-inches high.

3. 7-14 Fire Hydrants.

a. 7-14.2 Materials. Replace the entire section with the following:

The City of Zillah accepts fire hydrants of the following manufacturers, providing the hydrants conform to the City's technical specifications for fire hydrants:

Mueller Centurion

M & H 929 Reliant

All hydrants shall have a Main Valve Opening (MVO) of 5-1/4" and one port with a 5" Storz Quick Coupling and two (2) 2-½" diameter ports. Threads on all ports shall be National Standard Thread.

b. 7-14.3(1) Setting Hydrants. Add the following:

The hydrant shall be set to the correct elevation on a concrete block base measuring 12" x 12" x 6" thick, which has been placed on undisturbed earth. Around the base of the hydrant, the Contractor shall place 0.35 cubic yards of "Gravel Backfill for Drywells" per Section 9-03.12(5) to allow free drainage of the hydrant.

The hydrants will be painted a color approved by the City.

c. 7-14.3(2) Hydrant Connections. Add the following:

Hydrant runs of less than 50 feet shall be connected to the main with 6-inch minimum diameter water main. Each hydrant lateral shall include an auxiliary gate valve and valve box.

d. 7-14.3(2)(A) Hydrant Restraint. Add the following:

The Contractor shall securely connect the hydrant to the water main as indicated on the Standard Detail.

e. 7-14.3(2)(C) Hydrant Guard Posts. The director of public works may determine that four six-inch diameter Schedule 40 steel guard posts be installed at a hydrant location. The posts will be painted the same color as the hydrants.

4. 7-15 Service Connections.

a. 7-15.1 General. This work consists of the relocation of existing water meters, meter setters, and water meter boxes, where necessary, and the installation of new saddles, corp stops, service pipe, water meter boxes and meter stops and setters as shown on the plans.

b. 7-15.2 Materials. Section 7-15.2 of the Standard Specifications shall be revised as follows:

Saddle: New service tapping saddles shall be ROMAC D. I. service saddle with double stainless steel straps or approved equal.

Corporation Stop: New corp stops shall be Ford type 1001 or approved equal.

Service Line: New service pipe shall be Cross linked Polyethylene (PEX) Tubing meeting ASTM F876/F877 specifications and ANSI/NSF Standard 14/61.

Meter Box: Mueller/McCullough Coil Type Setter, style 15, with 2" insulation pad and non-locking lid.

Pipe Bedding and Select Backfill: The imported pipe bedding and select backfill to be utilized for trench backfill as directed by the Engineer or Public Works Director shall be in accordance with SECTION 7-09 of these Special Provisions.

c. 7-15.3 Construction Details. Add the following:

The Contractor shall set the meter box to the finished grade of the area. The Contractor will be required to reset the meter box if it is not at finished grade at the completion of the project. The completed water service shall be tested at system operating pressure by the Contractor and must show no signs of leakage.

Future water services shall be marked with an 18" long section of #4 rebar buried vertically with the top of the rebar set 6" below the finish surface.

(Ord. 1289 § 1 (Exh. A), 2011; Ord. 1202 § 2 (Exh. A), 2009)

Chapter 15.15
FIRE HYDRANTS

Sections:

15.15.010 Statement of purpose.

15.15.020 Painting and identification of hydrants.

15.15.010 Statement of purpose.

To provide standards and requirements for the painting, maintenance, and identification of fire hydrants located within the city limits of Zillah. (Ord. 1408 § 1, 2016)

15.15.020 Painting and identification of hydrants.

The barrel and bonnet of all fire hydrants shall be painted colors similar to Chrome Yellow, Smokin Hot, or a color designated and approved by the Zillah city council.

The cap of all fire hydrants shall be painted in compliance with American Water Works Association (AWWA), National Fire Protection Association (NFPA) 291, and based on their rated fire flow capacity as follows:

A. Light blue: rated capacity of 1,500 gpm (5,680 L/min) or greater;

B. Green: rated capacity of 1,000 to 1,499 gpm (3,785 to 5,675 L/min);

C. Orange: rated capacity of 500 to 999 gpm (1,900 to 3,780 L/min);

D. Red: rated capacity of less than 500 gpm (1,900 L/min). (Ord. 1408 § 2, 2016)

APPENDIX B

STANDARD DETAILS

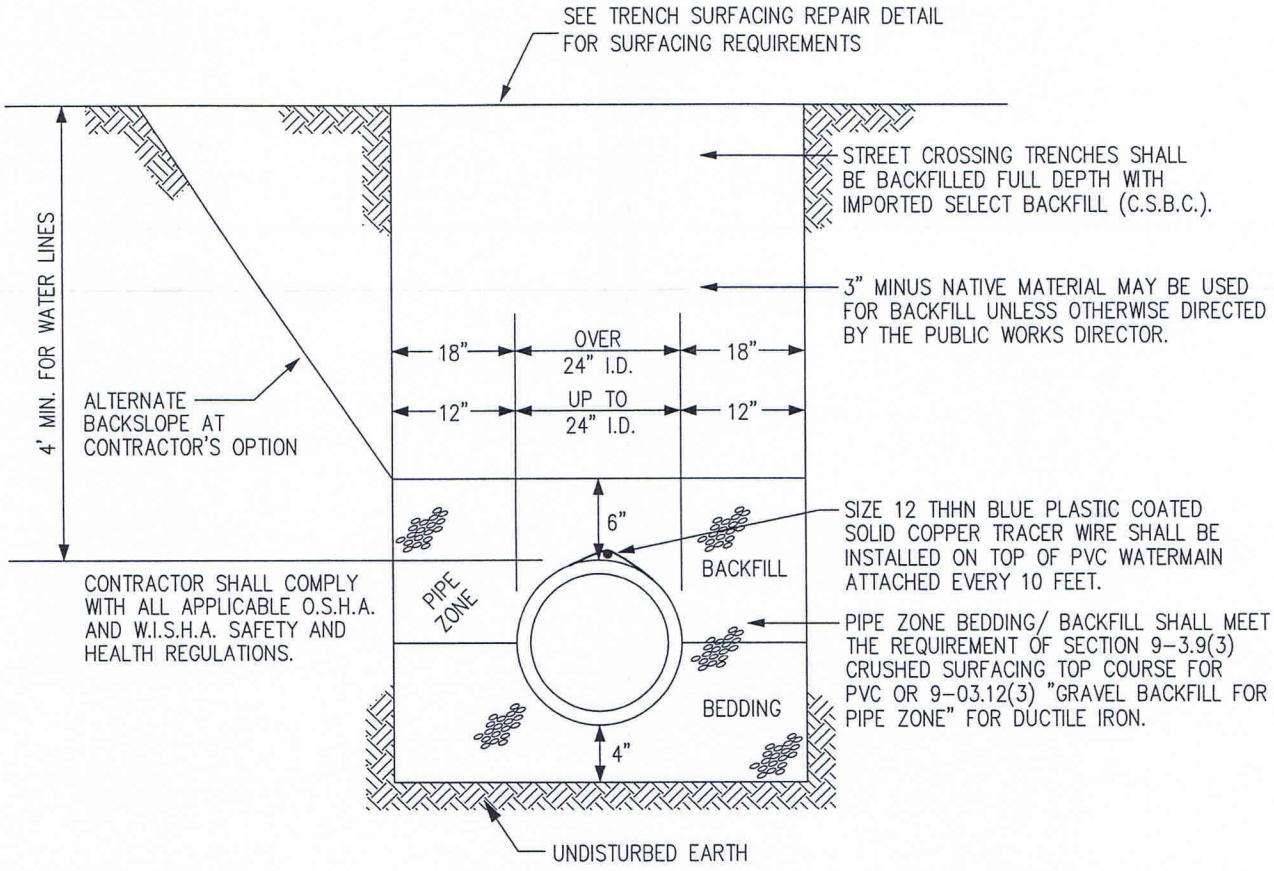
E-1 Conduit Trench
E-2 Junction Box
E-3 Commercial Street Light ** Residential Detail Needed**

SD-1 Catch Basin Type 1/1L
SD-2 Catch Basin Type 2

SS-1 Sewer Manhole Type 1
SS-2 Sewer Cleanout
SS-3 Sewer Drop Connection
SS-4 Sewer Manhole Adjustment
SS-5 Sewer/Storm Drain Pipe Trench Section
SS-6 Manhole Safety Step
SS-7 Side Sewer Connection

ST-1 Roadway Section – Major Collector
ST-2 Roadway Section – Minor Collector
ST-3 Roadway Section - Local Access- No Parking
ST-4 Roadway Section - Local Access-Parking
ST-5 Concrete Curb & Gutter
ST-6 Concrete Sidewalk Sections
ST-7 Sidewalk Ramp
ST-8 Sidewalk Jointing
ST-9 Residential Driveway Entrance
ST-10 Monument
ST-11 Asphalt Sidewalk Ramp
ST-12 Trench Surfacing Repair
ST-13 Cul-de-Sac Layout

W-1 Water Main Trench
W-2 Fire Hydrant Assembly
W-3 Water Service
W-4 Water Meter Box
W-5 Water Valve Box
W-6 Air Release Valve
W-7 Blow Off Assembly
W-8 Concrete Thrust Blocking
W-9 Hydrant Guard Posts



TYPICAL WATERMAIN TRENCH

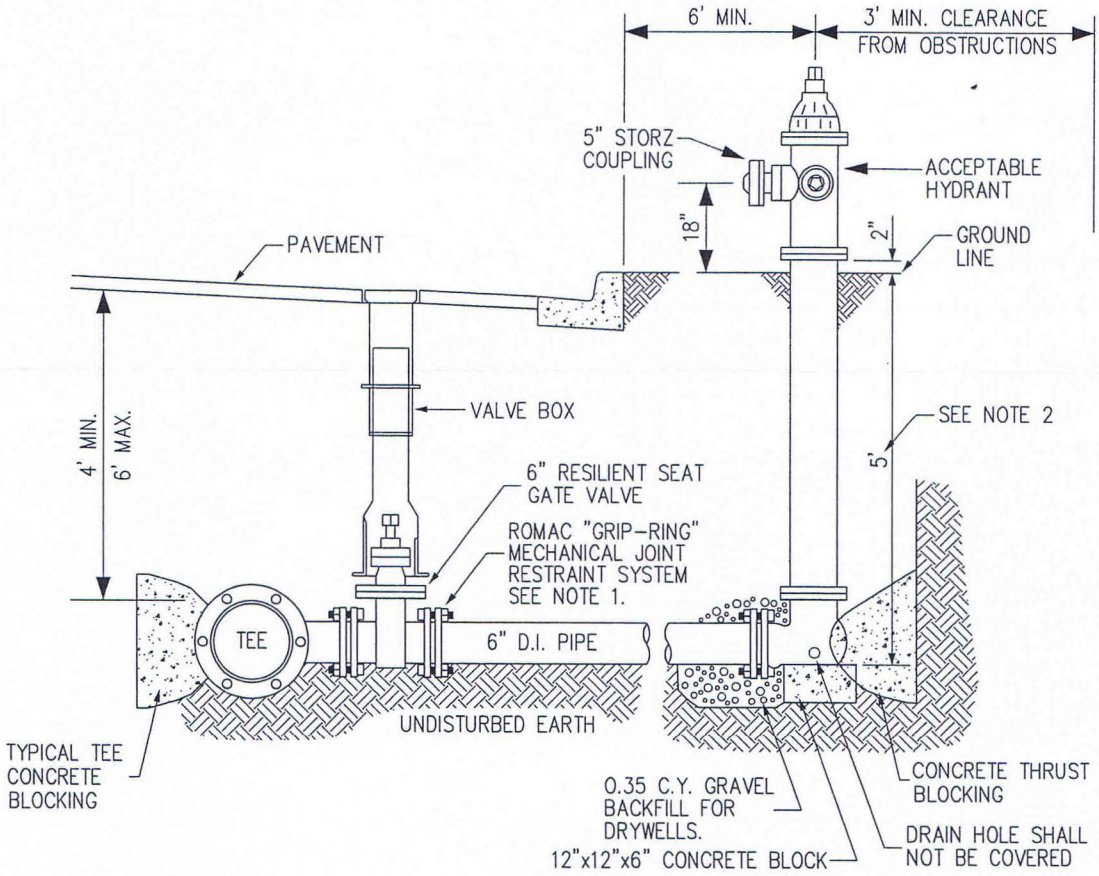
NOT TO SCALE

NOTES:

- FOR WATER SERVICES, INSTALL IMPORTED PIPE BEDDING A MINIMUM OF 3" THICK ON ALL SIDES OF PIPE.
- MECHANICAL TAMPING AND COMPACTION REQUIRED AS DIRECTED BY THE CITY. WATER SETTLING MAY ONLY BE USED OUTSIDE THE ROADWAY PRISM WHEN APPROVED BY THE CITY.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	11/06		
Revision	Date	Description	Appr

CITY OF ZILLAH–STANDARD DETAIL	WATERMAIN TRENCH	W–1



TYPICAL FIRE HYDRANT ASSEMBLY

NOT TO SCALE

ACCEPTABLE HYDRANTS:

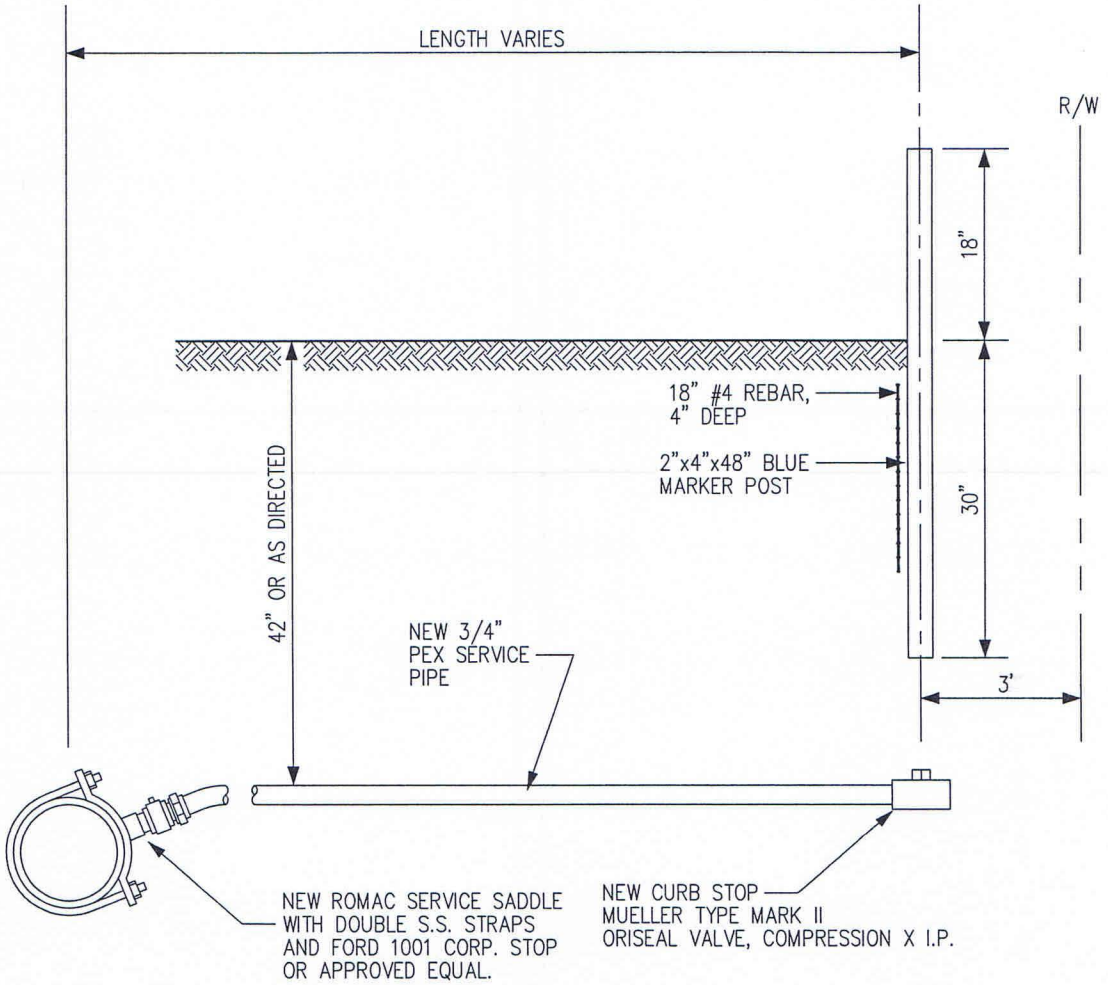
- MUELLER CENTURION
- M&H 929 RELIANT

NOTES:

- ROMAC "GRIP-RING" MECHANICAL JOINT ACCESSORY PACK SHALL BE USED ON ALL MECHANICAL JOINT CONNECTIONS FROM TEE TO HYDRANT.
- MINIMUM HYDRANT DEPTH IS 5 FEET. THIS DISTANCE MAY INCREASE WHEN HYDRANTS ARE INSTALLED ON DISTRIBUTION MAIN SIZES LARGER THAN 6 INCHES IN DIAMETER.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	11/06		
Revision	Date	Description	Appr

CITY OF ZILLAH-STANDARD DETAIL	TYPICAL FIRE HYDRANT	W-2



WATER SERVICE

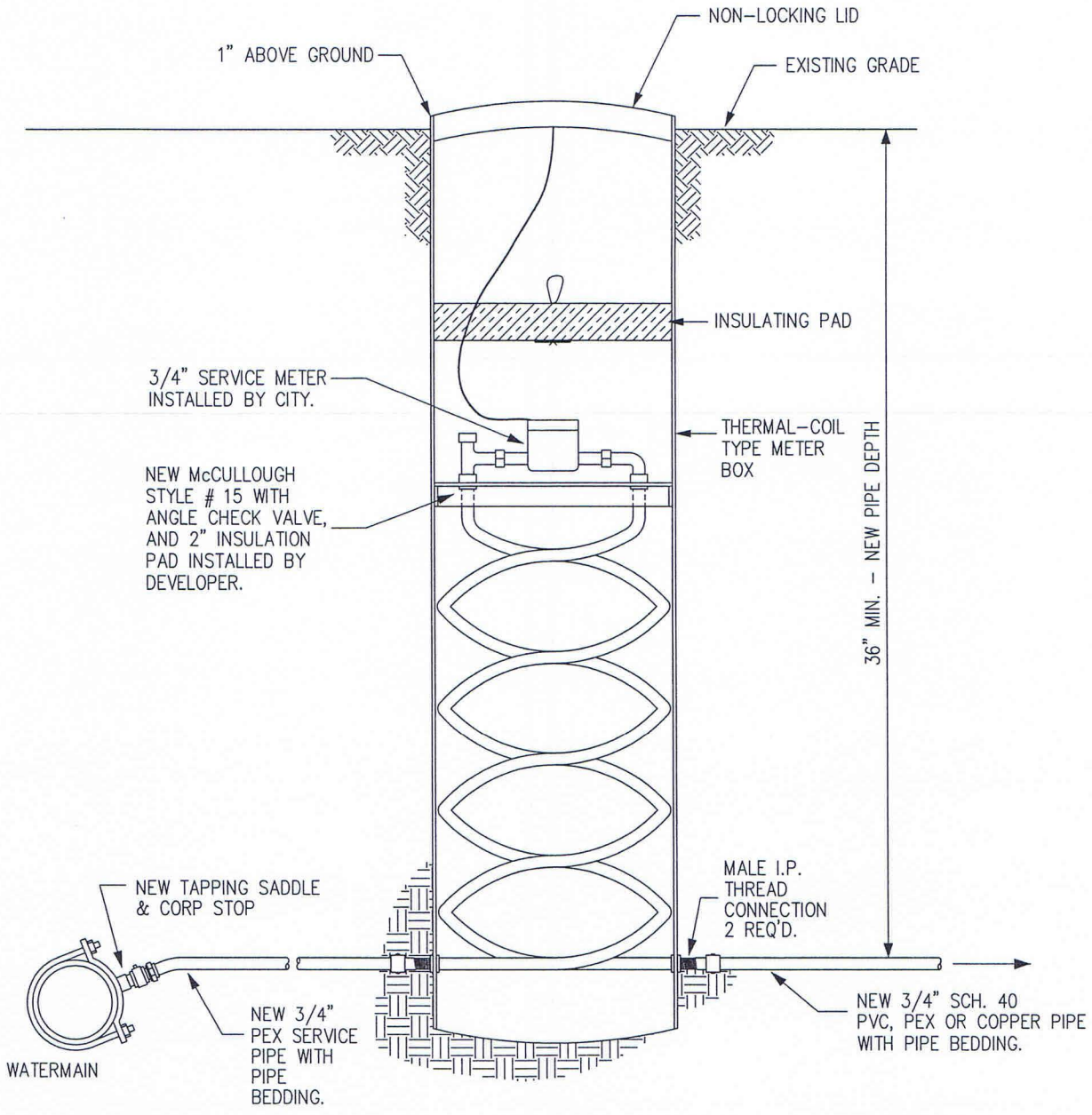
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF ZILLAH–STANDARD DETAIL	WATER SERVICE	W–3



WATER METER BOX

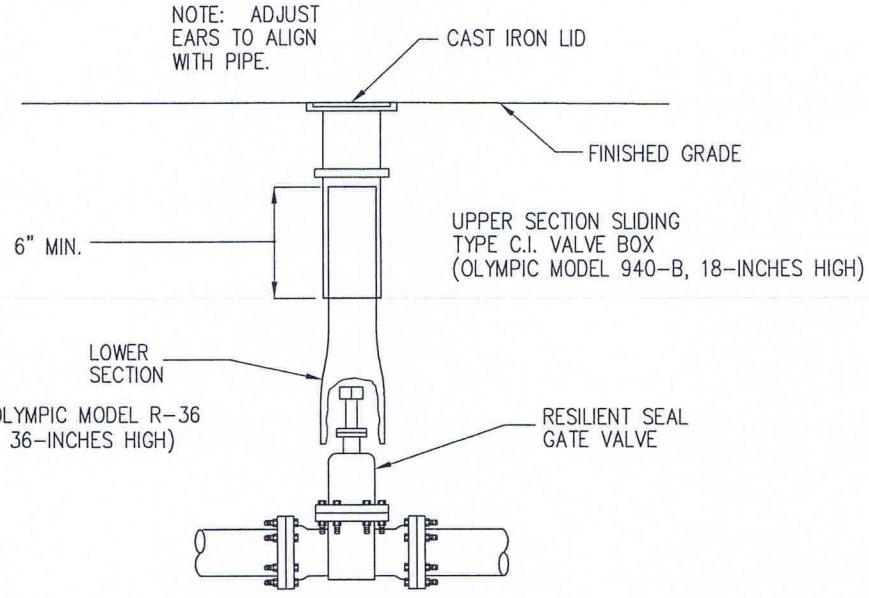
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF ZILLAH-STANDARD DETAIL	WATER METER BOX	W-4



VALVE SIZE AND ENDS AS SPECIFIED OR INDICATED ON PLANS. INSTALLATION IS SIMILAR FOR BUTTERFLY VALVE.

NOTE: PROVIDE EXTENSION PIECE WHERE REQUIRED FOR VALVE BOX. (OLYMPIC MODEL 044, 12-INCHES HIGH)

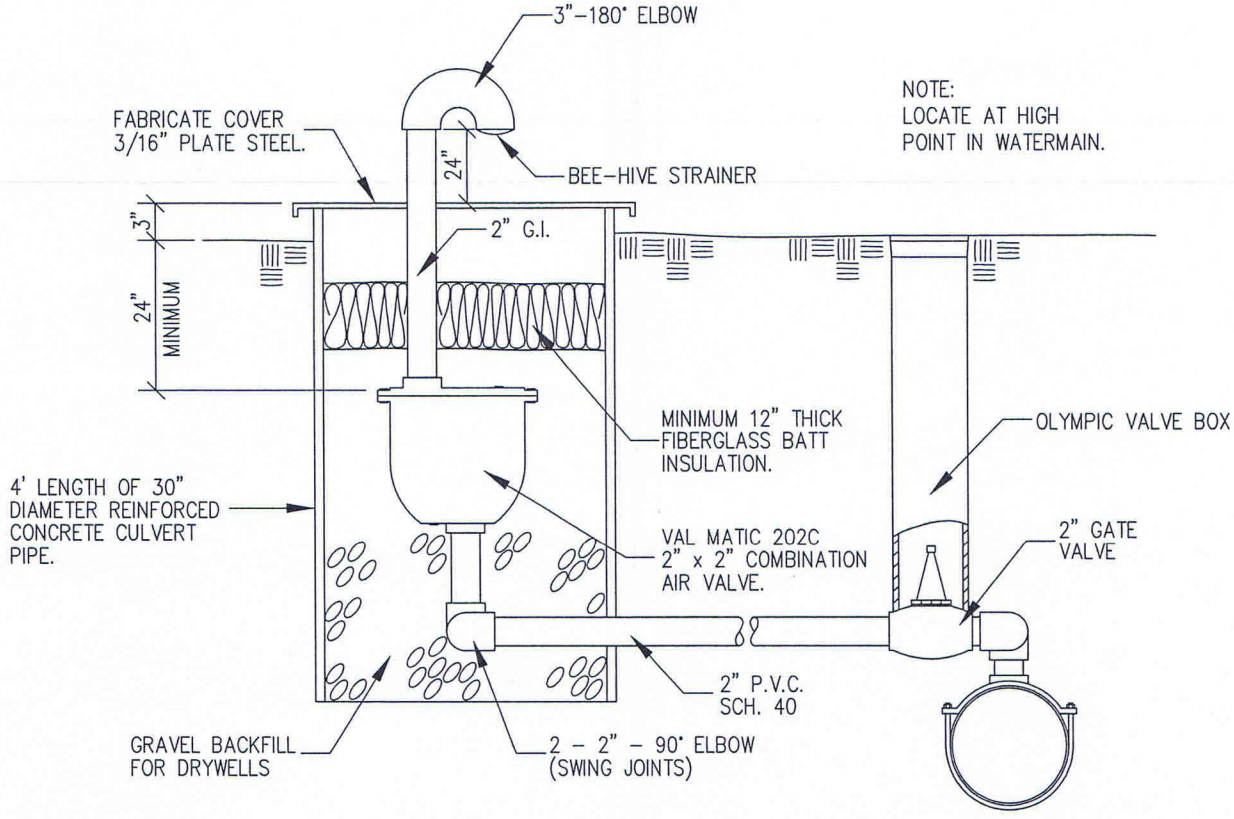
WATER VALVE BOX

NOT TO SCALE

NOTE:
ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF ZILLAH-STANDARD DETAIL	WATER VALVE BOX	W-5



AIR RELEASE/AIR VACUUM VALVE ASSEMBLY

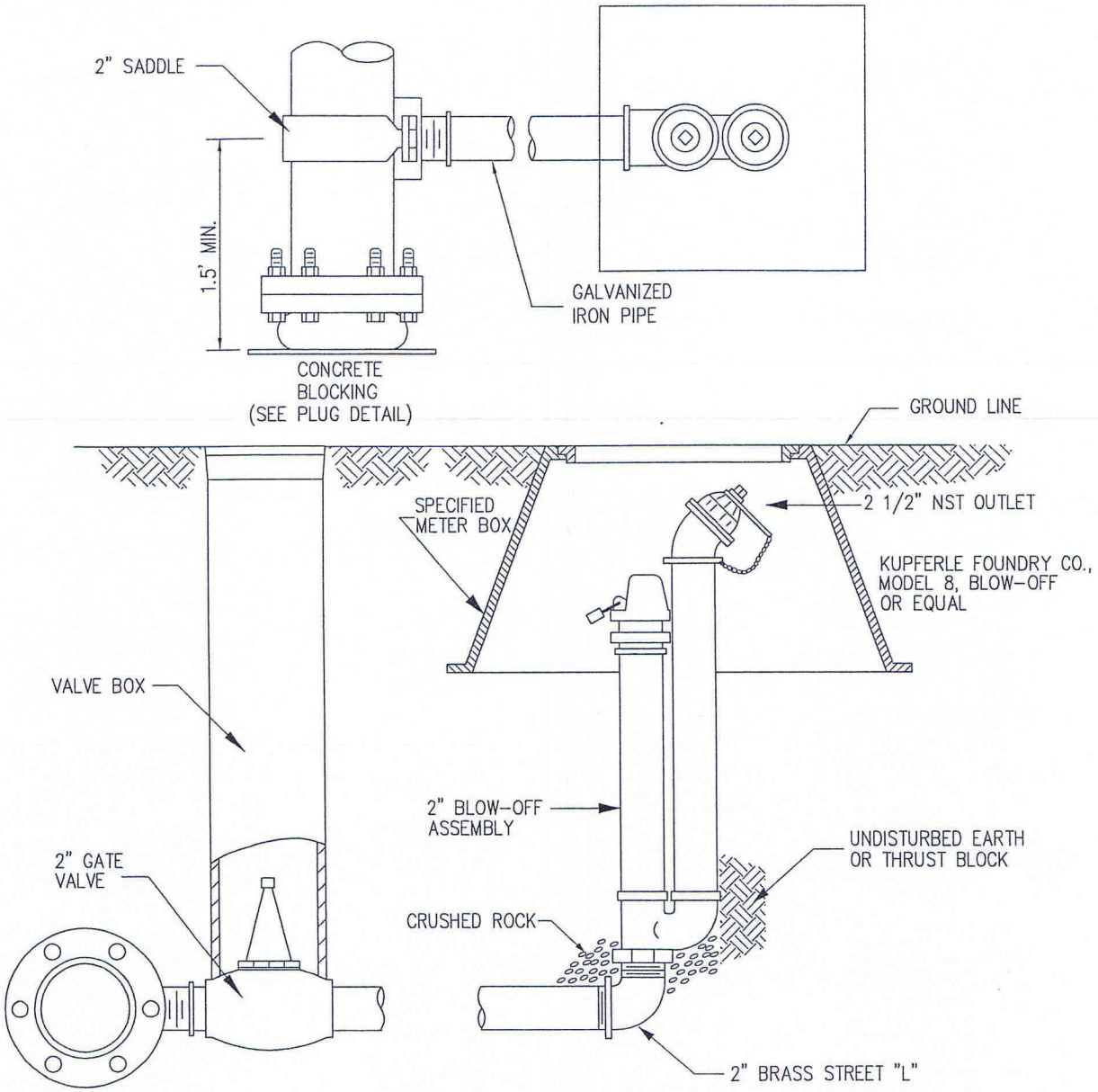
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF ZILLAH-STANDARD DETAIL	AIR RELEASE/AIR VACUUM VALVE	W-6



BLOW - OFF DETAIL

NOT TO SCALE

NOTE:
ONLY THE LATEST DETAIL, AS APPROVED BY
THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF ZILLAH-STANDARD DETAIL	BLOW - OFF DETAIL	W-7

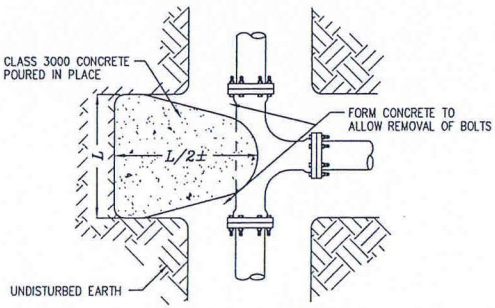
CITY OF ZILLAH – STANDARD DETAIL

TYPICAL THRUST BLOCKING

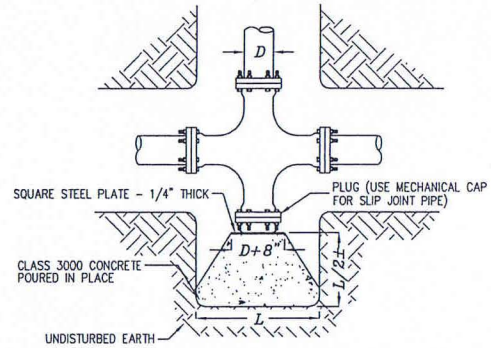
W-8

NOTE: ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

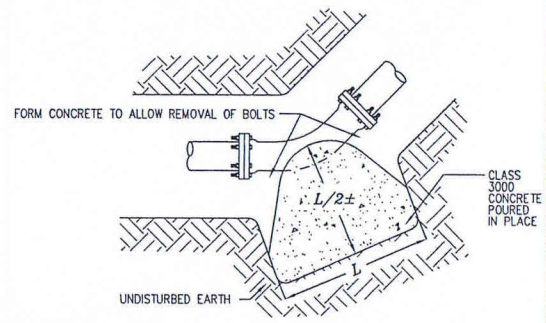
Revision	Date	Description	Appr
ORIG.	11/06		



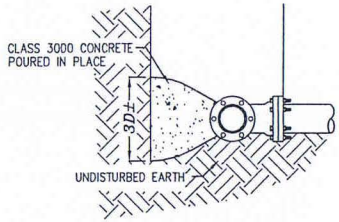
TEES



PLUGS AND CAPS



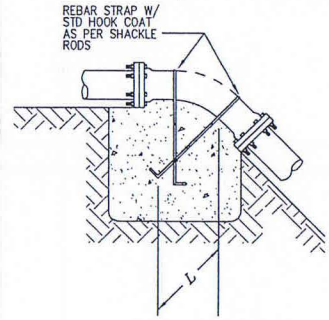
BENDS



SIDE VIEW
THIS VIEW TYPICAL OF ALL BLOCKING

NOTES:

1. D IS APPROXIMATE PIPE DIAMETER. THE ABOVE END AREAS ARE BASED ON AN ALLOWABLE SOIL BEARING PRESSURE OF 1500 PSF AND 250 PSI TEST PRESSURE.
2. DIMENSIONS LISTED DENOTE MINIMUM STANDARDS FOR SOIL AND TEST PRESSURES SHOWN. SHOULD TEST PRESSURE AND/OR SOIL CONDITIONS VARY, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR SPECIAL THRUST BLOCK DESIGN.
3. ALL FITTINGS AND/OR PIPE MAKING DIRECT CONTACT WITH CONCRETE SHALL BE WRAPPED WITH 4 MIL POLYETHYLENE SHEETING PRIOR TO PLACEMENT OF CONCRETE.



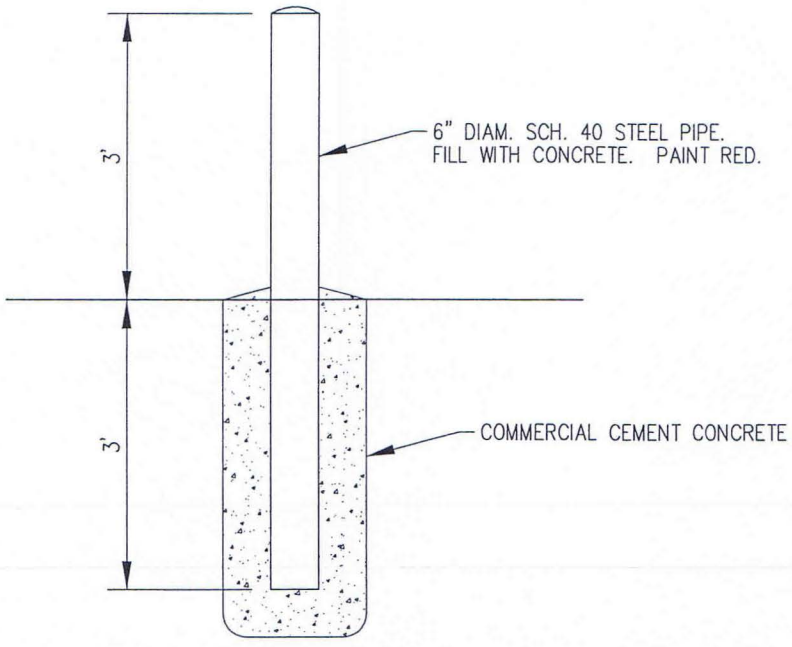
VERTICAL OVERBEND

MINIMUM END AREAS				
PIPE SIZE (D)	TEES & PLUGS	90° BENDS	45° BENDS	11 1/4° AND 22 1/2° BENDS
6"	5.1 SQ FT	7.2 SQ FT	3.9 SQ FT	2.0 SQ FT
8"	8.8 SQ FT	12.4 SQ FT	6.7 SQ FT	3.4 SQ FT
10"	14.3 SQ FT	20.2 SQ FT	11.0 SQ FT	5.6 SQ FT
12"	20.4 SQ FT	28.9 SQ FT	15.7 SQ FT	7.9 SQ FT
14"	27.7 SQ FT	39.2 SQ FT	21.2 SQ FT	10.7 SQ FT
16'	35.8 SQ FT	51.2 SQ FT	27.5 SQ FT	13.9 SQ FT

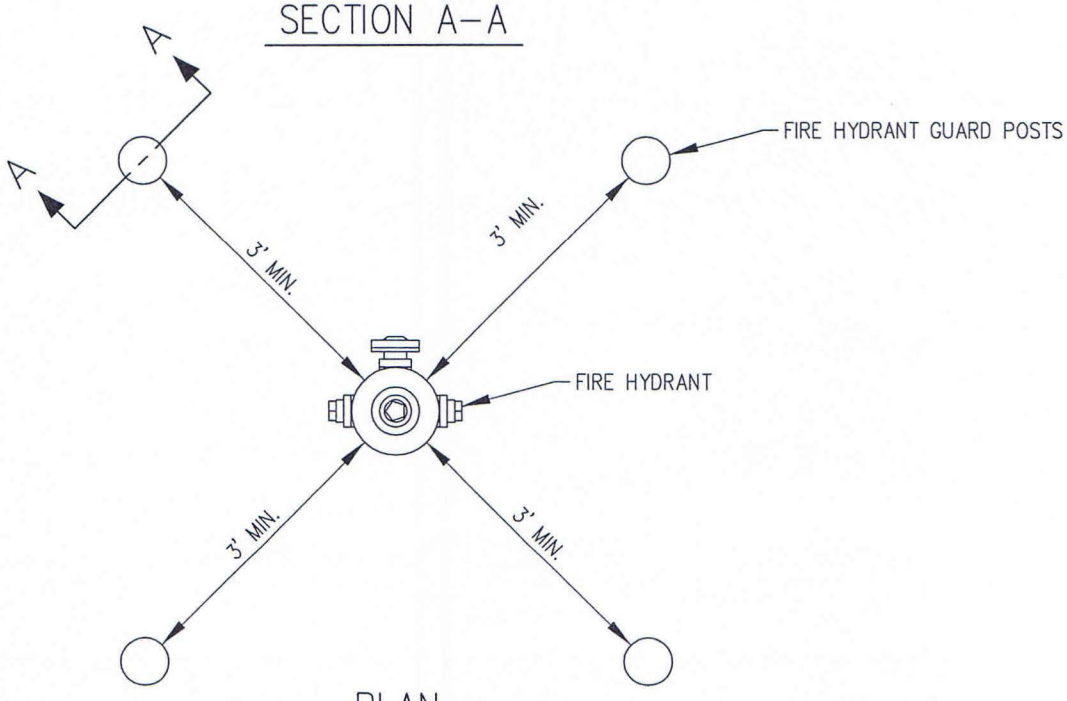
VERTICAL OVERBEND				
PIPE SIZE (D)	22 1/2° BEND	45° BEND	REBAR SIZE	L
6"	20 CU FT	39 CU FT	#5	2.0 FT
8"	34 CU FT	67 CU FT	#5	2.0 FT
10"	56 CU FT	110 CU FT	#5	2.0 FT
12"	79 CU FT	157 CU FT	#6	2.5 FT
14"	107 CU FT	212 CU FT	#7	3.0 FT
16'	139 CU FT	275 CU FT	#9	4.0 FT

TYPICAL THRUST BLOCKING

NOT TO SCALE



SECTION A–A



PLAN

FIRE HYDRANT GUARD POSTS

NOT TO SCALE

NOTE:
ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	11/06		
Revision	Date	Description	Appr

CITY OF ZILLAH–STANDARD DETAIL	FIRE HYDRANT GUARD POSTS	W–9

25.
CITY OF ZILLAH UTILITY CONNECT ORDER FORM

HLA
Engineering and Land Surveying, Inc.

CITY OF ZILLAH
UTILITY CONNECT ORDER

DATE: _____ CONNECT DATE: _____

NAME:_____

STREET ADDRESS:_____

MAILING ADDRESS:_____

CITY/ZIP CODE:_____

PHONE #: _____

EMPLOYER: _____ PHONE: _____

RESIDENT SIGNATURE:_____

HOMEOWNER: _____ RENTER: _____

MAILING ADDRESS: _____

CITY/ZIP CODE: _____

-FOR OFFICE USE-

ACCOUNT #: _____

METER #: _____ METER MAKE: _____

READ ONLY: _____ READ/CONNECT: _____

CREW MEMBER: _____ DATE: _____

DEPOSIT $_____ DATE: _____ RECEIPT #: _____

DEPOSIT BOOK: _____ COMPUTER: _____

GARBAGE LIST: _____

SPECIAL INSTRUCTIONS:
RECEIVED CURRENT INFORMATION BROCHURE: _____

IRRIGATION: _____ **TURN OVER** ☛

-FOR OFFICE USE-

The following information is required by the Federal Government in order to monitor compliance with Federal laws prohibiting discrimination against applicants seeking to participate in this program on the basis of race, color, national origin, age, sex or disability. You are not required to furnish this information, but are encouraged to do so. This information will not be used in evaluating your application or to discriminate against you in anyway. However, if you choose not to furnish it, we are required to note the race/national origin of individual applicants on the basis of visual observation or surname.

Ethnicity
- ☐ **Hispanic or Latino**
- ☐ **NOT Hispanic or Latino**

Race
- ☐ **American Indian/Alaskan Native**
- ☐ **Asian**
- ☐ **Black or African American**
- ☐ **Native Hawaiian or Pacific Islander**
- ☐ **White**

Sex
- ☐ **Male**
- ☐ **Female**

This institution is an equal opportunity provider.
Esta institucion es de oportunidad igualada.

26.
CITY OF ZILLAH WORK ORDER FORM

HLA
Engineering and Land Surveying, Inc.

CITY OF ZILLAH
WORK ORDER FORM

Call-ins requested by_____
Crew member_____

Complaint:_____
_____

Name_____ **Address**_____
Phone number _____ **Account #** _____
Date _____ **Date Resolved**_____

_____

Special instructions or description of the work done:

Crew member signature_____

Original – Public Works Director *Yellow – Crew* *Pink – Office*

27.
CITY OF ZILLAH FIRE DEPARTMENT HYDRANT FLOW TEST 2013

HLA
Engineering and Land Surveying, Inc.

Date	Elevation	Time	Location	Static	Flow (GPM)	Residual PSI
12/16/2013	782	10:00	Zillah West	90	750	20
12/16/2013	837	11:00	Catholic Church	55	650	15
12/16/2013	807	2:00	1st Ave & Person St	75	1130	45
12/16/2013	856	2:13	Ellen & Concord	45	840	25
12/16/2013	849	2:22	1118 Reo Dr.	48	795	23
12/16/2013	801	2:41	Cheyne & Collins Place	66	940	32
12/16/2013	763	2:53	Fountain Blvd. (Z. Lakes)	86	1000	35
12/16/2013	752	3:27	Vintage Valley Parkway	90	1190	50
12/16/2013	826	3:42	Park St. & “F” St.	58	960	32
12/16/2013	826	3:54	1701 Cutler Way	62	840	25

MAP A

CITY OF ZILLAH

EXISTING WATER SYSTEM

N
W E
S

0 250 500 1000

LEGEND

- CITY LIMITS
- UGA
- PROPOSED UGA
- EXISTING WATERMAIN
- FIRE HYDRANT
- WATER VALVE
- WELL/PUMP STATION
- RESERVOIR

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

4/6/2021 P:\Projects\2019\19202\2021 WSP FIGURES.dwg

SEE MATCH LINE BELOW

SEE MATCH LINE ABOVE

ZILLAH LAKES AREA

MAP B

CITY OF ZILLAH

WATER SYSTEM HYDRAULIC ANALYSIS NODE MAP

N
W E
S

0 300 600 1200

LEGEND

- EXISTING SERVICE AREA BOUNDARY (CITY LIMITS)
- FUTURE SERVICE AREA BOUNDARY (UGA)
- FUTURE SERVICE AREA BOUNDARY (PROPOSED UGA)
- HYDRAULIC ANALYSIS PIPE
- HYDRAULIC ANALYSIS JUNCTION NODE

CITY OF ZILLAH

HLA Engineering and Land Surveying, Inc.

2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

07-23-14 R:\Hydraulic Analysis\Zillah\05026\2007 Zillah Hydraulic Analysis.dwg