City of Tenino

149 Hodgen Street South
Tenino, WA 98589

City Council Meeting
Tuesday, November 11, 2025 at 6:30 PM

Agenda

WORK SESSION

CALL TO ORDER

AGENDA APPROVAL

1. Agenda Approval

    Recommended Action: Motion to approve the 11/11/2025 agenda as presented.

APPROVAL OF MINUTES

2. Approval of Minutes

    Recommended Action: Motion to approve the 10/28/2025 minutes as presented.

CONSENT CALENDAR

3. Consent Calendar for October 29, 2025 through November 11, 2025 consisting of:

    Payroll EFT's in the amount of $74,428.01 and Claims Checks #33670 through #33689 and EFT's in the amount of $165,861.12 for a Grand Total of $240,289.13.

    Liquor License Renewals: None

    Recommended Action: Move to approve the consent calendar as presented.

EXECUTIVE SESSION

PRESENTATIONS

PUBLIC COMMENTS

PUBLIC HEARING

4. Ad Valorem Property Tax for fiscal year 2026.

    Thurston County has provided the Assessed Valuation and Property Tax Worksheet for the purpose of calculating and the Ad Valorem Property Tax for fiscal year 2026. The City will hold two Public hearings as required by RCW 84.55 on October 28 and November 11th and is required to pass a resolution adopting the 2026 property tax by November 30, 2025.

Ordinance / Resolution No. 2025-07 (RCW 84.55.120)

Recommended Action: Motion to adopt an Ad Valorem Tax Levy using Hightest Lawful Levy Procedures that would result in a total increase of $368.96.

5. 2026 Annual Budget

State law provides that each municipality hold two Public Hearings prior to budget adoption in order to provide the opportunity for input by the Public. Tonight's hearing will focus primarily upon revenues for the 2026 Budget.

Recommended Action: Move to accept the Administration's recommendations on the 2026 budget revenues as presented.

6. Tenino Water System Plan Update.

To present and approve The Tenino Water System Plan.

Recommended Action: Move to approve the Tenino Water System Plan.

7. Water Use Efficiency Goals

To present and adopt Water Use Efficiency Goals

Recommended Action: Move to adopt the Water Use Efficiency Goals.

PROCLAMATIONS

OLD BUSINESS

NEW BUSINESS

RESOLUTIONS

ORDINANCES

REPORTS

8. Outside Agency

1) Chamber of Commerce

2) Economic Development Council (EDC)

3) South Thurston Economic Development Initiative (STEDI)

4) ARCH Commission 5) Experience Olympia & Beyond (VCB)

5) Timberland Regional Library

9. 13. Committees/Commissions

1) Civil Service Commission

2) Finance Committee

3) Planning Commission

4) Public Safety Committee

5) Public Works Committee

10. 14. Staff

1) Chief of Police

2) Director of Public Works

3) Code Enforcement/Building Inspector

4) PARC Specialist

5) Clerk/Treasurer

6) Mayor

11. 15. **Liaisons**

1) Bucoda/Tenino Healthy Action Team (BTHAT)

2) Solid Waste Advisory Board

3) TCOMM/911

4) Tenino School Board

5) Thurston Regional Planning Council (TRPC)

6) Transportation Policy Board

7) Thurston County Commissioner's Office

8) Legislature

PUBLIC COMMENTS 2

ANNOUNCEMENTS

ADJOURNMENT

File Attachments for Item:

2. Approval of Minutes

Recommended Action: Motion to approve the 10/28/2025 minutes as presented.

City Council Meeting
Tuesday, October 28, 2025

Minutes

WORK SESSION

Councilmember Gotovac convened the work session at 6:30 pm with:

PRESENT
Councilmember Linda Gotovac
Councilmember Elaine Klamn
Councilmember John O'Callahan
Councilmember Jason Lawton
Councilmember Jeff Eisel via Skype.

1. Ad Valorem Property Tax for fiscal year 2026.

   Thurston County has provided the Assessed Valuation and Property Tax Worksheet for the purpose of calculating and the Ad Valorem Property Tax for fiscal year 2026. The City will hold two Public hearings as required by RCW 84.55 on October 28 and November 11th and is required to pass a resolution adopting the 2026 property tax by November 30, 2025.

   C/T Reddick discussed the Ad Valorem Property Tax Levy resolution that will be presented to be adopted in the upcoming public hearings on 11/11/25 and 11/25/25. Projected to ask for 1%.

CALL TO ORDER

Councilmember Linda Gotovac convened the regular Council Meeting at 7:30PM with the absence of Mayor Watterson.

PRESENT
Councilmember Linda Gotovac
Councilmember Elaine Klamn
Councilmember John O'Callahan
Councilmember Jason Lawton
Councilmember Jeff Eisel

AGENDA APPROVAL

2. Agenda Approval

   Recommended Action: Motion to approve the 10/28/2025 agenda as presented.

   Merotion made by Councilmember O'Callahan, Seconded by Councilmember Lawton.

   Voting Yea: Councilmember Gotovac, Councilmember Klamn, Councilmember O'Callahan, Councilmember Lawton, Councilmember Eisel.

Motion passes: 5/0.

APPROVAL OF MINUTES

3. Approval of Minutes

Recommended Action: Motion to approve the 10/14/2025 minutes as presented.

Motion made by Councilmember O'Callahan, Seconded by Councilmember Lawton.

Voting Yea: Councilmember Gotovac, Councilmember Klamn, Councilmember O'Callahan, Councilmember Lawton, Councilmember Eisel.

Motion passes: 5/0.

CONSENT CALENDAR

4. Consent Calendar for October 15, 2025 through October 28, 2025 consisting of:

Payroll EFT's in the amount of $58,748.95 and Claims Checks #33670 through #33689 and EFT's in the amount of $51,963.62 for a Grand Total of $110,712.57.

Liquor License Renewals: None

Recommended Action: Move to approve the consent calendar as presented.

Motion made by Councilmember O'Callahan, Seconded by Councilmember Lawton.

Voting Yea: Councilmember Gotovac, Councilmember Klamn, Councilmember O'Callahan, Councilmember Lawton, Councilmember Eisel.

Motion passes: 5/0.

PRESENTATIONS

None.

EXECUTIVE SESSION

None.

PUBLIC COMMENTS

PUBLIC HEARING

5. 2026 Annual Budget

State law provides that each municipality hold two Public Hearings prior to budget adoption in order to provide the opportunity for input by the Public. Tonight’s hearing will focus primarily upon revenues for the 2026 Budget.

C/T Reddick discussed that the budget is not ready for a Public Hearing. The Public Hearings will be held on 11/11/25 and 11/25/25. The city council has agreed this meeting is just to inform and discuss where the budget adoption is currently.

PROCLAMATIONS

None.

OLD BUSINESS

None.

NEW BUSINESS

None.

RESOLUTIONS

None.

ORDINANCES

None.

REPORTS

6. **Outside Agency**

1) Chamber of Commerce - November 19th Tree Lighting on December 5th at the Eagles.

2) Economic Development Council (EDC) - Dec 4th, Regional Economic Forecast Innovation Expo.

7. **13. Committees/Commissions**

8. **14. Staff**

5) Clerk/Treasurer - C/T Reddick sent bank statements, there was a system error with one of the transactions so she couldn't get the treasurers report for September. Could not get the report for September, supplied the statement in this meeting. Still waiting on the City Street Fund, waiting on some funds from TIB for the overlay that is why that fund is still showing in the negative.

6) Mayor - Mayor Watterson stated he went to the State Surplus because he knew they had a program for municipalities, they were very positive that they could find us a vehicle for the police, we need to fill out some paperwork and work on some stuff before we look further at that. Early next week he will work on expenditure side and get out to you ASAP.

9. 15. **Liaisons**

2) Solid Waste Advisory Board - Councilmember Klamn reported that OPMA will be mandatory every four years that we all have it. Canceling regular meeting needs to be posted on the door and on the webpage. Compactor work starts on October 20th and take 2 weeks to do it.

5) Thurston Regional Planning Council (TRPC) - November 6th, open meeting to meet candidates for the director position.

6) Transportation Policy Board - November 6th, open meeting to meet candidates for the director position.

PUBLIC COMMENTS 2

None.

ANNOUNCEMENTS

None.

ADJOURNMENT

None.

File Attachments for Item:

3. Consent Calendar for October 29, 2025 through November 11, 2025 consisting of:

Payroll EFT's in the amount of $74,428.01 and Claims Checks #33670 through #33689 and EFT's in the amount of $165,861.12 for a Grand Total of $240,289.13.

Liquor License Renewals: None

Recommended Action: Move to approve the consent calendar as presented.

Consent Calendar November 11, 2025 consisting of:

- **Payroll EFT's in the amount of $ 74,428.01**
- **Claims Checks # 33670 through # 33689 in the amount of $ 165861.12**

for a total of $ 240,289.13

Liquor & Cannabis License:

None at this time

File Attachments for Item:

4. Ad Valorem Property Tax for fiscal year 2026.

Thurston County has provided the Assessed Valuation and Property Tax Worksheet for the purpose of calculating and the Ad Valorem Property Tax for fiscal year 2026. The City will hold two Public hearings as required by RCW 84.55 on October 28 and November 11th and is required to pass a resolution adopting the 2026 property tax by November 30, 2025.

Ordinance / Resolution No. 2025-07 (RCW 84.55.120)

Recommended Action: Motion to adopt an Ad Valorem Tax Levy using Hightest Lawful Levy Procedures that would result in a total increase of $368.96.

CITY COUNCIL
AGENDA STAFF REPORT

Council Meeting Date: 11/11/2025
Agenda Item Number:

Originator: Nancy Reddick
Title: Clerk Treasurer

☐ **Discussion** ☒ **Action Required**

Department: Administration

☐ **Old Business** ☒ **New Business** ☐ **Resolution** ☐ **Ordinance** ☐ **Public Hearing**

Subject: Public Hearing for Ad Valorem Tax Levy

Comments:

.Thurston County has provided the Assessed Valuation and Property Tax Worksheet for the purpose of calculating and the Ad Valorem Property Tax for fiscal year 2026. The City will hold two Public hearings as required by RCW 84.55 on November 11th and 25th and is required to pass a resolution adopting the 2026 property tax by November 30, 2025

Staff Recommendation:

Move to adopt an Ad Valorem Tax Levy using Highest Lawful Levy Procedures that would result in a total increase of $368.96

LEVY LIMITATIONS WORKSHEET

TAXING DISTRICT City of Tenino **2025** Levy for **2026** Taxes

Instructions for electronic version of form - Fill in highlighted cells all other self populate.

A. Highest regular tax which could have been lawfully levied beginning with the 1985 levy (refund levy not included).

Year 2025 — $335,929.95 (Highest Lawful Levy Since 1985) # 101.000% (Limit Factor/Max Increase 101%) = $339,289.25

B. Current year's assessed value of new construction, improvements, and wind turbines, solar, biomass, and geothermal facilities in original districts before annexation occurred times last year's levy rate (if an error occurred or an error correction was made in the previous year, use the rate that would have been levied had no error occurred).

$1,402,600 (A.V.) × 1.236221460605 (Last Year's Levy Rate) ÷ $1,000 = $1,733.92

C. Tax increment finance area increment AV increase (RCW 84.55.010(1)(e)) (value included in B & D cannot be included in C)

$0 (A.V.) × 0.000000000000 (Last Year's Levy Rate) ÷ $1,000 = $0.00

D. Current year's state assessed property value less last year's state assessed property value. The remainder is to be multiplied by last year's regular levy rate (or the rate that should have been levied).

$6,012,731 (Current Year's A.V.) - $6,012,731 (Previous Year's A.V.) = $ - (Remainder)

$0 (Remainder from Line D) × 1.236221460605 (Last Year's Levy Rate) ÷ $1,000 = $0.00

E. Regular property tax limit: ..... A+B+C+D = $341,023.17

Parts F through H are used in calculating the additional levy limit due to annexation.

F. To find the rate to be used in G, take the levy limit as shown in Line E above and divide it by the current assessed value of the district, excluding the annexed area.

$341,023.17 (Total in Line E) ÷ $292,812,503 (Assessed Value Less Annexed AV) × $1,000 = 1.164646886680

G. Annexed area's current assessed value including new construction and improvements, times the rate in Line F.

(Annexed Area's A.V.) × 1.164646886680 (Rate in Line F) ÷ $1,000 = 0

H. Regular property tax limit including annexation ..... E+G = $341,023.17

I. **Statutory maximum calculation**

Only enter fire/RFA rate, library rate, & firefighter pension fund rate for cities annexed to a fire/RFA or library, or has a firefighters pension fund.

3.600000000000 (District base levy rate) - 1.218272547406 (Fire or RFA Rate) - 0.228924000000 (Library Rate) + (Firefighter Pension Fund) = 2.152803452594 (Statutory Rate Limit)

$292,812,503 (A.V. of District) × 2.152803452594 (Statutory Rate Limit) ÷ $1,000 = $630,367.77 (Statutory Amount)

J. **Highest lawful Levy For This Tax Year (Lesser of H and I)** ..... = $341,023.17

K. **New highest lawful levy since 1985** (Lesser of I & H minus C, unless A (before limit factor increase) is greater than I or H minus C, then A before the limit factor increase) = $341,023.17

L. **Tax Base For Excess Levies**

1. Regular levy taxable value (including state-assessed property, and excluding boats, timber assessed value, and the senior citizen exemption for the regular levy) $292,812,503
2. Less assessed value of the senior citizen exemption of less than $40,000 income or 65% of the median household income for the county based on lower of frozen or market value.
3. Plus Timber Assessed Value (TAV) .....
4. Tax base for excess and voted bond levies ..... (1-2+3) $292,812,503

Excess Levy Rate Computation - Excess levy amount divided by the assessed value in Line L4 above.

(Levy Amount) ÷ $292,812,503 (A.V. from Line L4 above) × $1,000 = 0.000000000000

Bond Levy Rate Computation - Bond levy amount divided by the assessed value in Line L4 above.

(Levy Amount) $292,812,503 (A.V. from Line L4 above) × $1,000 = 0.000000000000

4.

TAXING DISTRICT City of Tenino **2025** Levy For **2026** Taxes

Population: ☑ Less than 10,000 ☐ 10,000 or more	Res/Ord Amount	368.96
Was a resolution/ordinance adopted authorizing an increase over the previous year's levy?	☐ Yes	☑ No
Was a second resolution/ordinance adopted authorizing an increase over the IPD?	☐ Yes	☐ No ☑ N/A
If so, what was the percentage increase?	Calculated % Increase	0.001088634

A. Previous year's actual levy adjusted by the increases as stated in ordinance or resolution (RCW 84.55.120).

Year 2025 — $338,920.29 (Previous Year's Actual Levy) + 368.96 (Plus Resolution Increase Amount) = $339,289.25

Year 2025 — $338,920.29 (Previous Year's Actual Levy) × 0.228886090194% (Resolution Percentage of Increase) = $339,696.03

B. Amount for new construction, improvements, & certain green energy (Line B page 1)	=	
C. Amount for increment value increase (Line C page 1)	=	$0.00
D. Amount for increase in value of state-assessed property (Line D, page 1)	=	$0.00
E. Amount for increase in annexation (Line G, page 1)	=	0
F. Total levy amount authorized, including the annexation ..... Lesser of A+(B+C+D+E)	=	$339,289.25

G. Total levy amount authorized by resolution (F) plus amount refunded or to be refunded (RCW 84.55.070).

$339,289.25 (Total from Line F) + $3,527.77 (Amount to be Refunded) = $342,817.02 (Amount allowable per)

H. Total amount certified by county legislative authority or taxing district as applicable.
(RCW 84.52.020 and RCW 84.52.070) ..... = $342,817.02

I. Levy limit from line H on page 1, plus amount refunded or to be refunded (RCW 84.55.070).

$341,023.17 (Line H, Page 1) + $3,527.77 (Amount to be Refunded) = $344,550.94 (Total)

J. Amount of taxes recovered due to a settlement of highly valued disputed property (RCW 84.52.018).

$342,817.02 (Lesser of G, H, or I) — (Amount Held in Abeyance) = $342,817.02 (Total)

K. Statutory limit from line I on page 1 (dollar amount, not the rate)	=	$630,367.77
L. Lesser of J & K		$342,817.02
M. **Levy Corrections** Year of Error:		
1. Minus amount over levied (if applicable)		
2. Plus amount under levied (if applicable)		
N. **Total:** L +/- M		$342,817.02

O. **Regular Levy Rate Computation Without Levy Error Correction**
Use this rate in next year's levy calculations unless it's changed due to levy error, other limitation, or there's a road levy shift.

$342,817.02 (Lesser of K and L) ÷ $292,812,503 (Amount on line L1 on page 1) × $1,000 = 1.170773161964 (rate w/o error correction)

P. **Regular Levy Rate Computation:** Lesser of K and N divided by the assessed value in line L1 on page 1.
Use this rate for the current year's tax roll unless it is changed due to another levy limitation such as the $5.90 limit.

$342,817.02 (Lesser of K & N) ÷ $292,812,503 (Amount on line L1 on page 1) × $1,000 = 1.170773161964 (rate before aggregate check)

Q. **Road Levy Shift Rate Computation - (Do not enter a shift amount in both shift fields.)**

R. (Amount shifted **TO** this taxing district) **OR** (Amount shifted **FROM** this taxing district)

S. (Post Shift Levy Amount) ÷ (Amount on line L1 on page 1) × $1,000 = #DIV/0! (Post Shift Levy Rate)

Department of Revenue Washington State

Ordinance / Resolution No. 2025-07

RCW 84.55.120

WHEREAS, the City (Governing body of the taxing district) of Tenino (Name of the taxing district) has met and considered its budget for the calendar year 2026; and,

WHEREAS, the districts actual levy amount from the previous year was $ 338,920.29 (Previous year's levy amount); and,

WHEREAS, the population of this district is ☐ more than or ☒ less than 10,000; and now, therefore, (Check one)

BE IT RESOLVED by the governing body of the taxing district that an increase in the regular property tax levy is hereby authorized for the levy to be collected in the 2026 (Year of collection) tax year.

The dollar amount of the increase over the actual levy amount from the previous year shall be $ 368.96 which is a percentage increase of 1.0 (Percentage increase) % from the previous year. This increase is exclusive of additional revenue resulting from new construction, improvements to property, newly constructed wind turbines, solar, biomass, and geothermal facilities, and any increase in the value of state assessed property, any annexations that have occurred and refunds made.

Adopted this 25 day of November, 2025.

_____ _____

_____ _____

_____ _____

If additional signatures are necessary, please attach additional page.

This form or its equivalent must be submitted to your county assessor prior to their calculation of the property tax levies. A certified budget/levy request, separate from this form is to be filed with the County Legislative Authority no later than November 30th. As required by RCW 84.52.020, that filing certifies the total amount to be levied by the regular property tax levy. The Department of Revenue provides the "Levy Certification" form (REV 64 0100) for this purpose. The form can be found at: http://dor.wa.gov/docs/forms/PropTx/Forms/LevyCertf.doc.

To ask about the availability of this publication in an alternate format, please call 1-800-647-7706. Teletype (TTY) users may use the Washington Relay Service by calling 711. For tax assistance, call (360) 534-1400.

REV 64 0101e (w) (12/9/14)

File Attachments for Item:

5. 2026 Annual Budget

State law provides that each municipality hold two Public Hearings prior to budget adoption in order to provide the opportunity for input by the Public. Tonight's hearing will focus primarily upon revenues for the 2026 Budget.

Recommended Action: Move to accept the Administration's recommendations on the 2026 budget revenues as presented.

CITY COUNCIL
AGENDA STAFF REPORT

Council Meeting Date: 11/11/2025
Agenda Item Number:

Originator: Nancy Reddick
Title: Clerk Treasurer

☐ **Discussion** ☒ **Action Required**

Department: Administration

☐ **Old Business** ☒ **New Business** ☐ **Resolution** ☐ **Ordinance** ☐ **Public Hearing**

Subject: Public Hearing for Budget Revenues

Comments:

State law provides that each municipality hold two Public Hearings prior to budget adoption in order to provide the opportunity for input by the Public. Tonight's hearing will focus primarily upon revenues for the 2026 Budget.

Staff Recommendation:

Move to accept the Administration's recommendations on the 2026 budget revenues as presented

2026 PROPOSED BUDGET CHANGES

Ci Tenino

Time: 12:18:53 Date: 11/06/2025

001 General Government Fund #001

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 91 00 01 Beginning Balance	735,000.00	40,000.00	(695,000.00)	5.4%	
308 Beginning Balances	735,000.00	40,000.00	(695,000.00)	5.4%	
310 Taxes					
311 10 00 00 Real & Personal Property Taxes	300,500.00	310,000.00	9,500.00	103.2%	
311 30 00 00 Sale Of Tax Title Property	31.00	0.00	(31.00)	0.0%	None anticipated
313 11 00 00 Sales & Use	405,500.00	410,000.00	4,500.00	101.1%	
313 15 00 00 Sales & Use (Public Safety)	75,000.00	80,000.00	5,000.00	106.7%	
313 71 00 00 Local Criminal Justice	44,856.59	40,000.00	(4,856.59)	89.2%	
316 10 00 00 Business And Occupation Taxes	107,132.54	95,000.00	(12,132.54)	88.7%	
316 41 00 00 Business Utility Tax-electri	135,500.11	175,000.00	39,499.89	129.2%	
316 42 00 00 Utility Tax - Water	15,317.82	15,000.00	(317.82)	97.9%	
316 44 00 00 Utility Tax-Sewer	68,461.69	70,000.00	1,538.31	102.2%	
316 44 01 00 Utility Tax-Septic Receiving	0.00	0.00	0.00	0.0%	
316 45 00 00 Business Utility Tax (Solid Waste)	24,165.38	29,000.00	4,834.62	120.0%	
316 46 00 00 Business Utility Tax (Cable)	23,423.44	24,000.00	576.56	102.5%	
316 47 00 00 Business Utility Tax (Telephone)	20,209.81	16,000.00	(4,209.81)	79.2%	
316 81 00 00 Gambling Taxes	10,145.00	26,000.00	15,855.00	256.3%	
317 40 00 00 Timber Excise Tax (4X)	311.27	80.00	(231.27)	25.7%	
310 Taxes	1,230,554.65	1,290,080.00	59,525.35	104.8%	
320 Licenses & Permits					
321 91 00 00 Comcast Franchise Fees	0.00	0.00	0.00	0.0%	
321 91 00 01 Comcast Franchise Fees	17,863.00	13,000.00	(4,863.00)	72.8%	
321 91 00 02 Verizon Franchise Fees	13,776.48	13,000.00	(776.48)	94.4%	
321 99 00 00 Business Licenses - New	7,649.00	10,000.00	2,351.00	130.7%	
321 99 01 00 Business License Renewal	8,500.00	2,000.00	(6,500.00)	23.5%	
322 10 00 00 Building Permits	35,000.00	22,000.00	(13,000.00)	62.9%	
322 30 00 00 Animal License	575.00	1,200.00	625.00	208.7%	
322 40 00 00 Street Use Permit	500.00	500.00	0.00	100.0%	
322 40 00 01 Parades / Special Events	800.00	400.00	(400.00)	50.0%	

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

001 General Government Fund #001

Revenues	2025	2026	Difference		Remarks
320 Licenses & Permits					
320 Licenses & Permits	84,663.48	62,100.00	(22,563.48)	73.3%	
330 Intergovernmental Revenues					
331 16 60 00 Bulletproof Vest Partnership Program	0.00	0.00	0.00	0.0%	
333 14 00 02 CARES Act Funding	0.00	0.00	0.00	0.0%	
334 00 20 00 Law Enforcement Grant	0.00	200,000.00	200,000.00	0.0%	Anticipated Revenue 2026
334 03 10 01 SMP Update Grant - DoE	0.00	0.00	0.00	0.0%	
334 04 20 01 HEAR Grant	95,009.00	0.00	(95,009.00)	0.0%	Project Complete 2025
334 04 20 02 Comp Plan-Climate Element Grant	64,000.00	0.00	(64,000.00)	0.0%	Project Complete 2025
334 05 80 00 Capital Project Pilot Grant - ARTS	10,000.00	0.00	(10,000.00)	0.0%	Project Complete 2025
334 05 80 01 Creative Dist Annual Convening-Reimb	7,500.00	0.00	(7,500.00)	0.0%	Project Complete 2025
336 00 98 00 City Assistance	45,281.74	28,000.00	(17,281.74)	61.8%	
336 06 21 00 Criminal Justice - Populatio	1,208.00	1,000.00	(208.00)	82.8%	MRSC est
336 06 26 00 Criminal Justice - Special Programs	2,340.73	3,071.00	730.27	131.2%	MRSC est
336 06 42 00 Marijuana Excise Tax	5,198.57	4,000.00	(1,198.57)	76.9%	
336 06 51 00 Police OT Reimbursement / DUI	0.00	200.00	200.00	0.0%	
336 06 51 10 Crime Vicitims Compensation	219.28	200.00	(19.28)	91.2%	
336 06 94 00 Liquor Excise Tax	15,236.91	14,504.00	(732.91)	95.2%	MRSC est
336 06 95 00 Liquor Control Board Profits	15,137.99	15,210.00	72.01	100.5%	MRSC est
337 00 00 10 RMSA Lexipol Cost Share	2,000.00	0.00	(2,000.00)	0.0%	None anticipated
337 00 00 20 Bowen Foundation Donation	4,887.00	0.00	(4,887.00)	0.0%	Project Complete 2025
330 Intergovernmental Revenues	268,019.22	266,185.00	(1,834.22)	99.3%	
340 Charges For Services					
341 33 00 00 Compliance Fee	99.50	20.00	(79.50)	20.1%	
341 33 02 00 Warrant Cost	311.12	32.00	(279.12)	10.3%	
341 33 03 00 Court Admin Cost	440.36	30.00	(410.36)	6.8%	
341 35 01 00 Police Reports	68.60	100.00	31.40	145.8%	
341 49 00 01 Court Conviction Fees	289.55	100.00	(189.55)	34.5%	

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

001 General Government Fund #001

Revenues	2025	2026	Difference		Remarks
340 Charges For Services					
341 81 00 00 Photocopies	48.28	90.00	41.72	186.4%	
341 95 00 00 Legal Services	261.52	225.00	(36.52)	86.0%	
341 95 00 01 Notary Fee	175.00	60.00	(115.00)	34.3%	
342 10 00 01 Special Emphasis Reimbursement	0.00	0.00	0.00	0.0%	
342 10 00 02 TSD School Resource Officer Contract	50,000.00	50,000.00	0.00	100.0%	
342 10 00 03 Code Enforcement/Building Official Contract	0.00	0.00	0.00	0.0%	
342 33 06 00 Traffic Safety School	0.00	0.00	0.00	0.0%	
342 36 00 00 Housing And Monitoring Of Prisoners	175.00	0.00	(175.00)	0.0%	None anticipated
342 37 00 00 Booking Fees	175.00	30.00	(145.00)	17.1%	
345 29 00 00 Sales Of Electricity Solar Incentive	0.00	0.00	0.00	0.0%	
345 81 00 00 Zoning & Subdivision Fees	1,485.00	650.00	(835.00)	43.8%	
345 83 00 00 Plan Check Fees	24,577.74	10,500.00	(14,077.74)	42.7%	
347 30 01 00 Ball Field Fees	3,500.00	2,000.00	(1,500.00)	57.1%	
340 Charges For Services	81,606.67	63,837.00	(17,769.67)	78.2%	
350 Fines, Penalties, & Forfeitures					
352 30 00 00 Mandatory Insurance Cost	0.00	0.00	0.00	0.0%	
353 10 00 00 Traffic Infractions	1,722.48	3,000.00	1,277.52	174.2%	
354 00 00 00 Parking Infractions	0.00	0.00	0.00	0.0%	
355 80 00 00 Criminal Traffic	2,935.87	2,500.00	(435.87)	85.2%	
356 90 00 00 Criminal Non-traffic	943.10	1,800.00	856.90	190.9%	
357 33 00 00 Public Defense Cost	2,966.71	6,000.00	3,033.29	202.2%	
357 37 00 00 Court Cost Recoup	379.41	379.41	0.00	100.0%	
359 00 00 00 Tax Penalties	0.00	0.00	0.00	0.0%	
359 00 00 01 Business License Renewal Penalty	0.00	0.00	0.00	0.0%	
359 00 00 02 B&O Penalties	3,150.00	350.00	(2,800.00)	11.1%	
350 Fines, Penalties, & Forfeitures	12,097.57	14,029.41	1,931.84	116.0%	
360 Misc Revenues					

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

001 General Government Fund #001

Revenues	2025	2026	Difference		Remarks
360 Misc Revenues					
361 11 45 20 Investment Interest	944.82	3,500.00	2,555.18	370.4%	
361 40 00 00 Sales Interest	563.38	1,500.00	936.62	266.3%	
361 40 01 00 D/M Interest Income	566.66	0.00	(566.66)	0.0%	None anticipated
362 00 00 00 Ag Park Lease-North Bldg	36,000.00	36,000.00	0.00	100.0%	Based on 2025 recpts
362 00 00 01 Ag Park Lease- South Land	10,000.00	10,000.00	0.00	100.0%	Estimate on future
362 40 01 00 Camping Fees	3,500.00	400.00	(3,100.00)	11.4%	Campground closed
362 40 02 00 Quarry House Rent	20,000.00	23,000.00	3,000.00	115.0%	Est based on 2025 useage
362 40 03 00 Park & Picnic Shelter Rental	3,500.00	3,500.00	0.00	100.0%	Est based on 2025 useage
362 40 04 00 Concession Stand Rental	350.00	350.00	0.00	100.0%	Est based on 2025 useage
362 40 05 00 Food Warehouse Rental	3,480.00	25.00	(3,455.00)	0.7%	
362 40 06 00 Old PW Building Rental	10,200.00	25.00	(10,175.00)	0.2%	
362 40 07 00 Programs-Paks & Rec	10,000.00	10,000.00	0.00	100.0%	Est based on 2025
362 40 08 00 CouncilChamberRental	500.00	0.00	(500.00)	0.0%	Est based on 2025
362 40 09 00 Park Vendor Rental	0.00	500.00	500.00	0.0%	Est based on 2025
367 00 00 00 Donations	1,500.00	4,000.00	2,500.00	266.7%	Est based on 2025 recpts
367 00 00 01 Donations/Jubilee	0.00	0.00	0.00	0.0%	
367 00 00 02 Donations To COVID-10 Relief Fund	0.00	0.00	0.00	0.0%	
367 00 00 03 ARTS WA GRANT/ Banner Donations	0.00	0.00	0.00	0.0%	
367 01 00 00 Park events- Vendor Fee	1,000.00	500.00	(500.00)	50.0%	
367 10 00 00 Animal Shelter Donations	0.00	0.00	0.00	0.0%	
369 10 00 02 Sale Of Scrap And Junk	5,000.00	100.00	(4,900.00)	2.0%	Based on 2025 recpts
369 90 00 01 Tuition Refund	0.00	0.00	0.00	0.0%	
369 91 00 00 Other Miscellaneous Revenue	300.00	1,000.00	700.00	333.3%	
360 Misc Revenues	107,404.86	94,400.00	(13,004.86)	87.9%	
380 Non Revenues					
369 91 00 01 CC Convenience Fee	2,000.00	2,000.00	0.00	100.0%	
381 20 00 00 Interfund Loan	0.00	200,000.00	200,000.00	0.0%	Fm Fund 421
385 00 00 00 Special Or Extraordinary Items	10,000.00	1,000.00	(9,000.00)	10.0%	
389 10 00 01 Deposit / Facility Rental	5,000.00	12,000.00	7,000.00	240.0%	

001 General Government Fund #001

Revenues	2025	2026	Difference		Remarks
380 Non Revenues					
389 10 00 02 Deposit / Land Use	450.00	0.00	(450.00)	0.0%	None anticipated
389 10 00 03 Deposit / Special Events	1,500.00	500.00	(1,000.00)	33.3%	
389 10 00 04 Hydrant Meter Deposit	250.00	0.00	(250.00)	0.0%	None anticipated
389 30 00 02 Building Code Fees	500.00	3,000.00	2,500.00	600.0%	
389 30 00 04 EMS/Trauma	343.07	150.00	(193.07)	43.7%	
389 30 00 05 Auto Theft	679.69	300.00	(379.69)	44.1%	
389 30 00 06 Trama Brain Injury	258.22	125.00	(133.22)	48.4%	
389 30 00 07 PSEA 3	260.90	150.00	(110.90)	57.5%	
389 30 00 08 WSP Highway Account	195.91	50.00	(145.91)	25.5%	
389 30 00 09 Highway Safety	142.81	50.00	(92.81)	35.0%	
389 30 00 10 Death Investigation	95.22	20.00	(75.22)	21.0%	
389 30 00 11 Public Safety/education PSEA 1	6,528.57	4,000.00	(2,528.57)	61.3%	
389 30 00 12 PSEA 2	1,261.80	2,000.00	738.20	158.5%	
389 30 00 13 JIS	2,696.76	1,100.00	(1,596.76)	40.8%	
389 30 00 14 School Zone Safety	434.04	0.00	(434.04)	0.0%	None anticipated
389 30 00 15 Distracted Driving	832.16	0.00	(832.16)	0.0%	None anticipated
389 91 00 01 CC Suspense Account	0.00	0.00	0.00	0.0%	
380 Non Revenues	33,429.15	226,445.00	193,015.85	677.4%	
397 Interfund Transfers					
397 00 00 07 Transfer From #109	0.00	0.00	0.00	0.0%	
397 Interfund Transfers	0.00	0.00	0.00	0.0%	
398 Insurance Recoveries					
398 10 00 00 Insurance Recoveries	0.00	0.00	0.00	0.0%	
398 Insurance Recoveries	0.00	0.00	0.00	0.0%	
515 Legal					
315 41 41 05 Outside Counsel Retainer Refund	10,039.00	0.00	(10,039.00)	0.0%	None anticipated
515 Legal	10,039.00	0.00	(10,039.00)	0.0%	

2026 PROPOSED BUDGET CHANGES

001 General Government Fund #001

Revenues	2025	2026	Difference		Remarks
Fund Revenues:	2,562,814.60	2,057,076.41	(505,738.19)	80.3%	

Expenditures	2025	2026	Difference		Remarks
360 Misc Revenues					
557 30 42 00 Park events- Fam Fun Day, Special Celebrations	1,000.00	1,000.00	0.00	100.0%	
592 11 01 00 Interfund Loan Interest	24,000.00	160,000.00	136,000.00	666.7%	
360 Misc Revenues	25,000.00	161,000.00	136,000.00	644.0%	
511 Legislative					
511 20 45 00 Professional Services - Leader Wkshp	0.00	0.00	0.00	0.0%	
511 30 45 01 Code Book Publications	1,500.00	1,500.00	0.00	100.0%	
511 60 10 00 Council Stipend	15,000.00	15,000.00	0.00	100.0%	
511 60 20 00 Council Benefits - Taxes	650.00	650.00	0.00	100.0%	
511 60 31 00 Janitorial Supplies	350.00	350.00	0.00	100.0%	
511 60 42 03 MNS Service Provider	20,000.00	20,000.00	0.00	100.0%	
511 60 42 04 E Governance Software	2,050.00	2,050.00	0.00	100.0%	
511 60 42 05 PRA Compliance Software	350.00	350.00	0.00	100.0%	
511 60 42 06 City Web Site	0.00	0.00	0.00	0.0%	
511 60 42 08 Postage	28.00	30.00	2.00	107.1%	
511 60 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
511 60 46 00 Insurance	15,864.06	15,450.00	(414.06)	97.4%	
511 60 47 00 Advertising & Publications	750.00	750.00	0.00	100.0%	
511 60 48 01 Education/Training	500.00	500.00	0.00	100.0%	
511 60 48 02 Meals/Lodging/Travel	500.00	500.00	0.00	100.0%	
511 61 10 00 Leg Spt Salaries & Wages	27,084.33	26,724.94	(359.39)	98.7%	
511 61 20 00 Leg Spt - Benefits-Taxes	2,000.00	2,167.34	167.34	108.4%	
511 61 21 00 Leg Spt - Benefits-Health Care	3,500.00	5,400.00	1,900.00	154.3%	
511 61 22 00 Leg Spt - Benefits-Retirement	2,500.00	1,370.80	(1,129.20)	54.8%	
511 61 22 01 Legislative -DCP	35.00	54.00	19.00	154.3%	
511 Legislative	92,661.39	92,847.08	185.69	100.2%	

2026 PROPOSED BUDGET CHANGES

Ci Tenino

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001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
512 Judical					
512 50 41 00 Judicial Activities -Contract Svc	0.00	0.00	0.00	0.0%	
512 50 48 02 Meals/Lodging/Travel	0.00	0.00	0.00	0.0%	
512 51 10 00 Judicial Spt Salaries & Wages	28,677.35	0.00	(28,677.35)	0.0%	Court to TC
512 51 20 00 Judicial Spt - Benefits-Taxes	4,555.00	0.00	(4,555.00)	0.0%	Court to TC
512 51 21 00 Judicial Spt - Benefits-Health Care	10,594.77	0.00	(10,594.77)	0.0%	Court to TC
512 51 22 00 Judicial Spt - Benefits-Retirement	5,346.49	0.00	(5,346.49)	0.0%	Court to TC
512 51 22 01 Judicial -DCP	180.00	0.00	(180.00)	0.0%	Court to TC
512 51 30 00 Office Supplies	150.00	0.00	(150.00)	0.0%	Court to TC
512 51 33 00 Small Tools & Equipment	150.00	0.00	(150.00)	0.0%	Court to TC
512 51 41 04 Judge Fees	10,000.00	900.00	(9,100.00)	9.0%	Court to TC
512 51 42 00 Telephone (Land Line)	750.00	750.00	0.00	100.0%	
512 51 42 03 MNS Service Provider	3,400.00	0.00	(3,400.00)	0.0%	Court to TC
512 51 42 05 PRA Compliance Software	350.00	0.00	(350.00)	0.0%	Court to TC
512 51 42 06 City Web Site	0.00	0.00	0.00	0.0%	
512 51 42 08 Postage	250.00	250.00	0.00	100.0%	
512 51 42 10 Office Productivity Software	150.00	0.00	(150.00)	0.0%	Court to TC
512 51 45 01 Printing	250.00	250.00	0.00	100.0%	
512 51 46 00 Insurance	7,500.00	7,300.00	(200.00)	97.3%	
512 51 48 01 Education/Training	0.00	0.00	0.00	0.0%	
512 51 49 00 Dues/membership/misc	250.00	0.00	(250.00)	0.0%	Court to TC
512 52 41 00 Thurston Co - Municipal Court - Contracted Ct Svc -	0.00	25,000.00	25,000.00	0.0%	
512 Judical	72,553.61	34,450.00	(38,103.61)	47.5%	
513 Executive					
513 10 42 09 Telephone (Cellular)	0.00	0.00	0.00	0.0%	
513 10 10 00 Mayor Stipend	18,000.00	18,000.00	0.00	100.0%	
513 10 20 00 Mayor Benefits - Taxes	1,193.92	1,500.00	306.08	125.6%	
513 10 42 03 MNS Service Provider	3,100.00	3,100.00	0.00	100.0%	
513 10 42 05 PRA Compliance Software	125.00	125.00	0.00	100.0%	
513 10 42 06 City Web Site	0.00	0.00	0.00	0.0%	
513 10 42 08 Postage	33.00	35.00	2.00	106.1%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
513 Executive					
513 10 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
513 10 46 00 Insurance	9,500.00	9,250.00	(250.00)	97.4%	
513 10 48 01 Executive - Education/Training	0.00	1,500.00	1,500.00	0.0%	
513 10 48 02 Executive - Meals, Travel, & Lodging	0.00	1,000.00	1,000.00	0.0%	
010 Office of the Chief Executive	31,951.92	34,510.00	2,558.08	108.0%	
513 20 10 00 Executive Spt Salaries & Wages	24,342.26	26,724.94	2,382.68	109.8%	
513 20 20 00 Executive Spt Benefits - Taxes	2,125.76	2,167.34	41.58	102.0%	
513 20 21 00 Executive Spt Benefits - Health Care	2,955.68	5,400.00	2,444.32	182.7%	
513 20 22 00 Executive Spt Benefits - Retirement	2,309.11	1,370.80	(938.31)	59.4%	
513 20 22 01 Executive Spt Benefits - Retirement (DCP)	125.00	54.00	(71.00)	43.2%	
020 Advisory Services	31,857.81	35,717.08	3,859.27	112.1%	
513 20 42 03 MNS Service Provider	8,500.00	8,500.00	0.00	100.0%	
513 20 42 04 E Governance Software	2,331.00	2,400.00	69.00	103.0%	
513 20 42 05 PRA Compliance Software	350.00	350.00	0.00	100.0%	
513 20 42 06 City Web Site	0.00	0.00	0.00	0.0%	
513 20 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
513 20 45 10 CS Commission - Examiner	0.00	0.00	0.00	0.0%	
513 20 46 00 CS Commission - Insurance	6,500.00	6,500.00	0.00	100.0%	
513 20 48 01 CS Commission - Training	0.00	0.00	0.00	0.0%	
513 20 48 02 CS Commission - Travel, Meals, & Lodging	0.00	0.00	0.00	0.0%	
021 Civil Service Commission	17,681.00	17,750.00	69.00	100.4%	
513 Executive	81,490.73	87,977.08	6,486.35	108.0%	
514 Finance, Recording, And Elections					
514 20 10 00 Salaries & Wages	36,699.77	32,445.40	(4,254.37)	88.4%	

2026 PROPOSED BUDGET CHANGES

Ci Tenino

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001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
514 Finance, Recording, And Elections					
514 20 20 00 Benefits - Taxes	3,625.56	2,604.96	(1,020.60)	71.8%	
514 20 21 00 Benefits - Health Care	6,350.24	6,300.00	(50.24)	99.2%	
514 20 22 00 Benefits - Retirement	3,948.00	1,750.23	(2,197.77)	44.3%	
514 20 22 01 Benefits - Retirement (DCP)	235.00	63.00	(172.00)	26.8%	
514 20 30 00 Office Supplies	1,000.00	750.00	(250.00)	75.0%	
514 20 31 00 Janitorial Supplies	150.00	150.00	0.00	100.0%	
514 20 35 00 Small Tools & Equipment	150.00	100.00	(50.00)	66.7%	
514 20 42 00 Telephone (Land Line)	1,151.24	1,250.00	98.76	108.6%	
514 20 42 03 MNS Service Provider	5,800.00	5,800.00	0.00	100.0%	
514 20 42 05 PRA Compliance Software	320.00	320.00	0.00	100.0%	
514 20 42 07 Web Bill Pay Services	0.00	0.00	0.00	0.0%	
514 20 42 08 Postage	1,500.00	2,000.00	500.00	133.3%	
514 20 42 09 Telephone (Cellular)	0.00	300.00	300.00	0.0%	
514 20 42 10 Office Productivity Software	200.00	320.00	120.00	160.0%	
514 20 42 13 Financial Software (BIAS)	3,500.00	7,000.00	3,500.00	200.0%	
514 20 42 14 Express Credit Card Service	0.00	9,000.00	9,000.00	0.0%	Includes set up
514 20 45 00 Professional Services	800.00	100.00	(700.00)	12.5%	
514 20 45 01 Equipment Repair/maintenance	200.00	100.00	(100.00)	50.0%	
514 20 46 00 Insurance	7,500.00	7,300.00	(200.00)	97.3%	
514 20 48 01 Education & Training	300.00	1,000.00	700.00	333.3%	
514 20 48 02 Travel/lodging/meals	500.00	500.00	0.00	100.0%	
514 20 49 00 Dues/memberships/misc.	150.00	150.00	0.00	100.0%	
514 20 49 01 Bank Charges	500.00	2,000.00	1,500.00	400.0%	
514 20 49 03 Fines And Penalties	500.00	2,500.00	2,000.00	500.0%	
514 23 40 00 Audit Costs	5,000.00	25,000.00	20,000.00	500.0%	
514 40 51 00 Election Services	3,500.00	2,500.00	(1,000.00)	71.4%	
514 Finance, Recording, And Elections	83,579.81	111,303.59	27,723.78	133.2%	
515 Legal					
515 41 41 01 City Attorney	45,000.00	20,000.00	(25,000.00)	44.4%	
515 41 41 02 Prosecuting Attorney	10,000.00	30,000.00	20,000.00	300.0%	
515 41 41 05 Outside Counsel	500.00	500.00	0.00	100.0%	
515 93 41 03 Public Defender	14,000.00	30,000.00	16,000.00	214.3%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
515 Legal					
515 93 41 06 Interpreter Services	500.00	300.00	(200.00)	60.0%	
515 Legal	70,000.00	80,800.00	10,800.00	115.4%	
518 Centralized/General Services					
518 90 49 01 Misc/Subscriptions	0.00	50.00	50.00	0.0%	
518 10 10 00 Pers Svc-Salaries	50,394.47	52,259.79	1,865.32	103.7%	
518 10 20 00 Pers Svc-Benefits-Taxes	2,272.00	4,216.00	1,944.00	185.6%	
518 10 21 00 Pers Svc - Benefits-Health Care	4,846.40	10,980.00	6,133.60	226.6%	
518 10 22 00 Pers Svc-Benefits-Retirement	2,576.03	2,795.64	219.61	108.5%	
518 10 22 01 Pers Svc-Benefits-Retirement-(DCP)	200.00	109.80	(90.20)	54.9%	
518 10 30 00 Office Supplies	250.00	250.00	0.00	100.0%	
518 10 31 00 Lions Club Flags	0.00	0.00	0.00	0.0%	
518 10 41 00 Professional Services	500.00	500.00	0.00	100.0%	
518 10 45 02 OASI Benefits DRS	25.00	25.00	0.00	100.0%	
518 10 46 00 Insurance - HR	7,532.25	7,350.00	(182.25)	97.6%	
518 10 47 00 Advertising/Publication	0.00	200.00	200.00	0.0%	
518 10 48 01 Education/Training	300.00	300.00	0.00	100.0%	
518 10 48 02 Meals/Lodging/Travel	0.00	750.00	750.00	0.0%	
010 Personnel Services	68,896.15	79,736.23	10,840.08	115.7%	
518 30 10 00 Central Svc-Salaries & Wages	14,646.05	14,646.05	0.00	100.0%	
518 30 20 00 Central Svc-Benefits-Taxes	2,644.44	2,644.44	0.00	100.0%	
518 30 21 00 Central Svc-Benefits-Health Care	6,448.00	6,448.00	0.00	100.0%	
518 30 22 00 Central Svc-Benefits-Retirement	4,130.00	4,130.00	0.00	100.0%	
518 30 22 01 Central Services-Benefits-Retirement (DCP)	209.00	209.00	0.00	100.0%	
518 30 23 00 Safety Clothing	250.00	250.00	0.00	100.0%	
518 30 30 00 Small Tools & Equipment	200.00	200.00	0.00	100.0%	
518 30 31 01 Janitorial Supplies	200.00	100.00	(100.00)	50.0%	
518 30 32 00 Bldg Hdw/Materials	150.00	150.00	0.00	100.0%	
518 30 35 06 Fuel, F-150	250.00	250.00	0.00	100.0%	
518 30 45 03 Maintenance - Office Equipment	100.00	100.00	0.00	100.0%	

2026 PROPOSED BUDGET CHANGES

Ci Tenino

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001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
518 Centralized/General Services					
518 30 45 04 Maintenance - Electronics	750.00	750.00	0.00	100.0%	
518 30 45 05 Maintenance - Facilities	2,000.00	2,000.00	0.00	100.0%	
518 30 45 06 Utilities	6,630.30	9,000.00	2,369.70	135.7%	
030 Maintenance/Janitorial Services	38,607.79	40,877.49	2,269.70	105.9%	
518 70 42 11 Copier Costs	6,500.00	6,500.00	0.00	100.0%	
518 80 42 00 Telephone (Land Line)	0.00	0.00	0.00	0.0%	
518 80 42 01 Internet Service Provider	2,500.00	2,500.00	0.00	100.0%	
518 80 42 03 MNS Service Provider	21,000.00	21,000.00	0.00	100.0%	
518 80 42 06 City Web Site	0.00	0.00	0.00	0.0%	
518 80 42 08 Postage	300.00	250.00	(50.00)	83.3%	
518 80 42 09 Telephone (Cellular)	0.00	0.00	0.00	0.0%	
518 80 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
518 80 42 13 HR Accounting Software (BIAS)	1,988.00	2,000.00	12.00	100.6%	
080 Information Technology	32,288.00	32,250.00	(38.00)	99.9%	
518 90 10 00 Pers Svc - Salaries & Wages	0.00	0.00	0.00	0.0%	
518 90 10 01 Pers Svc-Salaries (P&R Manager)	0.00	0.00	0.00	0.0%	
518 90 20 00 Pers Services - Personnel Benefits	0.00	0.00	0.00	0.0%	
518 90 20 01 Pers Svc-SalariesBenefits-Taxes (P&R Manager)	0.00	0.00	0.00	0.0%	
518 90 40 00 Audit Costs	0.00	0.00	0.00	0.0%	
518 90 46 00 Insurance (City Hall & PW)	17,122.00	16,675.00	(447.00)	97.4%	
518 90 49 00 AWC Dues	5,500.00	1,300.00	(4,200.00)	23.6%	
518 90 49 02 WMCA Dues	200.00	200.00	0.00	100.0%	
090 Other Centralized Services	22,822.00	18,175.00	(4,647.00)	79.6%	
518 Centralized/General Services	162,613.94	171,088.72	8,474.78	105.2%	
521 Law Enforcement					
521 20 21 01 Benefits - Health Care	0.00	0.00	0.00	0.0%	
521 20 21 02 Benefits - Health Care	0.00	0.00	0.00	0.0%	
521 20 21 03 Benefits - Health Care	0.00	0.00	0.00	0.0%	

2026 PROPOSED BUDGET CHANGES

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
521 Law Enforcement					
521 10 10 00 Salaries & Wages	36,674.88	32,774.27	(3,900.61)	89.4%	
521 10 10 02 Overtime	0.00	0.00	0.00	0.0%	
521 10 20 00 Benefits - Taxes	2,000.00	2,630.12	630.12	131.5%	
521 10 20 02 OT Benefits - Taxes	0.00	0.00	0.00	0.0%	
521 10 21 00 Benefits - Health Care	6,117.00	7,200.00	1,083.00	117.7%	
521 10 21 02 OT Benefits - Health Care	0.00	0.00	0.00	0.0%	
521 10 22 00 Benefits - Retirement	2,225.00	1,828.80	(396.20)	82.2%	
521 10 22 01 Benefits-Retirement (DCP)	360.00	72.00	(288.00)	20.0%	
521 10 22 02 OT Benefits - Retirement	0.00	0.00	0.00	0.0%	
521 10 24 02 Retiree Medical/Deductible	0.00	0.00	0.00	0.0%	
521 10 31 00 Office Supplies	750.00	750.00	0.00	100.0%	
521 10 33 00 Small Equipment	500.00	500.00	0.00	100.0%	
521 10 36 00 Computer Hardware/software	500.00	500.00	0.00	100.0%	
521 10 40 00 Audit Services	0.00	0.00	0.00	0.0%	
521 10 42 03 MNS Service Provider	4,200.00	4,200.00	0.00	100.0%	
521 10 42 05 PRA Compliance Software	350.00	350.00	0.00	100.0%	
521 10 42 06 City Web Site	0.00	0.00	0.00	0.0%	
521 10 42 08 Postage	500.00	900.00	400.00	180.0%	
521 10 42 09 Telephone (Cellular)	506.00	400.00	(106.00)	79.1%	
521 10 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
521 10 45 01 Prof Svc -Background Investigations	0.00	0.00	0.00	0.0%	
521 10 45 02 Repair/Maintenance (Office Equipment)	500.00	500.00	0.00	100.0%	
521 10 47 00 Advertising	0.00	0.00	0.00	0.0%	
521 10 48 01 Education/Training	0.00	0.00	0.00	0.0%	
521 10 48 02 Meals/Lodging/Travel	0.00	100.00	100.00	0.0%	
521 10 49 00 Dues/Memberships/Misc.	0.00	0.00	0.00	0.0%	
010 Admin	55,182.88	52,705.19	(2,477.69)	95.5%	
521 20 10 00 Salaries & Wages	366,607.08	362,299.58	(4,307.50)	98.8%	
521 20 10 01 Standby	7,500.00	2,500.00	(5,000.00)	33.3%	
521 20 10 02 Overtime	15,000.00	15,000.00	0.00	100.0%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
521 Law Enforcement					
521 20 10 03 Holiday	10,000.00	15,000.00	5,000.00	150.0%	
521 20 20 00 Benefits - Taxes	25,000.00	42,675.28	17,675.28	170.7%	
521 20 20 01 Standby Benefits - Taxes	1,000.00	750.00	(250.00)	75.0%	
521 20 20 02 OT Benefits - Taxes	1,500.00	1,500.00	0.00	100.0%	
521 20 20 03 Benefits - Taxes HW	0.00	1,500.00	1,500.00	0.0%	
521 20 21 00 Benefits - Health Care	42,000.00	72,000.00	30,000.00	171.4%	
521 20 22 00 Benefits - Retirement	15,000.00	19,274.34	4,274.34	128.5%	
521 20 22 01 Standby Benefits-Retirement	1,000.00	540.00	(460.00)	54.0%	
521 20 22 02 OT Benefits-Retirement	1,000.00	1,000.00	0.00	100.0%	
521 20 22 03 Benefits-Retirement (DCP)	1,800.00	550.00	(1,250.00)	30.6%	
521 20 23 00 Benefits - Uniforms	800.00	1,500.00	700.00	187.5%	
521 20 30 00 Office Supplies	250.00	250.00	0.00	100.0%	
521 20 33 00 Small Equipment	500.00	500.00	0.00	100.0%	
521 20 33 01 Firearm Inventory Replacement	0.00	0.00	0.00	0.0%	
521 20 35 20 Fuel, K8 7418	500.00	1,200.00	700.00	240.0%	
521 20 35 21 Fuel, K8 7419	2,000.00	1,000.00	(1,000.00)	50.0%	
521 20 35 22 Fuel, K8 7420	2,000.00	1,000.00	(1,000.00)	50.0%	
521 20 35 23 Fuel, Explorer (Black)	2,000.00	1,500.00	(500.00)	75.0%	
521 20 35 24 Fuel, Ford F150	2,000.00	3,000.00	1,000.00	150.0%	
521 20 37 00 Bullet-proof Vests	1,500.00	1,500.00	0.00	100.0%	
521 20 38 00 Pistol Ammunition	0.00	0.00	0.00	0.0%	
521 20 38 01 Rifle Ammunition	0.00	0.00	0.00	0.0%	
521 20 42 03 MNS Service Provider	18,000.00	18,000.00	0.00	100.0%	
521 20 42 09 Telephone (Cellular)	3,500.00	3,950.00	450.00	112.9%	
521 20 42 10 Office Productivity Software	800.00	1,000.00	200.00	125.0%	
521 20 42 11 Cad Communications	0.00	0.00	0.00	0.0%	
521 20 42 12 RMS System	10,000.00	10,000.00	0.00	100.0%	
521 20 45 05 LE Equipment Repairs & Maintenance	1,000.00	1,000.00	0.00	100.0%	
521 20 45 11 Maintenance, K8 7418	2,500.00	2,500.00	0.00	100.0%	
521 20 45 12 Maintenance, K8 7419	2,500.00	2,500.00	0.00	100.0%	
521 20 45 13 Maintenance, K8 7420	2,500.00	2,500.00	0.00	100.0%	
521 20 45 14 Maintenance, Explorer (Black)	2,500.00	2,500.00	0.00	100.0%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
521 Law Enforcement					
521 20 45 15 Maintenance, Ford F150	2,500.00	2,500.00	0.00	100.0%	
521 20 45 20 TCSO Interlocal	25,000.00	25,000.00	0.00	100.0%	
521 20 45 21 Lexipol	4,470.14	5,500.00	1,029.86	123.0%	
521 20 46 00 Insurance	30,602.96	29,800.00	(802.96)	97.4%	
521 20 48 01 Education/Training	0.00	0.00	0.00	0.0%	
521 20 48 02 Meals/Lodging/Travel	0.00	0.00	0.00	0.0%	
020 Operations	604,830.18	652,789.20	47,959.02	107.9%	
521 30 49 01 Crime Prevention Education	0.00	0.00	0.00	0.0%	
030 Crime Prevention	0.00	0.00	0.00	0.0%	
521 50 42 00 Telephone (Land Line)	4,308.00	3,775.00	(533.00)	87.6%	
521 50 42 01 Internet Service Provider	0.00	0.00	0.00	0.0%	
521 50 42 02 Alarm Services	800.00	800.00	0.00	100.0%	
521 50 45 00 Custodial Services	1,000.00	1,000.00	0.00	100.0%	
521 50 45 04 Repair & Maintenance	1,500.00	1,500.00	0.00	100.0%	
521 50 45 06 Utilities	6,300.00	7,300.00	1,000.00	115.9%	
521 50 46 00 Insurance	9,742.66	11,000.00	1,257.34	112.9%	
050 Facilities	23,650.66	25,375.00	1,724.34	107.3%	
521 70 49 00 Traffic Safety School	0.00	0.00	0.00	0.0%	
070 Traffic	0.00	0.00	0.00	0.0%	
521 Law Enforcement	683,663.72	730,869.39	47,205.67	106.9%	
522 Fire And Emergency Medical Activities					
522 20 41 00 Contracted Services - STFEMS	10,000.00	10,000.00	0.00	100.0%	
522 60 49 00 Emergency Management Council Dues	350.00	350.00	0.00	100.0%	
525 60 50 01 Emergency Management Council Dues	0.00	0.00	0.00	0.0%	
522 Fire And Emergency Medical Activities	10,350.00	10,350.00	0.00	100.0%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
523 Detention/Correction Activities					
523 60 40 00 Detention/Correction-Chehalis	2,500.00	4,000.00	1,500.00	160.0%	
523 60 40 01 Detention/Correction-Nisqually	250.00	500.00	250.00	200.0%	
523 60 40 02 Detention/Correction-Thurston	250.00	250.00	0.00	100.0%	
523 60 40 03 Inmate Medical Expenses	1,500.00	1,500.00	0.00	100.0%	
523 Detention/Correction Activities	4,500.00	6,250.00	1,750.00	138.9%	
524 Protective Inspection Services					
524 20 41 00 Protective Inspection Services - Inspections, Permits, Certificates & Licenses -	0.00	4,500.00	4,500.00	0.0%	
524 Protective Inspection Services	0.00	4,500.00	4,500.00	0.0%	
525 Disaster Services					
525 10 41 01 COVID-19 Legal Expenses	0.00	0.00	0.00	0.0%	
525 10 42 14 Go To Meeting	1,500.00	1,500.00	0.00	100.0%	
525 10 45 13 Vehicle Maintenance	0.00	0.00	0.00	0.0%	
525 20 33 01 Recovery Grant Supplies	0.00	0.00	0.00	0.0%	
525 20 33 02 COVID-19 Cleaning Materials	0.00	0.00	0.00	0.0%	
525 20 33 03 COVID-19 PPE	0.00	0.00	0.00	0.0%	
525 20 45 01 Recovery Grant Printing Svc	0.00	0.00	0.00	0.0%	
525 20 45 13 Vehicle Maintenance	0.00	0.00	0.00	0.0%	
525 30 45 50 COVID-19 Grant Proceeds	0.00	0.00	0.00	0.0%	
525 30 45 51 Food Bank Plus Donation	0.00	0.00	0.00	0.0%	
525 30 45 52 CARES Act Disbursement To EDC	0.00	0.00	0.00	0.0%	
525 50 40 01 Emergeny Notification System Contribution	300.00	300.00	0.00	100.0%	
565 10 45 20 COVID-19 Recovery Grant Program	0.00	0.00	0.00	0.0%	
565 10 45 21 Tenino Food Bank Plus Grant	0.00	0.00	0.00	0.0%	
525 Disaster Services	1,800.00	1,800.00	0.00	100.0%	
526 Building Services					

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
526 Building Services					
524 10 10 00 Salaries And Wages	12,224.96	24,580.70	12,355.74	201.1%	
524 10 20 00 Benefits-Taxes	0.00	1,972.59	1,972.59	0.0%	
524 10 21 00 Benefits-Healthcare	0.00	5,400.00	5,400.00	0.0%	
524 10 22 00 Benefits-Retirement	0.00	1,371.60	1,371.60	0.0%	
524 10 24 00 Benefits-Safety Uniforms	0.00	54.00	54.00	0.0%	
524 10 31 00 Vehicle Fuel	0.00	0.00	0.00	0.0%	
524 20 20 00 Overtime	0.00	0.00	0.00	0.0%	
524 30 32 00 Office Supplies	0.00	100.00	100.00	0.0%	
524 30 35 00 Small Equipment/Tools	0.00	0.00	0.00	0.0%	
524 30 35 01 Computer Hardware/Software	0.00	0.00	0.00	0.0%	
524 30 41 00 Office Productivity Software	0.00	0.00	0.00	0.0%	
524 30 41 01 PRA Compliance Software	0.00	400.00	400.00	0.0%	
524 30 41 03 Legal-City Attorney	500.00	500.00	0.00	100.0%	
524 30 41 04 MNS Service Provider	1,500.00	1,500.00	0.00	100.0%	
524 30 42 00 Cell Phone	500.00	500.00	0.00	100.0%	
524 30 42 01 Postage	100.00	25.00	(75.00)	25.0%	
524 30 48 00 Vehicle Maintenance	0.00	0.00	0.00	0.0%	
524 30 48 01 Equipment-Repairs/Maintenance	0.00	0.00	0.00	0.0%	
524 40 41 01 Education/Training	0.00	0.00	0.00	0.0%	
524 40 49 01 Dues/Memberships/Misc	0.00	0.00	0.00	0.0%	
524 40 49 02 Travel/Lodging/Meals	0.00	0.00	0.00	0.0%	
526 Building Services	14,824.96	36,403.89	21,578.93	245.6%	
553 Conservation					
553 70 40 01 DNR FFPA Assessment	275.30	300.00	24.70	109.0%	
553 70 50 00 Air Pollution Control	1,875.72	2,000.00	124.28	106.6%	
553 Conservation	2,151.02	2,300.00	148.98	106.9%	
554 Environmental Services					
554 30 10 00 Salaries & Wages	0.00	0.00	0.00	0.0%	
554 30 20 00 Benefits - Taxes Animal Control	0.00	0.00	0.00	0.0%	
554 30 21 00 Benefits - Health Care	0.00	0.00	0.00	0.0%	

2026 PROPOSED BUDGET CHANGES

Ci Tenino

Time: 12:18:53 Date: 11/06/2025

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
554 Environmental Services					
554 30 22 00 Retirement - Animal Control	0.00	0.00	0.00	0.0%	
554 30 31 00 Supplies	0.00	0.00	0.00	0.0%	
554 30 35 00 Fuel	0.00	0.00	0.00	0.0%	
554 30 41 00 Disposal Fees/county	0.00	0.00	0.00	0.0%	
554 30 45 04 Kennel Maintenance	0.00	0.00	0.00	0.0%	
554 30 45 06 Utilities	0.00	0.00	0.00	0.0%	
554 30 45 30 Join Animal Services Contract	0.00	0.00	0.00	0.0%	
554 30 46 00 Insurance	4,155.05	4,050.00	(105.05)	97.5%	
554 Environmental Services	4,155.05	4,050.00	(105.05)	97.5%	
557 Community Services					
557 30 41 00 Jubilee/Donations Spent	0.00	0.00	0.00	0.0%	
557 Community Services	0.00	0.00	0.00	0.0%	
558 Community Planning & Economic Developr					
558 50 41 00 Community Planning And Economic Development - Building Permits And Plan Reviews -	0.00	30,000.00	30,000.00	0.0%	
558 60 41 02 Comp Plan-Climate Element	64,000.00	36,000.00	(28,000.00)	56.3%	Contract to extend
558 60 44 03 ADA Transition Plan	0.00	0.00	0.00	0.0%	
558 70 21 00 Benefits - Taxes	0.00	1,800.00	1,800.00	0.0%	
558 70 22 01 Retirement (DCP)	0.00	18.00	18.00	0.0%	
558 70 41 00 Professional Services-Creative Dist Convening	0.00	0.00	0.00	0.0%	
524 60 10 00 Salaries & Wages - Building Inspector	30,000.00	12,975.44	(17,024.56)	43.3%	Partial to Contract Svcs
524 60 20 00 Benefits - Taxes	0.00	1,337.57	1,337.57	0.0%	
524 60 21 00 Benefits - Healthcare	0.00	3,600.00	3,600.00	0.0%	
524 60 22 00 Benefits - Retirement	0.00	724.03	724.03	0.0%	
524 60 22 01 Benefits - Reirement (DCP)	0.00	36.00	36.00	0.0%	
524 60 30 00 Office Supplies	0.00	0.00	0.00	0.0%	
524 60 42 03 MNS Service Provider	4,129.67	4,200.00	70.33	101.7%	

001 General Government Fund #001

Expenditures		2025	2026	Difference		Remarks
558 Community Planning & Economic Developr						
524 60 42 05	PRA Compliance Software	287.59	300.00	12.41	104.3%	
524 60 42 06	City Web Site	0.00	0.00	0.00	0.0%	
524 60 42 08	Postage	100.00	100.00	0.00	100.0%	
524 60 42 10	Office Productivity Software	0.00	0.00	0.00	0.0%	
524 60 45 01	Code Publications	1,500.00	1,500.00	0.00	100.0%	
524 60 46 00	Insurance	10,578.02	10,300.00	(278.02)	97.4%	
524 60 49 00	Dues	195.00	200.00	5.00	102.6%	
	010 Protective Inspection Services	46,790.28	35,273.04	(11,517.24)	75.4%	
557 30 00 00	Tourism Promotional Items	500.00	500.00	0.00	100.0%	
557 30 31 00	Supplies	125.00	125.00	0.00	100.0%	
557 30 44 00	Tourism (VCB Interlocal)	0.00	0.00	0.00	0.0%	
557 30 47 00	Tourism Expenses	300.00	300.00	0.00	100.0%	
557 30 48 02	Lodging/Meals/Travel	0.00	0.00	0.00	0.0%	
557 30 49 00	VCB Dues	0.00	0.00	0.00	0.0%	
	030 Tourism	925.00	925.00	0.00	100.0%	
558 60 10 00	Salaries & Wages	2,648.88	2,648.88	0.00	100.0%	
558 60 20 00	Benefits - Taxes	0.00	0.00	0.00	0.0%	
558 60 21 00	Benefits - Health Care	0.00	0.00	0.00	0.0%	
558 60 22 00	Benefits - Retirement	0.00	0.00	0.00	0.0%	
558 60 22 01	Benefits - Retirement - (DCP)	0.00	0.00	0.00	0.0%	
558 60 31 00	Supplies	500.00	100.00	(400.00)	20.0%	
558 60 42 03	MNS Service Provider	14,929.00	15,000.00	71.00	100.5%	
558 60 42 04	E Governance System	2,413.66	2,500.00	86.34	103.6%	
558 60 42 05	PRA Compliance Software	249.00	250.00	1.00	100.4%	
558 60 42 06	City Web Site	0.00	0.00	0.00	0.0%	
558 60 42 08	Postage	304.00	750.00	446.00	246.7%	
558 60 42 10	Office Productivity Software	0.00	0.00	0.00	0.0%	
558 60 43 00	Engineering Services Planning	2,500.00	10,000.00	7,500.00	400.0%	
558 60 44 00	Planning Services Contract	35,000.00	62,000.00	27,000.00	177.1%	
558 60 44 01	Strategic Visioning Facilitator	200.00	200.00	0.00	100.0%	
558 60 44 02	SMP Update	650.00	500.00	(150.00)	76.9%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
558 Community Planning & Economic Developr					
558 60 45 01 Printing	50.00	50.00	0.00	100.0%	
558 60 46 00 Insurance	20,457.00	19,925.00	(532.00)	97.4%	
558 60 47 00 Advertising/planning	225.00	225.00	0.00	100.0%	
558 60 48 01 Training/Education	500.00	500.00	0.00	100.0%	
558 60 48 02 Meals/Lodging/Travel	500.00	500.00	0.00	100.0%	
558 60 49 00 TRPC Dues	2,500.00	2,500.00	0.00	100.0%	
060 Planning	83,626.54	117,648.88	34,022.34	140.7%	
558 70 10 00 Salaries & Wages - Econ Dev	4,761.13	8,591.74	3,830.61	180.5%	
558 70 20 00 Benefits - Taxes	1,068.00	703.35	(364.65)	65.9%	
558 70 22 00 Benefits - Retirement	1,000.00	419.19	(580.81)	41.9%	
558 70 45 00 Professional Services - EDC Contract	10,000.00	10,000.00	0.00	100.0%	
558 70 45 07 Professional Services - Grant Writer	0.00	0.00	0.00	0.0%	
558 70 45 08 P.A.R.C. Foundation	2,500.00	3,500.00	1,000.00	140.0%	
070 Economic Development	19,329.13	23,214.28	3,885.15	120.1%	
558 Community Planning & Economic Develc	214,670.95	244,879.20	30,208.25	114.1%	
559 Property Development					
559 30 41 00 HEAR Grant	95,009.00	0.00	(95,009.00)	0.0%	Project completed 2025
559 Property Development	95,009.00	0.00	(95,009.00)	0.0%	
560 Social Services					
565 10 45 05 Food Warehouse Maintenance	400.00	400.00	0.00	100.0%	
565 10 45 06 Food Warehouse Utilities	3,711.00	3,711.00	0.00	100.0%	
565 10 46 00 Food Warehouse Insurance	675.00	675.00	0.00	100.0%	
565 40 49 01 CIP Dues	0.00	0.00	0.00	0.0%	
566 00 00 00 Employee Assistance Program	0.00	0.00	0.00	0.0%	
560 Social Services	4,786.00	4,786.00	0.00	100.0%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
572 Libraries					
572 50 10 00 Salaries & Wages	5,083.87	5,375.33	291.46	105.7%	
572 50 20 00 Benefits - Taxes	1,000.00	562.13	(437.87)	56.2%	
572 50 21 00 Benefits - Health Care	2,000.00	1,575.00	(425.00)	78.8%	
572 50 22 00 Benefits-Retirement	1,300.00	299.94	(1,000.06)	23.1%	
572 50 22 01 Benefits -Retirement (DCP)	100.00	15.75	(84.25)	15.8%	
572 50 31 00 Office Supplies	100.00	100.00	0.00	100.0%	
572 50 31 01 Janitorial Supplies	250.00	300.00	50.00	120.0%	
572 50 35 06 Fuel	250.00	300.00	50.00	120.0%	
572 50 45 06 Utilities	5,746.26	6,825.00	1,078.74	118.8%	
572 50 46 00 Insurance	7,000.00	1,000.00	(6,000.00)	14.3%	
572 50 48 00 Repairs/Maintenance	1,000.00	1,000.00	0.00	100.0%	
572 Libraries	23,830.13	17,353.15	(6,476.98)	72.8%	
575 Cultural & Recreational Facilities					
575 30 48 00 Programs-Parks & Rec	2,000.00	7,000.00	5,000.00	350.0%	
575 60 31 00 Supplies-Ag Park	800.00	800.00	0.00	100.0%	
575 60 46 00 Insurance-Ag Park	12,000.00	10,025.00	(1,975.00)	83.5%	
575 60 47 00 Utilities-Ag Park	500.00	1,500.00	1,000.00	300.0%	
575 30 10 00 Salaries & Wages	2,119.10	2,119.10	0.00	100.0%	
575 30 20 00 Benefits - Taxes	700.00	700.00	0.00	100.0%	
575 30 21 00 Benefits - Health Care	1,800.00	1,800.00	0.00	100.0%	
575 30 22 00 Benefits - Retirement	1,000.00	1,000.00	0.00	100.0%	
575 30 22 01 Benefits - Retirement (DCP)	40.00	40.00	0.00	100.0%	
575 30 31 00 Office Supplies	100.00	100.00	0.00	100.0%	
575 30 31 01 Janitorial Supplies	0.00	0.00	0.00	0.0%	
575 30 42 00 Telephone (Land Line)	600.00	600.00	0.00	100.0%	
575 30 42 02 Alarm Services	250.00	250.00	0.00	100.0%	
575 30 42 03 MNS Service Provider	4,000.00	4,000.00	0.00	100.0%	
575 30 42 05 PRA Compliance Software	300.00	300.00	0.00	100.0%	
575 30 42 06 City Web Site	0.00	0.00	0.00	0.0%	
575 30 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
575 30 45 05 Repairs & Maintenance	500.00	600.00	100.00	120.0%	
575 30 45 06 Utilities	8,359.16	12,000.00	3,640.84	143.6%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
575 Cultural & Recreational Facilities					
575 30 46 00 Insurance	9,000.00	8,775.00	(225.00)	97.5%	
575 30 47 00 Advertising	0.00	0.00	0.00	0.0%	
030 Museum	28,768.26	32,284.10	3,515.84	112.2%	
575 50 10 00 Salaries & Wages	9,322.08	11,808.16	2,486.08	126.7%	
575 50 20 00 Benefits - Taxes	800.00	1,115.68	315.68	139.5%	
575 50 21 00 Benefits - Health Care	2,400.00	1,575.00	(825.00)	65.6%	
575 50 22 00 Benefits - Retirement	850.00	299.94	(550.06)	35.3%	
575 50 22 01 Benefits - Retirement (DCP)	100.00	15.75	(84.25)	15.8%	
575 50 31 00 Supplies	800.00	250.00	(550.00)	31.3%	
575 50 31 01 Janitorial Supplies	350.00	350.00	0.00	100.0%	
575 50 35 06 Fuel	200.00	200.00	0.00	100.0%	
575 50 42 00 Telephone (Land Line)	0.00	300.00	300.00	0.0%	
575 50 42 01 Internet Service Provider	3,000.00	3,000.00	0.00	100.0%	
575 50 42 05 PRA Compliance Software	300.00	300.00	0.00	100.0%	
575 50 42 06 City Web Site	0.00	0.00	0.00	0.0%	
575 50 45 05 Repairs & Maintenance	1,500.00	1,500.00	0.00	100.0%	
575 50 45 06 Utilities	4,691.25	4,700.00	8.75	100.2%	
575 50 46 00 Insurance	7,000.00	6,825.00	(175.00)	97.5%	
050 Quarry House	31,313.33	32,239.53	926.20	103.0%	
575 Cultural & Recreational Facilities	75,381.59	83,848.63	8,467.04	111.2%	
576 Park Facilities					
576 80 45 04 Replacement Of Damaged Park PG Equipment	0.00	0.00	0.00	0.0%	
576 30 10 00 Salaries & Wages	0.00	3,216.41	3,216.41	0.0%	
576 30 20 00 Benefits - Taxes	0.00	276.78	276.78	0.0%	
576 30 21 00 Benefits - Health Care	0.00	0.00	0.00	0.0%	
576 30 22 00 Benefits - Retirement	0.00	0.00	0.00	0.0%	
576 30 22 01 Benefits - Retirement (DCP)	0.00	0.00	0.00	0.0%	
576 30 35 08 Fuel	0.00	300.00	300.00	0.0%	
576 30 45 06 Utilities - Campground	300.00	1,625.00	1,325.00	541.7%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
576 Park Facilities					
576 30 46 00 Insurance - Campground	3,615.00	3,525.00	(90.00)	97.5%	
576 30 53 00 Taxes & Assessments	150.00	150.00	0.00	100.0%	
030 Campgrounds	4,065.00	9,093.19	5,028.19	223.7%	
576 40 10 00 Salaries & Wages	7,548.56	1,500.63	(6,047.93)	19.9%	
576 40 20 00 Benefits - Taxes	1,000.00	157.92	(842.08)	15.8%	
576 40 21 00 Benefits - Health Care	2,000.00	450.00	(1,550.00)	22.5%	
576 40 22 00 Benefits - Retirement	1,300.00	83.74	(1,216.26)	6.4%	
576 40 22 01 Benefits - Retirement (DCP)	100.00	4.50	(95.50)	4.5%	
576 40 31 00 Supplies	1,000.00	1,400.00	400.00	140.0%	
576 40 32 06 Fuel	600.00	1,100.00	500.00	183.3%	
576 40 32 08 Fuel, Diesel	500.00	250.00	(250.00)	50.0%	
576 40 45 05 Repairs & Maintenance	1,000.00	200.00	(800.00)	20.0%	
576 40 45 06 Utilities	7,420.00	7,425.00	5.00	100.1%	
576 40 46 00 Insurance - Ball Fields	6,000.00	5,850.00	(150.00)	97.5%	
576 50 35 00 Fuel	0.00	0.00	0.00	0.0%	
576 50 35 01 Fuel, Diesel	0.00	0.00	0.00	0.0%	
040 Ballfields & Concession Stand	28,468.56	18,421.79	(10,046.77)	64.7%	
576 50 10 00 Salaries & Wages - Pump Trak	0.00	0.00	0.00	0.0%	
576 50 20 00 Benefits - Taxes	0.00	0.00	0.00	0.0%	
576 50 21 00 Benefits - Health Care	0.00	0.00	0.00	0.0%	
576 50 22 00 Benefits - Retirement	0.00	0.00	0.00	0.0%	
576 50 22 01 Benefits - Retirement (DCP)	0.00	0.00	0.00	0.0%	
576 50 45 06 Utilities	0.00	0.00	0.00	0.0%	
576 50 46 00 Insurance	0.00	0.00	0.00	0.0%	
050 Pump Track	0.00	0.00	0.00	0.0%	
576 80 10 00 Salaries & Wages	7,549.56	61,391.32	53,841.76	813.2%	
576 80 20 00 Benefits - Taxes	1,000.00	5,971.12	4,971.12	597.1%	
576 80 21 00 Benefits - Health Care	2,000.00	11,700.00	9,700.00	585.0%	
576 80 22 00 Benefits - Retirement	1,300.00	2,528.26	1,228.26	194.5%	
576 80 22 01 Benefits - Retirement (DCP)	100.00	117.00	17.00	117.0%	
576 80 31 00 Office Supplies	500.00	500.00	0.00	100.0%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
576 Park Facilities					
576 80 32 00 Hardware & Materials	1,000.00	1,000.00	0.00	100.0%	
576 80 34 00 Small Equipment	1,200.00	1,200.00	0.00	100.0%	
576 80 35 03 Fuel	1,800.00	2,600.00	800.00	144.4%	
576 80 35 04 Fuel, Diesel	800.00	250.00	(550.00)	31.3%	
576 80 42 03 MNS Service Provider	200.00	300.00	100.00	150.0%	
576 80 42 05 PRA Compliance Software	300.00	200.00	(100.00)	66.7%	
576 80 42 06 City Web Site	0.00	200.00	200.00	0.0%	
576 80 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
576 80 45 05 Repairs & Maintenance (Park)	5,500.00	5,500.00	0.00	100.0%	
576 80 45 06 Utilities	4,678.84	4,700.00	21.16	100.5%	
576 80 46 00 Insurance (Park)	7,000.00	6,825.00	(175.00)	97.5%	
576 80 49 00 Property Taxes	300.00	300.00	0.00	100.0%	
080 Park Core & Playground	35,228.40	105,282.70	70,054.30	298.9%	
576 Park Facilities	67,761.96	132,797.68	65,035.72	196.0%	
580 Other Decreases In Fund Resources					
581 10 00 00 Interfund Loan Issuance	600,000.00	0.00	(600,000.00)	0.0%	Incorrect BARS for IF loan
581 20 00 00 Interfund Loan Repayment	0.00	0.00	0.00	0.0%	
582 00 00 02 Deposit Refund / Special Events	1,500.00	1,500.00	0.00	100.0%	
582 10 00 04 Deposit Refund/Hydrant Meter	61.00	0.00	(61.00)	0.0%	None anticipated
588 10 00 00 Prior Period(s) Adjustments - Other Costs Allocations	0.00	0.00	0.00	0.0%	
589 00 00 02 Deposit Refund / Special Events	0.00	0.00	0.00	0.0%	
589 10 00 01 Deposit Refunds / Facility Rental	4,000.00	4,000.00	0.00	100.0%	
589 10 00 04 Deposit Refund/Hydrant Meter	0.00	0.00	0.00	0.0%	
589 30 00 02 Building Code Fees	411.75	425.00	13.25	103.2%	
589 30 00 03 Crime Victim Comp Fund	181.97	200.00	18.03	109.9%	
589 30 00 04 Trauma	205.86	200.00	(5.86)	97.2%	
589 30 00 05 Auto Theft Prevention	386.95	400.00	13.05	103.4%	
589 30 00 06 Trauma Brain Injury	179.32	200.00	20.68	111.5%	
589 30 00 07 State Fees 3	1,243.19	1,300.00	56.81	104.6%	
589 30 00 08 WSP Highway Account	122.41	125.00	2.59	102.1%	

001 General Government Fund #001

Expenditures	2025	2026	Difference		Remarks
580 Other Decreases In Fund Resources					
589 30 00 09 Highway Safety	44.42	50.00	5.58	112.6%	
589 30 00 10 Death Investigation	47.32	50.00	2.68	105.7%	
589 30 00 15 Thurston-Mason Behavioral Health	412.86	425.00	12.14	102.9%	
589 91 00 00 State Fees	3,363.66	3,500.00	136.34	104.1%	
589 92 00 00 State Fees 2	1,726.14	1,800.00	73.86	104.3%	
589 97 00 00 JIS	1,085.34	1,100.00	14.66	101.4%	
589 99 00 00 School Zone Safety	128.52	150.00	21.48	116.7%	
599 14 00 99 Payroll Benefit Clearing Account	0.00	0.00	0.00	0.0%	
580 Other Decreases In Fund Resources	615,100.71	15,425.00	(599,675.71)	2.5%	
594 Capital Expenditures					
594 76 61 10 Bowen Foundation Land Donation funds	4,887.00	4,887.00	0.00	100.0%	
594 Capital Expenditures	4,887.00	4,887.00	0.00	100.0%	
597 Interfund Transfers					
597 00 00 01 Transfer To Quarry Pool (Fund 002)	20,000.00	5,000.00	(15,000.00)	25.0%	
597 00 00 05 Transfer To Contingency	0.00	0.00	0.00	0.0%	
597 00 00 18 Transfer To #310	0.00	0.00	0.00	0.0%	
597 Interfund Transfers	20,000.00	5,000.00	(15,000.00)	25.0%	
999 Ending Balance					
508 90 00 01 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 01 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	2,430,771.57	2,044,966.41	(385,805.16)	84.1%	
Fund Excess/(Deficit):	132,043.03	12,110.00			

002 Quarry Pool Fund #002

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 51 00 02 Beginning Balance	13,369.27	4,593.29	(8,775.98)	34.4%	
308 91 00 02 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	13,369.27	4,593.29	(8,775.98)	34.4%	
340 Charges For Services					
347 30 00 02 Swimming Pool Revenues	40,500.00	40,500.00	0.00	100.0%	
340 Charges For Services	40,500.00	40,500.00	0.00	100.0%	
360 Misc Revenues					
347 30 00 03 Quarry Pool Concessions	3,000.00	3,000.00	0.00	100.0%	
367 11 05 02 Quarry Pool Donations	1,000.00	500.00	(500.00)	50.0%	
369 80 00 00 Quarry Pool Over/Short	0.00	0.00	0.00	0.0%	
360 Misc Revenues	4,000.00	3,500.00	(500.00)	87.5%	
397 Interfund Transfers					
397 00 00 01 Transfer From #001	20,000.00	5,000.00	(15,000.00)	25.0%	
397 00 00 08 Transfer From #109	0.00	0.00	0.00	0.0%	
397 Interfund Transfers	20,000.00	5,000.00	(15,000.00)	25.0%	
Fund Revenues:	77,869.27	53,593.29	(24,275.98)	68.8%	

Expenditures	2025	2026	Difference		Remarks
576 Park Facilities					
576 20 33 00 Quarry Pool Concessions	500.00	500.00	0.00	100.0%	
576 20 49 00 Quarry Pool Donations-Splash Bash	0.00	2,500.00	2,500.00	0.0%	
576 20 47 00 Advertising	150.00	150.00	0.00	100.0%	
576 20 48 01 Lifeguard Training	1,000.00	1,000.00	0.00	100.0%	
576 21 10 00 Salaries & Wages - Lifeguards	25,000.00	25,000.00	0.00	100.0%	
576 21 20 00 Benefits - Taxes - Lifeguards	2,198.00	2,200.00	2.00	100.1%	

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

002 Quarry Pool Fund #002

Expenditures	2025	2026	Difference		Remarks
576 Park Facilities					
100 Pool Operations	28,348.00	28,350.00	2.00	100.0%	
576 20 10 00 Salaries & Wages - Full Time Employees	8,628.89	19,639.59	11,010.70	227.6%	
576 20 20 00 Benefits - Taxes - Full Time	550.00	1,908.82	1,358.82	347.1%	
576 20 21 00 Benefits - Health Care - Full Time	972.56	3,600.00	2,627.44	370.2%	
576 20 22 00 Benefits - Retirement - Full Time	550.00	736.94	186.94	134.0%	
576 20 22 01 Benefits - Retirement -(DCP) Full Time	30.00	36.00	6.00	120.0%	
576 20 31 00 Supplies	1,500.00	1,500.00	0.00	100.0%	
576 20 32 00 Bldg Hdw/Materials	110.00	125.00	15.00	113.6%	
576 20 42 02 Telephone (Land Line)	466.00	475.00	9.00	101.9%	
576 20 42 05 PRA Compliance Software	249.00	250.00	1.00	100.4%	
576 20 42 06 City Web Site	250.00	250.00	0.00	100.0%	
576 20 45 02 Repairs & Maintenance (Pool)	2,500.00	2,500.00	0.00	100.0%	
576 20 45 06 Utilities	4,279.22	4,300.00	20.78	100.5%	
576 20 46 00 Insurance (Pool)	5,500.00	5,375.00	(125.00)	97.7%	
576 20 49 02 Operating Permit/Taxes	2,500.00	2,500.00	0.00	100.0%	
200 Pool Maintenance	28,085.67	43,196.35	15,110.68	153.8%	
576 Park Facilities	56,933.67	74,546.35	17,612.68	130.9%	
999 Ending Balance					
508 80 00 02 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 02 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	56,933.67	74,546.35	17,612.68	130.9%	
Fund Excess/(Deficit):	20,935.60	(20,953.06)			

003 Reserve Academy Operating Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 91 01 03 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	0.00	0.00	0.0%	
340 Charges For Services					
342 10 00 00 Tuition Fees	0.00	0.00	0.00	0.0%	
340 Charges For Services	0.00	0.00	0.00	0.0%	
Fund Revenues:	0.00	0.00	0.00	0.0%	

Expenditures	2025	2026	Difference		Remarks
521 Law Enforcement					
521 21 10 00 Salaries & Wages	0.00	0.00	0.00	0.0%	
521 21 10 03 Overtime	0.00	0.00	0.00	0.0%	
521 21 20 00 Benefits - Taxes	0.00	0.00	0.00	0.0%	
521 21 20 03 OT Benefits - Taxes	0.00	0.00	0.00	0.0%	
521 21 21 00 Benefits - Health Care	0.00	0.00	0.00	0.0%	
521 21 21 03 OT Benefits - Health Care	0.00	0.00	0.00	0.0%	
521 21 22 00 Benefits - Retirement	0.00	0.00	0.00	0.0%	
521 21 22 01 OT Benefits - Retirement	0.00	0.00	0.00	0.0%	
521 21 23 01 Benefits - Uniforms	0.00	0.00	0.00	0.0%	
521 21 35 26 Fuel	0.00	0.00	0.00	0.0%	
521 22 31 01 Office & Operating Supplies	0.00	0.00	0.00	0.0%	
521 22 33 02 Small Equipment	0.00	0.00	0.00	0.0%	
521 22 48 03 Education/Training	0.00	0.00	0.00	0.0%	
521 22 48 04 Meals/Lodging/Travel	0.00	0.00	0.00	0.0%	
521 Law Enforcement	0.00	0.00	0.00	0.0%	
Fund Expenditures:	0.00	0.00	0.00	0.0%	
Fund Excess/(Deficit):	0.00	0.00			

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

101 City Street Fund #101

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 31 00 04 Beginning Balance	233,038.09	(12,473.92)	(245,512.01)	5.4%	
308 91 00 03 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	233,038.09	(12,473.92)	(245,512.01)	5.4%	
310 Taxes					
313 11 00 02 Sales & Use (Streets)	0.00	0.00	0.00	0.0%	
318 35 00 00 REET	30,750.75	35,000.00	4,249.25	113.8%	
310 Taxes	30,750.75	35,000.00	4,249.25	113.8%	
330 Intergovernmental Revenues					
334 03 80 01 Ritter Street SCAP Grant	0.00	0.00	0.00	0.0%	
334 03 80 02 TIB Bundle/Chip Seal	0.00	0.00	0.00	0.0%	
334 03 80 03 Old Hy 99 Overlay-TIB Grant	506,103.00	506,103.00	0.00	100.0%	
334 05 90 01 Hodgden Street Intersection	0.00	0.00	0.00	0.0%	
334 06 90 01 ParkAveGrindOverlay	0.00	0.00	0.00	0.0%	
336 00 71 00 Multimodal Transpo City	2,413.48	2,594.00	180.52	107.5%	MRSC est
336 00 87 00 Mv Fuel Tax - Streets	33,330.56	35,752.00	2,421.44	107.3%	MRSC est
330 Intergovernmental Revenues	541,847.04	544,449.00	2,601.96	100.5%	
360 Misc Revenues					
361 11 45 21 Investment Interest	435.00	435.00	0.00	100.0%	
360 Misc Revenues	435.00	435.00	0.00	100.0%	
Fund Revenues:	806,070.88	567,410.08	(238,660.80)	70.4%	

Expenditures	2025	2026	Difference		Remarks
308 Beginning Balances					
594 38 00 04 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	0.00	0.00	0.0%	

2026 PROPOSED BUDGET CHANGES

Ci Tenino

Time: 12:18:53 Date: 11/06/2025

101 City Street Fund #101

Expenditures	2025	2026	Difference		Remarks
542 Roads/Streets Ordinary Maintenance					
542 30 10 00 Salaries & Wages	44,959.36	47,917.53	2,958.17	106.6%	
542 30 20 00 Benefits - Taxes	2,491.36	4,829.89	2,338.53	193.9%	
542 30 21 00 Benefits - Health Care	4,754.23	12,150.00	7,395.77	255.6%	
542 30 22 00 Benefits - Retirement	2,530.16	2,673.80	143.64	105.7%	
542 30 22 01 Benefits - Retirement (DCP)	155.40	121.50	(33.90)	78.2%	
542 30 31 00 Supplies	1,000.00	1,000.00	0.00	100.0%	
542 30 33 00 Small Tools	500.00	500.00	0.00	100.0%	
542 30 35 00 Fuel	3,000.00	4,000.00	1,000.00	133.3%	
542 30 35 02 Fuel, Diesel	1,000.00	4,450.00	3,450.00	445.0%	
542 30 42 03 MNS Service Provider	0.00	1,500.00	1,500.00	0.0%	
542 30 42 05 PRA Compliance Software	0.00	5,000.00	5,000.00	0.0%	
542 30 42 06 City Web Site	0.00	38,575.00	38,575.00	0.0%	
542 30 42 10 Office Productivity Software	0.00	1,500.00	1,500.00	0.0%	
542 30 46 00 Insurance	4,436.00	4,325.00	(111.00)	97.5%	
542 30 48 01 Auto Repair	1,500.00	5,000.00	3,500.00	333.3%	
542 30 48 02 Maintenance/repair	5,000.00	5,000.00	0.00	100.0%	
542 63 47 00 Utilities / Street Lighting	38,572.50	38,572.50	0.00	100.0%	
542 64 48 00 Traffic Control Devices	1,500.00	1,500.00	0.00	100.0%	
542 67 50 00 Street Cleaning	1,500.00	1,500.00	0.00	100.0%	
542 67 50 01 Street Painting/Striping	1,000.00	1,000.00	0.00	100.0%	
542 Roads/Streets Ordinary Maintenance	113,899.01	181,115.22	67,216.21	159.0%	
594 Capital Expenditures					
594 62 63 00 ParkAveGrindOverlay	0.00	0.00	0.00	0.0%	
595 10 41 01 Professional Engineering Services	2,241.00	12,000.00	9,759.00	535.5%	
595 10 41 02 Old Hy 99 Overlay-Engineering	58,397.00	58,397.00	0.00	100.0%	
595 10 43 01 Ritter Street Engineering	0.00	0.00	0.00	0.0%	
595 10 62 11 Old Hy 99 Overlay-Grant Match	26,637.00	26,637.00	0.00	100.0%	
595 30 50 00 Street Sign Replacement	1,500.00	1,500.00	0.00	100.0%	
595 30 62 01 Ritter Street Roadway	0.00	0.00	0.00	0.0%	
595 30 62 10 Old Hy 99 Overlay-Roadway	447,706.00	447,706.00	0.00	100.0%	
595 30 63 03 Pot Hole Supplies	1,500.00	1,500.00	0.00	100.0%	
595 40 62 02 Ritter Street Drainage	0.00	0.00	0.00	0.0%	

101 City Street Fund #101

Expenditures	2025	2026	Difference		Remarks
594 Capital Expenditures					
595 61 62 03 Ritter Street Sidewalks	0.00	1,500.00	1,500.00	0.0%	
595 62 62 00 Hodgden Street Intersection	0.00	0.00	0.00	0.0%	
594 Capital Expenditures	537,981.00	549,240.00	11,259.00	102.1%	
999 Ending Balance					
508 80 00 03 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 03 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	651,880.01	730,355.22	78,475.21	112.0%	
Fund Excess/(Deficit):	154,190.87	(162,945.14)			

102 Special Revenue Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 31 00 12 Estimated Beginning Balance	0.00	0.00	0.00	0.0%	
313 27 10 00 Beginning Balance	100,284.48	157,761.76	57,477.28	157.3%	
308 Beginning Balances	100,284.48	157,761.76	57,477.28	157.3%	
310 Taxes					
313 27 00 00 Affordable & Supportive Housing Sales & Use Tax	36,000.00	50,000.00	14,000.00	138.9%	
310 Taxes	36,000.00	50,000.00	14,000.00	138.9%	
Fund Revenues:	136,284.48	207,761.76	71,477.28	152.4%	
Fund Excess/(Deficit):	136,284.48	207,761.76			

109 Contingency Fund #109

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 51 00 05 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	0.00	0.00	0.0%	
360 Misc Revenues					
361 11 45 22 Investment Interest	0.00	0.00	0.00	0.0%	
360 Misc Revenues	0.00	0.00	0.00	0.0%	
397 Interfund Transfers					
397 00 00 49 Transfer From Water Fund	0.00	0.00	0.00	0.0%	
397 00 10 01 Transfer From #001	0.00	0.00	0.00	0.0%	
397 Interfund Transfers	0.00	0.00	0.00	0.0%	
Fund Revenues:	0.00	0.00	0.00	0.0%	

Expenditures	2025	2026	Difference		Remarks
308 Beginning Balances					
594 38 00 05 Ending Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	0.00	0.00	0.0%	
597 Interfund Transfers					
597 00 00 07 Transfer To #001	0.00	0.00	0.00	0.0%	
597 00 00 08 Transfer To #002	0.00	0.00	0.00	0.0%	
597 Interfund Transfers	0.00	0.00	0.00	0.0%	
999 Ending Balance					
508 10 00 01 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	

109 Contingency Fund #109

Expenditures	2025	2026	Difference		Remarks
Fund Expenditures:	0.00	0.00	0.00	0.0%	
Fund Excess/(Deficit):	0.00	0.00			

2026 PROPOSED BUDGET CHANGES

310 Municipal Capital Imp Fund 310

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 31 00 06 Beginning Balance	0.00	159,500.00	159,500.00	0.0%	
308 91 00 06 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	159,500.00	159,500.00	0.0%	
310 Taxes					
318 34 03 01 REET	64,516.54	35,000.00	(29,516.54)	54.2%	
310 Taxes	64,516.54	35,000.00	(29,516.54)	54.2%	
330 Intergovernmental Revenues					
331 14 00 01 Housing Rehab Loan Payments	0.00	0.00	0.00	0.0%	
333 14 00 00 CDBG Grant - Quarry Pool Renovation	0.00	0.00	0.00	0.0%	
333 14 00 01 CDBG Grant - Quarry House Renovation	0.00	0.00	0.00	0.0%	
333 14 22 03 CDBG Quarry Pool 2022 Funds	0.00	0.00	0.00	0.0%	
334 03 60 00 ARTSWA-Signs	7,500.00	7,500.00	0.00	100.0%	
334 03 60 01 ARTSWA Capital Grant	0.00	5,800.00	5,800.00	0.0%	
334 04 20 00 HAPI Grant-WA Dept Of Commerce	0.00	0.00	0.00	0.0%	
334 10 00 01 Leg Direct Grant - City Hall Renovation	0.00	0.00	0.00	0.0%	
334 10 00 03 RCO Grant	0.00	0.00	0.00	0.0%	
334 10 00 04 RCO Grant-Ballfield	589,761.00	562,390.84	(27,370.16)	95.4%	
334 10 00 05 RCO YAF-Basketball/Pickleball	0.00	40,460.00	40,460.00	0.0%	Rollover
334 10 00 06 RCO WWRP-Campground/Trails	0.00	500,000.00	500,000.00	0.0%	New grant
334 10 00 18 State Grants, Awards And Other Contributions - - Depreciation, Amortization, Other Decreases In Fun	0.00	0.00	0.00	0.0%	
337 00 00 01 Port Of Olympia Small Cities Grant	10,000.00	20,000.00	10,000.00	200.0%	2025&2026
337 00 00 02 Heritage Grant	10,000.00	10,000.00	0.00	100.0%	
337 00 00 03 Nisqually Tribe Grant	14,000.00	10,000.00	(4,000.00)	71.4%	
337 00 00 04 ARPA-2021	0.00	0.00	0.00	0.0%	

2026 PROPOSED BUDGET CHANGES

Ci Tenino

Time: 12:18:53 Date: 11/06/2025

310 Municipal Capital Imp Fund 310

Revenues	2025	2026	Difference		Remarks
330 Intergovernmental Revenues					
337 00 00 05 ARPA-2022	0.00	0.00	0.00	0.0%	
337 00 00 06 Leg Direct Grant-Park Bathrooms	0.00	0.00	0.00	0.0%	
337 00 00 07 Lodging Tax Award Grant	0.00	0.00	0.00	0.0%	
337 00 00 08 CERB Grant	209,527.00	209,527.00	0.00	100.0%	
337 00 00 09 CERB Funding	150,000.00	150,000.00	0.00	100.0%	
337 00 00 11 AWC Loss Control Grant	5,000.00	5,000.00	0.00	100.0%	
337 00 00 12 US Congressional Appropriation	0.00	0.00	0.00	0.0%	
337 00 00 13 AWC Grant-Trees	0.00	5,000.00	5,000.00	0.0%	
337 10 00 03 SLCGP Cyber Grant	0.00	0.00	0.00	0.0%	
337 10 00 04 GMA Grant	50,000.00	50,000.00	0.00	100.0%	
337 10 01 00 EV Charging Grant	367,343.00	367,343.00	0.00	100.0%	
330 Intergovernmental Revenues	1,413,131.00	1,943,020.84	529,889.84	137.5%	
360 Misc Revenues					
361 11 45 23 Investment Interest	0.00	0.00	0.00	0.0%	
362 00 01 00 Ag Park N. Bld-EDC Funds	49,548.62	49,548.62	0.00	100.0%	
360 Misc Revenues	49,548.62	49,548.62	0.00	100.0%	
390 Other Financing Sources					
395 10 00 01 Sale Of Fire Station	0.00	0.00	0.00	0.0%	
395 10 00 02 Sale of Surplus Property	0.00	200,000.00	200,000.00	0.0%	
395 11 00 01 Interest From Sale Of Fire Station	0.00	0.00	0.00	0.0%	
390 Other Financing Sources	0.00	200,000.00	200,000.00	0.0%	
397 Interfund Transfers					
397 00 01 00 Transfer From #001	0.00	0.00	0.00	0.0%	
397 Interfund Transfers	0.00	0.00	0.00	0.0%	

080 Park, General

594 Capital Expenditures

310 Municipal Capital Imp Fund 310

Revenues	2025	2026	Difference		Remarks
594 Capital Expenditures					
334 00 10 00 Playground Funds	0.00	562,400.00	562,400.00	0.0%	
594 Capital Expenditures	0.00	562,400.00	562,400.00	0.0%	
080 Park, General	0.00	562,400.00	562,400.00	0.0%	
Fund Revenues:	1,527,196.16	2,949,469.46	1,422,273.30	193.1%	

Expenditures	2025	2026	Difference		Remarks
330 Intergovernmental Revenues					
594 76 60 11 ARPA 2022	0.00	0.00	0.00	0.0%	
330 Intergovernmental Revenues	0.00	0.00	0.00	0.0%	
521 Law Enforcement					
594 21 45 00 Law Enforcement - Vehicle Lease	9,183.35	9,183.35	0.00	100.0%	
594 21 45 01 Police Cruiser	0.00	20,000.00	20,000.00	0.0%	Police Vehicle
521 Law Enforcement	9,183.35	29,183.35	20,000.00	317.8%	
558 Community Planning & Economic Developr					
594 58 60 01 Port/Facade Grants	10,000.00	20,000.00	10,000.00	200.0%	2025&2026
594 70 00 00 Leg Direct Grant-Park Bathrooms	0.00	0.00	0.00	0.0%	
558 Community Planning & Economic Develc	10,000.00	20,000.00	10,000.00	200.0%	
594 Capital Expenditures					
594 18 60 03 Danger Tree Management	3,000.00	3,000.00	0.00	100.0%	
594 18 62 01 Library	0.00	0.00	0.00	0.0%	
594 21 45 02 PW Truck-Street Sweeper	0.00	0.00	0.00	0.0%	
594 21 60 00 Law Enforcement-Toughbook Puchase	0.00	0.00	0.00	0.0%	
594 21 60 04 Dowies Bldg Renovation	0.00	0.00	0.00	0.0%	
594 21 60 05 Dowies Bldg Sign	0.00	0.00	0.00	0.0%	

310 Municipal Capital Imp Fund 310

Expenditures	2025	2026	Difference		Remarks
594 Capital Expenditures					
594 21 64 03 Nisqually Tribe Grant	5,000.00	5,000.00	0.00	100.0%	
594 75 60 01 Museum Reno	0.00	0.00	0.00	0.0%	
594 76 60 00 Park Improvements - General	40,000.00	40,000.00	0.00	100.0%	
594 76 60 01 Interpretive Signs	0.00	0.00	0.00	0.0%	
594 76 60 02 Quarry Pool Renovation Project	0.00	0.00	0.00	0.0%	
594 76 60 03 Quarry House Renovation Project	0.00	0.00	0.00	0.0%	
594 76 60 04 Caboose Restoration	0.00	0.00	0.00	0.0%	
594 76 60 05 Pump Track	0.00	0.00	0.00	0.0%	
594 76 60 06 HAPI Grant - WA Dept Of Commerce	0.00	0.00	0.00	0.0%	
594 76 60 07 Quarry House-Ramp	0.00	0.00	0.00	0.0%	
594 76 60 08 Library-Exterior Wall	0.00	0.00	0.00	0.0%	
594 76 60 09 CDBG 2022 Quarry Pool	0.00	0.00	0.00	0.0%	
594 76 60 10 Old PW Shop Repair/Maint.	0.00	0.00	0.00	0.0%	
594 76 60 12 AWC Loss Prevention Grant	5,000.00	5,000.00	0.00	100.0%	
594 76 60 13 RCO Grant	0.00	0.00	0.00	0.0%	
594 76 60 14 RCO Grant-Ballfield	589,761.00	562,400.00	(27,361.00)	95.4%	
594 76 60 15 RCO YAF	0.00	40,460.00	40,460.00	0.0%	ROLLOVER
594 76 60 16 RCO YAF Match	0.00	12,340.00	12,340.00	0.0%	Match
594 76 60 17 RCO WWRP-Campground/Trails	0.00	500,000.00	500,000.00	0.0%	
594 76 60 18 AWC Grant-Trees	0.00	5,000.00	5,000.00	0.0%	
594 76 62 00 Heritage Grant	10,000.00	10,000.00	0.00	100.0%	
594 76 63 01 Professional Services - Engineer Cont	20,000.00	20,000.00	0.00	100.0%	
594 76 63 02 Campground Improvements	0.00	0.00	0.00	0.0%	
594 76 63 03 ARPA 2021	0.00	0.00	0.00	0.0%	
595 10 42 01 Engineering - City Hall Reno	0.00	0.00	0.00	0.0%	
595 10 42 02 GMA Grant	50,000.00	50,000.00	0.00	100.0%	
595 10 42 03 Ag Park Construction Management	0.00	0.00	0.00	0.0%	
595 10 42 04 Quarry Pool Lake Side Improvements	0.00	0.00	0.00	0.0%	
595 10 42 05 Ag Park N.Bld- EDC Funds	49,548.62	49,548.62	0.00	100.0%	

310 Municipal Capital Imp Fund 310

Expenditures	2025	2026	Difference		Remarks
594 Capital Expenditures					
595 21 65 01 RTV-XG850 Sidekick Utility Vehicle	0.00	0.00	0.00	0.0%	
595 21 65 02 PD Communications Upgrade	0.00	0.00	0.00	0.0%	
595 50 42 02 Structures - City Hall Reno	0.00	0.00	0.00	0.0%	
595 50 43 01 EV Charging Grant	367,343.00	367,343.00	0.00	100.0%	
595 62 41 00 Engineering-NonGrant	0.00	0.00	0.00	0.0%	
595 76 64 01 ARTS WA Grant	0.00	5,800.00	5,800.00	0.0%	
595 76 64 02 ARTS WA Grant	7,500.00	7,500.00	0.00	100.0%	
595 76 64 03 ARTS WA Grant-Match	0.00	700.00	700.00	0.0%	
595 76 65 01 Lodging Tax Award	0.00	0.00	0.00	0.0%	
595 76 65 04 SLCGP Cyber Grant	0.00	0.00	0.00	0.0%	
595 90 60 01 Ag Park/CERB	359,527.79	359,527.79	0.00	100.0%	
595 90 60 02 US Congressional Appropriation	0.00	0.00	0.00	0.0%	
594 Capital Expenditures	1,506,680.41	2,043,619.41	536,939.00	135.6%	
999 Ending Balance					
508 80 00 04 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 04 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
080 Park, General					
594 Capital Expenditures					
594 76 63 00 Playground Funds	0.00	0.00	0.00	0.0%	
594 Capital Expenditures	0.00	0.00	0.00	0.0%	
080 Park, General	0.00	0.00	0.00	0.0%	
Fund Expenditures:	1,525,863.76	2,092,802.76	566,939.00	137.2%	
Fund Excess/(Deficit):	1,332.40	856,666.70			

330 Inter Goverenmental Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 31 00 30 Estimated Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	0.00	0.00	0.0%	
330 Intergovernmental Revenues					
334 01 10 00 State Direct/Indirect Grant From Criminal Justice Training Commission	0.00	0.00	0.00	0.0%	
330 Intergovernmental Revenues	0.00	0.00	0.00	0.0%	
Fund Revenues:	0.00	0.00	0.00	0.0%	
Fund Excess/(Deficit):	0.00	0.00			

401 Water Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 51 00 07 Beginning Balance	155,000.00	210,800.00	55,800.00	136.0%	
308 91 00 07 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	155,000.00	210,800.00	55,800.00	136.0%	
340 Charges For Services					
343 40 00 00 Water Services	255,000.00	257,000.00	2,000.00	100.8%	
343 40 00 02 Water Account Activation Fee	2,710.00	2,710.00	0.00	100.0%	
343 40 03 00 Excise Tax	10,032.21	11,000.00	967.79	109.6%	Estimate
343 40 04 00 Hydrant Permits	150.00	150.00	0.00	100.0%	
359 00 00 04 Late Charge Penalty - Water	16,000.00	17,000.00	1,000.00	106.3%	
340 Charges For Services	283,892.21	287,860.00	3,967.79	101.4%	
360 Misc Revenues					
361 11 45 24 Interest	0.00	0.00	0.00	0.0%	
361 40 00 41 Interfund Loan Interest	2,500.00	2,500.00	0.00	100.0%	
360 Misc Revenues	2,500.00	2,500.00	0.00	100.0%	
380 Non Revenues					
381 20 00 41 Interfund Loan Repayment from Fund 001	62,500.00	62,500.00	0.00	100.0%	
380 Non Revenues	62,500.00	62,500.00	0.00	100.0%	
Fund Revenues:	503,892.21	563,660.00	59,767.79	111.9%	

Expenditures	2025	2026	Difference		Remarks
534 Water Utilities					
534 00 40 00 Audit Costs	5,000.00	5,000.00	0.00	100.0%	
534 10 49 00 State Water Excise Tax	13,300.00	16,625.00	3,325.00	125.0%	
534 80 10 00 Salaries & Wages	126,579.10	127,881.53	1,302.43	101.0%	
534 80 15 00 Salaries & Wages	14,619.07	14,619.07	0.00	100.0%	

401 Water Fund

Expenditures	2025	2026	Difference		Remarks
534 Water Utilities					
534 80 20 00 Benefits - Taxes	7,763.75	12,591.24	4,827.49	162.2%	
534 80 21 00 Benefits - Health Care	16,157.14	32,760.00	16,602.86	202.8%	
534 80 22 00 Benefits - Retirement	9,036.09	6,594.95	(2,441.14)	73.0%	
534 80 22 01 Benefits - Retirement (DCP)	500.00	327.60	(172.40)	65.5%	
534 80 23 00 Safety Clothing	1,500.00	1,500.00	0.00	100.0%	
534 80 31 00 Supplies	8,500.00	8,500.00	0.00	100.0%	
534 80 31 01 Corrosion Control Supplies	3,500.00	4,000.00	500.00	114.3%	
534 80 33 00 Small Tools & Equipment	3,000.00	3,000.00	0.00	100.0%	
534 80 35 00 Fuel	5,000.00	8,000.00	3,000.00	160.0%	
534 80 35 01 Fuel - Diesel	3,000.00	3,000.00	0.00	100.0%	
534 80 41 03 Water Utilities - Professional Services	0.00	0.00	0.00	0.0%	
534 80 42 00 Telephone (Land Line)	4,500.00	4,500.00	0.00	100.0%	
534 80 42 03 MNS Service Provider	5,500.00	5,500.00	0.00	100.0%	
534 80 42 05 PRA Compliance Software	400.00	400.00	0.00	100.0%	
534 80 42 06 City Web Site	125.00	125.00	0.00	100.0%	
534 80 42 08 Postage	3,500.00	3,500.00	0.00	100.0%	
534 80 42 09 Telephone (Cellular)	1,688.00	2,500.00	812.00	148.1%	
534 80 42 10 Office Productivity Software	250.00	250.00	0.00	100.0%	
534 80 42 13 BIAS Financial Software	2,200.00	5,000.00	2,800.00	227.3%	
534 80 45 03 Professional Testing Service	2,500.00	2,500.00	0.00	100.0%	
534 80 45 04 Repair & Maintenance	30,000.00	30,000.00	0.00	100.0%	
534 80 45 05 Computer Software Maintenance	1,500.00	1,500.00	0.00	100.0%	
534 80 45 17 Maintenance - Vactor Truck	1,000.00	1,000.00	0.00	100.0%	
534 80 46 00 Insurance	9,500.00	9,250.00	(250.00)	97.4%	
534 80 47 00 Utilities	15,900.00	15,900.00	0.00	100.0%	
534 80 48 01 Education / Training	1,000.00	100.00	(900.00)	10.0%	
534 80 48 02 Meals/Lodging/Travel	500.00	500.00	0.00	100.0%	
534 80 49 00 Misc Dues, Subs & Tuition	5,250.00	5,250.00	0.00	100.0%	
534 Water Utilities	302,768.15	332,174.39	29,406.24	109.7%	
597 Interfund Transfers					
597 00 00 15 Transfer To #402	0.00	0.00	0.00	0.0%	

401 Water Fund

Expenditures	2025	2026	Difference		Remarks
597 Interfund Transfers					
597 00 00 49 Transfer To Water Capital Improvement	0.00	0.00	0.00	0.0%	
597 Interfund Transfers	0.00	0.00	0.00	0.0%	
999 Ending Balance					
508 80 00 05 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 05 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	302,768.15	332,174.39	29,406.24	109.7%	
Fund Excess/(Deficit):	201,124.06	231,485.61			

402 Water Capital Imp Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 51 00 08 Beginning Balance	180,000.00	42,225.00	(137,775.00)	23.5%	
308 91 00 08 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	180,000.00	42,225.00	(137,775.00)	23.5%	
340 Charges For Services					
343 40 01 00 Water Surcharge/Cap. Improve	42,051.51	43,000.00	948.49	102.3%	
343 40 02 00 Tapping Fees	7,500.00	7,500.00	0.00	100.0%	
343 40 06 00 Meter Installation	0.00	0.00	0.00	0.0%	
340 Charges For Services	49,551.51	50,500.00	948.49	101.9%	
360 Misc Revenues					
361 11 45 25 Investment Interest	1,301.00	1,300.00	(1.00)	99.9%	
361 40 00 42 Interfund Loan Interest	8,000.00	8,000.00	0.00	100.0%	
360 Misc Revenues	9,301.00	9,300.00	(1.00)	100.0%	
380 Non Revenues					
381 20 00 42 Interfund Loan Repayment from Fund 001	200,000.00	200,000.00	0.00	100.0%	
380 Non Revenues	200,000.00	200,000.00	0.00	100.0%	
397 Interfund Transfers					
397 00 00 15 Transfer From #401	0.00	0.00	0.00	0.0%	
397 Interfund Transfers	0.00	0.00	0.00	0.0%	
Fund Revenues:	438,852.51	302,025.00	(136,827.51)	68.8%	

Expenditures	2025	2026	Difference		Remarks
591 Debt Repayment					
591 34 70 00 DWSRF Loan Repayment	6,545.10	6,545.09	(0.01)	100.0%	

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

402 Water Capital Imp Fund

Expenditures	2025	2026	Difference		Remarks
591 Debt Repayment					
591 Debt Repayment	6,545.10	6,545.09	(0.01)	100.0%	
594 Capital Expenditures					
594 34 43 00 Water Comp Plan Update	0.00	0.00	0.00	0.0%	
594 34 45 03 Reservoir Cleaning	0.00	0.00	0.00	0.0%	
594 34 61 00 Water Rights	15,000.00	15,000.00	0.00	100.0%	
594 34 61 01 Third Well	40,000.00	40,000.00	0.00	100.0%	
594 34 62 01 Vactor Truck	53,822.96	53,822.96	0.00	100.0%	
594 34 62 02 Emergency Response Vehicle	0.00	30,000.00	30,000.00	0.0%	
594 34 63 01 Well #1	10,000.00	15,000.00	5,000.00	150.0%	
594 34 63 02 Fire Hydrants	5,000.00	5,000.00	0.00	100.0%	
594 34 63 09 Water Main Replacement	50,000.00	50,000.00	0.00	100.0%	
594 34 63 10 PW Shop Maintenance	0.00	5,000.00	5,000.00	0.0%	
594 34 64 05 Radio Read Meter Reading	10,000.00	10,000.00	0.00	100.0%	
594 34 64 06 Meter Read Tower	0.00	0.00	0.00	0.0%	
594 34 64 07 Street Sweeper Finance Payment	26,218.79	26,225.00	6.21	100.0%	
594 34 65 00 Water System Repairs	10,000.00	20,000.00	10,000.00	200.0%	
595 50 60 02 PW Shop Extension	0.00	0.00	0.00	0.0%	
594 Capital Expenditures	220,041.75	270,047.96	50,006.21	122.7%	
999 Ending Balance					
508 80 00 06 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 06 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	226,586.85	276,593.05	50,006.20	122.1%	
Fund Excess/(Deficit):	212,265.66	25,431.95			

2026 PROPOSED BUDGET CHANGES

Ci Tenino

Time: 12:18:53 Date: 11/06/2025

403 Stormwater Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 51 00 09 Beginning Balance	38,128.19	39,611.45	1,483.26	103.9%	
308 91 00 09 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	38,128.19	39,611.45	1,483.26	103.9%	
360 Misc Revenues					
361 11 45 26 Investment Interest	80.00	80.00	0.00	100.0%	
360 Misc Revenues	80.00	80.00	0.00	100.0%	
Fund Revenues:	38,208.19	39,691.45	1,483.26	103.9%	

Expenditures	2025	2026	Difference		Remarks
543 Roads/Streets General Administration And (					
543 40 10 00 Salaries And Wages	0.00	0.00	0.00	0.0%	
543 40 20 00 Benefits - Taxes	0.00	0.00	0.00	0.0%	
543 40 21 00 Benefits - Health Care	0.00	0.00	0.00	0.0%	
543 40 22 00 Benefits - Retirement	0.00	0.00	0.00	0.0%	
543 40 31 00 Maintenance & Repairs	0.00	0.00	0.00	0.0%	
543 40 45 01 Old 99 Ditch Cleaning	0.00	0.00	0.00	0.0%	
595 50 64 03 Storm Drain Installation	0.00	0.00	0.00	0.0%	
543 Roads/Streets General Administration An	0.00	0.00	0.00	0.0%	
999 Ending Balance					
508 80 00 07 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 07 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	0.00	0.00	0.00	0.0%	
Fund Excess/(Deficit):	38,208.19	39,691.45			

410 Sewer Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 51 00 10 Beginning Balance	150,000.00	594,756.16	444,756.16	396.5%	
308 91 00 10 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	150,000.00	594,756.16	444,756.16	396.5%	
340 Charges For Services					
343 50 00 10 Sewer Services	1,720,581.80	1,720,600.00	18.20	100.0%	
343 50 00 11 Septage Receiving	0.00	0.00	0.00	0.0%	
343 50 03 10 Excise Tax - Sewer	56,910.97	57,000.00	89.03	100.2%	
340 Charges For Services	1,777,492.77	1,777,600.00	107.23	100.0%	
350 Fines, Penalties, & Forfeitures					
359 90 04 02 Late Charge Penalty - Sewer	14,291.08	14,000.00	(291.08)	98.0%	
350 Fines, Penalties, & Forfeitures	14,291.08	14,000.00	(291.08)	98.0%	
380 Non Revenues					
385 00 00 01 Refund Of Overpayment	0.00	0.00	0.00	0.0%	
380 Non Revenues	0.00	0.00	0.00	0.0%	
Fund Revenues:	1,941,783.85	2,386,356.16	444,572.31	122.9%	

Expenditures	2025	2026	Difference		Remarks
535 Sewer/Reclaimed Water Utilities					
535 10 20 01 Overtime	20,000.00	20,000.00	0.00	100.0%	
535 10 20 02 On Call	51,600.00	51,600.00	0.00	100.0%	
535 10 10 00 Salaries & Wages	14,919.07	24,834.34	9,915.27	166.5%	
535 10 20 00 Benefits - Taxes	2,091.44	2,090.30	(1.14)	99.9%	
535 10 21 00 Benefits - Health Care	2,357.00	5,760.00	3,403.00	244.4%	
535 10 22 00 Benefits - Retirement	5,345.00	1,024.39	(4,320.61)	19.2%	
535 10 22 01 Benefits - Retirement (DCP)	152.00	57.60	(94.40)	37.9%	
535 10 31 00 Office Supplies	0.00	0.00	0.00	0.0%	

410 Sewer Fund

Expenditures	2025	2026	Difference		Remarks
535 Sewer/Reclaimed Water Utilities					
535 10 42 08 Postage	3,500.00	3,500.00	0.00	100.0%	
535 10 53 00 External Taxes/Op. Assessmts	15,000.00	15,000.00	0.00	100.0%	
535 23 40 00 Audit Costs	0.00	0.00	0.00	0.0%	
010 Admin	43,364.51	52,266.63	8,902.12	120.5%	
535 10 49 00 SR Excise Tax	0.00	0.00	0.00	0.0%	
535 30 10 00 SR Salaries & Wages	0.00	0.00	0.00	0.0%	
535 30 20 00 SR Benefits - Taxes	0.00	0.00	0.00	0.0%	
535 30 21 00 SR Benefits - Health Care	0.00	0.00	0.00	0.0%	
535 30 22 00 SR Benefits - Retirement	0.00	0.00	0.00	0.0%	
535 30 22 01 SR Benefits - Retirement (DCP)	0.00	0.00	0.00	0.0%	
535 30 31 00 SR Office & Operating Supplies	0.00	0.00	0.00	0.0%	
030 Septage Receiving	0.00	0.00	0.00	0.0%	
535 50 10 00 Salaries & Wages	93,571.79	103,407.36	9,835.57	110.5%	
535 50 20 00 Benefits - Taxes	6,465.90	10,454.65	3,988.75	161.7%	
535 50 21 00 Benefits - Health Care	12,868.38	26,550.00	13,681.62	206.3%	
535 50 22 00 Benefits - Retirement	7,519.05	5,770.13	(1,748.92)	76.7%	
535 50 22 01 Benefits - Retirement (DCP)	415.80	265.50	(150.30)	63.9%	
535 50 32 00 Hdw/Maint Supplies	1,200.00	1,200.00	0.00	100.0%	
535 50 33 00 Small Tools & Equipment	100.00	500.00	400.00	500.0%	
535 50 35 00 Fuel	1,500.00	2,800.00	1,300.00	186.7%	
535 50 35 01 Fuel, Diesel	1,000.00	1,000.00	0.00	100.0%	
535 50 42 12 Utility Locator Service (811)	200.00	200.00	0.00	100.0%	
535 50 45 03 Repairs & Maintenance	50,000.00	50,000.00	0.00	100.0%	
535 50 45 17 Maintenance - Vactor Truck	0.00	500.00	500.00	0.0%	
535 50 46 00 Insurance	5,000.00	4,875.00	(125.00)	97.5%	
050 Collection System	179,840.92	207,522.64	27,681.72	115.4%	
535 80 10 10 Salaries & Wages	80,998.70	86,384.62	5,385.92	106.6%	
535 80 20 10 Benefits - Taxes	7,479.35	8,505.63	1,026.28	113.7%	
535 80 21 10 Benefits - Health Care	14,715.58	19,800.00	5,084.42	134.6%	
535 80 22 03 Benefits - Retirement (DCP)	532.00	198.00	(334.00)	37.2%	
535 80 22 10 Benefits - Retirement	3,734.17	4,820.26	1,086.09	129.1%	

410 Sewer Fund

Expenditures	2025	2026	Difference		Remarks
535 Sewer/Reclaimed Water Utilities					
535 80 23 00 Personnel Safety Equip/clothes	1,500.00	1,500.00	0.00	100.0%	
535 80 31 00 Supplies	5,500.00	8,500.00	3,000.00	154.5%	
535 80 33 00 Small Tools & Equipment	1,500.00	1,500.00	0.00	100.0%	
535 80 34 00 Chemicals	8,000.00	8,000.00	0.00	100.0%	
535 80 35 00 Fuel	2,500.00	7,500.00	5,000.00	300.0%	
535 80 35 12 Fuel, Diesel	5,000.00	5,000.00	0.00	100.0%	
535 80 41 03 Sewer/Reclaimed Water Utilities - Professional Services	15,000.00	15,000.00	0.00	100.0%	
535 80 42 00 Telephone (Land Line)	2,500.00	2,500.00	0.00	100.0%	
535 80 42 01 Internet Service Provider	1,000.00	1,000.00	0.00	100.0%	
535 80 42 03 MNS Service Provider	6,500.00	8,500.00	2,000.00	130.8%	
535 80 42 05 PRA Compliance Software	300.00	300.00	0.00	100.0%	
535 80 42 06 City Web Site	125.00	125.00	0.00	100.0%	
535 80 42 09 Telephone (Cellular)	1,760.00	1,760.00	0.00	100.0%	
535 80 42 10 Office Productivity Software	0.00	0.00	0.00	0.0%	
535 80 42 13 BIAS Financial Software	2,000.00	2,000.00	0.00	100.0%	
535 80 45 03 WWTP Repairs & Maintenance	50,000.00	60,000.00	10,000.00	120.0%	
535 80 45 08 Water/WasteWater Services Contract	66,000.00	60,000.00	(6,000.00)	90.9%	
535 80 45 09 Laboratory Services	25,000.00	25,000.00	0.00	100.0%	
535 80 45 10 Crane Services For Lifting	5,000.00	8,500.00	3,500.00	170.0%	
535 80 46 00 Insurance	20,000.00	19,475.00	(525.00)	97.4%	
535 80 47 10 Utilities	45,776.50	45,800.00	23.50	100.1%	
535 80 48 01 Education/Training	0.00	1,500.00	1,500.00	0.0%	
535 80 48 02 Meals/Lodging/Travel	0.00	650.00	650.00	0.0%	
535 80 49 00 Dues/Memberships/Misc	650.00	6,000.00	5,350.00	923.1%	
535 80 49 02 Permits/Licenses/Fees	6,000.00	2,000.00	(4,000.00)	33.3%	
535 80 49 03 Manuals/Software/support	2,000.00	2,000.00	0.00	100.0%	
080 WWTP	381,071.30	413,818.51	32,747.21	108.6%	
535 Sewer/Reclaimed Water Utilities	675,876.73	745,207.78	69,331.05	110.3%	
597 Interfund Transfers					

410 Sewer Fund

Expenditures	2025	2026	Difference		Remarks
597 Interfund Transfers					
597 00 00 16 Transfer To #421	0.00	0.00	0.00	0.0%	
597 00 00 20 USDA-RD Bond Interest Payment	44,740.00	53,750.00	9,010.00	120.1%	
597 00 00 22 USDA-RD Bond Principal Payment	60,280.00	51,290.00	(8,990.00)	85.1%	
597 00 00 30 PRE-119 Principal Payment	0.00	0.00	0.00	0.0%	
597 00 00 31 PRE-119 Interest Payment	60,000.00	60,000.00	0.00	100.0%	
597 00 00 40 PW-044 Principal Payment	387,226.00	387,250.00	24.00	100.0%	
597 00 00 41 PW-044 Interest Payment	11,617.00	1,950.00	(9,667.00)	16.8%	
597 00 00 50 Transfer To Sewer Capital Improvement	363,123.64	363,123.64	0.00	100.0%	
597 Interfund Transfers	926,986.64	917,363.64	(9,623.00)	99.0%	
999 Ending Balance					
508 80 00 08 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 08 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	1,602,863.37	1,662,571.42	59,708.05	103.7%	
Fund Excess/(Deficit):	338,920.48	723,784.74			

421 Sewer Capital Improvement Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 51 00 11 Beginning Balance	416,000.00	416,000.00	0.00	100.0%	
308 91 00 11 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	416,000.00	416,000.00	0.00	100.0%	
340 Charges For Services					
343 50 00 00 Facility Charges - New Connection	28,000.00	28,000.00	0.00	100.0%	
343 50 00 01 Sewer Capital Improvement Fee	10,432.87	10,000.00	(432.87)	95.9%	
343 50 00 02 Facility Charge - Loan Repayment	0.00	0.00	0.00	0.0%	
343 50 00 21 Sewer Services	0.00	0.00	0.00	0.0%	
340 Charges For Services	38,432.87	38,000.00	(432.87)	98.9%	
360 Misc Revenues					
361 11 45 27 Investment Interest-	1,500.00	1,500.00	0.00	100.0%	
361 40 04 21 Interfund Loan Interest	2,500.00	2,500.00	0.00	100.0%	
360 Misc Revenues	4,000.00	4,000.00	0.00	100.0%	
380 Non Revenues					
381 20 04 21 Interfund Loan Repayment from Fund 001	62,500.00	62,500.00	0.00	100.0%	
380 Non Revenues	62,500.00	62,500.00	0.00	100.0%	
397 Interfund Transfers					
397 00 00 16 Transfer From #420	0.00	0.00	0.00	0.0%	
397 00 00 50 Transfer From Sewer Fund (410)	363,123.64	363,123.64	0.00	100.0%	
397 Interfund Transfers	363,123.64	363,123.64	0.00	100.0%	
Fund Revenues:	884,056.51	883,623.64	(432.87)	100.0%	

Expenditures	2025	2026	Difference		Remarks

421 Sewer Capital Improvement Fund

Expenditures	2025	2026	Difference		Remarks
580 Other Decreases In Fund Resources					
581 10 00 01 Loan to Fund 001	0.00	200,000.00	200,000.00	0.0%	
580 Other Decreases In Fund Resources	0.00	200,000.00	200,000.00	0.0%	
594 Capital Expenditures					
594 35 60 02 Grinder Pump Replacement	60,000.00	60,000.00	0.00	100.0%	
594 35 62 01 Emergency Response Vehicle	0.00	30,000.00	30,000.00	0.0%	
594 35 62 02 Septic pumper slider kit	0.00	30,000.00	30,000.00	0.0%	
594 35 68 01 Septage Receiving Facility Construction	0.00	0.00	0.00	0.0%	
594 35 68 02 Belt Press Rental	0.00	0.00	0.00	0.0%	
594 35 68 03 Composting Facility Construction	0.00	0.00	0.00	0.0%	
594 35 68 04 MBR Replacement	300,000.00	300,000.00	0.00	100.0%	
594 35 68 05 Sludge Removal	150,000.00	30,000.00	(120,000.00)	20.0%	
594 35 68 06 Sludge Hauling Truck/Sweep	26,218.79	26,218.79	0.00	100.0%	
594 35 68 07 Vactor Truck Finance Payment	53,822.96	53,822.96	0.00	100.0%	
594 Capital Expenditures	590,041.75	530,041.75	(60,000.00)	89.8%	
999 Ending Balance					
508 80 00 09 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 09 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	590,041.75	730,041.75	140,000.00	123.7%	
Fund Excess/(Deficit):	294,014.76	153,581.89			

2026 PROPOSED BUDGET CHANGES

422 Sewer Reserve Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 31 00 11 Reserved Beginning Balance	85,191.89	96,261.73	11,069.84	113.0%	
308 51 00 12 Beginning Balance	0.00	0.00	0.00	0.0%	
308 91 00 12 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	85,191.89	96,261.73	11,069.84	113.0%	
360 Misc Revenues					
361 40 04 22 Interfund Loan Interest	500.00	500.00	0.00	100.0%	
360 Misc Revenues	500.00	500.00	0.00	100.0%	
380 Non Revenues					
381 20 04 22 Interfund Loan Repayment From Fund 001	12,500.00	12,500.00	0.00	100.0%	
380 Non Revenues	12,500.00	12,500.00	0.00	100.0%	
397 Interfund Transfers					
397 00 00 20 USDA-RD Bond Principal From #410	44,740.00	51,300.00	6,560.00	114.7%	
397 00 00 21 USDA-RD Bond Interest From #410	53,882.00	53,750.00	(132.00)	99.8%	
397 00 00 30 PRE-119 Principal From #410	0.00	0.00	0.00	0.0%	Final 2025
397 00 00 31 PRE-119 Interest From #410	1,347.00	0.00	(1,347.00)	0.0%	Final 2025
397 00 00 40 PW-044 Principal From #410	387,226.00	387,250.00	24.00	100.0%	
397 00 00 41 PW-044 Interest From #410	11,617.00	1,950.00	(9,667.00)	16.8%	
397 Interfund Transfers	498,812.00	494,250.00	(4,562.00)	99.1%	
Fund Revenues:	597,003.89	603,511.73	6,507.84	101.1%	

Expenditures	2025	2026	Difference		Remarks
591 Debt Repayment					
591 35 72 20 USDA RD Bond Principal Payment	49,905.40	52,000.00	2,094.60	104.2%	

422 Sewer Reserve Fund

Expenditures	2025	2026	Difference		Remarks
591 Debt Repayment					
591 35 78 30 PRE-119 & PW-044 Principal Payments	398,098.14	387,250.00	(10,848.14)	97.3%	
592 35 83 21 USDA RD Bond Interest Payment	55,118.60	53,750.00	(1,368.60)	97.5%	
592 35 83 31 PRE-119 & PW-044 Interest Payments	11,617.00	1,950.00	(9,667.00)	16.8%	
591 Debt Repayment	514,739.14	494,950.00	(19,789.14)	96.2%	
999 Ending Balance					
508 10 00 02 Ending Balance	0.00	0.00	0.00	0.0%	
508 31 00 02 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	514,739.14	494,950.00	(19,789.14)	96.2%	
Fund Excess/(Deficit):	82,264.75	108,561.73			

580 Claims Receipts Clearing

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 91 00 80 Estimated Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	0.00	0.00	0.0%	
Fund Revenues:	0.00	0.00	0.00	0.0%	

Expenditures	2025	2026	Difference		Remarks
580 Other Decreases In Fund Resources					
589 90 00 01 Claims/ Receipts Clearing	0.00	0.00	0.00	0.0%	
580 Other Decreases In Fund Resources	0.00	0.00	0.00	0.0%	
Fund Expenditures:	0.00	0.00	0.00	0.0%	
Fund Excess/(Deficit):	0.00	0.00			

2026 PROPOSED BUDGET CHANGES

City of Tenino

Time: 12:18:53 Date: 11/06/2025

601 SWWAIP Trust Fund

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 91 00 13 Beginning Balance	0.00	0.00	0.00	0.0%	
308 Beginning Balances	0.00	0.00	0.00	0.0%	
330 Intergovernmental Revenues					
334 00 10 02 Leg Direct Grant- Ag Park Sewer/Water Extension	0.00	0.00	0.00	0.0%	
330 Intergovernmental Revenues	0.00	0.00	0.00	0.0%	
Fund Revenues:	0.00	0.00	0.00	0.0%	

Expenditures	2025	2026	Difference		Remarks
594 Capital Expenditures					
594 35 63 01 Ag Park Sewer/Water Line Extension	0.00	0.00	0.00	0.0%	
594 Capital Expenditures	0.00	0.00	0.00	0.0%	
Fund Expenditures:	0.00	0.00	0.00	0.0%	
Fund Excess/(Deficit):	0.00	0.00			

631 Municipal Court Trust Fund #631

Revenues	2025	2026	Difference		Remarks
308 Beginning Balances					
308 31 00 14 Beginning Balance	3,000.00	3,000.00	0.00	100.0%	
308 Beginning Balances	3,000.00	3,000.00	0.00	100.0%	
380 Non Revenues					
386 00 00 00 Receipts From Court	0.00	0.00	0.00	0.0%	
380 Non Revenues	0.00	0.00	0.00	0.0%	
Fund Revenues:	3,000.00	3,000.00	0.00	100.0%	

Expenditures	2025	2026	Difference		Remarks
580 Other Decreases In Fund Resources					
586 00 00 03 Expenditures For TMC	0.00	0.00	0.00	0.0%	
580 Other Decreases In Fund Resources	0.00	0.00	0.00	0.0%	
999 Ending Balance					
508 80 00 10 Ending Balance	0.00	0.00	0.00	0.0%	
508 91 00 10 Ending Balance	0.00	0.00	0.00	0.0%	
999 Ending Balance	0.00	0.00	0.00	0.0%	
Fund Expenditures:	0.00	0.00	0.00	0.0%	
Fund Excess/(Deficit):	3,000.00	3,000.00			

2026 PROPOSED BUDGET CHANGES
Fund Totals

Fund	Revenues 2025	Revenues 2026	Revenues Difference		Expenditures 2025	Expenditures 2026	Expenditures Difference	
001 General Government Fund #001	2,562,814.60	2,057,076.41	(505,738.19)	80.3%	2,430,771.57	2,044,966.41	(385,805.16)	84.1%
002 Quarry Pool Fund #002	77,869.27	53,593.29	(24,275.98)	68.8%	56,933.67	74,546.35	17,612.68	130.9%
003 Reserve Academy Operating Fund	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
101 City Street Fund #101	806,070.88	567,410.08	(238,660.80)	70.4%	651,880.01	730,355.22	78,475.21	112.0%
102 Special Revenue Fund	136,284.48	207,761.76	71,477.28	152.4%	0.00	0.00	0.00	0.0%
109 Contingency Fund #109	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
310 Municipal Capital Imp Fund 310	1,527,196.16	2,949,469.46	1,422,273.30	193.1%	1,525,863.76	2,092,802.76	566,939.00	137.2%
330 Inter Goverenmental Fund	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
401 Water Fund	503,892.21	563,660.00	59,767.79	111.9%	302,768.15	332,174.39	29,406.24	109.7%
402 Water Capital Imp Fund	438,852.51	302,025.00	(136,827.51)	68.8%	226,586.85	276,593.05	50,006.20	122.1%
403 Stormwater Fund	38,208.19	39,691.45	1,483.26	103.9%	0.00	0.00	0.00	0.0%
410 Sewer Fund	1,941,783.85	2,386,356.16	444,572.31	122.9%	1,602,863.37	1,662,571.42	59,708.05	103.7%
421 Sewer Capital Improvement Fund	884,056.51	883,623.64	(432.87)	100.0%	590,041.75	730,041.75	140,000.00	123.7%
422 Sewer Reserve Fund	597,003.89	603,511.73	6,507.84	101.1%	514,739.14	494,950.00	(19,789.14)	96.2%
580 Claims Receipts Clearing	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
601 SWWAIP Trust Fund	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
631 Municipal Court Trust Fund #631	3,000.00	3,000.00	0.00	100.0%	0.00	0.00	0.00	0.0%
Excess/(Deficit):	9,517,032.55	10,617,178.98	1,100,146.43	111.6%	7,902,448.27	8,439,001.35	536,553.08	106.8%

File Attachments for Item:

6. Tenino Water System Plan Update.

To present and approve The Tenino Water System Plan.

Recommended Action: Move to approve the Tenino Water System Plan.

Water System Plan Update

City of Tenino
Water System

Thurston County, Washington

Prepared By:

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

December 2023

Gibbs & Olson Project No. 0751.5021

Water System Plan Update

City of Tenino
Water System

Thurston County, Washington

Prepared By:

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

MICHAEL E. MARSHALL
STATE OF WASHINGTON
24635
REGISTERED
PROFESSIONAL ENGINEER

PRELIMINARY

December 2023

Gibbs & Olson Project No. 0751.5021

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Chapter 1

DESCRIPTION OF WATER SYSTEM

CHAPTER 1

DESCRIPTION OF WATER SYSTEM

INTRODUCTION

Gibbs & Olson has been authorized by the City of Tenino to prepare this Water System Plan (WSP) Update for the purpose of identifying capital improvements, operational programs and financial guidelines for the next ten-year planning period. The WSP is intended to be a comprehensive planning tool and meet the regulatory requirements of Chapter 246-290 of the Washington Administrative Code (WAC), specifically WAC 246-290-100.

OWNERSHIP AND MANAGEMENT

The water system (Washington State Department of Health (DOH) ID #87400) is owned and operated by the City and serves the City and surrounding areas. Tenino is a Code City operated under a Mayor-Council form of government in accordance with RCW 35A.12. The Mayor has the responsibility of appointing the Public Works Director, who is responsible for utility operation and maintenance. The City Council is responsible for enacting policies that govern the operations of the City. The Tenino Planning Commission is a volunteer board comprised of five citizens who review and make recommendations to the city council on development proposals, subdivisions, rezones, and long-range planning projects, such as changes to the Land Development Regulations and Comprehensive Plan. Responsible parties involved with the water system are as follows:

Mayor	**City Council**	**Planning Commission Members**
Wayne Fournier	Linda Gotovac	Dave Watterson
	Elaine Klamn	William Rutherford
Clerk-Treasurer	John O'Callahan	Darnella Stenzel
Jen Scharber	Rachel Davidson	Alex Murray
	Jason Lawton	
Public Works	**Building Department**	**City Planner**
Troy Cannon	Rene Durand	Dan Penrose

Mailing address: City of Tenino, Public Works Department
P.O. Box 4019
149 S. Hodgden Street
Tenino, WA 98589
Phone (360) 264-2368 / Fax (360) 264-5772

SYSTEM BACKGROUND

The City is located in Thurston County approximately 12 miles south of the City of Olympia. A vicinity map is shown in Figure I-1. Based on information from the Tenino Comprehensive Plan (TCP), the City is located on the historic Oregon Trail. In 1872 a railroad line from the Columbia River to Tenino's Hodgden Street was completed. This was the closest mainline rail transportation to Olympia, which was not served by rail at that time. From the Tenino depot, two stagecoaches ran daily to the capitol city. A branch line to Olympia was completed in 1878. Sandstone quarries came after the railroads and were a major industry in the City for several decades. In 1888, Van Tine and Fentons' Tenino Stone Company founded the first quarry, now the site of the City pool. This development was followed by the Eureka Sandstone Company on the east side of the City and later the Hercules Stone Company on the west side of the City.

By 1912, concrete had become a widely used construction material, and the sandstone industry declined. However, the quarries operated until the 1930's. With the hope for another source of prosperity, exploratory oil wells were drilled in and around the City in the 1940's but these failed to produce positive results. Logging and farming later became the major employers in Tenino, and the City is still a regional trading center for south Thurston County. Tenino is also famous for its wooden money. When the Great Depression hit in 1920, Tenino created wooden money to relieve the currency shortage. Tenino's ingenuity became famous in an economically depressed world.

Until 1954, Highway 99, the major route through the City, was the primary north/south route between Portland and Seattle and the major transportation route for the West Coast. During that period, Tenino's economy was oriented to tourism from the highway. With the completion of Interstate 5, the major transportation corridor was moved west of the City.

During the early 1970's, Tenino experienced rapid growth, as did the rest of the County. Since 1980, however, growth has slowed to a fraction of the growth rate of the 1970's. Tenino has become a bedroom community for Tumwater, Olympia and Lacey, many new residents preferring to live in a small community and commute to the larger urban area for employment and services. The city constructed a sewage treatment collection and treatment system in 2009 and will now be able to grow and provide opportunities for commercial/retail and light industrial growth.

The City relies on two wells, Well No. 1 and Well No. 3, with a combined capacity of approximately 700 gpm. Well No. 1 was drilled in 1967 and Well No. 3. was drilled in 1994 to replace Well No. 2, which at that time, was producing sand. In 1994, the City constructed two reservoirs with a total storage capacity of 550,000 gallons. The majority of the distribution system was installed in the 1970's and is comprised of approximately 13 miles of piping, all within one pressure zone. A detailed discussion of water system components and related analysis is presented in Chapter 3.

INVENTORY OF EXISTING FACILITIES

The following Table 1-6 shows the key components of the Tenino water system facilities including approximate date of installation, remaining useful life and schedule for replacement.

TABLE 1-1

Asset Inventory

Item	Year Installed	Condition	Remaining Life	Replacement Cost
Well 1 (1)	1967	Adequate/Good	0 years	$200,000
Well 2 (1)	1994	Adequate/Good	0 years	$200,000
Distribution System (2)	Varies	Varies	Varies	$20,600,000
Reservoir 1 (3)	1994	Good	20+ years	$1,000,000
Reservoir 2 (3)	1994	Good	20+ years	$1,000,000

1. The well submersible pumps are past a typical lifespan of 15 years and are scheduled to be replaced upon failure. A complete description of the wells is given in the Source Capacity Analysis in Chapter 3.
2. Assumes $300 per linear foot of pipe.
3. Reservoir maintenance is discussed in Chapter 6. A complete description of the reservoirs is given in the Storage Analysis in Chapter 3.

PREVIOUS ENGINEERING AND PLANNING DOCUMENTS

Documents utilized in the preparation of this WSP are summarized below:

City of Tenino Water System Plan – February 2010, Gibbs & Olson, Inc.

This document is the latest version of the City's Water System Plan (WSP). The 2010 WSP estimated a future 2016 Maximum Day Demand (MDD) of 0.62 MGD and a Peak Hour Demand (PHD) of 792 gpm. The recommended six-year improvements included continued replacement of older cast iron piping.

Population, Housing, and Employment Data – July 2022, Thurston Regional Planning Council

The Thurston Regional Planning Council (TRPC) provides population forecasts for Thurston County online at www.trpc.org. Table 3 (see Appendix A) from TRPC shows population forecasts for cities and jurisdictions in Thurston County. The population allocation for the City of Tenino for the year 2040 is 2,750 and for the year 2045 is 2,790. The projected populations and annual growth rates from TRPC are used to develop water demand projections as shown in Table 2-10. TRPC staff coordinated with the Washington State Office of Financial Management (OFM) to develop population forecasts.

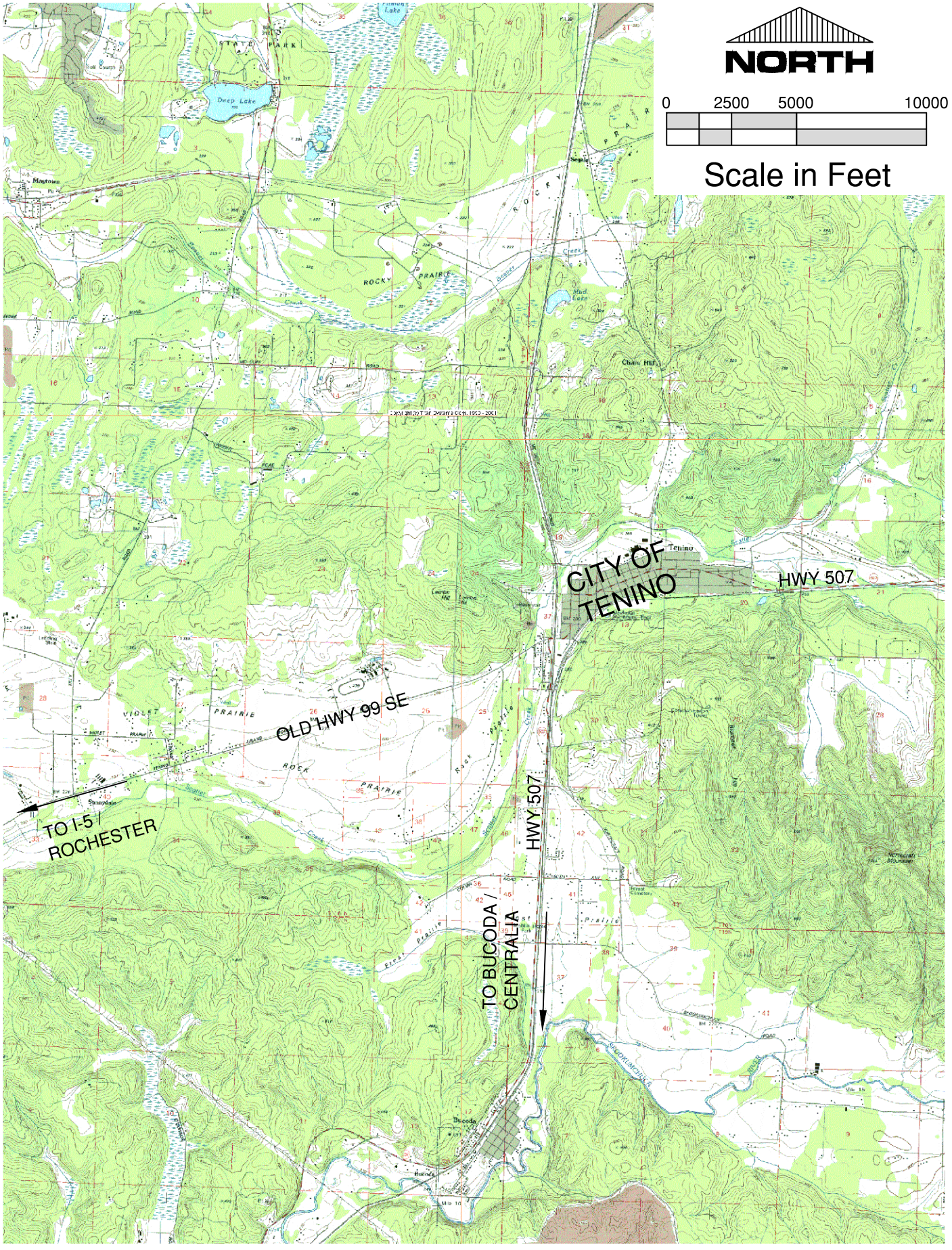
Housing Needs Assessment – December 2022, SCJ Alliance

SCJ Alliance prepared a document for the City of Tenino titled Housing Needs Assessment: Housing Action Plan dated December 2022. This document uses population forecasts from OFM and TRPC and average household size from American Community Survey (ACS) to determine current and future housing needs. The population forecasts, land use, and average household size used in this document were reviewed and are consistent with TRPC data which is used in this Water System Plan. The projected City of Tenino population used by SCJ is also 2,790 in the year 2045.

City of Tenino, Washington – Water and Sewer Rate Study Report – January 11, 2016, FCS Group

This report summarizes FCS Group's methodology, findings, and recommendations for each of the following core study elements: financial policies; revenue requirements; rate equity; and structure analysis and design. The purpose of the study was to provide a rate forecast and financial plan targeting financial stability and rate equity for a ten-year period. The study period was refined to cover only years included in the capital improvement plans (2016 through 2022).

This rate study report was reviewed in conjunction with Chapter 9 – Financial Program of this Water System Plan. Chapter 9 projects the City's financial status beginning in the year 2023 and the planning years of FCS Group's rate study and this Water System Plan do not overlap. For this reason, FCS Group's recommendations and projections were considered; however, new projections were developed for this Water System Plan.



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City of Tenino
Water System Plan
Service Area Vicinity Map
Figure I-1

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MUNICIPAL WATER LAW COMPLIANCE

The Municipal Water Supply Efficiency Requirements Act of 2003 (also referred to as HB 1338) requires water systems to demonstrate compliance with local planning, conservation requirements and water resource allocation laws. A Local Government Consistency Determination Form (DOH Form 331-568) is in Appendix C. The form must be signed by the local planning jurisdiction prior to Water System Plan approval by DOH. In this case, the local planning jurisdictions are the City of Tenino and Thurston County. Draft copies of this Water System Plan will be submitted to the City of Tenino and Thurston County in conjunction with submittal to DOH. Any comments from these agencies will be addressed and signed Local Government Consistency Determination Forms will be submitted with the final copy of this Water System Plan. The Water Use Efficiency (WUE) Rule portion of HB 1338 became effective on January 22, 2007. This new Rule mandates that public water systems develop a WUE program. The WUE program is presented in detail in Chapter 4 of this Water System Plan.

SERVICE AREA CHARACTERISTICS

A map of the service area is presented in Figure I-2. For the City of Tenino, the future water system service area is defined as the Urban Growth Area (UGA) boundary established in the current comprehensive plan. For DOH planning purposes, the City must identify a "Retail Service Area". The DOH definition for the retail service area "means a specific area a public water system plans to provide water service." In this case, the "future" water system service area (i.e., the UGA) defines the "retail" water service area.

For minor UGA adjustments, there is no requirement to update the WSP. However, if future UGA boundary adjustments in the comprehensive plan updates have a significant impact on water supply issues, the City will revise the WSP accordingly at that time. The following are general service area characteristics.

Zoning

Zoning for areas within the City limits is established in the City Comprehensive Plan and regulated through Tenino Municipal Code (TMC) Title 104. City zoning is shown in figures in Appendix A. Zoning for areas within the UGA, but outside City limits is established in the County Comprehensive Plan. A majority of the southwest portion of the UGA was recently annexed into the City. Land use density in the southwest area will likely increase and there will be a moderate to high demand for water and sewer service in that area. The potential for moderate to high service densities in the southwest area is accounted for in the growth projections discussed in Chapter 2 and in the system analysis in Chapter 3 of this WSP Update.

Topography

Tenino is located in a narrow glacial valley bordered by Scatter Creek to the north and west and surrounded by hills on the south and east that are part of the Cascade foothills. The hillsides in Tenino are gentle with slopes that are typically under 5 percent. Elevation within the water service area is within the range of approximately 250-feet to 640-feet above sea level. The majority of the customers served are below 320 feet in elevation. The hydraulic analysis of pressure zone constraints and requirements is included in Chapter 3. Current general mapping of service area (i.e. UGA) features such as soils and wetlands are provided on the City website at http://www.ci.tenino.wa.us/maps.htm.

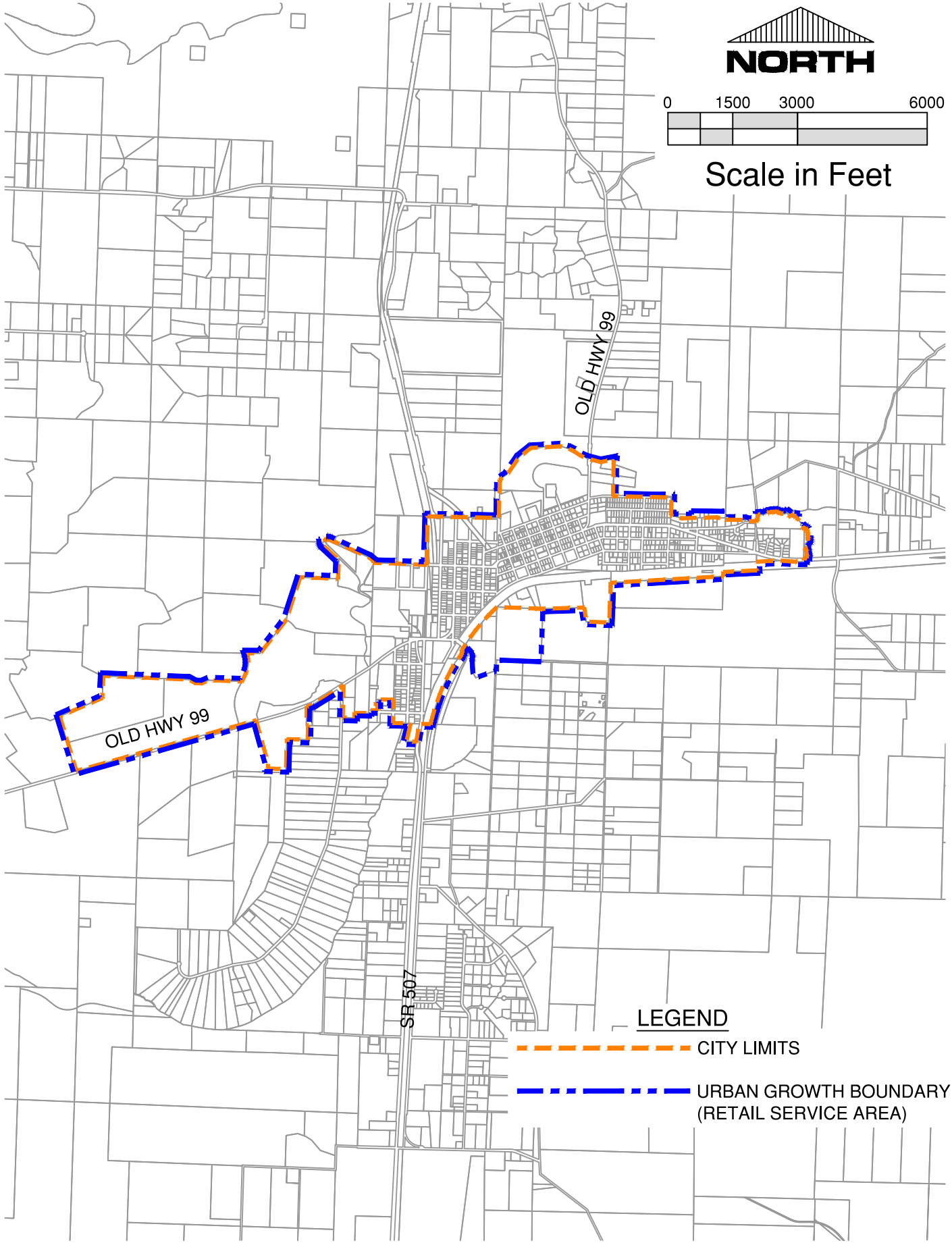
Climate

The climate in the Tenino area is typical of the Pacific Northwest west of the Cascade Mountains. Summers are fairly warm but hot days are rare. Rainfall is extremely light in the summer when several weeks often pass without precipitation. Winters are wet and cloudy, but mild. The average annual air temperature is about 51 degrees Fahrenheit. The lowest temperature on record for the area measured in the City of Olympia is -7 degrees; the highest is 102 degrees in Centralia. In summer, the average temperature is 63 degrees at Centralia and the average daily maximum temperature is about 75 degrees with highs above 90 degrees, and lows dropping below 50 degrees. In winter, the average temperature is 41 degrees at Centralia and the average daily minimum temperature is 35 degrees. Generally, the frost-free season lasts from 150 to 200 days per year.

The total annual precipitation is about 47 inches (Centralia), of which 76% falls between October and March. Rainfall extremes have fluctuated from an annual low of 28 inches to a high of about 60 inches. November, December, and January are the months of highest rainfall. Snowfall is light. The average seasonal snowfall is about 9 inches at nearby Centralia.

Adjacent Public Water Systems

There are numerous small water systems in the immediate vicinity of Tenino. However, there are currently no known Group A public water systems within the City UGA. The more significant water systems in the area are Loma Vista (Thurston County PUD) approximately 1.3 miles to the south, Bucoda approximately 4-1/2 miles to the south and Rainier, approximately 7 miles to the east. There are currently no interties with other water systems in the area. The potential for a future intertie with the Loma Vista system is discussed in other Chapter 3 of this Water System Plan.



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City of Tenino
Water System Plan Update
Service Area
Figure I-2

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SERVICE AREA POLICIES AND CONDITIONS OF SERVICE

Policies and conditions of service allow the City Council to deal with customers on a fair and consistent basis and are developed in the form of codes, resolutions, ordinances, standards or comprehensive plans adopted by the City Council. Where not specifically addressed in these other documents, standard operating procedures are outlined in this WSP Update. Typical policies and conditions of service for water system operations, which must be addressed in accordance with DOH planning requirements, are summarized below. Applicable sections of codes and ordinances are provided in Appendix B. Construction standards are addressed in Chapter 7 of this WSP Update.

Policies

- Annexation Policy: New water customers outside City limits are not required to commit to annexation prior to service.

- Cross-Connection Control Program: A Cross-connection Control Program is required by regulation (WAC 246-290-490) to reduce the potential for system contamination through backflow from potential contaminant sources. The Cross-Connection Control Program is addressed in Chapter 6 of this WSP Update.

- Direct Connection Policy: New development requires direct connection to the water system through individual service connections.

- Private or Public Wells: No new water systems or private wells will be allowed within the City limits unless approved by the City Council. Approval would need to be based on extreme circumstances since the existing water distribution system is readily available to most properties within the City limits. Customers with existing wells (used for irrigation or other purposes) shall have an approved backflow prevention device at the meter consistent with the City's Cross-Connection Control Program.

- Design and Performance Standards Policy: Water system planning and subsequent design and construction activities within the water system service area will follow the DOH Water System Design Manual (WSDM). Distribution improvements are to be designed in accordance with the policies and standards identified in Chapter 7.

- Formation of Local Improvement District: The City will allow an applicant to propose formation of an LID to pay for system upgrades. LID formation must be in accordance with state statutes. The initial costs for an LID feasibility study is borne by the applicant or rolled into LID costs but in no case is the cost the responsibility of the City. The City will provide an initial construction cost estimate for the proposed project and other technical assistance as needed. Once LID formation is shown to be feasible, the City will take the lead role to ensure proper formation and implementation of an LID.

- Late-comer Agreements: The City will allow the use of Late-Comer Agreements to help recover up to 50 percent of the water main extension which directly fronts other properties. All costs for the latecomer agreement and construction across the subject property shall be borne by applicant/property owner. All agreements will be case specific and subject to City Attorney review and approval. Late-comer agreement requests may be denied per City Council discretion. Latecomer agreements shall also comply with the requirements identified in the development standards.

- Individual Booster Pumps: Individual booster pumps will be allowed where hydraulic modeling indicates that pressure under 20-year PHD design conditions along the property frontage is in excess of 30-psi. The property owner shall be responsible for all costs of the booster pump system and shall be required to install a backflow prevention device on the private property side of the service meter. The backflow device must then be tested on an annual basis in accordance with the City's Cross Connection Control Program. Where service pressure is less than 30 psi, the City must manage and control any booster pumps in accordance with 246-290-230(8).

- Oversizing: The City may require a developer or property owner to increase the size of water main extensions in order to meet future planning goals for an area. The developer or property owner is required to fund the entire cost of design and construction of extensions to meet minimum water main size and/or the water main size established in the Capital Improvement Program for a specific pipe corridor (if applicable). If the City requires oversizing within a pipe corridor that does not have a main size identified in the CIP, the City will pay for the additional water main and appurtenant material costs that are in excess of the costs for the minimum required water main and appurtenant materials.

- Remote System Policy: The City will own and operate a separate water system that will serve the new WWTP in the southwest portion of the UGA. The WWTP water system will be abandoned when service from the City's primary water system is available in that area. Decisions regarding other remote water systems within or adjacent to the service area will be made on a case-by-case basis by staff and City Council. If the City decides to own and operate other remote systems, the system will need to be designed and constructed to meet both DOH and City standards. Construction costs specific to the system will be the responsibility of the developer or property owner. Operation and maintenance costs will be based on the actual costs incurred, but in no case will rates for remote systems be less than those for other City customers.

- Surcharge for Outside Customers: The City's current connection fees and rate structures includes a higher water rate for customers outside the corporate limits of the City (Ordinance 709). The surcharge is based on the additional costs associated with service to outside areas.

- Undersized Main Replacement Policy: If a City-owned water main is identified as deficient (through modeling or flow tests), the City assumes responsibility for upsizing the main to the minimum size in accordance with City standards. The prioritization of undersized main replacement projects are set in the WSP Capital Improvement Program (CIP) and shall be based upon overall benefit to City customers as well as level of inadequacy of the flow condition. Basic regulatory compliance for pressure at Peak Hour Demand (PHD) shall be a higher priority than meeting minimum fire flow goals. Should the City not be able to replace an undersized main in a time frame to meet service conditions for proposed development, the development applicant can upgrade the main, but at no cost to the City. In no case shall new connections be added to undersized water mains, unless the adequacy of service is established through review of field data and/or engineering analysis and subsequent approval by the Public Works Director.

- Water Availability: City approval of water availability forms issued by the County simply indicates that the City has adequate water system capacity to serve the proposed use. The approval of a water availability form in no way implies that the City has adequate facilities that are ready to serve the property. The applicant will be required to comply with conditions of service and implement any and all improvements consistent with applicable development or as otherwise identified by the City.

- Water Wheeling: Water wheeling is the practice of selling or buying water to or from a water system by using the piping network of a third water system. There is limited potential for water wheeling at this time due to lack of nearby systems.

- Wholesaling of Water: Routine wholesale to other water systems is not anticipated. In addition, wholesaling to new development would be in conflict with the City's direct connection policy and UGA service policy.

Conditions of Service

Conditions of service are established in the City's design and construction standards, see Chapter 7 and Chapter 13.04 of the TMC. The City will provide water of sufficient quantity and quality as required by the DOH and Environmental Protection Agency (EPA). Other obligations to DOH, as required of water purveyors, are the responsibilities of the City. Ownership, operation and maintenance of facilities upstream of service meters shall be the City's responsibility with reimbursement for such services through customer rates. All rates paid for water service shall be placed into the Water/Sewer Account and shall be used solely for the Water/Sewer Utility. Billing and connection fees are in accordance with the most current rate resolution as addressed in more detail in Chapter 9 of this WSP Update.

Customers shall comply with standards, codes, resolutions and ordinances as adopted by the City Council. Property owners requesting water service shall follow the City water service application process. The City's responsibility does not include main extensions or pump stations to serve new customers unless incidental to capital improvement projects required for provision of service to existing customers. Planning criteria for future improvements shall be a minimum "design" pressure of 30 psi and a minimum "operating" pressure of 20 psi under peak hour demands in accordance with applicable regulations.

Water Main Extensions: Conditions for design and construction of main extensions and related improvements for development are addressed in the City standards described in Chapter 7. Extensions to the water system are the responsibility of the developer. Properties requesting service which do not currently have complete water line frontage will be required to extend existing mains across the entire frontage of property. Frontage shall be at the discretion of the Public Works Department and will be selected to encourage looping and/or access for future extensions. All extensions shall become property of the City following construction approval by the City and shall include associated easements and rights-of-way. Exceptions will be granted only if the property lies within minimum distance for fire protection and in the opinion of the Public Works Department; there is a low probability for the water main to be extended to provide future service beyond the applicant's property.

For most platted properties with existing water main frontage, main extension or other system upgrades are typically not required prior to obtaining water service. However, if the main is less than the minimum water main size, operating pressure is less than 30 psi or if the service line will exceed 150 feet, an analysis will have to be conducted to determine specific service requirements

for that property. Specific requirements for these properties will be based on compliance with minimum design criteria with regard to the specific circumstances for the property.

The current version of City codes or development standards at the time when a development application is made shall supersede the provisions of this Water System Plan.

Chapter 2

BASIC PLANNING DATA

CHAPTER 2

BASIC PLANNING DATA

OBJECTIVE

The objective of this chapter is to present basic planning data and water demand forecasts needed to assess the current and future capabilities of the water system to provide service. This chapter will provide existing and projected population, service connections, and water use data, and will develop the water demand associated with the planning element known as an equivalent residential unit (ERU). This chapter also includes projected land use and water demands for 10- and 20-year planning periods.

The water use data and water demand forecasts found in this chapter comprise two of the three elements required for the development of a conservation program. The third required element is implementation of the conservation program and its component parts, which is addressed in Chapter 4.

CURRENT SYSTEM DEMANDS

In this section current system demands are examined in terms of total production and sales per connection by customer class for the City of Tenino. This information is later used to project future water system demands and evaluate water use efficiency.

CURRENT CITY POPULATION

The analysis of local population and demographic trends is important for a broad understanding of the community and to anticipate future needs.

The total population within the city limits of Tenino was estimated to be 2,030 by the 2022 Postcensal Estimate. Postcensal population data from 1968 to 2022 is available in the Office of Financial Management (OFM), *Postcensal Estimates of April 1 Population, 1960 to Present.*

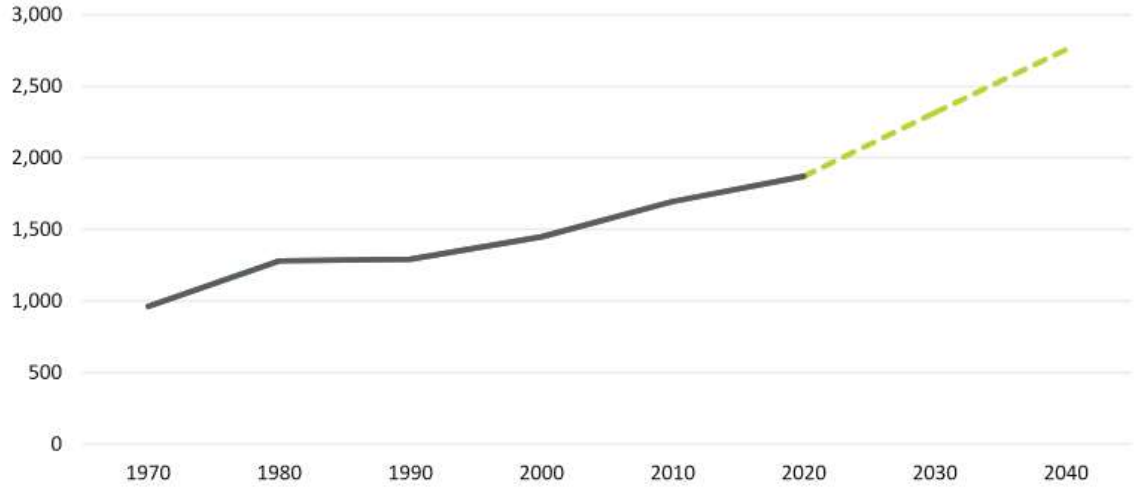
Figure 2-1 is copied from a report titled Housing Needs Assessment Housing Action Plan prepared by SCJ Alliance dated December 2022, see Chapter 1 Previous Engineering and Planning Documents. Figure 2-1 shows the historic and projected population since 1970. When Tenino incorporated in 1906, it was a bustling community powered by the railroad and the sandstone quarries. In 1910, there were 1,038 people living in the community, comprising 5.9% of Thurston County's population. As these formative industries declined, so did the job market and the population. By 1920, Tenino's population had decreased to 850.

Between 1920 and 1950, the population of the community grew at a relatively slow rate but never reached the population levels of 1910. The population decreased in the 1950s once Interstate 5 opened. This reduced automobile travel through Tenino and eliminated jobs serving passing motorists and freight trucks.

The City's population began to increase in the 1960s and has continued to do so since. Between 1970 and 1980, Tenino grew by 2.9% annually, its fastest growth rate over the last 100 years. Population growth slowed significantly in the 1980s, but steady population growth occurred over the last two census periods.

FIGURE 2-1

Historic and Forecasted Population within the City of Tenino Limits



Source: Washington Office of Financial Management (OFM), TRPC 2021 Statistical Profile

TOTAL SERVICE CONNECTIONS

The City of Tenino water system has four customer classes (residential, commercial, public facility, and school). Year-end water connections and estimated year-end population from OFM are shown in Table 2-1.

TABLE 2-1

End of Year Residential and Commercial Units Served and Estimated Population

Year	Total Meters Served	Residential Connections	Commercial Connections	Public Facility Connections	School Units Served	Estimated Service Area Residential Population
2019	785	667	96	15	7	1,858
2020	795	678	95	15	7	1,870
2021	821	705	94	15	7	2,010
2022	833	716	95	15	7	2,030

WATER PRODUCTION

Water production history is examined in the following sections. Source production data is obtained from source meters at each well which are typically read on a daily basis. Annual water production since 2019 is presented in Table 2-2, and monthly water production since 2020 is presented in Figure 2-2.

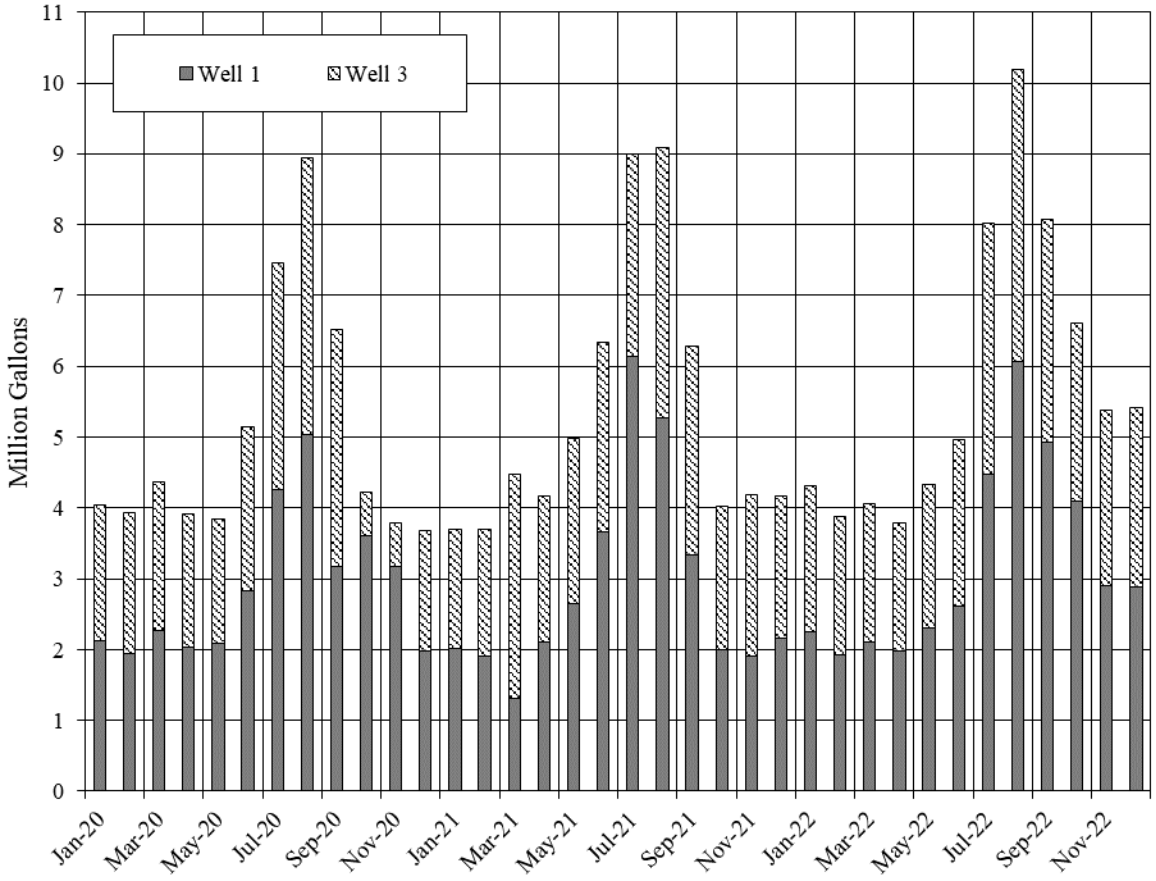
TABLE 2-2

Annual Water Production Records

Year	Production, Well 1		Production, Well 3		Total Production	
	MG	ac-ft	MG	ac-ft	MG	ac-ft
2019	35.9	110.2	26.1	80.1	62.0	190.3
2020	34.5	105.9	25.3	77.6	59.8	183.5
2021	34.5	105.9	29.7	91.1	64.2	197.0
2022	38.5	118.2	30.5	93.6	69.0	211.8
Average	35.9	110.0	27.9	85.6	63.8	195.7

FIGURE 2-2

Monthly Water Production Records



WATER CONSUMPTION

Water Consumption by Customer Class

Water sales data was obtained for the period January 2019 through December 2022, a period of 4 years. The City reads water meters and bills customers monthly. Water sales are divided into residential, commercial, school, and city facility customer classes. The number of residential accounts has slightly increased throughout the time period. Water usage metered or estimated by the city, but not sold will be addressed in the next section.

Average annual water sales by customer class are shown in Tables 2-3 through 2-5. All billing categories are taken inside and outside City limits. Table 2-5 shows average annual water sales per unit for all customer classes in gallons per day (gpd). Monthly City water sales for each customer class are shown in Figure 2-3.

TABLE 2-3

Annual Water Sales by Customer Class

Year	Residential (gpd)	Commercial (gpd)	School (gpd)	City Facility (gpd)	Total Sales (gpd) (1)
2019	96,920	18,590	17,760	9,012	142,282
2020	111,964	18,598	12,536	5,702	148,800
2021	114,585	18,281	7,093	4,051	144,010
2022	123,772	19,865	10,946	3,538	158,121
Average	111,810	18,834	12,084	5,576	148,303

(1) Does not include authorized unbilled water.

TABLE 2-4

Annual Percent Water Sales by Customer Class

Year	Percent Residential	Percent Commercial	Percent School	Percent City Facility
2019	68.1%	13.1%	12.5%	6.3%
2020	75.2%	12.5%	8.4%	3.8%
2021	79.6%	12.7%	4.9%	2.8%
2022	78.3%	12.6%	6.9%	2.2%
Average	75.3%	12.7%	8.2%	3.8%

TABLE 2-5

Average Annual Water Sales per Unit

Year	Residential Units	Residential Sales per Unit (gpd)	Commercial Units	Commercial Sales per Unit (gpd)	School Units	School Sales per Unit (gpd)	City Facility Units	City Facility per Unit (gpd)
2019	667	145	96	194	7	2,537	15	601
2020	678	165	95	195	7	1,791	15	380
2021	705	163	94	194	7	1,013	15	270
2022	716	173	95	210	7	1,564	15	236
Average	692	162	95	198	7	1,726	15	372

FIGURE 2-3

Monthly Water Sales by Customer Class

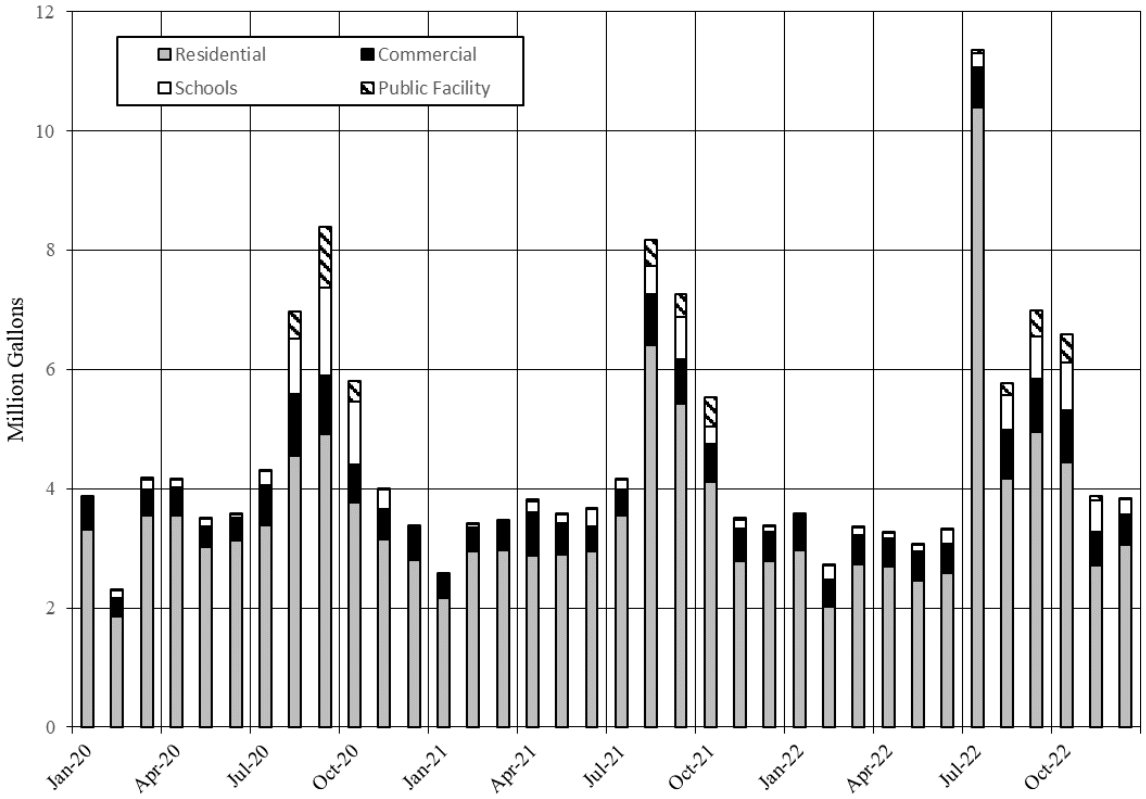
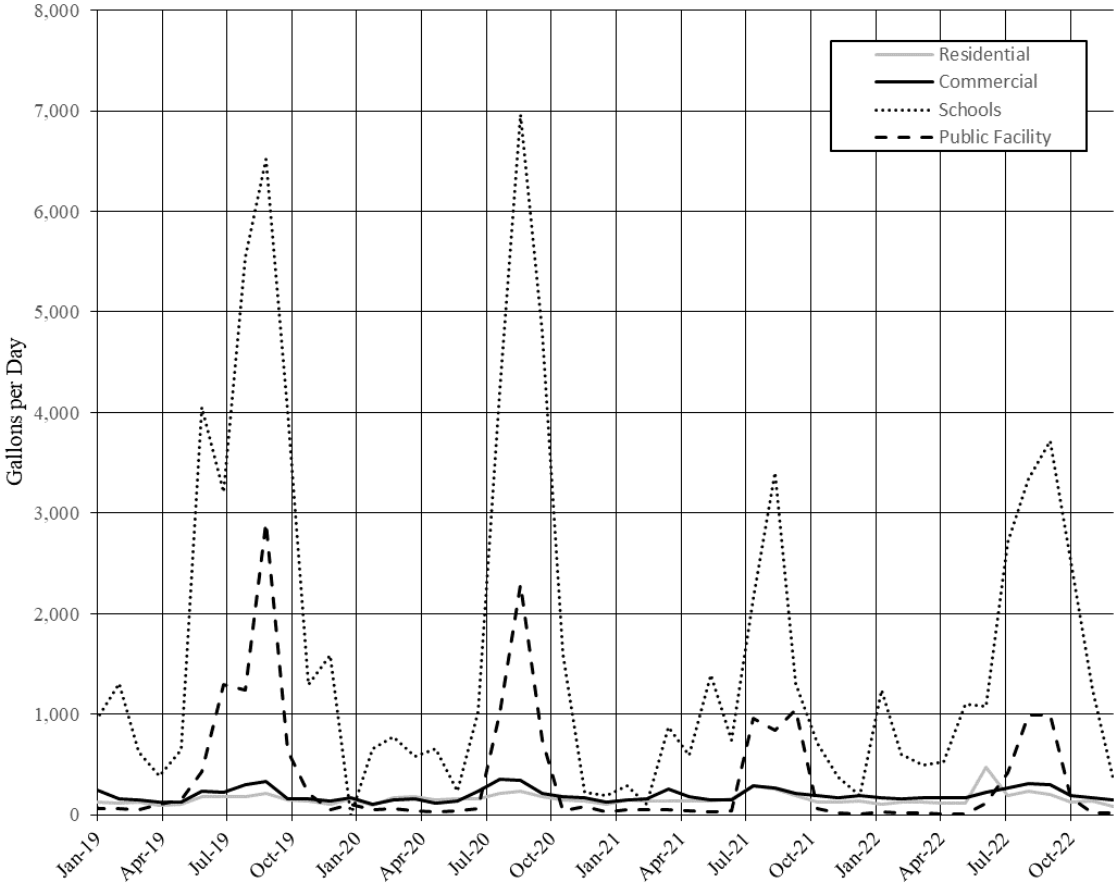


Figure 2-4 shows water use rates by customer class in gpd per connection. The figure shows commercial customers have a slightly larger usage rate than residential customers and both customer classes have seasonally higher usage rates in the late summer and early fall. The lowest month residential usage rate was 94 gpd per connection in April of 2020, the highest month residential usage rate was 476 gpd per connection in July of 2022, and the average residential usage rate is 162 gpd per connection.

In comparison, the lowest month commercial usage rate was 107 gpd per connection in February of 2020, the highest month commercial usage rate was 354 gpd per connection in August of 2020, and the average commercial usage rate is 198 gpd per connection. The schools and public facility customer classes also have seasonally higher usage rates in the late summer and early fall with the public facility having exceptionally high seasonal spikes due to the use of the Tenino Quarry Pool recreational swimming facility. The schools and public facility water usage significantly decreased in 2021 and 2022, presumably due to school and public facility closures in response to Covid.

FIGURE 2-4

Water Use Rates by Customer Class



Average Day Demand

The Water System Design Manual defines Average Day Demand (ADD) as the average day usage per connection of the residential connections on the subject water system. Use of Equivalent Residential Units (ERUs) is a way to express water use by non-residential customers as an equivalent number of residential customers. The value of an ERU is system specific and is calculated by dividing the volume of water utilized in the residential customer classes by the number of residential units served. This number defines the average day residential water use, or one ERU.

When water sales data is available, actual system data should be used for planning purposes. DOH's Water System Design Manual uses the following equations where no metered data is available:

Equation 2-1 Hyperbolic Function

ADD = (8,000/AAR) + 200

ADD = average day demand (gpd/ERU)

AAR = average annual rainfall (in/yr.)

Equation 2-2 Power Function

$ADD = 2{,}500/(AAR)^{1/2}$

Equation 2-3 Modified Power Function

$ADD = [1{,}350/(AAR)^{1/2}] + 200$

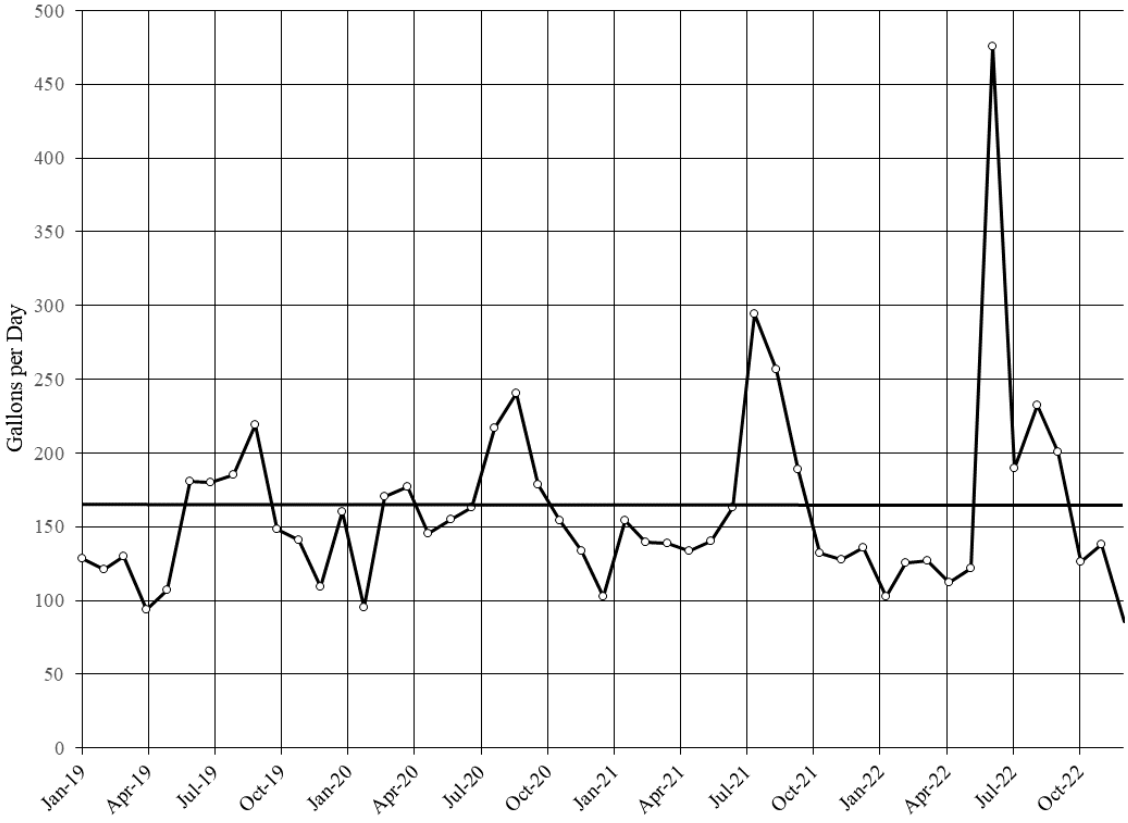
With an average annual precipitation of 49 in/yr. for the City of Tenino, Equations 2-1, 2-2, and 2-3 calculate ADD as 363 gpd/ERU, 357 gpd/ERU, and 393 gpd/ERU respectively. As will be shown based on actual system data, the actual ADD is significantly lower than DOH's guideline which could be due to several factors including households having a moderate population density and demographics such as median age and income.

The City of Tenino's ADD is based on actual system data. Taking each month's total residential water sales in gallons and dividing it by the total number of residential connections for that month and the total number of days for that month yields the monthly residential water use rate per ERU as shown in Figure 2-5, below.

Table 2-5 shows the 2019 to 2022 average calculated ADD to be 162 gallons per day (gpd). For the purposes of planning future water demands, **an ADD of 173 gpd per ERU will be used** because this ADD occurred in the most recent year. For comparison, the 2010 Water System Plan estimated an ERU was equivalent to 203 gpd for the years 2005 through 2007. Note that this per connection water demand does not necessarily represent the actual water use by each connection but represents overall system production divided by the estimated number of individual connections.

FIGURE 2-5

Monthly Single-Family Residential ADD



Maximum Day Demand

Maximum Day Demand (MDD) is defined in the DOH Water System Design Manual as the maximum day demand of the average residential water system connection, or ERU. Since daily residential water service meter data is generally not available, MDD is often estimated based on maximum day production data. Daily production records were reviewed for 2019 through 2022 and maximum day water production is summarized in Table 2-6.

TABLE 2-6

Maximum Day to Average Day Factor

Date	Maximum Day Production (gal)	Annual Average Day Production (gpd)	Factor
July 2, 2019	355,020	169,754	2.1
August 5, 2020	685,010	163,587	4.2
August 16, 2021	422,331	175,685	2.4
July 29, 2022	349,408	189,087	1.8
Average			2.6

The maximum days were determined by visual examination of the monthly data sheets. Average day production data for 2019 through 2022 is the total production from Table 2-2 divided by days in the year. The maximum day to average day factor was determined by dividing the maximum day by the annual average day. DOH suggests an average day to maximum day ratio of 2.0; however, Tenino's water system primarily serves residential customers and is therefore subject to higher demand fluctuations. The more conservative four-year maximum day demand (MDD) to ADD ratio will be used.

A MDD to ADD peaking factor of 2.6 will be used to estimate MDD. The estimated MDD is 450 gpd (173 gpd x 2.6). For comparison, the previous 2010 Water System Plan used a MDD to ADD peaking factor of 2.8 for the years 2005 through 2007 which would result in an MDD of 568 gpd.

Peak Hour Demand

Peak Hour Demand (PHD) is a value that applies to the system as a whole, not to any individual service, and is estimated using Equation 3-1 from the 2019 Water System Design Manual:

Equation 2-4 Peak Hour Demand

$$PHD = (MDD/1,440)\ [(C)(N) + F] + 18$$

Where

PHD = Peak Hour Demand, gallons per minute
C = Coefficient from Water System Design Manual Table 3-1
N = Number of ERUs served
F = Factor from Water System Design Manual Table 3-1
MDD = Maximum Day Demand per connection, gallons per day

For a system with more than 500 service connections, C and F are: 1.6 and 225, respectively. As derived above, MDD for the City water system is 450 gpd. Inserting these numbers into Equation 2-4 yields the following:

$$PHD = (450/1,440)\ [(1.6)\ (N)+225] + 18$$

This equation simplifies to the following:

$$PHD = 0.50N + 88$$

Using 914 currently metered ERUs from Table 2-9 below, the estimated peak hour demand for metered sales in 2022 is 545 gpm. The estimated peak hour demand for the 1,093 metered ERUs plus ERUs from Authorized Consumption and Distribution System Leakage (DSL) is 635 gpm. For comparison, the previous 2010 Water System Plan used a PHD of 647 gpm for the years 2005 through 2007. The above formula will be used to estimate projected peak hour demands.

It can be assumed that overall use will remain approximately proportional to population and ADD and MDD are useful predictors of future water needs. Table 2-7 summarizes water demand statistics.

TABLE 2-7

Summary of Per Capita Water Demand Statistics

Demand Factor	Value
Average Day Demand (gpd)	173
Maximum Day Demand (gpd)	450
Maximum Day to Average Day Demand Factor	2.6
Peak Hour Demand (gpm)	0.50N + 88

Distribution System Leakage

Distribution System Leakage (DSL) consists of the difference between water produced and water sold or otherwise accounted-for. DSL generally consists of a total of several things, including leakage, unauthorized consumption, water main flushing, firefighting, street sweeping, construction, water main breaks, under-reading service meters, and sales to water haulers not metered, estimated, or otherwise accounted-for in the water sales records.

For systems that collect water sales data monthly for all customers, the month-to-month DSL tends to be quite variable. This variability may be due to filling and drawing of reservoirs, timing of the reading of water service meter relative to water source meters, as well as actual monthly variability of water losses and unaccounted for water uses.

Amendments to the Drinking Water Regulations collectively known as the “Water Use Efficiency Rule,” effective January 22, 2007, establishes a 3-year average DSL water goal of 10 percent or less. The water use efficiency (WUE) rule is discussed in greater detail in Chapter 4 of this Plan.

Due to monthly data variability, annual DSL is considered a better evaluation of overall WUE. Annual water production, water sales, and DSL for the years 2019 to 2022 are shown in Table 2-8. The data shows annual DSL averaged 7.8 percent. For comparison, the 2010 Water System Plan noted that DSL has been under 10 percent since 2004. The current 3-year average rate of 6.9 percent DSL is maintained below the WUE rule of 10 percent. The WUE Rule requires specific actions of water utilities that have a 3-year average DSL greater than 10 percent. Chapter 4 further describes the requirements of the WUE Rule and the City’s plans to maintain DSL below 10 percent.

TABLE 2-8

Annual Water Production, Sales, and DSL

Year	Water Production (MG)	Water Sales (MG)	Authorized Consumption, (MG) [1]	Total Accounted-for (MG)	DSL (MG)	Percent DSL
2019	61.96	51.88	3.61	55.49	6.48	10.5%
2020	59.87	54.52	3.27	57.79	2.08	3.5%
2021	64.13	52.56	5.50	58.06	6.06	9.5%
2022	69.02	57.71	6.00	63.71	5.33	7.7%
3-Year Average						6.9%

(1) The City keeps detailed sheets tracking Fire Department use, fire hydrant testing, leaks, losses due to water meters, line flushing, construction use, reservoir cleaning, and other water losses.

Equivalent Residential Units

The volume of water used by non-residential commercial customer classes can be divided by the average single-family residential water use to determine the number of equivalent residential units (ERUs) utilized by the other customer classes. It should be noted that the number of ERUs represented by non-residential users will change from year to year because commercial users do not use the same amount of water every year. It should also be noted that the definition of an ERU will change from year to year because residential users also do not use the same amount of water every year. Since the definition of an ERU is the average residential water use over a data period, the total residential water use in any given year will not necessarily match the total number of residential connections multiplied by the water use per ERU. Therefore, the ERU estimates should not be used as exact predictors of water use in any given year, but rather as an estimate of the capacity of the water system to support additional water users. ERUs for residential, commercial, school, city facility, non-sales water use, and DSL are shown in Table 2-9.

TABLE 2-9

Equivalent Residential Units for 2022

Customer Class	Water Use (gpd)	Meters	ERUs
Residential [1]	123,772	716	716
Commercial [2]	19,865	95	115
School [2]	10,946	7	63
City Facility [2]	3,538	15	20
Authorized Consumption [2]	16,438	-	95
Subtotals	174,559	833	1,009
DSL [2]	14,528	-	84
Totals	189,087	833	1,093

(1) All residential meters are 1 ERU each regardless of usage for any given year.
(2) Commercial, School, City Facility, and DSL ERUs are determined by dividing the average day water sales by 173 gpd per ERU.

PROJECTED SYSTEM DEMANDS

To project future City water demands it will be assumed that water use will be proportional to population. The historic water use factors developed above will be applied to projected populations to estimate future water demands.

PROJECTED LAND USE

The majority of the service area is reserved for residential use with the largest classification being single family residential. Smaller areas are zoned multi-family residential, commercial, and industrial. There are no known plans for large scale changes in land use.

PROJECTED POPULATION

From Figure 2-1 the population within City limits has grown steadily over the last 50 years. Projected population from TRPC Population, Housing, and Employment Data as discussed in Chapter 1, Previous Engineering and Planning Documents is used to project water system demands.

TRPC data was updated most recently in December 2022 and is shown Figure 2-1 above and Table 2-10 below. This forecast projects that the population of Tenino will increase by 760 people between 2022 and 2045.

TABLE 2-10

Projected City Service Area Population

Year	Population (1)	Average Annual Rate of Change (2)
2010	1,695	--
2020	1,870	0.99%
2021	2,010	7.49%
2022	2,030	1.00%
2025	2,050	0.33%
2030	2,310	2.42%
2035	2,565	2.12%
2040	2,750	1.40%
2045	2,790	0.29%

(1) From TRPC – Population, Housing, and Employment Data,
(2) Average Annual Rate of Change was calculated from population data.

PROJECTED NON-RESIDENTIAL WATER NEEDS

By using historic per capita water production, historic non-residential water demand and DSL are accounted for. Since there are no known plans for large-scale changes in land use, it is estimated that non-residential water use will increase proportionately to population. If residential use, non-residential use, or DSL are reduced in the future, then

use of historic per-capita water demand may overpredict future water demands. However, it is preferable to overpredict than to underpredict future water demands so that adequate resources can be assured. Therefore, future water use will be estimated based on projected growth rates and historic water production records.

FUTURE DEVELOPMENT

Since there are no large-scale developments planned at this time, it is estimated that future development will progress in a manner similar to development in the recent past. The West Tenino annexation area (see the Zoning Map in Appendix A) has been federally identified as critical habitat for endangered species and has little to no development potential as verified by SCJ Alliance's Housing Needs Assessment: Housing Action Plan discussed in Chapter 1 of this Water System Plan.

PROJECTED EQUIVALENT RESIDENTIAL UNITS

It is anticipated that the value of an ERU will change as the system grows. With promotion of water conservation, the water usage represented by an ERU may go down. Due to anticipated growth being primarily residential, this Water System Plan projects future ERUs with the same growth rate as city population. DOH requires demand estimates with WUE program projections. The City of Tenino has set a WUE efficiency goal of reducing public water use by 10%.

PROJECTED NON-REVENUE WATER DEMANDS

Non-revenue water consists of all the City's municipal water uses, authorized consumption, and DSL. Non-revenue water demands are listed in Tables 2-3 to 2-5 and 2-8. This data will be used to project (or estimate) future non-revenue water demands. It will be assumed that future non-revenue water demands will remain approximately the same as current non-revenue water demands and will increase proportionately to population.

WATER RATES AND RATE IMPACTS ON WATER DEMAND

If the City's water rate structure is adjusted in the future, that adjustment may have an impact on water usage. The most likely impact of future rate adjustments would be to promote water conservation. If water customers use water in a more conservative manner than historic water use, the water usage rate represented by an ERU would decline and the number of ERUs represented by a given water usage rate would increase. Water usage should be re-evaluated periodically to adjust the value of an ERU.

PROJECTED WATER DEMAND FOR 10- AND 20-YEAR HORIZONS

Projected Average Day, Maximum Day, Peak Hour, and Annual Demands

Based on historic water use rates and projected population growth rates, estimated future City water demands are shown in Table 2-11. PHD in Table 2-11 is estimated based on the PHD formula developed previously and applied to the projected total ERUs for the water system. Annual water demands are calculated directly from the ADD in Table 2-11 and expressed in acre-feet per year (ac-ft/yr) for easy comparison to water right limitations.

Table 2-12 shows the same demands as Table 2-11 with the WUE goal of reducing public water usage by ten percent as further discussed in Chapter 4. Table 2-12 shows 10 percent public water use reduction beginning in 2023 and therefore demands are shown to decrease from 2022 to 2023. It is important to note that 10 percent public water use reduction is a goal and will not likely be achieved in the first year as shown in Table 2-12.

Annual incremental projections are made for the 10-year horizon to the year 2037 to allow time for Water System Plan review and approval. One final projection for the 20-year horizon in the year 2042 is also included.

TABLE 2-11

Projected Water Demands

Year	Population [1]	Service Connections [2]	ERUs [3]	ADD gpd [4]	MDD gpd [5]	PHD gpm [6]	Annual Demand ac-ft/yr [7]
2022 [8]	2,030	833	1,093	189,087	349,408	635	211.8
2023	2,037	836	1,097	189,708	493,460	636	212.5
2024	2,043	838	1,100	190,329	495,075	638	213.8
2025	2,050	841	1,104	190,952	496,696	640	213.9
2026	2,100	862	1,130	195,567	508,700	653	219.1
2027	2,150	882	1,158	200,294	520,995	667	224.4
2028	2,202	904	1,186	205,135	533,587	681	230.4
2029	2,255	926	1,214	210,093	546,483	695	235.3
2030	2,310	948	1,244	215,170	559,691	710	241.0
2031	2,359	968	1,270	219,724	571,536	723	246.1
2032	2,409	988	1,297	224,374	583,632	736	252.0
2033	2,460	1,009	1,324	229,122	595,983	750	256.6
2034	2,512	1,031	1,352	233,971	608,596	764	262.1
2035	2,565	1,053	1,381	238,923	621,475	779	267.6
2036	2,601	1,067	1,400	242,274	630,192	788	272.1
2037	2,637	1,082	1,420	245,672	639,031	798	275.2
2042	2,766	1,135	1,489	257,639	670,159	833	288.6

(1) Population starts at 2,030 in 2022 and increases at the annual rate of change shown in Table 2-10.
(2) Service connections start at 833 in 2022 and increase at the annual rate of change shown in Table 2-10.
(3) Projected ERUs are the year 2022 total ERUs from Table 2-9 (including DSL) projected forward at the annual rate of change in Table 2-10.
(4) ADD is the projected number of ERUs multiplied by 173 gpd/ERU from Table 2-7.
(5) MDD is the projected number of ERUs multiplied by 450 gpd/ERU from Table 2-7.
(6) PHD is based on the formula in Table 2-7 and the projected number of ERUs shown in this table.
(7) 2022 is based on actual data and may not correlate with forecast factors because forecast factors are derived using prior 4-year averages.
(8) One acre-foot (ac-ft) of water is the amount of water required to cover 1 acre to a depth of 1 foot which is approximately 325,851 gallons.

TABLE 2-12

Projected Water Demands with Water Use Efficiency

Year	Population [1]	Service Connections [2]	ERUs [3]	ADD gpd [4][9]	MDD gpd [5][9]	PHD gpm [6][9]	Annual Demand ac-ft/yr [7][9]
2022 [8]	2,030	833	1,093	189,087	444,114	635	211.8
2023	2,037	836	1,097	170,737	445,568	573	191.2
2024	2,043	838	1,100	171,296	447,026	574	192.4
2025	2,050	841	1,104	171,857	457,830	576	192.5
2026	2,100	862	1,130	176,010	468,896	588	197.2
2027	2,150	882	1,158	180,264	480,228	600	201.9
2028	2,202	904	1,186	184,621	491,835	613	207.4
2029	2,255	926	1,214	189,083	503,722	626	211.8
2030	2,310	948	1,244	193,653	514,383	639	216.9
2031	2,359	968	1,270	197,752	525,268	651	221.5
2032	2,409	988	1,297	201,937	536,385	663	226.8
2033	2,460	1,009	1,324	206,210	547,736	675	231.0
2034	2,512	1,031	1,352	210,574	559,328	688	235.9
2035	2,565	1,053	1,381	215,031	567,173	701	240.9
2036	2,601	1,067	1,400	218,047	575,128	709	244.9
2037	2,637	1,082	1,420	221,105	444,114	718	247.7
2042	2,766	1,135	1,489	231,875	603,143	749	259.7

(1) Population starts at 2,030 in 2022 and increases at the annual rate of change shown in Table 2-10.
(2) Service connections start at 833 in 2022 and increase at the annual rate of change shown in Table 2-10.
(3) Projected ERUs are the year 2022 total ERUs from Table 2-9 (including DSL) projected forward at the annual rate of change in Table 2-10.
(4) ADD is the projected number of ERUs multiplied by 173 gpd/ERU from Table 2-7.
(5) MDD is the projected number of ERUs multiplied by 450 gpd/ERU from Table 2-7.
(6) PHD is based on the formula in Table 2-7 and the projected number of ERUs shown in this table.
(7) 2022 is based on actual data and may not correlate with forecast factors because forecast factors are derived using prior 4-year averages.
(8) One acre-foot (ac-ft) of water is the amount of water required to cover 1 acre to a depth of 1 foot which is approximately 325,851 gallons.
(9) Although projected ERUs do not change with or without the WUE goal, ADD, MDD, and PHD were calculated using 10% less ERUs for projecting water demands with WUE.

Chapter 3

SYSTEM ANALYSIS

CHAPTER 3

SYSTEM ANALYSIS

OBJECTIVE

The objective of this chapter is to evaluate if the water system facilities can supply sufficient quality and quantity of water to meet existing and projected demands. Facility performance and design criteria are established as the basis for evaluating existing facilities and proposed improvements. The majority of the standards identified below are based on regulatory requirements and DOH guidance. System specific standards that deviate from DOH guidance are referenced where applicable. Water System Standards are addressed in further detail in Chapter 7

DESIGN STANDARDS AND CRITERIA

The following is a summary of applicable capacity requirements and minimum design standards for water service as defined in Chapter 246-290 WAC and the DOH Water System Design Manual (WSDM).

SOURCE AND PUMPING CAPACITY

In general, overall source requirements are dependent upon the capacity and reliability of the source facilities. Specifically, source capacity and pumping stations must equal or exceed Maximum Day Demand (MDD) in accordance with WAC 246-290-222. Source pumping should not exceed instantaneous withdrawal rights allowed by the Department of Ecology (Ecology).

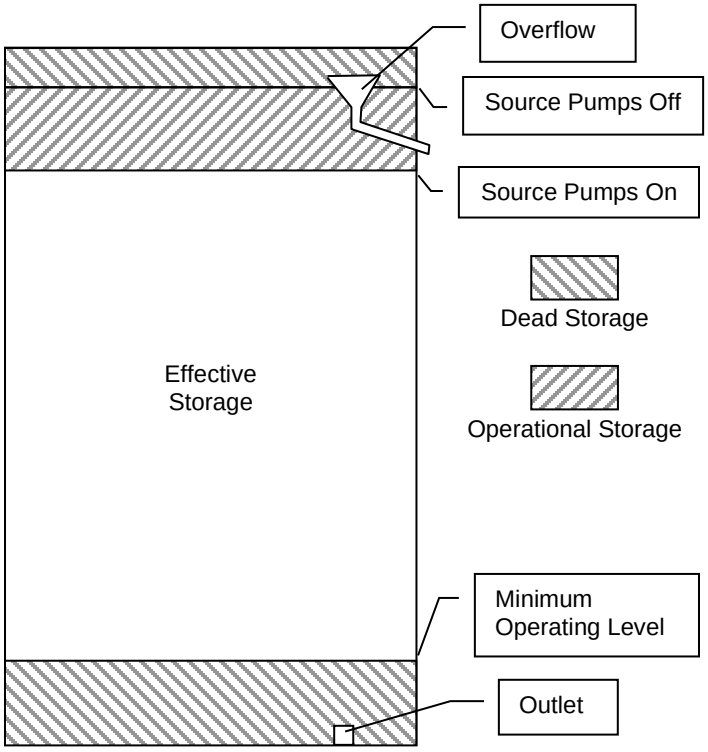
DISTRIBUTION AND TRANSMISSION PERFORMANCE

Minimum design pressures must be maintained under Peak Hour Demand (PHD) and MDD plus fire flow conditions (WAC 246-290-222). DOH rules differentiate between “design” and “operating” conditions. Water systems must be designed to provide a minimum pressure of 30 psi measured at the meter or property line under PHD conditions (WAC 246-290-230). This design pressure must be met at the condition where equalizing storage is depleted. During routine operating conditions, approved design pressures must be maintained, but in no case shall service pressure be less than 20 psi (WAC 246-290-420). When fire flow is required, 20-psi design pressure must be maintained at the operating hydrant and in all other areas of the distribution system. Positive pressures must be maintained at all points in the distribution system under actual fire flow operating conditions.

Storage Capacity

According to the DOH Water System Design Manual, water system storage volume is comprised of five components:

Figure 3-1 Water System Storage Components



- Operational storage (OS)
- Equalizing storage (ES)
- Standby Storage (SS)
- Fire suppression storage (FSS)
- Dead storage (DS)

These required volume components are illustrated in Figure 3-1. Table 3-1 replicates Table 7-1 of the 2019 Water System Design Manual which provides equations or methods to calculate or determine each volume component. A reservoir's effective storage volume is the nominal or total volume less operational storage and dead storage. This volume must be large enough to accommodate the requirements for equalizing storage, standby storage, and fire suppression storage.

Storage must be sufficient for the 10-year planning period and storage improvements should be designed to meet the requirements for at least the next 20-year planning period. Critical components are operational, equalizing, standby, fire suppression, and dead storage as discussed in the following.

- Operational Storage: Operational storage is the amount of water that flows in and out of a reservoir during normal system control cycling. Reservoirs typically operate with a maximum water level at which all source pumps are turned off, and a minimum level at which all source pumps are turned on and are set by City operations staff. The amount of water that flows into and out of the reservoir between these two levels depends on the operational control levels and the dimensions of the system reservoirs. Operational storage should be sufficient to avoid source of supply pump cycling (starts/stops per hour) in excess of the pump motor manufacturer's recommendation.
- Equalizing Storage: Equalizing storage is the amount of water needed to meet peak system demand for the period of time that system demand exceeds the system source capacity. The DOH Water System Design Manual recommends that this volume be estimated as PHD minus source capacity for 150 minutes, but not less than zero. The equalizing volume of a storage tank must be located at an elevation that provides a minimum service pressure of 30 pounds per square inch (psi) to all customers served by the reservoir.
- Standby Storage: Standby Storage is water held in reserve for emergency situations, such as temporary loss of a water source. A key concept is that establishing standby volume involves planning for reasonable system outages – those that can be expected to occur under normal operating conditions, such as a pipeline failure, power outage or valve failure. Major system emergencies, such as those created by an earthquake, are intended to be covered by emergency system operations planning, because construction of sufficient reserve volume to accommodate sustained system demands under emergency

conditions is not economically feasible. The DOH Water System Design Manual recommends that this volume be based on one day of maximum day demand for the pressure zone and adjusted based on source vulnerability and/or redundancy, but not less than 200 gallons per ERU.

- Fire Suppression Storage: Fire flow storage must be equal to the greatest required fire flow within the service area multiplied by the required duration. Fire flow storage may be nested within standby storage if allowed by the local fire protection authority. Applicable fire flow, duration and local standards are provided in the discussion of fire flow criteria below.
- Dead Storage: Dead storage is the volume at the bottom of the reservoir that cannot be used because it is either physically too low to provide sufficient service pressure at one or more connection in the distribution system or cannot be withdrawn from the reservoir at the required rates while maintaining the minimum required system pressure or other required operating parameter. The amount of dead storage existing in a system depends on storage system dimensions, elevations, pumping systems, outlet design, and possibly other requirements such as disinfectant contact time. Since fire flow storage is the first component above dead storage, the dead storage volume typically must be at an elevation such that a minimum of 20 psi (approximately 46 feet) distribution system pressure is maintained at the highest connection in the zone supplied by the reservoir when the water level in the reservoir reaches the bottom of the fire flow storage.

TABLE 3-1

Reservoir Storage Component Cross-Section Diagram

	High Level Alarm. Overflow above **pump off** elevation
Pump(s) Off	**Operational Storage (OS) Component** Not part of ES Not applicable for continuous pumping systems. Minimum OS volume for pump protection can be conservatively calculated as the pump supply capacity (in gpm) times 2.5 minutes.
Pump(s) On	OS = Operational storage component (gallons).
	Equalizing Storage (ES) Component For call-on-demand: **ES = (PHD - Q_S)(150 min.),** but in no case less than zero. ES = Equalizing storage component (gallons). PHD = Peak hourly demand (gpm). Q_S = Total of all permanent and seasonal sources (gpm).
Maintain 30 psi (required)	See WSDM Section 7.1.1.2 for sizing criteria for continuous pumping operations.
Low Level Alarm	**Fire Suppression Storage (FSS) Component** For Single Sources: **FSS = (FF)(t_m)** FSS = Fire suppression storage component (gallons). FF = Needed fire flow rate, expressed in gpm as specified by fire authority or the Coordination Act, whichever is greater.
Maintain 20 psi (required)	t_m = Duration of FF rate, expressed in minutes as specified by fire authority.
	Standby Storage (SB) Component SB = (N)(SB_i)(T_d) SB = Total standby storage component, or its equivalent, in gallons. N = Number of ERUs based on the ERU_{MDD} value SB_i = Locally adopted unit SB volume in gallons per day per ERU (number of ERUs based on the ERU_{MDD} value) T_d = Number of days selected to meet water system-determined standard of reliability
Maintain 20 psi (recommended)	We recommend a minimum SB volume of at least 200 gal per ERU.
	Dead Storage (DS)
	Portion of a gravity reservoir that does not provide required minimum pressure.

FIRE FLOW CRITERIA

The Washington Survey and Rating Bureau (WSRB) classifies municipalities according to firefighting capabilities and establishes guidelines for rating overall fire protection. The insurance rating of a local fire authority is based upon a variety of criteria distributed among three key

components. Ten percent (10%) of the rating is based upon the “911” center’s ability to answer and dispatch calls, forty percent (40%) is based upon the fire department itself, and fifty percent (50%) is based upon the reliability of the water system and its ability to provide required fire flows.

The WSRB rating influences fire insurance premiums. The Fire District has a WSRB rating of 6 in and around the City, on a scale of 1, high to 10, low. Ratings are typically conditional upon proximity of hydrants. If a residential property is more than 1,000 feet, or a commercial property is more than 300 feet from a fire hydrant, the rating may be reduced for insurance purposes. A municipality should request a new rating evaluation when significant upgrades to fire protection capabilities are completed.

Fire flow performance requirements for the water system can be based on statutes or can be established by the City Council in the form of performance standards. At a minimum, the water system must comply with WAC 246-293, which sets specific fire flow performance requirements for public water systems with greater than 1,000 service connections. For reference and comparison, these performance requirements are summarized in Table III-2.

TABLE 3-2

Minimum Fire Flow per WAC 246-293-640

Development Classification	Minimum Fire Flow Requirement [1]
Rural [3]	None
Residential [4]	500 gpm for 30 minutes
Commercial [5]	750 gpm for 60 minutes [2]
Multi-Family [5]	750 gpm for 60 minutes [2]
Industrial	1,000 gpm for 60 minutes [2]

1. Minimum fire flow requirements are in addition to maximum day demands.
2. Commercial and industrial buildings may be subject to higher flow requirements when evaluated on an individual basis by the fire protection authority.
3. Rural development - lot sizes greater than one acre (including parks, open space, agricultural lands, etc.)
4. Residential development - lot sizes one acre or less, (including all single family and multifamily structures less than 4,000 square feet, and mobile home and recreational vehicle parks)
5. Commercial and multifamily with a floor area 4,000 square feet or greater

The City’s design and construction guidelines (see Appendix B) identify the minimum fire flow goals listed in Table III-2. There is no mandated fire flow standard since the water system serves less than 1,000 connections. The City goal for 1,000 gpm for 60 minutes will be used to evaluate fire storage capacity. Since there is no specific mandate for the City to provide fire flow, the City has the option to nest the fire flow storage component within the standby storage component. The City will continue to exercise this option to achieve greater flexibility with regard to storage sizing, which is a typical operating procedure for most small cities.

Fire flow requirements are specific to both the water system performance and to specific building projects. Site specific fire flow requirements in addition to the minimum standards may be required by the local fire protection authority (i.e. City or County) through the building permit process. It is common for codes and ordinances to specify building requirements in excess of the water system fire flow standards. It is important to note that the building related codes and ordinances do not require the water system to provide the fire flow. In the case where site specific fire flow requirements are greater than the water system fire flow requirements or available fire flow, it is the responsibility of the property owner and/or developer to provide the improvements

that are required for the specific building or development proposal. Typically, the property owner or developer must make up the shortfall with site-specific mitigation such as fire sprinklers, fire resistant construction, or reduction in building size. In extreme cases, such as large industrial or commercial buildings, the building owner may need to install storage, pumping and/or piping to provide the necessary fire flow. In summary, the water system is required to meet the minimum fire flow performance standard based on the designated land use. If the City can provide fire flow in excess of the minimum standards with reasonable and affordable improvements, there may be advantages to customers in the form of lower insurance premiums and less on-site fire flow mitigation for future commercial and industrial projects.

DISINFECTION CONTACT TIME

The City is not currently required to maintain a minimum disinfection contact time. Typically, DOH only requires contact time for groundwater sources that have had multiple positive coliform sample results at the source of supply or if a source is vulnerable to microbiological contamination.

WATER QUALITY ANALYSIS

The City's water quality must comply with the provisions of the federal Safe Drinking Water Act (SDWA). DOH water quality provisions contained in Chapter 246-290 WAC generally incorporate the SDWA requirements. However, due to resource and legal process constraints, the DOH rules tend to lag behind SDWA implementation. Compliance with the current state rules does not guarantee compliance with all current federal rules. Therefore, some of the analysis in this section may evaluate proposed federal rules as well as current state statutes.

The City is required to test various water quality parameters ranging from monthly coliform samples to sampling inorganic chemicals. The following section discusses the various water quality parameters and most recent results. Table III-3 provides a summary of water quality monitoring requirements and results. The Cities water quality monitoring schedule is provided in Appendix D.

TABLE 3-3

Water Quality Monitoring Summary

Parameter	Monitoring Requirements	Results
Coliform	Monthly coliform samples have been consistently collected in accordance with the regulations. (1)	The City has had one positive total coliform sample in March 2022 over the previous ten-year period. The repeat samples taken as a result showed an absence of total coliform.
Inorganic Chemicals (IOC)	DOH has granted the City a 9-year waiver. The next sample is due in September of 2027.	The last sample was taken on September 6, 2018. Results show no contaminants were above the Maximum Contaminant Levels (MCLs). Most analytes were not detected (or less than the State Reporting Limit). Sodium, hardness, conductivity, turbidity, total dissolved solids, and total nitrate/nitrite were detected which is typical for most groundwater sources.
Nitrates	Nitrate samples are required annually.	Previous nitrate sample results are in the range of 0.5 mg/l to 1.0 mg/l, which is typical for groundwater in the area and far below the MCL of 10.0 mg/l. The most recent sample was taken in April 2023 with a result of 0.71 mg/l.
Volatile Organic Chemicals (VOC)	The most recent sample was taken March 2022 and the next sample due date is currently being determined.	The last sample was taken March 2022. Results are below the current MCLs.
Synthetic Organic Chemicals (SOC)	SOC monitoring requirements are based on DOH rating of the source susceptibility. DOH has granted the City a 9-year waiver for herbicides and the next sample is due June 2024.	The water system has purchased waivers to reduce SOC monitoring requirements since the waiver program was instituted in 1995. The last herbicide and pesticide samples were taken July 8, 2016 and all results were below the current MCLs.
Per and polyfluroalkyl substances (PFAS)	Beginning Jan 2023 through Dec 2025, DOH requires Group A community and non-transient non-community water systems to monitor for PFAS.	The City has collected a sample in March 2023 and the results are currently being determined.
Radionuclides	Radionuclide samples are required every six years. The last samples were taken May 13, 2015 and the compliance period ends Dec 2025.	The last samples were taken May 13, 2015, and results are below the current MCLs.
Asbestos	DOH policy requires asbestos sampling every nine years if more than 10% of the distribution system consists of AC pipe.	Sample results from October of 2018 were less than the state reporting limit. The next sample due date is in October 2027.
Disinfection By-Products (DBPs)	The City has been granted reduced monitoring (annually in Oct) for TTHMs and HAA5.	Sample results from September of 2023 were well below the maximum contaminant level.
Lead and Copper	The City is required to take 10 Lead and Copper samples at the standard 3 year frequency. The last samples were taken Sep of 2023 and the next samples are due Sep of 2026.	Sample results from September of 2023 were less than action levels.

1. See Coliform Monitoring Plan in Appendix D

EPA passed the Stage 2 Disinfection Byproducts (DBP) Rule in January 2006. The Stage 2 DBP rule builds on earlier rules that addressed DBPs. The DBP rules are intended to reduce potential cancer and reproductive and developmental health risks. The DBPs form in drinking water when disinfectants are used to control microbial pathogens. This Stage 2 DBP Rule enhances compliance monitoring requirements for two groups of DBPs, trihalomethanes (TTHM) and haloacetic acids (HAA5).

Because previous monitoring results have been low, the City received a 40/30 Certification from EPA. The 40/30 Certification allows for reduction of some DPB monitoring requirements including reduction of the monitoring frequency from quarterly to annually.

SYSTEM DESCRIPTION AND ANALYSIS

This section provides a description of the general condition and physical capacity of each water system component. The existing capacity is compared to the existing and projected water demands identified in Chapter 2. This analysis identifies the extent and timing of facility deficiencies. Each identified deficiency is summarized at the end of this section. Other deficiencies are identified in the Operations and Maintenance Program in Chapter 6. Recommendations are discussed in more detail in the Capital Improvement Program in Chapter 8. See Figure 3-2 for a schematic map of the water system facilities.

Source Capacity Analysis

The City currently owns and operates two wells located along the north central part of the service area. The wells are referred to Well No. 1 and Well No. 3. Well No. 2 is located in the vicinity of Well No. 1 and Well No. 3 but is no longer utilized due to excessive sand production. Well No. 1 and Well No. 3 are currently designated as a well field by DOH, which reduces overall water quality monitoring requirements. Table 3-4 presents a summary of general parameters for each well.

TABLE 3-4

Well Characteristics

Parameter	Well No. 1	Well No. 3
Installation Date	May 1967	May 1994
Casing Size	12-inch	12-inch
Depth below ground surface	94 feet	93 feet
Screened interval	89 to 94 feet	58 to 93 feet
Well Tag	AAA-948	ABE-103
Confining Layer	13.5 to 23 feet	5 to 59 feet
Static Water Level	16.5 feet	11 feet
Pump Test Capacity	459 gpm	359 gpm
Installed Pump Capacity	300 gpm	400 gpm

Total source capacity must equal or exceed the estimated Maximum Day Demand (MDD) as required in WAC 246-290-222. The current available pumping capacity is 700 gpm which is also the City's existing instantaneous water rights as discussed in the Water Rights Analysis section below. Table 3-5 shows the existing source capacity compared against projected MDD developed in Chapter 2 and the projected surplus or deficit in annual increments through the year 2037 and one final projection in the year 2042. As shown in Table 3-5, the City's current source capacity is

projected to support MDD through the year 2037; however, there is a projected 41 gpm deficit in the year 2042.

Table 3-6 shows the same information as Table 3-5; however, uses Average Day Demand (ADD) and MDD developed in Chapter 2 assuming the water use efficiency (WUE) goal of reducing public water use by ten percent (further discussed in Chapter 4) is achieved. As shown in Table 3-6, if the City achieves the WUE goal, existing source capacity is projected to support MDD through the 20-year scenario. This analysis should be reviewed again during the next Water System Plan, anticipated to occur between 2032 and 2037, to determine if water use efficiency efforts reduce or eliminate the projected 20-year source capacity deficit.

Peak Hour Demand (PHD) can either be met through the provision of source capacity or equalizing storage. Beginning in the year 2028, the City is projected to not have adequate source capacity to meet PHD and therefore must provide equalizing storage within the system. Storage capacity is discussed later in this section.

Well No. 1 and Well No. 3 pump operation is automatically controlled by storage tank levels. After each well pump cycle, the status of each well alternates as the lead or the lag pump. A pump control valve, located in Well No. 3 building, is utilized to minimize surge when the pump operates.

Water Rights Analysis

This section recognizes that water rights have a legal bearing on water system capacity. ADD is compared against the City's existing annual rate of withdrawal and MDD is compared against the City's existing instantaneous rate of withdrawal. Table 3-5 shows a summary of current water rights. Water right documentation and the Water Rights Self-Assessment (DOH Form 331-372-F) are included in Appendix C. There are no extraordinary conditions associated with the existing water rights.

TABLE 3-5

Water Rights Summary

Water Right Number	Priority Date	Instantaneous Water Right (gpm)	Annual Water Right (acre-feet/year)	Notes
6869-A	June 5, 1967	300	196(P)	Certificate for Well No. 1 POW: NW NE T16N R01W S19
G2-20933 C	April 19, 1973	400	74(P) 196(S)	Certificate for Well No. 2 and Well No. 3 POW: T16N R01W S19
	Total	**700**	**270(P)**	

(P) - Primary, (S) Supplemental

The City's existing instantaneous rate of withdrawal water right matches current source capacity and therefore, the analysis is the same for both a legal analysis and physical capacity analysis, see the Source Capacity Analysis section. As shown in Tables 3-6 and 3-7, the City is projected to have an annual water right deficit in the year 2036 unless water use efficiency goals are achieved. This projected deficiency and further recommendations to resolve it are further discussed below.

TABLE 3-6

Water Rights Analysis

Year	Annual (ac-ft/yr)			Instantaneous (gpm)		
	Water Rights [1]	ADD [2]	Surplus / (Deficit) [3]	Source Capacity / Water Rights [1][4]	MDD [2]	Surplus / (Deficit) [5]
2022	270.0	211.8	58.2	700	243	457
2023	270.0	212.5	57.5	700	343	357
2024	270.0	213.8	56.2	700	344	356
2025	270.0	213.9	56.1	700	345	355
2026	270.0	219.1	50.9	700	353	347
2027	270.0	224.4	45.6	700	362	338
2028	270.0	230.4	39.6	700	371	329
2029	270.0	235.3	34.7	700	380	320
2030	270.0	241.0	29.0	700	389	311
2031	270.0	246.1	23.9	700	397	303
2032	270.0	252.0	18.0	700	405	295
2033	270.0	256.6	13.4	700	414	286
2034	270.0	262.1	7.9	700	423	277
2035	270.0	267.6	2.4	700	432	268
2036	270.0	272.1	(2.1)	700	438	262
2037	270.0	275.2	(5.2)	700	444	256
2042	270.0	288.6	(18.6)	700	465	235

(1) Water Rights and the Water Right Self-Assessment (DOH Form 331-372-F) are provided in Appendix C.
(2) Average and maximum day demands are from Table 2-11.
(3) Annual surplus/(deficit) is the difference between annual water rights and average day demand.
(4) Source capacity for each well matches the instantaneous water rights, see Table 3-4.
(5) Instantaneous surplus/(deficit) is the difference between instantaneous water rights and maximum day demand.

TABLE 3-7

Water Rights Analysis with Water Use Efficiency

Year	Annual (ac-ft/yr)			Instantaneous (gpm)		
	Water Rights [1]	ADD [2]	Surplus / (Deficit) [3]	Source Capacity / Water Rights [1][4]	MDD [2]	Surplus / (Deficit) [5]
2022	270.0	211.8	58.2	700	243	457
2023	270.0	191.2	78.8	700	308	392
2024	270.0	192.4	77.6	700	309	391
2025	270.0	192.5	77.5	700	310	390
2026	270.0	197.2	72.8	700	318	382
2027	270.0	201.9	68.1	700	326	374
2028	270.0	207.4	62.6	700	333	367
2029	270.0	211.8	58.2	700	342	358
2030	270.0	216.9	53.1	700	350	350
2031	270.0	221.5	48.5	700	357	343
2032	270.0	226.8	43.2	700	365	335
2033	270.0	231.0	39.0	700	372	328
2034	270.0	235.9	34.1	700	380	320
2035	270.0	240.9	29.1	700	388	312
2036	270.0	244.9	25.1	700	394	306
2037	270.0	247.7	22.3	700	399	301
2042	270.0	259.7	10.3	700	419	281

(1) Water Rights and the Water Right Self-Assessment (DOH Form 331-372-F) are provided in Appendix C.
(2) Average and maximum day demands are from Table 2-12.
(3) Annual surplus/(deficit) is the difference between annual water rights and average day demand.
(4) Source capacity for each well matches the instantaneous water rights, see Table 3-4.
(5) Instantaneous surplus/(deficit) is the difference between instantaneous water rights and maximum day demand.

Treatment Analysis

The City provides disinfection at both wells as a proactive measure to protect the distribution system from contamination. The residual goal at entry to the system is 0.3 mg/l. The hypochlorite solution is maintained at a ratio of 1 gallon of 12.5% sodium hypochlorite to 15 gallons of water.

The City also utilizes calcite contactors to raise pH prior to entry into the distribution system. One contactor vessel is provided for each 100 gpm of well capacity. Therefore, four contactors are dedicated to Well No. 3 and three contactors are dedicated to Well No. 1. The contactors have adequately adjusted pH to optimize corrosion control in the distribution system. Installation of new media into the contactors is somewhat difficult but is not a significant concern since media replacement is relatively infrequent.

Storage Capacity Analysis

The City has two existing glass-lined steel tanks located in the west area of the City referred to as Lemon Hill. The tanks were built in 1994 and are both 50 foot in diameter with a base elevation of approximately 467 feet, an overflow elevation of approximately 486 feet, and an overflow height of approximately 19-feet. The combined storage volume is approximately 550,000 gallons. The tank site is fenced and the City has recently installed security cameras and motion activated lights to deter vandalism. Results of bi-annual cleaning and inspection by City staff indicate that valves function properly, screens are intact, and the interior coatings are in good condition.

Table 3-6 provides a summary of the storage capacity requirements with the current total source capacity of 700 gpm. The largest storage volume requirement for this zone is standby storage. Storage capacity requirements are calculated in accordance with the 2019 DOH WSDM formulas. The Water System Design Manual requires that 30 psi be provided at the highest customer's water meter minus operating and equalizing storage. Due to the reservoir's base elevation (approximate elevation 476 feet) which is higher than the highest customer's water meter (approximate elevation 310 feet), the City maintains 30 psi at the highest customer's elevation minus the year 2042 projected equalizing storage. The limiting factor is therefore required storage greater than 20 psi minus operating, equalizing, standby, and fire suppression storage. Table 3-6 shows the storage surplus/deficit for maintaining 20 psi at the highest customer's water meter without operational, equalizing, standby, and fire suppression storage.

DOH requires that water systems evaluate the capacity as well as the physical condition of each storage facility. The analysis must address constraints within the ten- and twenty-year planning periods. As discussed previously in this Chapter, specific storage capacity requirements are dependent upon capacity and reliability of the source of supply.

The previous Water System Plan indicated storage capacity to be adequate for most of the 20-year planning period; however, additional storage would be needed by 2027. Based upon the revised WSDM storage calculations, the storage capacity is not adequate for either the 10- or 20-year planning periods with a current storage surplus of only 28,774 gallons and a projected deficiency beginning in the year 2027. This deficiency and recommendations to address it are further discussed below.

TABLE 3-8

Storage Capacity Analysis for Main Zone

Year	Required Storage (gallons)					Existing Effective Storage (gallons) (6)	Storage Surplus/ (Deficit) (gallons) (7)
	Operating (1)	Equalizing (2)	Standby (3)	FSS (4)	Total (5)		
2022	29,376	0	491,850	60,000	521,226	550,000	28,774
2023	29,376	0	493,460	60,000	522,836	550,000	27,164
2024	29,376	0	495,075	60,000	524,451	550,000	25,549
2025	29,376	0	496,696	60,000	526,072	550,000	23,928
2026	29,376	0	508,700	60,000	538,076	550,000	11,924
2027	29,376	0	520,995	60,000	550,371	550,000	(371)
2028	29,376	0	533,587	60,000	562,963	550,000	(12,963)
2029	29,376	0	546,483	60,000	575,859	550,000	(25,859)
2030	29,376	1,482	559,691	60,000	590,549	550,000	(40,549)
2031	29,376	3,456	571,536	60,000	604,368	550,000	(54,368)
2032	29,376	5,472	583,632	60,000	618,479	550,000	(68,479)
2033	29,376	7,530	595,983	60,000	632,889	550,000	(82,889)
2034	29,376	9,633	608,596	60,000	647,604	550,000	(97,604)
2035	29,376	11,779	621,475	60,000	662,631	550,000	(112,631)
2036	29,376	13,232	630,192	60,000	672,800	550,000	(122,800)
2037	29,376	14,705	639,031	60,000	683,112	550,000	(133,112)
2042	29,376	19,893	670,159	60,000	719,428	550,000	(169,428)

(1) Operating storage is based on current operating levels of 2 feet of water in both tanks.
(2) Equalizing storage is calculated as shown in Table 3-1. Peak hour demands are shown in Table 2-11. Total source assumes source pumps are on for 24 hours a day at the maximum production rate, see the Source Capacity section above.
(3) Standby storage is calculated as shown in Table 3-1. The number of ERU's are shown in Table 2-11 and the ERU_{MDD} value is 450 gpd/ERU as developed in Chapter 2. The number of days selected to meet the standard of reliability is 1 as recommended by the Water System Design Manual.
(4) Fire suppression storage is 1,000 gpm x 60 minutes.
(5) Total required storage is equal to the total of operating, equalizing, and the greater of standby or fire flow storage. This assumes standby and fire flow storage are nested as allowed by the local fire authority. This total required storage must be above 20 psi.
(6) The existing effective storage volume available in Reservoirs 1 and 2, as described above, is based on the elevation of the highest customer's water meter (~310 feet).
(7) Storage surplus/(deficit) is the difference between the existing effective storage and the total required storage.

Distribution System

Figure 3-2 shows a schematic map of the water distribution system. The City currently tracks pipe installation and replacement through as-built drawings. As-built drawings are maintained in a file at the Public Works Department. The overall water system map is updated through WSP Updates. Minor repairs and modifications by City staff are documented through notes and revisions to existing maps. The overall distribution map generally shows the location of piping and valves with regard to right of way and other general features. As-built drawings are typically referenced when investigating problems or making improvements to the system.

Table 3-7 contains an inventory of distribution pipe. Approximately 70% of the distribution system is asbestos cement (AC) pipe. The life expectancy of AC pipe is significantly reduced in areas with hydric soils and/or where groundwater is present within the pipe zone for extended periods. Typically, the coarse subsurface material in Tenino is well drained and past inspection of the AC pipe during service installations has indicated little evidence of AC pipe deterioration. The condition of AC distribution materials must be carefully examined and documented during any future repairs or new service installations. There is no need for system wide AC pipe replacement at this time. However, the City will begin to look at ways to implement systematic replacement of a majority of the AC distribution materials over the long term.

TABLE 3-9

Distribution System Characteristics

	Pipe Material (feet)				
Pipe Size	**PVC and HDPE**	**Asbestos Cement**	**Ductile / Cast Iron**	**Galvanized Iron**	**Total**
14-inch	-	-	280	-	280
12-inch	-	-	1,964	-	1,964
10-Inch	-	-	-	-	-
8-inch	7,856	20,775	774	-	29,405
6-inch	6,259	24,550	4,239	-	35,048
4-inch	274	12,204	114	-	12,592
< 4-inch	3,201	123	70	3,580	6,974
Total	17,590	57,652	7,441	3,580	86,263

Leak detection was performed on the entire distribution system in 2004, which is discussed in more detail in Chapter 4. Leak detection identified some specific leaks but did not indicate system leakage of distribution system piping.

The City no longer uses small diameter cast iron pipe and the amount of small diameter cast iron pipe in the system is not significant. However, the small diameter cast iron pipe is typically subject to scale, corrosion, and leakage. Because of these factors, the City will systematically replace cast and galvanized pipe over the next six to ten years.

Hydraulic Analysis

Water systems are required to complete a hydraulic analysis to evaluate existing system performance, identify deficiencies, aid in identifying needed system improvements, and document any special operational needs. WAC 246-290-230 requires that the minimum size for transmission or distribution mains is six inches unless smaller mains can be justified by a hydraulic analysis (systems designed to provide fireflow shall have a minimum distribution main size of six inches).

Sizing mains using a hydraulic analysis must, at a minimum, consider the two demand scenarios specified in WAC 246-290-230 (i.e. PHD, MDD + Fire Flow). DOH also recommends that the design of distribution mains not exceed a maximum velocity of eight feet per second under PHD conditions. Maximum velocities of greater than eight feet per second may occur under fire flow conditions, for short sections of mains, or for piping within pump and valve station facilities.

Hydraulic Model

The model used for hydraulic analysis is KYPipe 2022. Pipes and nodes were imported from the City's water system base map. Elevations for nodes were obtained using Google Earth data and static pressures were reviewed to verify elevations. System demands presented in Chapter 2 are distributed evenly throughout the system nodes. As built drawings were reviewed and used to add segments of waterline that were constructed after the City's water system base map was developed.

DOH indicates that the model should be calibrated such that the system pressures predicted for certain conditions are in general agreement with field measurements. Table 6-1 of the DOH WSDM presents general criteria for calibrating a hydraulic network model. The general calibration criteria established by Walski et al. for long range planning is to predict the hydraulic grade line to within 5 to 10 feet (2.2 to 4.3 psi) at model calibration points during peak demands such as fireflows. Hydrant flow tests were conducted in February of 2022 to calibrate the model. Results of the model calibration are presented in Table 3-8. The water levels within Reservoirs 1 and 2 and the production flow rate of Wells 1 and 3 were recorded at the time of hydrant flow tests. The water level elevations within Reservoirs 1 and 2 were approximately elevation 484 feet, Well 1 was producing 270 gpm, and Well 3 was off at the time of the hydrant flow tests.

Model calibration was performed by setting the boundary conditions (reservoir levels and well production rates) and applying system demand. Model output for static pressures was generated by running the model at a steady state scenario. Model output for residual pressures was generated at each hydrant test location by placing an added demand equal to the measured hydrant flow rate at points (nodes) in the model equivalent to the locations of the tested hydrants.

System pressures and flow within the pipes are dependent on the friction loss characteristics within pipes, fittings, and valves. These friction losses are modeled using Hazen-Williams Coefficients applied to lengths of pipe. Hazen-Williams Coefficients are adjusted through the calibration process until the hydraulic model best estimates field measured values. For the City of Tenino water system, Hazen-Williams Coefficients were adjusted by pipe material and calibration results yielded coefficients between 110 and 140. These friction factors are typical values for most pipe materials and are generally conservative. The friction factors for the pipe also compensate for system losses through valves and pipe fittings.

The model output was produced for both static pressures and residual pressures. Comparing field measured static pressures with hydraulically modeled static pressures indicates the overall accuracy of the model node elevations and reservoir elevations under normal demand conditions. As shown in Table 3-8, the simulated model pressures were within 4.3 psi of the measured field pressures, which indicates a reasonable match between modeled and measured conditions.

Comparing field measured residual pressures (under a fireflow demand) with hydraulically modeled residual pressures aids in determining whether the model piping is connected correctly, and appropriate friction factors have been used. As shown in Table 3-8, the field measured versus hydraulically modeled difference in static and residual pressure (pressure drop) were within 3.2

psi. Hydrant flow tests were selected to provide adequate coverage over the water system and to maximize the friction losses across the system by placing the test locations as far from Reservoirs 1 and 2 as possible. This method of testing provides a high level of accuracy in the hydraulic model. For the purpose of comprehensive planning, the City's hydraulic water model is considered well calibrated.

TABLE 3-10

Hydraulic Model Calibration

Hydrant Location	Flow (gpm)	Field Test Pressures (psi)			Modeled Pressures (psi)			Difference (psi)	
		Static	Residual	Drop	Static	Residual	Drop	Static	Drop
5th Ave & Wichman St	1,100	90.0	88.0	2.0	87.8	83	4.8	2.2	-2.8
Garfield St & Ragless St	1,126	90.0	75.0	15.0	90.6	77.3	13.3	-0.6	1.7
Tenino Middle School	1,126	90.0	72.0	18.0	88.5	73.7	14.8	1.5	3.2
9th Ave & Houston St	1,186	95.0	70.0	25.0	97.4	73.2	24.2	-2.4	0.8
Park Ave & Frost St	1,061	80.0	72.0	8.0	76.7	69.5	7.2	3.3	0.8
4404 WA-507	836	80.0	65.0	15.0	77.3	62.5	14.8	2.7	0.2
Tenino Ag Park	1,007	80.0	40.0	40.0	84.6	47.8	36.8	-4.6	3.2

PHD Model Results:

The model is run under peak hour demands to ensure that the PHD can be provided at the minimum required pressure of 30 psi for design conditions and at least 20 psi for current operating conditions in all parts of the system. During PHD scenarios, all wells are off (i.e. steady state) and the reservoirs are depleted of operational and equalizing storage to simulate the worst case. The reservoir elevations are set at 480 feet (13 feet in the reservoir, 4 feet below the overflow elevation) for the 20-year scenario. The 20-year PHD developed in Chapter 2 is applied to the entire system. The model results indicate that the system can easily meet the 30 psi design criteria for current and future demand scenarios. The minimum system pressure for the 20-year PHD scenario is 65-psi. The maximum pipe velocity for the 20-year PHD scenario is 6.0 feet per second. The 20-year PHD model results are included in Appendix E.

MDD + Fire Flow Model Results:

The model is run under maximum day demands to ensure the required fireflow can be provided such that a residual "design" pressure of 20 psi is maintained throughout the distribution system. For "operating" conditions, 20 psi must be maintained at the operating hydrant and at least positive pressure must be maintained throughout the system (WAC 246-290-420(3)). For the MDD plus fire flow analysis, all wells are off and the reservoirs are depleted of operational, equalizing, and fire suppression storage. The reservoir elevations are set at 478-feet (11 feet in reservoir, 6 feet below the overflow elevation) for the 20-year scenario. The 20-year MDD developed in Chapter 2 is applied to the entire system. The model indicates that the existing system is capable of meeting minimum fire flow goals under design conditions in all areas of the distribution system. Under the design conditions fire flow available throughout the system ranges from approximately

1,000 gpm to 4,000 gpm; however, pipe velocity may be a more limiting factor under actual operation for the higher modeled design flows. The hydrants controlling the fire flow performance are located at the far east and west ends of the system. The 20-year MDD plus fireflow model results are included in Appendix E.

RELIABILITY

The water system is very reliable based on the presence of redundant wells, treatment, multiple storage tanks and standby power that is available to operate Well No. 3.

OVERALL CAPACITY

DOH requires that water systems provide an analysis of the system to determine overall physical service capacity in terms of ERUs. Table 3-9 presents the capacities of the water system components based on WSDM formulas and guidance.

TABLE 3-11

Current Water System Capacity Limits

System Component	Current System Capacity (ERUs)	Existing Demand (ERUs)	Available Surplus (ERUs)	Projected Year of Deficiency
Source	2,240	1,093	1,147	- (1)
Instantaneous Water Rights	2,240	1,093	1,147	- (1)
Annual Water Rights	1,236	1,093	143	2036
Storage	1,157	1,093	64	2027

1. No deficiency projected in the 20-year planning period.

The limiting system component is currently storage capacity (specifically standby storage) because of DOH's revised storage capacity calculations. The next most limiting system component is the City's existing annual water rights. The current 1,236 ERU capacity is adequate to meet demand projections through 2036 without WUE.

SUMMARY OF SYSTEM DEFICIENCIES AND RECOMMENDATIONS

The following section provides a summary of the system deficiencies from the analysis provided above and recommended improvements or courses of action. Priorities for implementation, project descriptions and planning level cost estimates are discussed in the Capital Improvement Program in Chapter 8 and the Financial Program in Chapter 9.

Source Capacity Summary and Recommendations

There are no current or projected deficiencies associated with source capacity.

Water Rights Summary and Recommendations

Water rights is a significant concern because Ecology is not processing applications for new water rights within the upper Chehalis basin. Therefore, the most feasible alternatives to address the projected water rights deficiency are WUE, acquisition of existing water rights, or purchase of wholesale water from another entity. The primary WUE program to address water right issues, as further discussed in Chapter 4, is the reduction of ADD. Because of existing efficiency in DSL programs and the relatively low ADD per customer, WUE program implementation may be difficult

to achieve and the progress towards the WUE goal should be reviewed in the next Water System Plan. Due to the significant amount of time it takes to process existing water rights sales or change applications, the City is recommended to begin pursuing additional water right acquisition. As shown in Table 3-5, the City is projected to have a 20-year annual water right deficiency of 18.6 acre-feet per year.

Another option would be to purchase wholesale water from another entity such as Loma Vista (Thurston County Public Utilities District). The Loma Vista system is approximately 1.3 miles south of Tenino. Purchase of wholesale water from Loma Vista would require the construction of an intertie.

Water Quality and Treatment Summary and Recommendations

There are no deficiencies associated with water quality or treatment. Chapter 6 discusses treatment projects which would improve the maintenance of treatment equipment and provide additional operational flexibility.

Storage Capacity Summary and Recommendations

As discussed in the Storage Capacity Analysis section above, additional standby storage is projected to be deficient in the year 2027 with a 10-year deficiency of 68,479 gallons and a 20-year deficiency of 169,428 gallons. Additional storage capacity on the order of 200,000 gallons is recommended which will conservatively provide for adequate 20-year demand projections.

Distribution System Summary and Recommendations

There are no projected deficiencies associated with the existing distribution system. The City intends to systematically replace older, small diameter, cast iron, galvanized iron, or asbestos cement piping which will maintain a distribution system leakage under 10 percent.



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City of Tenino
Figure 3-2
Water Distribution Map

Chapter 4

WATER USE EFFICIENCY PROGRAM

CHAPTER 4

WATER USE EFFICIENCY PROGRAM

INTRODUCTION

The objective of the Water Use Efficiency (WUE) program is to promote maximum efficiency in utilization of water resources. The WUE regulatory provisions were incorporated into Chapter 246-290 of the Washington Administrative Code (WAC), effective January 22, 2007. The WUE program elements are similar to the conservation program that has been implemented by Washington State Department of Health (DOH) since the early 1990's.

The general requirements of a WUE program are data collection, demand forecasting, leakage evaluation, rate structure evaluation, and implementation of WUE measures. All municipal water systems must meet a statewide distribution system leakage (DSL) standard. Water systems with 1,000 or more connections must also evaluate water reclamation opportunities. WUE program goals must be set through a public process (re-established every 6 years) and performance must be reported annually to customers. At present, the Tenino water system has less than 1,000 connections.

DATA COLLECTION AND ANALYSIS

Water systems are required to collect specific types of water use data in order to evaluate the water usage and the effectiveness of the WUE program. The minimum level of data collection for water systems with less than 1,000 connections based on DOH planning requirements (WAC 246-246-100(4)) is monthly and annual production totals from each source and annual totals for each customer class.

The City currently exceeds the minimum data collection requirements by metering daily water production and monthly water use. In addition to these data collection requirements for planning, WAC 246-290-820 identifies how water systems must quantify Authorized Consumption (AC) and DSL. The definition of AC is *the volume of metered and un-metered water used for municipal water supply purposes by consumers, the purveyor, and others authorized to do so by the purveyor, including, but not limited to, firefighting and training, flushing of mains and sewers, street cleaning, and watering of parks and landscapes. These volumes may be billed or unbilled.* The percentage and volume of DSL must be reported on an annual basis. The percentage of DSL must be calculated using the following equation:

Equation 4-1 Percent Distribution System Leakage

$$DSL = [(TP - AC)/TP] \times 100$$

Where:

DSL = Percent of Distribution System Leakage (%)
TP = Total Water Produced and Purchased
AC = Authorized Consumption

Per WAC 146-290-496, total water produced and purchased must be measured using source and supply meters. Elements of authorized consumption that cannot be metered must be estimated. A system is in compliance if DSL is less than or equal to 10 percent for the previous three-year DSL average. Systems with greater than 10% DSL must develop and implement a Water Loss Control Action Plan (WLCAP).

Demand projections in Chapter 2 identify a DSL of 6.9% for the past three years. A full leak detection survey was conducted in 2004, which confirmed that leaks are primarily associated with connections to corporation stops on older service line connections. It is likely that DSL is also related to older residential service meters and small diameter galvanized steel distribution and service piping.

The City will continue to implement programs to reduce or maintain DSL such as replacing older meter connections and galvanized pipe. The City will also work to reduce the amount of AC by replacing additional non-functioning meters each year and metering all park irrigation where practical. It is expected that these programs will maintain DSL at below 10 percent.

The City's goal is to maintain DSL below 8.5%. This is below the maximum allowed DSL of 10%. The 10% DSL level can be difficult to meet for older and smaller water systems and the City has done an outstanding job at keeping DSL below the standard for the last several years.

Demand Forecasting

Demand forecasting requires an evaluation of the current water use with projections for future water use over the next 10-year and 20-year planning periods. The required demand forecasting has been completed in Chapter 2 of this Water System Plan.

Previous WUE Goal

The previous Water System Plan dated February 2010 identified a 6-year goal of reducing Average Day Demand (ADD) by 10% by providing an economic incentive to reduce peak summer use. This 6-year goal projected a reduction in ADD from 235,886 gpd to 212,297 gpd in the 6-year planning period (2016). The measured ADD in 2016 was 198,203 gpm; therefore, this previous 6-year goal was achieved.

Another goal identified by the 2010 Water System Plan was to maintain DSL at about 8.5%. As shown in Table 2-8, this goal has also been achieved.

Current WUE Goals

Water systems are required to set WUE goals in a public forum that provides the opportunity for consumers and the public to participate in and comment on WUE goals. A public forum should be held and the WUE goal re-established every 6 years. WUE goals should be recorded in planning documents and performance reports. When setting WUE goals, the water system must:

- Include a measurable outcome in terms of water production or consumption.
- Address water supply and forecasted demand characteristics.
- Include an implementation schedule for meeting the goals.

The most recent WUE goal was set in a public forum in 2009 and the goal has not been changed since then. A public forum should be held to re-establish the WUE goal. DOH has published a

guidance document to aid in setting WUE goals through public forums titled *Setting Goals to Use Water Efficiently* (DOH 331-402) included in Appendix C.

The projected water demands with WUE in Chapter 2, Table 2-12 have been developed with a goal of reducing ADD by 10%. This goal can be reasonably achieved with continued WUE measures based on the most recent demand data. The majority of the savings will be met through consumer education, leak detection, and using reclaimed water for irrigation in the City Park. The City also plans to form a new utility committee to establish new goals.

WUE Measures

Municipal water suppliers need to evaluate or implement a specified number of WUE measures based on water system size (WAC 246-290-810). Currently, the water system is in the "500 to 999 service connections" range. In this case, at least four WUE measures must be evaluated or implemented. As shown in Table 2-11, the water system is projected to be within the "1,000 to 2,499 service connections" range by the year 2027. If the system exceeds 1,000 connections, at least five WUE measures must be evaluated or implemented. A detailed evaluation is not required for any measure the water system will implement. DOH guidance material identifies three categories of WUE measures:

- **Internal (supply side) –** Internal efficiency measures are activities undertaken by a water system, such as source metering, customer meter installation, meter calibration, distribution system leak detection and repair, implementation of rate structures that encourage the efficient use of water by the customer, and bills showing consumption history.
- **External (demand side) –** External measures are developed by the water system to motivate customers to reduce water use. Such measures include distribution and installation of water-saving devices and fixtures, residential and commercial water audits, and reuse of reclaimed water.
- **Customer information –** WUE program promotion and customer education with pertinent and timely information delivery is an essential component of internal and external efforts and can in itself lead to customer water use reductions.

The DOH guidelines indicate that metering is the most important part of a WUE program. Source and service meters provide the data necessary for water demand management and planning. A successful and measurable WUE program is not as effective without service meters. Service metering, when combined with a consumption-oriented rate structure and, if possible, a bill that shows current and previous year consumption information, is the most effective way to change customers' water use patterns. Generally, customers are more likely to modify water use behaviors if they know they will pay more for greater consumption.

In addition to source meter and service meter implementation, which are considered to be supply side WUE measures, the following external demand side WUE measures will continue to be implemented by the water system over the next 10-year planning period:

1. WUE oriented rate structure for single-family residential customers.
2. WUE oriented rate structure for outside residential customers.
3. WUE oriented rate structure for commercial customers.
4. WUE oriented rate structure for outside commercial customers.
5. Automated meter reading with system to alert customers about demand side losses such as leaky toilets**.**

As the system grows and there are more resources available, the city will attach consumption history to billings and provide WUE promotional materials to educate customers about WUE on a regular basis. The basic public education program is most often accomplished by distribution of DOH/DOE WUE guidelines. Pamphlets and other WUE educational materials are available online at:

https://www.doh.wa.gov/communityandenvironment/drinkingwater/watersystemdesignandplanning/wateruseefficiency/wuepublicationsandresources

WUE Based Rate Structures

DOH strongly advocates consideration of WUE oriented rate structures. The general premise of a WUE oriented rate structure is that the customer should be conscious of a financial incentive to use less water. In the mid 1990's, DOH's conservation guidance documents indicated that constant block (uniform) rate structures encourage WUE. In recent years, DOH advocates inverted (or increasing) block rates. Inverted block rates have at least two rate tiers, are generally effective, and have been more difficult to implement for small systems that do not have sophisticated billing software or processes. Billing software technology has become available which has made it easier for small systems to implement inverted block rate structures. Inverted block rates can be difficult for customers to understand.

In general, consumers should understand that the use of more water results in a higher water bill. For example, if a customer knows that each additional 100 cubic feet of water will cost more, WUE will occur at the same relative level if the similar commodity charges are presented in one single tier or in the second tier of an inverted rate structure. In summary, communication of WUE based pricing can be very effective with constant block rate structures that are implemented with a WUE based commodity (overage) charge.

The City will continue to implement a constant block rate structure with an overage rate that encourages WUE. This rate structure has proven to be effective at encouraging WUE for the City of Tenino as evident in the decreasing value of one Equivalent Residential Unit (ERU), see Chapter 2. Inverted block rates may be implemented in the future if practical. Inverted block rates would likely have to be implemented along with more education in the form of either expanded billing sheets, additional rate information or online access to usage information. Specific information regarding water rate development and implementation is provided in the financial discussion in Chapter 9.

Bills Reflecting Consumption History

Bills showing consumption history provide information to the customer and to the purveyor regarding water use trends. The customer can observe the difference in water consumption during the same period for both the current and previous year.

Level of Implementation

The City will consider purchasing water billing software that shows customer water use history when the City next upgrades their water billing software. Considerations should include the rapidly changing costs of software, including the cost of paper and printing, the revenue generated by actual water use, and the current progress towards the WUE goal. If ADD trends towards projected ADD with the WUE goal as shown in Table 2-12, purchasing new water billing software is not recommended. If ADD trends towards projected ADD without WUE, new water billing software is recommended to be considered.

Service Meters

All water conservation programs shall consider the benefits and cost of installing individual service meters. The metering program shall include periodic tests and repairs.

Level of Implementation
The City is fully metered and charges customers based on metered water usage. The City has pursued a water meter testing and replacement program and will continue this program to assure meter accuracy. The City is also pursuing an automatic read metering system. Beginning in 2020, the City began replacing all existing water meters with radio read meters beginning with difficult to read services and installing radio read meters for new services. The long-term goal is to have the entire water system on automated meter reading. This replacement program is currently pending completion.

Water Conservation Kits

Water conservation kits containing easily installed water-saving devices can be distributed to customers. These kits can include such items as shower flow restrictors, toilet-tank-water displacement devices, leak detection tablets, informational brochures, and other materials.

Level of Implementation
The City will consider obtaining and distributing water conservation kits in the future in consideration of the status of actual water use compared to WUE goals.

Landscape Management

Water use management of large irrigation operations for agriculture, nurseries, and landscaping can increase the irrigation efficiency of these operations. Moisture sensors, flow timers, low volume sprinklers, drip irrigation, weather monitoring, low water demand landscaping, and other practices can be encouraged by the water utility.

Level of Implementation
The City will promote the use of water efficient irrigation systems by large irrigators by distributing Water Conservation Guideline 7: Irrigation and Landscaping (DOH Pub. #331-120-7). A copy of Guideline 7 is included in Appendix C.

WUE Reporting and Evaluation

The effectiveness of the WUE program will be evaluated each year by comparing the current year ADD to the demand projections in Tables 2-11 and 2-12 in Chapter 2. Table 2-11 presents demand projections without WUE and Table 2-12 presents demand projections with WUE. These projections can be used to measure if the WUE program is effective. Water systems must report annually (by July 1) on their WUE performance to customers and DOH and make this information available to the public in accordance with WAC 246-290-840. DOH indicates that water systems may fulfill this requirement by including performance information in their Consumer Confidence Report (CCR). The annual report must include the following information:

- Total annual production
- DSL totals in percent and annual volume
- WUE goals
- Implementation schedule for WUE measures
- Description of progress on WUE goals
- Status of DSL reduction programs (if applicable)

The City reports on annual WUE to DOH by submitting Annual Performance Reports. A copy of the most recent Annual Performance Reports is included in Appendix C.

WUE Program Implementation and Cost

The WUE program will be implemented through the operation program identified in Chapter 6 and the Capital Improvement and Financial Programs in Chapters 8 and 9.

- Source metering costs will be included in proposed well implementation projects.
- Service meter installation will be required for all new services and costs will be paid for by new customers.
- Service connection repairs, service meter replacement and data collection will be addressed through the operations budget.
- Galvanized pipe replacement will be implemented through Capital Improvement budgets.
- Programs such as providing consumption history and additional public education on billing cards will be implemented through the operations budget.

The goal of reducing the ADD by 10% should be attainable based on an understanding of typical demands for residential customers in small western Washington communities. If the ADD goal is not met at the end of the 10-year period, the City will evaluate the use of other programs such as additional consumption history and/or rate information on billings and additional WUE pricing incentives. The galvanized pipe replacements may also be implemented earlier if resources allow or if results from the initial projects are not successful in maintaining the identified DSL goal.

Reclaimed Water

The wastewater treatment plant built in 2009 produces Class A reclaimed water that is available for sale and use. The plant uses groundwater recharge as the primary effluent disposal method. Approximately 90,000 gpd of Class A reclaimed water is available and until recently, there have been no customers because the plant is ½ mile from town where the bulk of the demand would be. Based on review of the planning data, it is unlikely that City-wide reuse would be a cost-effective option to off-set existing water demands at this time due to the high cost of the conveyance systems to existing areas. A recent development near the wastewater treatment plant titled Tenino Agriculture Park was constructed with reclaimed water conveyance piping which plans to use reclaimed water for landscape irrigation.

SOURCE OF SUPPLY ANALYSIS

The purpose of this section is to summarize efforts being undertaken to ensure an adequate quantity of water can be provided at all times. When water shortages or interruptions in service occur, public health can be threatened because system pressure may be reduced such that basic public health needs are not met or other backflow related problems occur. In addition, the City is required to prepare an emergency response plan and water shortage response plan to address contingencies for water system component failures. Emergency response and water shortage response planning is presented in Chapter 6.

Source Reliability

The water system has two wells and standby power for Well No. 3. Demands can be met from gravity standby storage. The reliability of the source of supply is above average. However, both wells are located at the same site and can both be affected by a single contamination event.

Overall reliability could be greatly enhanced by implementing an additional well or wells in a location that is independent of the current well site. To address this concern, an additional well site is recommended to be considered in conjunction with potential projects to address water rights deficiencies identified in Chapter 3 of this Water System Plan.

Chapter 5

WELLHEAD PROTECTION PROGRAM

CHAPTER 5

WELLHEAD PROTECTION PROGRAM

Source water protection for groundwater-based systems is provided through a Wellhead Protection Program (WHPP) in accordance with WAC 246-290-135. A WHPP is vital for meeting the overall goal to provide safe and reliable drinking water. The WHPP provides awareness of the conditions and activities that may affect source water quality. The following program has been developed in accordance with Washington State Department of Health (DOH) planning and wellhead protection guidance.

AQUIFER DESCRIPTION AND CHARACTERISTICS

The aquifer in the City of Tenino area is generally unconfined. The ground water is recharged by precipitation and surface waters through infiltration and percolation. Most of the land area in Tenino and some of the land area in the City's Urban Growth Area (UGA) is classified by Thurston County as extremely critical aquifer recharge areas (444 acres in the City limits, and 51 acres in the UGA). These are areas "which provide very rapid recharge with little protection, contain coarse soil textures and soil materials, and are derived from glacial outwash materials (Thurston County Critical Areas Ordinance, February 1994)." Water from rain and other sources move very rapidly into the water bearing soil layers which are as shallow as 3 feet and as deep as 83 feet below ground surface.

The number of contaminated wells in the south Thurston County region has risen rapidly during the last few years, likely due to increasing urbanization, agricultural use, and failing septic systems. The Critical Aquifer Recharge Area (CARA) of greatest concern to Tenino is in the southwest portion of the City. The City has passed a Critical Areas protection ordinance which includes CARAs to limit the intensity and type of use on this land. The ordinance is included in Appendix B.

Data provided by well logs and geologic maps of the area show that Rock Prairie and the upper Scatter Creek valley are predominately covered by glacial outwash sediments. Well log data suggests the thickness of the glacial outwash is generally 15 to 30 feet. Water levels in the area are typically five feet below ground surface in the winter months and 20 to 50 feet below ground surface during the summer months (depending on location and the effects of seasonal changes in recharge).

Direct measurements of aquifer characteristics are relatively limited through this area, but the available data is sufficient to identify reasonable ranges of water volumes and velocities. Based on the published data and information from Robinson & Noble, the amounts of water moving through the shallow aquifer system were calculated between 62,500 gallons per day per square foot of aquifer (gpd/ft^2) in the upper reaches of the Scatter Creek east of Tenino and over 2 million gpd/ft^2 in Rock Prairie. Based on this information, the average flow velocity of water within the aquifer may be in the range of 10 to 100 feet per day.

Scatter Creek flows east to west along the northern and western borders of Tenino, limiting development along its banks due to fish habitat and other species of concern that have been identified in the area. A wetland buffer of 200 feet and a high ground water table requiring a 300-foot buffer are common for properties along the Creek. According to Thurston Regional

Planning Council (TRPC), there are approximately 9.0 acres of wetlands within the City limits and another 35.2 acres within the UGA.

TIME OF TRAVEL ZONES

The wellhead protection area is made up of five zones based upon the time of travel of a contaminant reaching the well. The zones are:

1) The Sanitary Control Area (SCA)
2) 6-Month Time of Travel (TOT) Zone
3) 1-Year TOT Zone
4) 5-Year TOT Zone
5) 10-Year TOT Zone.

The Calculated Fixed Radius (CFR) method is the least complex method to determine the TOT zones for small water systems and relatively undefined areas. The CFR method is conservative in most cases and is recommended for use by DOH for small water systems with low to moderately susceptible sources of supply. Table 5-1 presents the TOT for Well No. 1 and Well No. 3 site as determined by using the CFR method. The calculation is based on a combined pumping rate of 700 gpm and a screen length of 35'. Assumed aquifer porosity is 0.22.

TABLE 5-1

Wellhead Protection Areas by Calculated Fixed Radius (CFR)

Time of Travel	Radius of Contribution (feet)
6-month	1,009
1-year	1,426
5-year	3,189
10-year	4,510

Contaminants within the TOT zones can conceivably reach the well within the time specified based upon the assumed groundwater hydrology. The City will utilize the CFR method for determining TOT boundaries. Groundwater modeling can also be conducted to better refine TOT boundaries. There is no specific need to model the aquifer at this time since sanitary sewers have been implemented. Figure 5-1 shows the TOT boundaries based on the CFR method.

The following is a brief description of the conditions in the protection zones:

Sanitary Control Area

The SCA should be 100 feet for wells per WAC 240-290-135 unless engineering justification allows for mitigation of the SCA based on hydrogeologic factors. The City owns the 100-foot SCA for each well. There are no potential contamination sources with the current SCAs.

TOT Land Use

The current land uses within TOT zones are predominantly low and medium density residential. Other current uses include light commercial and schools. The likelihood of additional development or higher development density is minimal due to zoning and the majority of the nearby properties

have been platted in a way that would preclude higher densities without substantial re-development.

INVENTORY OF POTENTIAL CONTAMINANT SOURCES

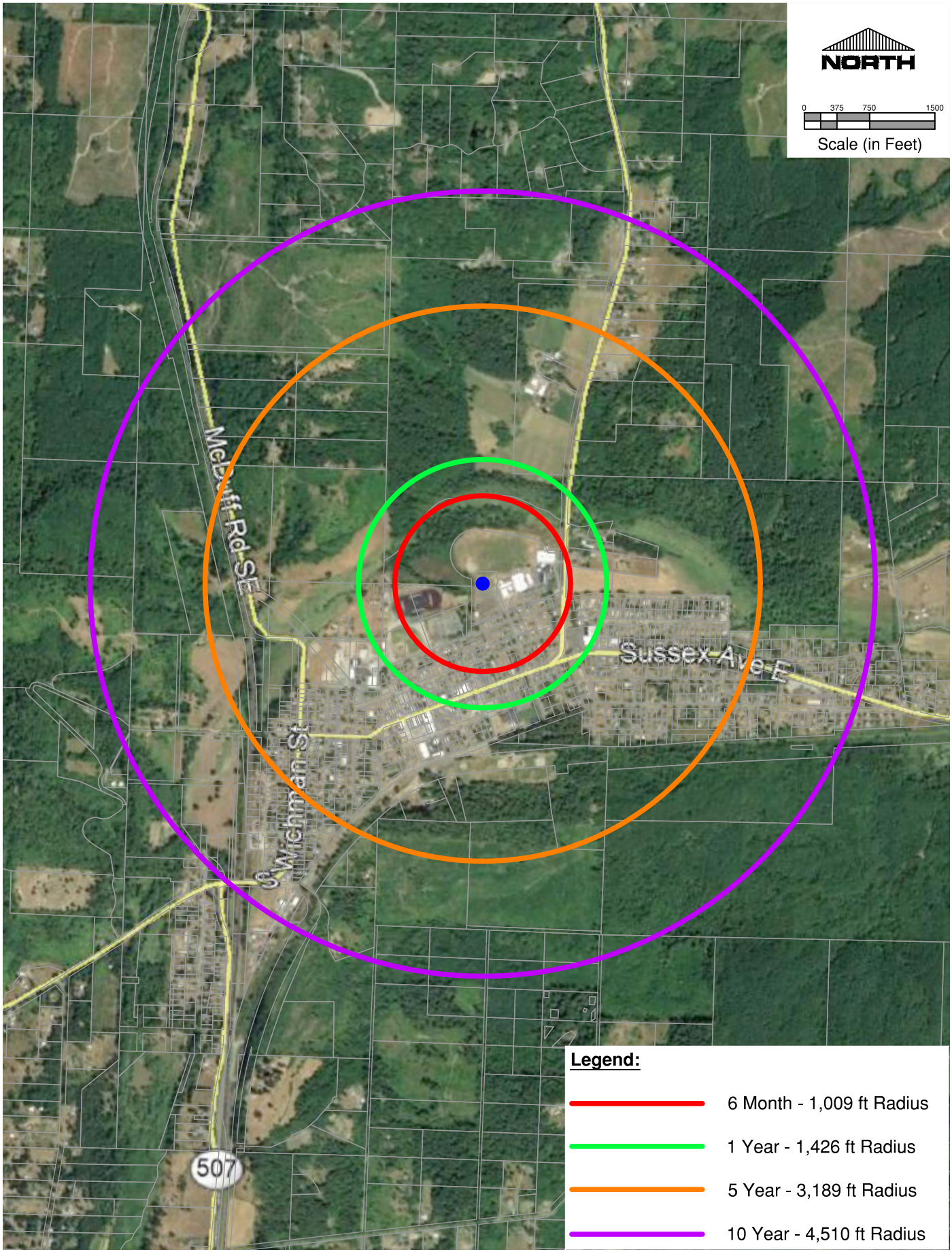
During the development of this Water System Plan, an inventory of potential contaminant sources was developed using Washington State Department of Ecology's (DOE's) Facility/Site Identification Database and Thurston County Online Maps. These databases list any operation that is a potential or active source of pollution. This includes gas stations, automotive stores, dry cleaners, gravel pits, waste management sites, and industrial facilities. Table 5-2 summarizes the review of the database and identifies all sites that are located within the 10-year TOT zone. Sites that have a listed end date, indicating that the potential contaminant source has been removed, are excluded. Figure 5-2 is printed from DOE's Facility/Site Identification Map and Figure 5-3 is printed from Thurston County Online Maps.

TABLE 5-2

Inventory of Potential Contaminant Sources

DOE Facility ID	Facility Name	Interaction (Contaminant Type)	Address (Tenino, WA)
87263176	Tenino Grader Storage Area	UST	McClellan St S & Hwy 507
74873833	Tenino Corner Grocery	UST / LUST / State Cleanup Site	319 Wichman St S
70971197	Tenino Service Center	UST / LUST	Garfield Ave E & Hodgden St N
70416466	Lycan Fuel Service	UST	Sussex Ave E & Ragless St N
55924127	Jackpot Food Mart 375	UST	397 Sussex Ave W
45564645	Laidlaw Transit Tenino	Industrial SW GP / Emergency Hazardous Chemical Report, Tier 2	500 W 2nd St
25436916	Tenino Telephone Company Inc	Emergency Hazardous Chemical Report, Tier 2	225 Central Ave W
16999364	American Tower Tenino	Emergency Hazardous Chemical Report, Tier 2	2 Mi SE
6413759	PSE Blumaer Substation	State Cleanup Site / Emergency Hazardous Chemical Report, Tier 2	Hodgden St N & Garfield Ave E
79806	Tenino City	Underground Injection Control	N Custer St
50269	Tenino Market Fresh	UST	500 Sussex Ave E
14941	Bakers Towing	Revisited Site Visit Program	508 Wichman St S

(1) UST = Underground Storage Tank
(2) LUST = Leaking Underground Storage Tank
(3) SW GP = Stormwater General Permit
(4) State cleanup sites are sites that are being cleaned up under state regulations which include Model Toxics Control Act or its predecessors.
(5) Emergency Hazardous Chemical Report Tier 2 refers to businesses that store 10,000 lbs or more of a hazardous chemical or 500 lbs or less, depending on the chemical, of an extremely hazardous chemical on site at any one time and must report annually.
(6) Underground Injection Control is a well or structure used to put fluids into the ground. The structure's depth is greater than the largest land surface dimension or it contains perforated pipe, i.e. drywell or infiltration trench with perforated pipe.
(7) Revisited Site Visit Program refers to engagement from Hazardous Waste and Toxics Reduction Program such as field work, site visits, or other contact with the site.



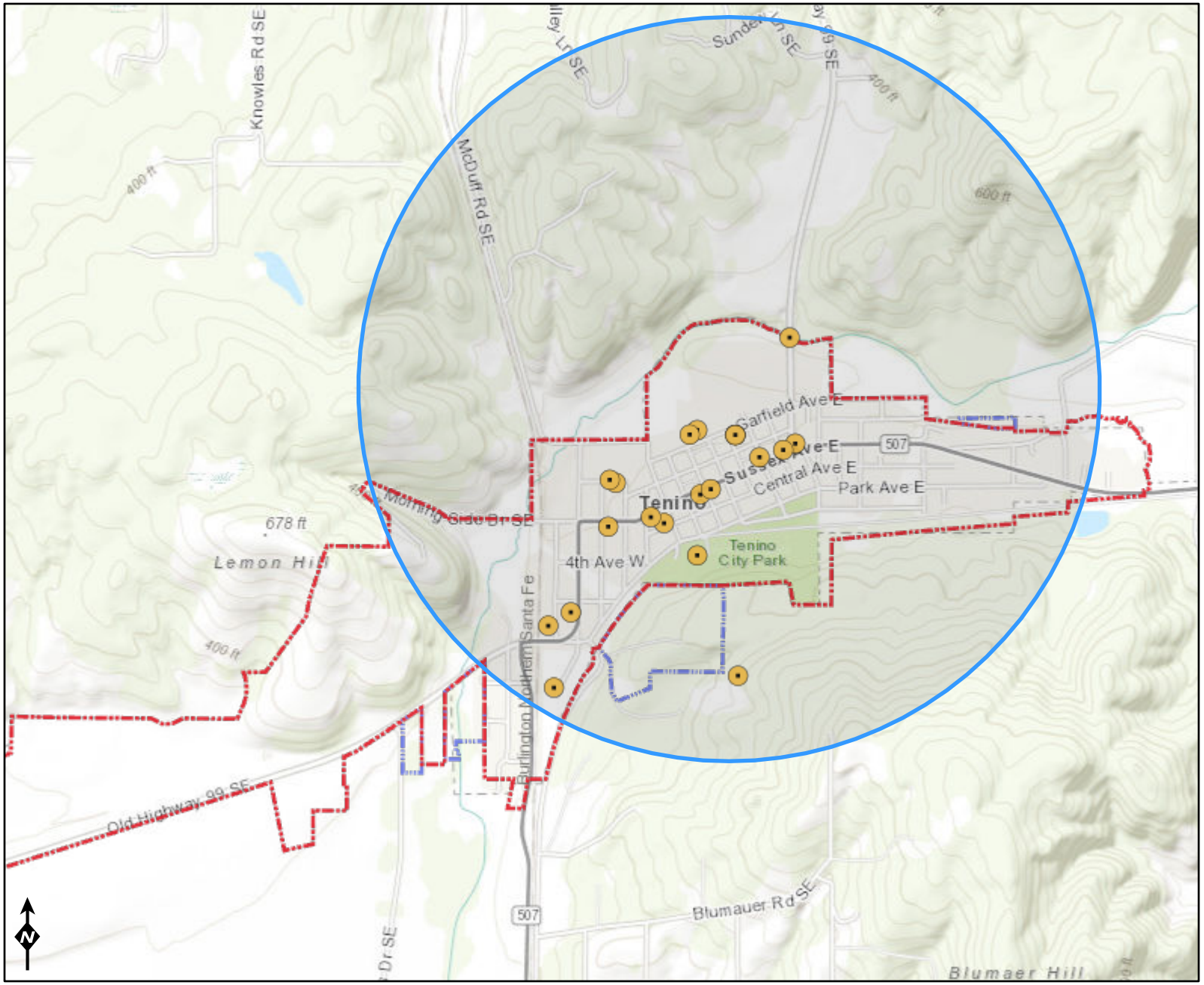
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City of Tenino
Water System Plan
Time Of Travel
Figure 5-1

DRAWING: T:\PROJECTS\0751 TENINO\5021 WATER SYSTEM UPDATE\FIGURES AND EXHIBITS\TIME OF TRAVEL FIGURE.DWG, LAYOUT TAB: FIGURE 5-1, PLOT DATE: 4/20/2023 12:49:01 PM, DRAWING SAVE DATE: 10/3/2019 9:52:48 AM, PLOTTED BY: GMICKELSEN
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6.

Figure 5-2 Potential Contaminant Sources Map



Selected facility/site locations
Selected facility/site

Cities
City limits

Urban growth areas
UGA boundary

Esri, NASA, NGA, USGS, FEMA
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Miles
0 0.23 0.45 0.9

DEPARTMENT OF ECOLOGY
State of Washington

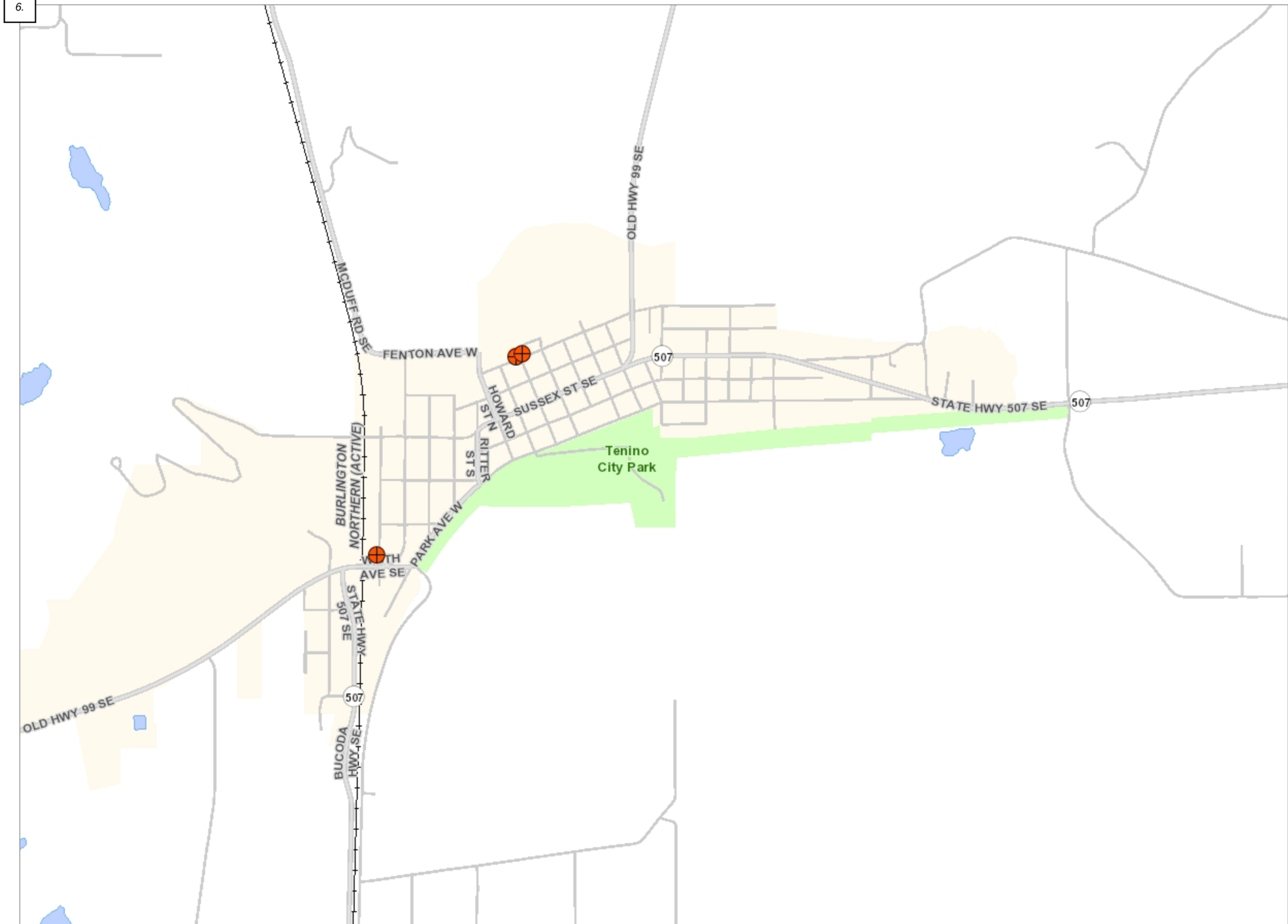


Fig 5-3 Potential Contaminant Sources Map

Legend

- Contaminated Sites
- Roads - Major (Large Scale)
  - <all other values>
  - I 5 ACCESS; US 101 ACCESS; US 101 SB OFF RAMP
  - I 5; US 101
- Roads (Large Scale)
- Railroads
- County Border
- Olympia Municipal Airport
- Water Bodies (River - Small Scale)
- Water Bodies (Other)
- Parks
- Cities
- Capital Forest
- County Background
- Roads - Major
  - <all other values>
  - I 5 ACCESS; US 101 ACCESS; US 101 SB OFF RAMP
  - I 5; US 101
- Roads
- Railroads
- County Border
- Olympia Municipal Airport
- Water Bodies (River - Small Scale)
- Water Bodies (Other)
- Parks
- Cities
- Capital Forest
- County Background
- Roads - Major
  - Major Roads
  - Ramp
  - I 5; US 101
- Roads (Large Scale)
- Railroads

Scale 1: 23,047

0 1000 2000

Feet

Map Created Using GeoData Public Website

Published: 4/20/2023

Note:

Thurston County GeoData Center

THURSTON COUNTY WASHINGTON SINCE 1852

The information included on this map has been compiled by Thurston County staff from a variety of sources and is subject to change without notice. Additional elements may be present in reality that are not represented on the map. Ortho-photos and other data may not align. The boundaries depicted by these datasets are approximate. This document is not intended for use as a survey product. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. Thurston County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. In no event shall Thurston County be liable for direct, indirect, incidental, consequential, special, or tort damages of any kind, including, but not limited to, lost revenues or lost profits, real or anticipated, resulting from the use, misuse or reliance of the information contained on this map. If any portion of this map or disclaimer is missing or altered, Thurston County removes itself from all responsibility from the map and the data contained within. The burden for determining fitness for use lies entirely with the user and the user is solely responsible for understanding the accuracy limitation of the information contained in this map. Authorized for 3rd Party reproduction for personal use only.

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SUSCEPTIBILITY ASSESSMENT

Susceptibility assessments for all of the wells are on file with DOH. The wells are rated as "moderately" susceptible. The susceptibility rating affects the level of water quality monitoring requirements for organic contaminants and wellhead protection planning. The rating may also influence future decisions regarding groundwater disinfection requirements.

WELLHEAD PROTECTION PROGRAM

Public water systems are required to implement a management plan to accomplish wellhead protection. The required elements of the management plan are public notification, contingency planning, and emergency spill response. The following is a discussion of those elements.

Notification

Landowners that have been identified as a potential contamination source must be notified with regard to the location of the public water system well. In addition, the City is required to notify Thurston County Emergency Management and Ecology Spill Response with regard to location and relative vulnerability of the well. Sample notification letters are included in Appendix F.

Future Development

Based on current zoning, significant development is not a concern with regard to the upgradient areas with the TOT boundaries at this time. However, the City will require higher density developments in the TOT boundaries to provide an analysis of aquifer impacts and appropriate mitigation such as sewers, storm drainage plans and landscape management plans.

Contingency Planning

The water system has limited contingencies for wellhead contamination events. Severe water use restrictions would likely be in place considering the tanker supply volumes relative to system demand. Depending on the type of contamination, water use from the wells may be continued with specific restrictions and instructions for customers. If contamination areas can be well defined, there is also the possibility to implement temporary emergency wells or replacement wells in areas that are not contaminated. The City's Water Shortage Response Plan included in Appendix G contains provisions for a water supply shortage. In any event, the City will contact the DOH Regional Engineer to develop a course of action and public notice procedures.

Emergency Spill Response

Upon notification of a spill event, the system will consult with DOH and Ecology on a proper monitoring program to ensure that contamination of the well will be detected in a timely manner. Actual procedures for spill response and clean-up will be developed by the applicable state and local emergency service entities.

Water Quality

Discussion and analysis of water quality is provided in Chapter 3.

Chapter 6

OPERATION AND MAINTENANCE PROGRAM

CHAPTER 6

OPERATION AND MANTENANCE PROGRAM

DEPARTMENT ORGANIZATION, ROLES, AND CERTIFICATIONS

The Public Works Director is Troy Cannon. The Public Works Department is responsible for the water system, storm drainage, sewage collection, streets, parks, cemeteries, and all other City facilities deemed Public Works. The lead person for the water system is also Troy Cannon. The City ensures that at least one person is available at all times for emergencies.

DOH requires operator certification for all group A public water systems. The level of certification required is dependent upon the system size and complexity. Requirements for the City are a Group 2 Water Distribution Manager (WDM2) and a Cross-Connection Control Specialist (CCS). Mr. Cannon is certified as a WDM2 and CCS. Brent Gibbs is also certified as a WDM2 and CCS. The City is in compliance, but will encourage other staff to take training and become certified as licensed operators.

RECORD KEEPING AND REPORTING

Records must be maintained for water quality, treatment, water use data, complaints, and maintenance activities. DOH requires that water systems document where the records are filed and specifies how long records are to be kept. Files are maintained by clerical and public works staff. WAC 246-290-480 provides requirements and details for record keeping and reporting. Table 6-1 summarizes the basic record keeping requirements.

TABLE 6-1

Record Keeping Requirements

Record Type	Retention Period	Official File Location
Bacteria Sample Results	5 years	City Hall
Chemical Sample Results	Life of the Facility	City Hall
Public Notification	3 years	City Hall
Treatment Related Reports	3 years	City Hall
Complaints	3 years	City Hall
Sanitary Surveys (by DOH or others)	10 years	City Hall
Reports and Construction Documents	Life of the Facility	City Hall
Water Use Data	10 years	City Hall

The basic reporting requirements applicable to the water system are in regard to water quality violations and Water Facility Inventory forms (WFIs). Acute coliform violations must be reported to DOH within 24 hours of the sample results. Other water quality violations must be reported within 48 hours. Any changes to the system's WFI must be reported within 30 days of the change. In general, it is good practice to keep DOH informed of water quality related events as soon as they become evident.

ROUTINE AND PREVENTATIVE OPERATION AND MAINTENANCE

Routine Operational and Maintenance (O&M) tasks include inspection of treatment systems and storage facilities, meter replacement, valve exercising, hydrant flushing, water quality sampling and repairs. A list of routine and preventative O&M duties are listed in Table 6-2 along with the frequency that the tasks are typically performed.

TABLE 6-2

Routine Maintenance Schedule

Frequency	Item
Daily	Daily Planning and Coordination
	Well site - Readings, Check Pumps, Check Treatment System Levels
	Chlorine Residual
Weekly	Customer Service/Requests/Complaints
	Tank Site Inspection
	Meter Activation/Inactivate
	Locates
	Distribution/Service Repair
	Customer Complaints
Monthly	Coliform Sampling per Coliform Monitoring Plan
	Customer Meter Reading
	Chlorination Reports
	Service Meter Replacement
	Building/Facility Maintenance
Yearly	Certification Requirements
	Flushing
	Service Meter Replacement
	Cross Connection Control Program Updates
Other	Meter Calibration
	Exercise Distribution Valves (every 5 years)
	Check Tank Hatch and Vents for Openings (quarterly)
	Tank Draining and Cleaning (every other year)
	Chemical Water Quality Monitoring (per DOH monitoring schedule)

In general, current water system staffing and routine O&M coverage is adequate for the expected level of service. Adjustments to the overall O&M program are addressed at the end of this Chapter.

WATER QUALITY MONITORING

The lead water system person conducts water quality monitoring and is responsible for scheduling and collecting samples in accordance with WAC 246-290. Bacteriological samples (coliform) are currently collected in accordance with the Coliform Monitoring Plan, see Appendix D. Sample results are sent directly to DOH. The City maintains a copy of the results in the Water Quality file at City Hall.

For most chemical testing (when needed), the City typically uses a private laboratory. Bottles for testing are usually requested by the City in advance and are delivered by mail to the City. Samples are delivered, if required by specific handling procedures, or shipped via UPS to the lab. The lead person maintains records of all samples sent to the labs by retaining the chain of custody report and filing it in the appropriate water quality-testing file. Once results are obtained, the chain of custody tally is discarded and replaced with test results.

EMERGENCY RESPONSE PLAN

The City is required to have an Emergency Response Plan that addresses general procedures for routine or major emergencies within the water system. The major components of this plan are general procedures for Emergency Notification to the Public, General Communication with the Public, an Emergency Roster, and a Basic Contingency Plan for anticipated emergencies. These basic items are provided on an Emergency Response Plan template, as recommended by DOH, included in Appendix G.

The minimum emergency reserve amount required to replace critical pumping or piping components is approximately $25,000 (approximate cost of a replacement well pump) and will be included in the minimum level of emergency reserve funding in the Financial Program in Chapter 9.

WATER SHORTAGE RESPONSE PLAN

The City water supply has not been subject to any supply limitations associated with drought or overall aquifer storage or supply limitations. The City periodically records static water level from the wells. The well level data from 2001 to present indicates that there is no trend that would suggest any long-term impacts to the aquifer from City water use. The City is required to develop a Water Shortage Response Plan (WSRP) that identifies actions to be taken during various levels of water shortage. Water shortage response planning for the City will focus on relatively short-term events resulting from facility failure or down time.

SAFETY PROCEDURES

Water system personnel currently follow all applicable Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Administration (WISHA) procedures. Training is provided on an ongoing basis in response to City insurance programs. Potential workplace hazards and special safety procedures, such as chemicals, heavy equipment, and asbestos-cement pipe are addressed during specific training. Material Safety Data Sheets (MSDS) for each chemical utilized are kept on-site and in a file at the Well No. 1 and Well No. 3 water treatment building. First aid equipment is provided in each public works vehicle.

The current method to replace media in the calcite contactors involves using the front loader side of the backhoe to elevate maintenance staff and media up to the filling port of the contactor vessels. A project is planned (see below summary) to correct this unsafe practice.

CROSS-CONNECTION CONTROL

The focus of the Cross-Connection Control Program (CCP) is to prevent backflow of contaminated water into the system during low-pressure occurrences or other water system abnormalities. The backbone of the program is a City Code/Ordinance which allows the City to eliminate cross-connections or require installation of an approved backflow prevention assembly to protect the public potable water system. The following is a summary of the City's compliance status based

on minimum program elements, as identified in WAC 246-290-490 (3):

Element 1. Implementing Ordinance

The current CCP ordinance is codified in Chapter 12.10 of the City Code provided in Appendix B.

Element 2. Notification of Existing and New Connections

The current ordinance requires all new service connections to be installed with a backflow prevention assembly. Double check valves have been installed on all new residential services since June 2004. The type of backflow preventers installed on new commercial installations is determined on a case-by-case basis by the CCS. Required devices must be installed prior to activation of a new service meter. The City's Water Standard Details included in Appendix B show approved residential and commercial backflow prevention.

The City has conducted a cross-connection survey of existing customers. City staff are typically aware of areas where potential cross connections may exist and have addressed those areas over the years. The City now needs to formally document the survey results. Identified sites with potential for cross-connections will be inspected and the results documented. If a potential cross-connection is confirmed, the customer will be notified of cross-connection risks, provided with a recommended action and given a date to complete the recommended action, which will likely be installation of a backflow prevention assembly.

Element 3. Schedules

Overall schedules are addressed in discussion of the individual elements and summarized below.

Elements 4, 5, 6 and 7. CCS Training

The City provides training and certification support to staff on a regular basis. The AWWA Pacific Northwest Section's "Cross-Connection Control Manual" and DOH guidance will be utilized as a basis for all CCP activities. A copy of the manual and DOH guidance will be maintained at City Hall for staff as well as public review and use.

Elements 8 and 9. Information and Record Keeping

The CCP requires ongoing monitoring and testing on an annual basis. The City currently hires a Backflow Assembly Tester (BAT) to test the City's backflow devices. The City is planning to maintain a Backflow Assembly Tester (BAT) on staff to test all devices and make corrections as needed. The BAT keeps information and records for the City of Tenino in accordance with the guidance provided in the AWWA Manual and DOH guidance.

The City will provide additional public education as needed through the Consumer Confidence Report or billing inserts.

COMPLAINT RESPONSE PROCEDURES

The City is required to document customer complaints and respond in a timely manner. The City currently receives complaints through City Hall, through customer contact with staff in the field, or through an online tool. Most complaints are minor and are addressed immediately. The City has implemented a complaint form to document the complaint and the response to the complaint (provided in Appendix F). City staff maintain complaint forms on-hand so that field complaints can be documented properly. If the complaint is initiated at City Hall, the form is given to the appropriate staff for resolution. In either case, the form is returned to City Hall for filing. The City also has an online tool titled Citizen's Action Request through which citizens can file a complaint provided at the following link:
https://cityoftenino.us/community/webform/citizens-action-request

OPERATION AND MAINTENANCE SUMMARY

The following is a summary of the Operation and Maintenance Program improvements identified in this Chapter and other Chapters of this Water System Plan. The operational improvements are shown in relative order of priority. Each improvement is identified as either a Capital Improvement Project which will be further described in Chapter 8 Capital Improvement Program and budgeted for in Chapter 9 Financial Program or will be included in normal O&M costs.

1. Cross-Connection Program Implementation: The City currently hires a Backflow Assembly Tester who complies with the Cross-Connection Program. The CCP is considered normal O&M and will be paid for using the O&M budget.

2. Service Connection Leak Repair: Previous leak detection efforts have documented older service lines as the most common water leak issue. The City has been working to eliminate the issue in recent years and will continue to address the problem. Service connection leak repair is considered normal O&M and will be paid for using the O&M budget.

3. Meter Replacement Program: Service meter accuracy can have a significant impact on revenue and unaccounted for water. Calibration of smaller meters is typically not cost effective and therefore older meters are typically replaced. The manufacturers recommended useful life of service meters is typically 10 to 15 years. As mentioned in Chapter 4, the City has begun a meter replacement program in 2020 which plans to replace all existing water meters with radio read meters beginning with difficult to read meters. All new water services are installed with radio read meters. The long-term goal is to have the entire water system on Automated Meter Reading (AMR) to save overall operational costs. This replacement program is currently projected to be completed in 2023. The advantages of meter replacement include more water is accounted for and water use is typically decreased due to increased customer costs when actual water use is billed. The City will utilize AMR type meters in all future installations to decrease long term operational costs associated with reading meters. The meter replacement program is considered a Capital Improvement and an annual proposed funding amount of $30,000 is planned for in Chapter 9.

4. Calcite Contactor Loading Platform: Obtain a portable access ladder and platform that can be moved to each calcite contactor unit for loading media. The front loader bucket of the backhoe would still be utilized to raise the media up to the platform level, but maintenance staff would not have to be situated in the bucket during loading. This project is considered normal O&M and will be paid for using the O&M budget.

5. Piping Calcite Contactor Flexibility: Install piping to allow use of either set of calcite contactors with either Well No.1 or Well No. 3 which would provide operational flexibility. This project is considered normal O&M and will be paid for using the O&M budget.

6. Water System Plan: Update the Water System Plan, required every 10 years from the date of approval. This project is identified in Chapter 8 Capital Improvement Program and is proposed to be funded with Capital Improvement funds.

Chapter 7

DESIGN & CONSTRUCTION STANDARDS

CHAPTER 7

DESIGN AND CONSTRUCTION STANDARDS

Standard construction specifications for distribution mains are identified in the City policy document *Water System Standards* in Appendix B (referred to herein as the City Standards). In general, the City Standards provide sizing criteria, detailed material specifications and criteria for installation of water mains and appurtenances. Current general administrative procedures for main extensions and recently completed standard detail drawings for uniform installation of service meters, valves, thrust blocks, and appurtenances are included in the City Standards.

Washington State Department of Health (DOH) will review the City Standards concurrently with this Water System Plan. Upon approval of the City Standards by DOH, the City may replace piping and extend distribution mains without further review by DOH if the replacement or extension is consistent with the City Standards and the Water System Plan. As a condition of the approval, the City must keep accurate records of distribution extensions and replacement projects. Record keeping must include record drawings and engineering certifications. Typically, most distribution extensions should be designed by a professional engineer and in all cases approved by the Public Works Supervisor prior to construction.

It should be noted that the City Standards only provide detailed guidelines for distribution mains and related appurtenances. Proposed improvements such as a new pump station or storage tank must be reviewed and approved by DOH prior to construction.

Chapter 8

CAPITAL IMPROVEMENT PROGRAM

CHAPTER 8

CAPITAL IMPROVEMENT PROGRAM

This Capital Improvement Program (CIP) has been developed in a manner consistent with the City's water system needs as well as State and federal regulations regarding planning, water quality, treatment, distribution, and storage. Updates to the Water System Plan are typically required every 10 years from the date of approval. Therefore, a schedule of improvements must extend at least 10 years into the future to correspond with the next 10-year Water System Plan. This CIP will extend 15 years into the future to allow for longer review and approval timelines; however, specific schedules for improvements outside of the 10-year planning period are not required.

SUMMARY OF CAPITAL IMPROVEMENTS

The following is a summary of the capital improvements to address deficiencies or needs that are identified in the various preceding chapters of this Water System Plan. Summaries of operational improvements are provided in Chapter 6. Specific project cost estimates are included in Appendix H. Unless otherwise stated, the opinions of cost in this report are based on implementation of the improvements through a public bid process. Unit costs are based on similar projects which have been recently constructed in southwest Washington. Total project costs for the improvements are estimated using an applicable construction contingency, sales tax, mobilization, and adjusted unit prices where construction conditions may be difficult or where materials are expected to be marked up due to relatively limited quantity on the job site. Administrative, legal, engineering, environmental, permitting and construction management costs are added to the subtotal of construction costs and contingencies. The planning level estimates are intended to be conservative to ensure that adequate funding is appropriated for each project. Industry standards for planning level estimates should be accurate within a range of minus 20% to plus 50%.

The system analysis in Chapter 3 identifies the basic premise for improvements and identifies a general strategy to address deficiencies. The specific improvements that are required to address the deficiencies are discussed in more detail below. The project summaries below are intended to layout the general nature of the improvement for determining the planning level cost estimates and more detailed pre-design work will be needed to provide additional information to implement the project.

Small Diameter Pipe Replacement

The primary intent of the small diameter main replacement is to replace older, small diameter, cast iron, galvanized iron, or asbestos-cement piping that is prone to leaking and high maintenance and repair costs. The typical small cast iron pipe run is in the range of 200 feet to 400 feet. Priorities for small diameter pipe replacement areas will be determined through field observations by City staff. The initial priority areas include South McArthur Street (4-inch A.C. lack of depth.) and South Wichman Street (old 2-inch cast iron). There are also multiple areas with 2-inch cast iron pipe that is over 50-years old. The most critical component of this program is to establish a budget item so that priorities can be addressed when they are identified. Since City staff time is fairly limited with regard to this type of work, the recommended annual budget planned for in Chapter 9 Financial Program is $50,000 annually to allow for replacement of the typical pipe run through a small works type contract. Pipe replacement budget could also be carried over multiple years to address larger projects.

Water Right Acquisition

As presented in Chapter 3, the City is projected to use all allowable water rights in the year 2036 unless the Water Use Efficiency (WUE) goal is achieved. The City is recommended to begin pursuing the acquisition of additional water rights because it can take a significant amount of time to process water rights sales or change applications. Water rights acquisitions should prioritize annual water rights. Instantaneous water rights are likely to be attached to annual water rights. As shown in Table 3-6, the City is projected to have a 20-year annual water right deficiency of 18.6 acre-feet per year. In addition, large expansions of the existing water system are not recommended until additional water rights are acquired. Table 3-11 shows a current Annual Water Right surplus of 143 ERUs. The City has budgeted $10,000 annually to pursue water rights.

Source Improvements

The 2010 Water System Plan identified several projects to develop the Southwest Urban Growth Area (UGA) known as Lemon Hill. Projects included 200 gpm of well capacity, storage tank, distribution system piping, and a booster station. These projects were dependent on development and were planned to be developer funded. Due to several challenges with developing the Lemon Hill area including steep grades and federally identified critical habitat for endangered species, plans to develop the Lemon Hill area have been discontinued.

The 2010 Water System Plan identified a well site (location to be determined by development), well house, and two well pumps, each with a minimum 100 gpm capacity (200 gpm total capacity which includes redundancy) based off a projected 20-year 55 gpm deficiency. As shown in Chapter 3, this Water System Plan no longer projects a source deficiency based on 2022 data projections; therefore, this source improvement project will be removed for this CIP; however, a new well site would improve source reliability and should be considered in conjunction with the Water Rights Acquisition CIP.

Storage Improvements

The 2010 Water System Plan identified a new water storage tank to be located on the southwestern side of Lemon Hill with a minimum recommended storage capacity of 200,000 gallons. The storage tank site was planned to be designed to accommodate a second tank. This CIP will include a new reinforced concrete water storage reservoir with the same minimum recommended capacity of 200,000 gallons to conservatively meet the projected 20-year storage deficiency of 169,428 gallons. This project is planned to be developer driven and funded and the location will depend on the location of future development.

The base construction cost was developed using unit costs from recent and similar reservoir projects in Southwest Washington. Sales tax was calculated as 8.1% (2023 local tax rate) of the base construction cost. 20% contingency was added to the base construction cost and sales tax to account for uncertainties associated with estimating project costs at this planning level. 30% was added to the base construction cost, sales tax, and contingency for City and consultant design, permitting, and construction administration costs. The total estimated project cost as shown in Appendix H is $1,660,000.

Maintenance and Operations

Chapter 6 identifies six operations and maintenance projects ordered in order of priority. Of these six projects, the Meter Replacement Program and the next Water System Plan are identified as Capital Improvements. The recommended annual budget is $30,000 annually for the Meter

Replacement Program which is expected to be completed in 2023. The next Water System Plan is estimated to cost $100,000.

CAPITAL IMPROVEMENT PROGRAM SCHEDULE

Project schedules are based on priorities established by the City Council and are adjusted based on financial considerations and effects of project scheduling on other City projects. The City has identified safe and reliable service, low costs, financial viability, and regulatory compliance as the highest priorities for the water system. Recommended improvements must be prioritized with regard to implementation in either the 10-year or 20-year planning period. A recommendation that is included for implementation in the 10-year period signifies a high priority and the improvement should be implemented prior to the next Water System Plan. A 20-year recommendation signifies that the improvement is not a significant (low) priority and can be re-evaluated after the next Water System Plan. The primary factors considered for prioritization of each of the operation program improvements and capital improvements are identified in Table 8-1.

TABLE 8-1

Capital Improvement Program

#	Project	Priority
1	Storage Improvement – New Reservoir	High – Due to revisions in DOH's storage calculations, a projected storage deficiency in the year 2024 has been identified. This project is planned to occur in conjunction with new development assumed to occur once additional water rights are acquired.
2	Small Diameter Pipe Replacement	Moderate/Ongoing – This project is planned to be funded with an annual amount to replace leaking pipes or pipes that are prone to leak to prevent potential future problems associated with emergency repairs and localized contamination from cast iron or steel pipe.
3	Meter Replacement Program	Moderate/Ongoing – This project will result in more accounted for water potentially reducing DSL and reduced operational costs.
4	Water Right Acquisition	Low – Due to the long timelines for processing water rights sales or changes, the City is recommended to begin pursuing additional water rights.
5	Water System Plan	Low – The next Water System Plan is planned to be updated 10 years after the date of approval of this Water System Plan anticipated to be between 2033 and 2037.

The CIP Schedule is shown in Table 8-2. Recommended implementation dates for the projects are based on the above priorities and integrated with the financial program analysis and recommendations in Chapter 9. The CIP and related basis of the recommendations in other chapters of this Water System Plan are based on the best information available and represent a significant investment of resources by the City to reach a comprehensive understanding of water system issues. CIP financing can be affected by many factors that may change the timing and scope for implementation. Since rate adjustments are dependent upon City Council support and can be controversial, there is no certainty that rate adjustments will be implemented within the scope and timing anticipated in the financial program. In addition, there may be competing priorities for reserve funds that are also contingent upon City Council approval prior to use. Financing methods such as low interest loans have specific timelines and requirements

associated with appropriations and implementation. These factors are built into the estimated schedules but can be highly variable based on the actual method utilized. In summary, the CIP schedule should be evaluated on an annual basis and modified as needed during the City's annual budgeting process.

TABLE 8-2

10-Year Capital Improvement Program Schedule

No.	Project Title	Purpose of Project	Cost Estimate	Financing Source	Year
Source Improvements					
1	Water Rights Acquisition	20-Yr. Deficiency	$10,000	City	Annual
Distribution System Improvements					
2	Small Diameter Pipe Replacement	Operation & Maintenance	$50,000	City	Annual
Storage Improvements					
3	200,000 Gallon Reinforced Concrete Water Reservoir	10-yr. Deficiency	$1,660,000	Developer	- (1)
Maintenance and Operations					
4	Meter Replacement Program	Operation & Maintenance	$30,000	City	Annual
5	Water System Plan	Operation & Maintenance	$100,000	City	2033 (2)

1. The planning year for developer funded projects depends on new development and is unknown.
2. The next Water System Plan will be scheduled 10 years from the date of approval of this Water System Plan. 2033 is the earliest this could occur.

Chapter 9

FINANCIAL PROGRAM

CHAPTER 9

FINANCIAL PROGRAM

OBJECTIVE

The objective of the financial program is to identify the total cost of providing water service, assure that the utility improvement schedule will be implemented, and assist in establishing adequate fees for service. The emphasis of the financial program for systems with less than 1,000 connections is financial viability. In order for a system to be "financially viable," it must have the capacity to obtain sufficient funds to develop, construct, operate, maintain and manage a public water system on a continuing basis in full compliance with federal, state and local requirements. In addition, a complete financial program can assist the purveyor in establishing water rates and other charges that reflect the actual cost of providing service.

Funds are compared to the following financial viability tests in accordance with DOH policies:

- Test 1 – Operating revenue must be greater than operating expenditure.
- Tests 2 & 3 - The operating cash reserve must be at least 1/8 of annual operating expenses and the emergency reserve must be sufficient to address expected emergency expenses for items such as equipment replacement.
- Test 4 – Annual water rates should be less than 1.5% of the Median Household Income (MHI) for the area.

FUND MANAGEMENT

The City of Tenino owns and operates two funds for the water system: the water (operating) fund and the water capital improvement fund. For financial forecasting purposes, operating fund expenditures and revenues tend to be ongoing and predictable, while capital costs are highly variable and may include large, one-time projects. The main funding source for utility operating expenditures is utility ongoing rate revenue. Capital funding sources consist of loans or grants, developer funding, or transfers from operating fund. The City uses the capital improvement fund to repay existing loans.

EXPENDITURES

Typical operating expenses include salaries, wages, benefits, operating supplies and services, and taxes. Typical capital expenses include debt repayment and projects designated as capital improvement projects. The previous four years of capital and operating expenditures are summarized in Table 9-3 and a comprehensive list provided in Appendix H.

REVENUE

The primary revenue sources for the water utility are water rates, connections fees and investment interest. The following sections contain a summary of the revenue sources available to the City. The previous four years of capital and operating revenues are summarized in Table 9-3 and a comprehensive list is provided in Appendix H.

Rate Revenue

The City collected approximately $275,000 in rate revenue in 2022 including taxes and late fees. Current basic rates for water service are shown in Table 9-1 as defined in Resolution No. 2019-02 provided in Appendix H.

TABLE 9-1

Water Rates

Customer Class	Base Rate (monthly)
3/4” Meter (up to 500 cf)	$12.65
1” Meter (up to 500 cf)	$17.63
1-1/2” Meter (up to 500 cf)	$29.58
2” Meter (up to 500 cf)	$44.84
3” Meter (up to 500 cf)	$93.04
4” Meter (up to 500 cf)	$138.38
Senior Citizen (in city only, up to 300 cf)	$7.59
Outside City Limits (up to 300 cf)	$18.95
Quarry Pool Rate	$9.11
Vacancy Rate	$3.16
Municipal Rate (up to 500 cf)	$8.93
Overage	
Within City per additional 100 cf	$3.22
Outside City per additional 100 cf	$4.56
Senior (in City only)	$0.81
Municipal per additional 100 cf	$0.77

The current resolution became effective in April 2019. The City has not increased water rates since that time. Current rates result in average monthly residential rates of $21.20 and $41.29 for inside City and outside City customers respectively (at 700 c.f. average monthly residential water use – see Chapter 2 including 6% Utility Tax and 5.029% State Excise Tax). Comparing this with the 2020 MHI of $79,769 for Thurston County (as listed on the Washington State Median Household Income Estimates by County published by the Office of Financial Management), rates inside the City and outside the City are approximately 0.03% and 0.05% of the MHI, respectively. Therefore, the City is in compliance with Test 4 that annual water rates should be less than 1.5% of the MHI for the area.

For general reference, Table 9-2 provides monthly residential water rates for similar size municipal water utilities in the area as calculated using 700 cubic feet and current rates per ordinance. Service connections are taken from The Department of Health Office of Drinking Water Sentry Internet containing information on public water systems.

TABLE 9-2

Residential Water Rates

Municipality	Service Connections	Inside City (Monthly Rate for 700 cf)	Outside City (Monthly Rate for 700 cf)
Castle Rock	1,151	$80.08	$120.12
McCleary	905	$89.56	$132.20
Mossyrock	532	$47.91	$73.10
Napavine	858	$49.00	$64.00
Tenino	833	$19.09	$37.19

(1) This table is for comparison purposes and excludes additional taxes.

The average water rates for Cities in the area is approximately $70 per month for inside City limits and $100 per month for outside City limits. The City of Tenino currently has low water rates compared to similar sized municipalities in the area.

Connection Fees

Current residential connection fees for the City are $2,500 plus materials for inside connections and $3,750 plus materials for outside service connections. The significant difference in the inside and outside fees recognizes the fact that the cost of service is higher for outside City customers. Connection fees are deposited into the water Capital Improvement account to meet the intent of RCW 35.92.025. State statutes require justification of connection fees and capacity charges with regard to prior and anticipated capital improvement costs. Therefore, it is also recommended to establish a basis for connection fees but is not a significant priority due to the unlikely event that the fees will be challenged. Connection fee revenue is projected to be $10,000 annually.

Loan Funding

There are currently no anticipated projects that would warrant loan funding at this time. If needed, the primary loan programs that will be considered are the DOH Drinking Water State Revolving Fund (DWSRF) and the Public Works Trust Fund (PWTF) infrastructure loan program. These programs have similar low interest rates and funding timelines.

Grant Funding

Grants funding is typically reserved for communities with very low average incomes and relatively high-water rates and is not a realistic source of water utility funding for the City of Tenino; however, availability and conditions on government grants can vary from year to year. The most probable sources of grant funding is the Community Development Block Grant (CDBG) program and General Purpose Grants (GPG). As mentioned above, the City does not currently anticipate significant projects that would warrant grant funding consideration.

Operating Reserves

An operating reserve is designed to provide a liquidity cushion protecting the utility from the risk of short-term variation in the timing of revenue collection or payment of expenses. An operating reserve also smooths rate increases over a multi-year period. The City's existing reserve policy states "The City's enterprise funds will maintain reserves equal to at least 10 percent of their adopted operating expenditures." This calculates to approximately $23,500 in the year 2022; however, the fund has historically been maintained above $200,000. Table 9-3 shows the city's year beginning operating fund balance, year ending operating fund balance, and the amount

transferred from the operating fund to the capital improvement fund for the past four years (2019-2022).

Capital Reserves

Capital reserves are utilized for funding smaller projects when the size of the project fits in with available reserve amounts or the project is too small to be viable for outside funding. Capital reserves are also utilized as a last resort for time sensitive projects or significant emergencies. Capital reserves are only used for capital improvement related expenses as a local match to other funding resources or when other funding resources are not available. Capital reserves are primarily funded through connections fees and transfer of operating reserves after operating reserve goals are met. The City's current policy does not specify a capital reserve; however, a study titled Water and Sewer Rate Study by FCS Group written for the City of Tenino in January 2016 developed a recommended minimum capital reserve balance roughly equal to average annual capital program spending. This Water System Plan will adopt this policy in developing the Financial Program. The average annual capital program spending over the previous 4-year period (2019 – 2022) was approximately $200,000.

Other Revenue

The City generates other revenue through various fees and short-term investment of operating and capital reserve funds. This other revenue was approximately $7,500 in 2019 and has decreased to $0 in 2022. For this Financial Program, other revenue is projected to generate $2,500 annually in the Operating Fund and $1,500 annually in the Capital Fund.

SUMMARY OF FINANCIAL HISTORY

Table 9-3 contains a summary of operating and capital revenues and expenditures and beginning of the year and end of year cash balances for both funds from the previous four years. Appendix H contains a comprehensive list of operating and capital revenues and expenditures for the previous four years. The City completes budget estimates in the fall for implementation in the next calendar year.

As shown in Table 9-3, operating revenue has been greater than operating expenses excluding transfer to the Capital Fund for the previous four years; therefore, the City has been in compliance with Test 1 as discussed in the Objective section above. Both Operating and Capital Fund reserves have been maintained above $200,000 for the previous four years; therefore, the City is in compliance with Tests 2 and 3 as discussed in the Objective section above.

TABLE 9-3

Summary of Financial History

Year	2019	2020	2021	2022
Operating Fund				
Water Services [(1)]	$278,147	$265,245	$252,524	$278,425
Interest	$4,604	$2,258	$352	$0
Total Revenue	**$282,751**	**$267,503**	**$252,876**	**$278,425**
Operations & Maintenance	$241,112	$235,204	$157,810	$209,771
Transfer to Capital Improvement Fund	$586,585	$287,447	$0	$0
Total Expenditures	**$827,697**	**$522,651**	**$157,810**	**$209,771**
Year Beginning Cash, January 1	**$1,047,415**	**$502,469**	**$247,321**	**$342,387**
Year Ending Cash, December 31	**$502,469**	**$247,321**	**$342,387**	**$411,041**
Capital Fund				
Water Services [(1)]	$41,133	$109,863	$54,681	$76,960
Interest	$2,794	$1,460	$215	$0
Transfers from Operating Fund	$586,585	$287,447	$0	$0
Total Revenue	**$630,512**	**$398,770**	**$54,896**	**$76,960**
Debt Repayment	$6,543	$6,686	$6,519	$6,519
Water System Plan	$1,553	$0	$6,437	$5,258
Meter Replacement Program	$3,540	$103,621	$1,847	$728
Small Diameter Pipe Replacement	$0	$0	$4,224	$375,592
Other CIPs	$23,732	$102,951	$9,139	$103,352
Total Expenditures	**$35,359**	**$213,258**	**$28,166**	**$491,449**
Year Beginning Cash, January 1	**$638,626**	**$1,233,778**	**$1,419,291**	**$1,446,021**
Year Ending Cash, December 31	**$1,233,778**	**$1,419,291**	**$1,446,021**	**$1,031,531**

1. Water services in the operating fund include revenue from water rates include account activation fees, taxes, and late charges. Water services in the capital fund include revenue from water surcharge tax for capital improvements, and connection fees.

BUDGET PROJECTIONS

DOH requires that the Water System Plan identify a balanced annual budget. Water systems should also identify budget framework for the 10-year planning period to evaluate general cash flow and potential rate impacts. The following assumptions are utilized as a basis for identifying budget constraints and future revenue requirements.

- Base O&M costs in the first year (2023) of budget estimates are determined using previous operating expense data and adjusted for inflation.
- The inflation rate for O&M costs is estimated at 2.5% annually.
- The inflation rate for CIP costs is estimated at 4.0% annually based on the Seattle

Construction Cost Index as published in the Engineering News Record, assuming that the year 2022 was an anomaly.

- Water rate revenue and connection fees shown in Table 9-4 are projected to increase proportionally to Equivalent Residential Units (ERU's) at the annual growth rates presented in Table 2-10 plus the proposed rate increase shown in Table 9-4.

A 10- to 15-year budget projection is provided in Table 9-4. The majority of capital expenditures will be funded by water reserves and transfers from the Operating Fund. The 200,000-gallon reservoir is planned to be funded by developer contributions. An annual 4.0% inflationary rate adjustment beginning in 2024 is projected to be necessary to maintain a financially viable program such that operating revenues are greater than expenses and the operating reserve is maintained above $200,000. Otherwise, the City may begin to draw down operating reserves. The 4.0% annual rate adjustment will allow revenue to keep pace with inflation and avoid more severe one-time increases in the future. If the inflationary costs do not materialize, the City could build up reserves and use them to complete future upgrades without taking on additional debt.

Annual transfers from the water operating fund to the water capital improvement fund on the order of $100,000 to $250,000 depending on the end of the year Operating Fund cash balance is projected to fund proposed capital improvement projects and maintain a capital reserve above $200,000. This financial program does not plan for funding through loans or grants; however, a higher cost small diameter pipe replacement project could be funded by loans, grants or building up capital reserves (instead of spending $50,000 annually as shown).

FINANCIAL VIABILITY

The balanced 10 to 15-year budget identifies compliance with financial viability requirements for operating revenue, operating reserves, and emergency reserves as follows:

- Test 1 - Revenue is greater than expenses in all periods.
- Tests 2 & 3 - The current operating cash reserve of approximately $400,000 decreases to between $200,000 and $260,000. The operating reserves are adequate to provide a liquidity cushion. The current capital cash reserve of approximately $1,000,000 decreases to approximately $260,000. The capital reserves are adequate to fund emergency response.
- Test 4 – The projected average rate for customer classes inside the City is 0.03%, which is less than 1.5% of the Median Household index for the area. Projected rate increases match projected inflation; therefore, this percentage is anticipated to be maintained.

Table 9-4 10 Year Budget

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Revenue - Operating Fund															
Water Services (with rate increase) [1]	$ 257,000	$ 267,000	$ 284,500	$ 303,000	$ 323,000	$ 344,000	$ 366,000	$ 389,000	$ 413,000	$ 438,500	$ 466,000	$ 494,500	$ 521,500	$ 550,000	$ 580,000
Proposed Rate Increase	0.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Interest	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500
Total Operating Revenues	**$ 259,500**	**$269,500**	**$ 287,000**	**$ 305,500**	**$ 325,500**	**$ 346,500**	**$ 368,500**	**$ 391,500**	**$ 415,500**	**$ 441,000**	**$ 468,500**	**$ 497,000**	**$ 524,000**	**$ 552,500**	**$ 582,500**
Expenditures - Operating Fund															
Operations & Maintenance [2]	$ 249,000	$ 255,000	$ 261,500	$ 268,000	$ 275,000	$ 281,500	$ 288,500	$ 296,000	$ 303,500	$ 311,000	$ 318,500	$ 326,500	$ 335,000	$ 343,000	$ 352,000
Total Operating Expenditures	**$ 249,000**	**$ 255,000**	**$ 261,500**	**$ 268,000**	**$ 275,000**	**$ 281,500**	**$ 288,500**	**$ 296,000**	**$ 303,500**	**$ 311,000**	**$ 318,500**	**$ 326,500**	**$ 335,000**	**$ 343,000**	**$ 352,000**
Cash Balance - Operating Fund															
Year Beginning Cash, Jan 1	$ 411,000	$ 422,000	$ 336,500	$ 261,500	$ 199,000	$ 249,500	$ 214,500	$ 194,500	$ 190,000	$ 202,000	$ 232,000	$ 282,000	$ 252,500	$ 242,000	$ 251,500
Proposed Transfer to Capital Fund	$ -	100,000	$ 100,000	$ 100,000	$ -	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 200,000	$ 200,000	$ 200,000	$ 200,000
Year Ending Cash, Dec 31	**$ 422,000**	**$ 336,500**	**$ 261,500**	**$ 199,000**	**$ 249,500**	**$ 214,500**	**$ 194,500**	**$ 190,000**	**$ 202,000**	**$ 232,000**	**$ 282,000**	**$ 252,500**	**$ 242,000**	**$ 251,500**	**$ 282,500**
Test 1: Operating Revenue - Operating Expenses	$ 10,500	14,500	$ 25,500	$ 37,500	$ 50,500	$ 65,000	$ 80,000	$ 95,500	$ 112,000	$ 130,000	$ 150,000	$ 170,500	$ 189,000	$ 209,500	$ 230,500
Operating Revenue > Operating Expenses?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Test 2: Operating Reserve Requirement (1/8 expenses)	$ 31,125	$ 31,875	$ 32,688	$ 33,500	$ 34,375	$ 35,188	$ 36,063	$ 37,000	$ 37,938	$ 38,875	$ 39,813	$ 40,813	$ 41,875	$ 42,875	$ 44,000
Operating Reserve > 1/8 Expenditures ?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Revenue - Capital Fund															
Water Services [1]	$ 48,500	$ 48,500	$ 49,000	$ 49,000	$ 49,000	$ 49,000	$ 49,500	$ 49,500	$ 49,500	$ 49,500	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,500
Interest	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
Total Capital Revenues	**$ 50,000**	**$ 50,000**	**$ 50,500**	**$ 50,500**	**$ 50,500**	**$ 50,500**	**$ 51,000**	**$ 51,000**	**$ 51,000**	**$ 51,000**	**$ 51,500**	**$ 51,500**	**$ 51,500**	**$ 51,500**	**$ 52,000**
Expenditures - Capital Fund															
Debt Repayment	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Improvement Projects															
200,000 Gallon Reservoir	Developer Financed														
Small Diameter Pipe Replacement	$ 50,000	$ 52,000	$ 54,000	$ 56,000	$ 58,500	$ 61,000	$ 63,500	$ 66,000	$ 68,500	$ 71,000	$ 74,000	$ 77,000	$ 80,000	$ 83,500	$ 86,500
Meter Replacement Program	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Right Acquisition	$ 10,000	$ 10,500	$ 11,000	$ 11,000	$ 11,500	$ 12,000	$ 12,500	$ 13,000	$ 13,500	$ 14,000	$ 15,000	$ 15,500	$ 16,000	$ 16,500	$ 17,500
Water System Plan	$ 6,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 154,000	$ -	$ -	$ -
Other	$ 101,000	$ 103,500	$ 106,000	$ 109,000	$ 111,500	$ 114,500	$ 117,000	$ 120,000	$ 123,000	$ 126,000	$ 129,500	$ 132,500	$ 136,000	$ 139,000	$ 142,500
Total Capital Expenditures	**$ 204,000**	**$ 172,500**	**$ 177,500**	**$ 182,500**	**$ 188,000**	**$ 194,000**	**$ 199,500**	**$ 205,500**	**$ 205,000**	**$ 211,000**	**$ 218,500**	**$ 379,000**	**$ 232,000**	**$ 239,000**	**$ 246,500**
Cash Balance - Capital Fund															
Year Beginning Cash, Jan 1	$ 1,031,500	$ 897,500	$ 875,000	$ 847,500	$ 815,000	$ 677,000	$ 633,500	$ 584,500	$ 530,000	$ 475,500	$ 415,000	$ 348,000	$ 220,500	$ 240,000	$ 252,500
Proposed Transfer from Operating Fund	$ -	$ 100,000	$ 100,000	$ 100,000	$ -	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 200,000	$ 200,000	$ 200,000	$ 200,000
Year Ending Cash, Dec 31	**$ 897,500**	**$ 875,000**	**$ 847,500**	**$ 815,000**	**$ 677,000**	**$ 633,500**	**$ 584,500**	**$ 530,000**	**$ 475,500**	**$ 415,000**	**$ 348,000**	**$ 220,500**	**$ 240,000**	**$ 252,500**	**$ 257,500**

1. Operating fund water service revenues are projected to increase at the growth rates in Table 2-11 plus the proposed rate increase.
2. Operations & Maintenance revenue is projected to increase at an annual inflation rate of 2.5%.
3. Capital Improvement Projects are projected from their 2023 cost at an annual inflation rate of 4.0% to the proposed year of implementation.
4. All costs are rounded to the nearest $500.

Appendix A

Tenino Plans and Maps

6.

Tenino Future Land Use Map

- Residential
- Multi-Family Residential
- Master Planned Community
- Mixed Use
- Commercial
- Public / Semi-Public
- Industrial
- Historic Preservation
- City Limits
- Urban Growth Boundary

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N W E S

0 500 1,000 2,000 Feet

DISCLAIMER:
This map is for general planning purposes only. Thurston Regional Planning Council makes no representations as to accuracy or fitness of the information for a particular purpose.

Path: P:\SmallTowns\Tenino\2015_CompPlan\Maps_Images\FutureLandUse.mxd

6.

City of Tenino, Thurston County, WA
Official Zoning Map

- Single Family ES
- Single Family
- Single Family Duplex
- West Tenino
- Multi-Family Residential
- Mixed Use
- Commercial - 1
- Commercial - 2
- Commercial - 3
- Industrial
- Public / Semi-Public
- Professional Office Overlay
- Historic Character
- Historic Preservation
- City Limits
- Urban Growth Boundary

Adopted Ordinance 823

N W E S

0 0.25 0.5 Miles

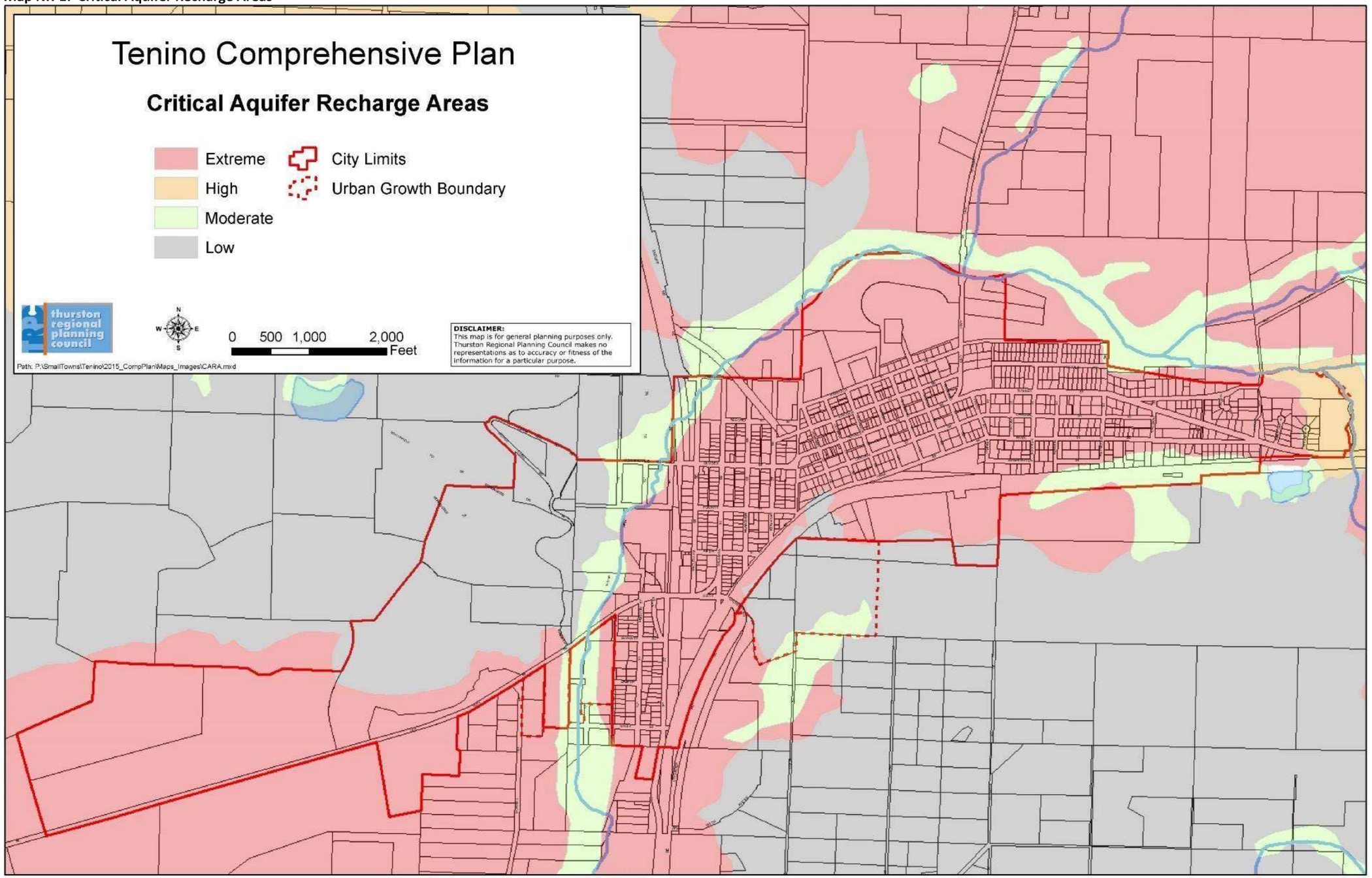
Date: Tuesday, December 18, 2012
Path: P:\SmallTowns\Tenino\WestTeninoVisioning\Maps_Images\Zoning2012.mxd

NATURE LN SE
MCDUFF RD SE
OLD MILITARY RD SE
GARFIELD AVE E
LINCOLN AVE E
CUSTER ST N
SUSSEX AVE E
OLD MILITARY RD E
REYNOLDS ST S
SR507 HWY
BOGNOR ST S
FENTON AVE W
STAGE ST N
WICHMAN ST N
LINCOLN AVE W
MORNINGSIDE DR SE
SUSSEX AVE W
CENTRAL AVE W
OLD DUMP RD S
KEITHAHN ST S
MCARTHUR ST S
PARK AVE W
MCCLELLAN ST S
WICHMAN ST S
OLD 99 HWY S
7TH AVE W
NELSON LN S
HUSTON ST S
CROWDER RD SE
OLD 99 HWY SE
MIMA AGRES DR SE
BUCODA HWY SE
168TH AVE SE
BLUMAUER RD SE
DYSON RD SE
COOK ST SE
KENT ST SE
CRANE ST SE

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Map NR-1: Critical Aquifer Recharge Areas



POPULATION ESTIMATES AND FORECAST
THURSTON COUNTY CITIES, URBAN GROWTH AREAS, AND RESERVATIONS
2010-2045

		Census Calibrated		TRPC		TRPC Forecast Most Recent Jurisdiction Boundaries				
Jurisdiction		**2010**	**2020**	**2021**	**2022**	**2025**	**2030**	**2035**	**2040**	**2045**
Bucoda	Total	562	600	595	610	625	685	720	765	800
Lacey	City	42,393	53,526	54,850	58,180	56,550	57,820	58,970	59,890	60,670
	UGA	33,170	37,733	37,330	34,750	41,480	44,550	47,050	49,850	52,770
	Total	75,560	91,259	92,180	92,930	98,030	102,370	106,020	109,740	113,440
Olympia	City	46,478	55,605	55,960	56,370	58,840	62,980	66,960	69,760	72,040
	UGA	11,840	12,480	12,510	12,590	13,270	13,390	13,730	14,610	15,610
	Total	58,320	68,085	68,470	68,960	72,110	76,370	80,690	84,370	87,650
Rainier	City	1,794	2,369	2,440	2,510	2,350	2,570	2,725	3,075	3,165
	UGA	110	133	125	125	115	120	130	135	160
	Total	1,905	2,502	2,565	2,635	2,465	2,690	2,855	3,210	3,325
Tenino	City	1,695	1,870	2,010	2,030	2,050	2,310	2,565	2,750	2,790
	UGA	15	26	15	15	15	15	15	15	45
	Total	1,710	1,896	2,025	2,045	2,065	2,325	2,580	2,765	2,835
Tumwater	City	17,371	25,350	26,050	26,360	29,120	31,670	34,090	35,920	36,900
	UGA	6,350	3,357	3,290	3,380	5,410	7,030	8,240	9,020	9,170
	Total	23,720	28,707	29,340	29,740	34,530	38,700	42,330	44,940	46,070
Yelm	City	6,848	10,617	10,640	10,680	13,540	17,390	20,910	23,910	25,890
	UGA	1,355	1,514	1,445	1,585	1,380	1,380	1,390	1,420	1,670
	Total	8,205	12,131	12,085	12,265	14,920	18,770	22,300	25,330	27,560
Grand Mound UGA	Total	1,345	1,358	1,220	1,260	1,870	2,270	2,505	2,665	2,745
Chehalis Reservation	Total	64	58	50	50	65	65	65	65	65
Nisqually Reservation	Total	575	715	610	610	855	870	885	905	930
Total Cities		117,141	149,937	152,545	156,740	163,070	175,430	186,950	196,080	202,240
Total UGAs (1)		54,180	56,601	55,940	53,700	63,550	68,760	73,070	77,710	82,170
Total Reservations (2)		639	773	660	660	920	930	950	970	990
Rural Unincorporated County (3)		80,300	87,482	88,650	89,400	88,960	90,880	93,430	95,940	98,090
Thurston County Total		**252,264**	**294,793**	**297,800**	**300,500**	**316,500**	**336,000**	**354,400**	**370,700**	**383,500**

SOURCE Thurston Regional Planning Council
Small Area Population Estimates and Population and Employment Forecast (2018 Update)

NOTES Estimates are for April 1 and reflect city limits on that date. Numbers may not add due to rounding.
A decrease in UGA population may be due to annexation. TRPC's most recent forecast was completed before 2020 Census data were released and in some cases underestimated growth.
1) Urban Growth Area (UGA): Unincorporated area designated to be annexed into city limits over 20 years time to accommodate urban growth.
2) Reservations: Estimate is for Thurston County portion of reservation only.
3) Rural Unincorporated County is the portion of the unincorporated county that lies outside UGA and Reservation boundaries.

UPDATED 12/6/2022

Appendix B

Tenino Water Distribution Standards and Municipal Code

Footnotes:
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***State Law reference—** Given certain prerequisites, municipal water supplier has duty to provide retail water service within its retail service area, RCW 43.20.260; general health and safety requirements for public water systems, RCW 70.119A.060; beneficial uses of municipal water supply, RCW 90.03.550.*

12.04.010. - Findings; operation.

This chapter is declared necessary and essential for the health and welfare of the public as related to the operation of a water system for use by the residents of the city and any other users. The water department shall be operated under the requirements of the rules and regulations of the state board of health regarding public water systems and any other applicable state and/or county regulations to ensure the safety of the water supply system. The city shall be the only purveyor of water within the city limits. The city shall establish and maintain such rates as will provide sufficient revenues to meet the needs and obligations of the water department.

(Code 1988, § 13.04.010; Ord. No. 408, § 1, 1985)

12.04.020. - Definitions.

When used in this chapter, the following words and phrases have the meaning ascribed to them in this section, unless the context indicates a different meaning:

Clerk means the clerk-treasurer as employed by the city.

Independent user, for the purpose of assessing the surcharge established in TMC 12.04.250C, is defined as a separate residence or business entity which receives, or is able to receive, water through a meter through which another separate residence or business entity also receives, or is able to receive, its water.

Property means real property.

Superintendent means the public works superintendent as employed by the city, or any employee as designated by the superintendent.

Water department means the city water department.

(Code 1988, § 13.04.020; Ord. No. 475, § 1, 1990; Ord. No. 631, § 1, 1994; Ord. No. 774, § 1, 8-24-2010)

12.04.030. - Water department.

The city shall organize and maintain a water department under the regulations set out in this chapter.

(Code 1988, § 13.04.030; Ord. No. 408, § 2, 1985)

12.04.040. - Water service application.

6.

(a) Any person desiring to obtain water from the water supply system of the city shall make application in the c office during regularly scheduled business hours. Every application shall be made or co-signed by the owner property subject to the application or by his authorized agent. The applicant shall state fully and truly all the purposes for which the water is required including the number of independent users plumbed into the prop subject to the application. The applicant must agree to conform to all applicable rules and regulations. The applicant must further agree that the city shall have the right to shut off the water for emergency repairs wi notice and that the city shall not be responsible for any damages caused by emergency shutoff.

(b) Upon receipt of a completed water service application, a nonrefundable fee shall be paid by the applicant for water account activation. The amount of the fee shall be as established by the city council, from time to time.

(Code 1988, § 13.04.040; Ord. No. 475, § 2, 1990; Ord. No. 631, § 2, 1994)

12.04.050. - Connection by city.

When an application has been completed for the installation of water and the property abuts upon a street where there is a city water main, the superintendent shall connect the new service to the city's water system. Included in the installation will be a meter stop which shall thereafter be maintained by and kept within the exclusive control of the city.

(Code 1988, § 13.04.050; Ord. No. 408, § 5, 1985)

12.04.060. - Main extension or renewal.

The council, at its discretion, may order the extension or renewal of mains by a local improvement plan, as provided by law, and the water department may pay for the improvement, or whatever part is deemed equitable, as determined by the council.

(Code 1988, § 13.04.060; Ord. No. 408, § 6, 1985)

12.04.070. - Pipelaying; service maintenance.

A. All persons connecting to the city system, or laying their own private pipes, shall be required to use only American Water Works Association approved methods and materials. The superintendent will maintain private service from the main in streets which are being graded or regarded, and will have such access on private property as is necessary to maintain such pipes during the work. As soon as is reasonable and practical upon the completion of the work, the pipes shall be relaid.

B. Except for the cause described in subsection A of this section, owners shall maintain their private pipes from the end of the city service into their property. Should the superintendent find it necessary to maintain a private service, due to owner disregard, the owner shall relinquish all rights to the pipes. When necessary, the superintendent may slope service in on property to conform to the slope occasioned by the grading of the street and charge the expense to the owner.

(Code 1988, § 13.04.070; Ord. No. 408, § 7, 1985)

6. 4.080. - Service installation cost; service deposit.

A. Services shall be installed at the expense of the property owner, the services to be installed by the city and actual cost charged therefor. All services shall be constructed by the city through meter coupling on the customer's side.

B. Within the legal city limits, the applicant, in applying for water services, shall be charged and pay a connection fee plus installation costs. Outside the legal city limits, a 50 percent surcharge will be assessed. The amount of the fee shall be as established by the city council, from time to time. All revenues received for connection fees shall be deposited to the Water Capital Improvement Fund No. 420.

C. The fixed fee service charges shall be paid to the clerk prior to the installation of the service. Upon completion of the installation, the superintendent shall prepare and submit to the applicant the plus cost section of the connection fee. Upon payment of the plus cost, the water shall be turned on to the premises.

D. The provisions of subsections A and B of this section also apply where exchanges in the size of the service are made at the property owner's request. This charge shall include the actual cost of installation ("plus cost" amount) only and not the fixed rate. In case of replacements, no service smaller than five-eighths by three-fourths inch shall be installed.

(Code 1988, § 13.04.080; Ord. No. 408, § 8, 1985; Ord. No. 629, § 1, 1994)

12.04.090. - Separate services; connection assembly.

Before the water shall be turned on to the premises connected to the city system, the service pipes must conform to the following:

A. The service pipes must be so located that the supply for each separate house or premises is controlled by separate valves of standard make with an access box, be properly protected from frost, and placed within the premises so that all fixtures may be shut off.

B. The connection between the city's pipes and the service pipes must be made with a coupling so that the supply to each separate house or premises may be controlled by a separate stop valve.

(Code 1988, § 13.04.090; Ord. No. 408, § 9, 1985)

12.04.100. - Activation; reactivation.

A. New service owners shall notify the superintendent of the desire to have the system inspected and the water turned on.

B. Requests to discontinue service must be filed in the clerk's office during regularly scheduled business hours. Service will then be discontinued within two business days. No remission of rates will be made for a period of less than one calendar month, nor without the notice prescribed in this section. Reactivation

6. of service will be made within one business day of the account being paid in full, including payment in full of all arrearages on the account.

(Code 1988, § 13.04.100; Ord. No. 408, § 10, 1985; Ord. No. 653, § 1, 1997)

12.04.110. - Expanded use.

A. The use of city water beyond the purposes identified in an application filed pursuant to TCM 12.04.040 is unlawful. If a person desires to expand the purpose for which water is required beyond that identified in the current water service application, the person must file a new water service application pursuant to TCM 12.04.040.

B. After being put on notice by the city of the existence of an unlawful expanded use of city water, the property subject to the expanded use shall be assessed a charge per day until the expanded use is stopped or properly authorized pursuant to TCM 12.04.040. Further, the city reserves the right to disconnect water service to a property that is the subject of an unlawful expanded use. The amount of the per day charge shall be as established by the city council, from time to time.

(Code 1988, § 13.04.110; Ord. No. 653, § 2, 1997)

12.04.120. - Removal of connection.

A. The superintendent may remove the service connection in the following circumstances:
   1. Change of service location;
   2. New service on existing service site;
   3. Abandoned service;
   4. Enlargement of existing service.

B. Following removal, a new service connection shall follow the application procedure set forth in this chapter.

C. When the service connection of any premises does not come from a main in front of the premises, the superintendent shall, when a main is laid in front of the premises, transfer the service connection to the new main without charge and remove the old service connection. The superintendent shall notify the property owner of any such action prior to making the transfer.

(Code 1988, § 13.04.120; Ord. No. 408, § 12, 1985)

12.04.130. - Fire hydrants.

No person, except firemen, the superintendent, or a designee in charge of their duties shall open or in any way tamper with any fire hydrant or valve connected with the main of the city's water supply system. No person shall place upon or about any hydrant, meter or water gate connected to the city's system any building material or other substance so as to prevent free access at any and all times.

(Code 1988, § 13.04.130; Ord. No. 408, § 13, 1985)

6. 4.140. - Charges—Responsibility.

All water rates, service connections and assessments will be charged against the property to which they are furnished and shall become a lien against the property. If any sums owing therefor become delinquent, the water shall be shut off and in no case shall be reactivated on the same property until all delinquencies have been paid in full. No owner or occupant or other persons may reactivate the service until all arrearages, including assessments authorized by this chapter, are satisfied.

(Code 1988, § 13.04.140; Ord. No. 408, § 14, 1985; Ord. No. 653, § 3, 1997)

12.04.150. - Charges; unauthorized turnon.

Any unauthorized activation, reactivation or expansion of the city's water service is unlawful and a prohibited act that will subject the occupant of the property to an action by the city pursuant to TCM 12.04.280. A charge shall be assessed against the property each time the water is shut off by the city following an unlawful reactivation. After the third such assessment, a charge of $100.00 shall be assessed against the property each time the water is shut off following an unlawful reactivation. The amount of the charge shall be as established by the city council, from time to time.

(Code 1988, § 13.04.150; Ord. No. 408, § 15, 1985; Ord. No. 653, § 4, 1997)

12.04.160. - Authorization required to connect, tamper with or disconnect.

No plumber or other person will be allowed to make connection with the city mains or make connection with any conduit, pipe or any fixture connected therewith, or to connect pipes that have been disconnected, or to turn water on or off the premises, without permission of the superintendent, excluding emergency repairs.

(Code 1988, § 13.04.160; Ord. No. 408, § 16, 1985)

12.04.170. - Prohibited acts.

The following acts are prohibited:

A. To open, close, turn or interfere with, or attempt to interfere with, any fire hydrant or stop valve belonging to the water department without prior permission of the superintendent. This rule shall not apply to members of the fire department while acting in that capacity;
B. To disturb or damage any pipe, machinery or other property of the water department;
C. To throw refuse or any substance into any city reservoir or to throw any deleterious matter in or upon any part of the city's water buildings or water supply system;
D. To deface or injure any building or other structure or improvement of the water department;
E. To place anything foreign upon the grounds or any area under the control of the water department;
F. To disturb or injure any landscape improvement or ornamental item belonging to or under the control of the water department;

6.

G. To activate, reactivate, or expand water system service without permission of the superintendent and cc with all requirements of this chapter.

(Code 1988, § 13.04.170; Ord. No. 408, § 17, 1985; Ord. No. 653, § 5, 1997)

12.04.180. - Regulation of water use.

The council, whenever the public safety, health or equitable distribution of water so demands, may direct the superintendent to establish regulations required to ensure a continuing and adequate supply of water.

(Code 1988, § 13.04.180; Ord. No. 408, § 18, 1985)

12.04.190. - Sprinklers wetting passersby.

No nozzle or other sprinkling device shall be so placed as to intentionally throw water on any person passing by on the street or sidewalk.

(Code 1988, § 13.04.190; Ord. No. 408, § 19, 1985)

12.04.200. - Meters—Ownership and regulation.

The city reserves the right to place a meter on any or all service. All meters shall remain the property of the city, and may be installed or removed by the superintendent in conformity to rules and regulations provided in this chapter.

(Code 1988, § 13.04.200; Ord. No. 408, § 20, 1985)

12.04.210. - Same—Reading.

Reading of meters shall be by radio read or handheld device. All readings shall record the actual meter reading. When it is not possible to read the meter, estimates will be made and adjusted to actual at the next reading.

(Code 1988, § 13.04.210; Ord. No. 408, § 23, 1985; Ord. No. 774, § 2, 8-24-2010)

12.04.220. - Same—Rereading after complaint.

When any consumer whose water service is metered makes a complaint that the bill for any past time has been incorrect, the water department shall, upon written request, have such meter reread and the service inspected for leaks.

(Code 1988, § 13.04.220; Ord. No. 408, § 21, 1985; Ord. No. 653, § 6, 1997)

12.04.230. - Same—Replacement.

6. In all cases where meters are lost, injured or broken by carelessness or negligence of owners or occupants of the premises, they shall be replaced or repaired by or under the direction of the superintendent. The cost of such repair or replacement will be charged against the owner. In the event of nonpayment the water shall be shut off and will not be reactivated until the charge and the charge for turning the water off are paid.

(Code 1988, § 13.04.230; Ord. No. 408, § 25, 1985)

12.04.240. - Reserved.

Editor's note— Ord. No. 869, § 2, adopted January 24, 2017, repealed § 12.04.240, which pertained to billing. See Code Comparative Table for complete derivation.

12.04.245. - Adjustment of utility bills.

A. The city administrator, or his designee, is empowered to resolve billing disputes upon receipt of request to do so from a city utility customer. Upon receipt of such notice from the customer, the city administrator, or his designee, shall review the bill with the customer to see if the amount is justly owed. The customer shall have the right to have a meeting to bring forth reasons and evidence why such bill should not be due and owing.

B. When any customer in any given billing period has used, according to the water meter, a quantity of water which is more than double the average amount of water used on such premises in similar billing periods in prior years, and the water consumption is solely caused by a broken water pipe on the user's premises, the customer may make an application to the treasurer in writing for a reduction of the billing.

   1. If the application states a broken pipe on the customer's premises caused a large consumption of water, the existence of a broken pipe shall be verified by inspection by the public works employees. If it is established by presenting acceptable documentation demonstrating to the city that such broken pipe has been repaired, a reduction of the water bill to an amount that is the average of the prior four months plus one-half of the difference between the average and the existing disputed bill.
   2. The reduction provided for in this section shall not be allowed if such excess water consumption is due to a customer's neglect or failure to repair the broken pipe. A reduction in billing shall not be permitted if such excess consumption is due simply to leaky faucets or other plumbing fixtures.

C. Any water customer of the city may receive a maximum of one utility bill adjustment per year.

D. Utility bill adjustments shall not be granted if the customer, after notification by the city, refuses to make repairs within three business days or isolate the leak to prevent continued water loss from the city's water system.

E. Irrigation systems are specifically excluded from any adjustments due to leakage.

F. In newly developed property which does not have a prior service record, the appropriate water service charge will be based upon the charges for a similar type of water service and occupancy for the preceding year.

G. The application by the customer shall be on the forms provided by the city.

6. rd. No. 838, § 1, 3-11-2014)

12.04.250. - Rates.

A. The minimum monthly rate for service and the water used shall be assessed per independent user and based upon meter size as listed in subsection B of this section. The council shall have the power to adjust rates to ensure adequate revenues are available for the maintenance and upgrading of the water system.

B. The minimum monthly rate and overage rate shall be assessed as follows:

1. *Building classification.*

a. Residential, duplex, triplex and fourplex: $25.30 per unit plus surcharge per unit (one-inch meter or less).

b. Apartment (multifamily): One meter charge plus surcharge per unit.

c. Commercial/industrial: One meter charge plus surcharge per unit.

d. Mixed use A (commercial and residential): $25.30 per unit plus surcharge/unit and one meter charge plus surcharge.

e. Mixed use B (commercial and apartment): Two meter charges plus surcharge per unit.

f. Residential (outside city limits): $45.60 plus surcharge.

g. Senior citizen (in city only): $19.30 plus surcharge.

h. Developed property (other): One surcharge.

2. *Meter rates.*

a. Up to three-fourth-inch meter: $25.30.

b. One-inch meter: $29.36.

c. 1½- to two-inch meter: $41.54.

d. Over two-inch meter: $52.50.

3. *Overage.*

a. Within city boundaries after 500 cubic feet: $1.25 per 100 cubic feet.

b. Outside city boundaries after 300 cubic feet: $2.00per 100 cubic feet.

c. Senior rate (in city only) after 300 cubic feet: $1.00per 100 cubic feet.

C. Effective June 1, 2008, in addition to the applicable minimum rate and overage charge, a surcharge of $18.30 per month will be charged to each meter. If a meter has independent users, that meter will be charged $18.30 per each independent user. The $18.30 per month surcharge per independent user will be charged to the meter regardless of the current occupancy of independent units within/with on the property. Each such unit capable of receiving water shall be considered to be receiving water for the purpose of this surcharge. Revenues generated by this surcharge shall be deposited in the city's water capital improvement fund to be used by the combined water/sewer utility. Upon connection to the sewer utility, the combined utilities surcharge for that independent user of $18.30 per month will be reduced to $3.80 per month.

6.

D. Should a meter become out of order and fail to register accurately, the charge shall be according to the aver quantity of water used for a period of three months, as shown by the meter when in order. The superintend shall ensure an accurate meter is installed.

E. Rates for the sale of bulk water out of fire hydrants or other distribution points shall be as follows:

Base charge, use of hydrant and rental of hydrant meter	$31.90
First 300 cubic feet	17.55
Each additional 100 cubic feet	1.05

Sale of bulk water must be approved and supervised by the public works director for the city or its appointee.

F. Water rates for active water services which are located outside of the city boundaries as of January 1, 1995, for which annexation petitions are received, shall be calculated based upon meter size for the same rate as meters within city boundaries.

(Code 1988, § 13.04.250; Ord. No. 485, § 1, 1991; Ord. No. 631, § 4, 1994; Ord. No. 635, § 1, 1995; Ord. No. 688, § 1, 2002; Ord. No. 709, §§ 1, 3, 2005; Ord. No. 743, § 1, 5-27-2008; Ord. No. 767, §§ 1, 2, 12-8-2009; Ord. No. 774, §§ 5, 6, 8-24-2010; Ord. No. 856, § 2, 10-27-2015)

12.04.255. - Reuse water rates and charges.

A. *Reuse water rates and charges (no free service).* The city will not furnish any service of the system to any customer whatsoever free of charge.

B. *Classifications.*

1. Residential.
2. Commercial.
3. Industrial. Sand and gravel pits.
4. The reclaimed water service base charge for industrial, sand and gravel pits shall be monthly as follows:

Meter Size (inches)	Amount
¾	$ 7.59
1	8.81

1½	12.46
2	15.75
3	22.68
4 plus	32.66

5. The reuse water service consumption charge for each service per month shall be as follows:

From	To	Rate/c.f.
Zero	5,000	$0.0040
5,001	20,000	0.0033
20,000	50,000	0.0027
50,001 and above		0.0020

C. *Normal billing period.* The normal billing period for customers shall be a two-month cycle and shall be that period falling between two consecutive water meter read dates; provided, however, the city may elect to change to a monthly utility billing cycle for accounts when feasible. During change of ownership, utility charges for periods of less than two months shall be prorated.

D. *COLA increases.* All rates are subject to annual COLA increases.

(Code 1988, § 13.04.255; Ord. No. 732, § 1, 2007)

12.04.260. - Amendment of provisions.

On or about September 1 of each year, the city clerk-treasurer shall cause the city council to review the then-existing water rates to consider whether such water rates are sufficient to meet the long-term needs of the city water system.

(Code 1988, § 13.04.260; Ord. No. 485, § 2, 1991)

12.04.270. - Policies and procedures document.

6. The council shall prepare, or cause to be prepared, a document entitled policies and procedures. The document is to be reviewed regularly and amended or modified as deemed appropriate by council.

(Code 1988, § 13.04.270; Ord. No. 408, § 28, 1985)

12.04.280. - Violation; penalty.

Each and every violation or infraction of any of the rules and regulations established by this chapter, in addition to any specific penalties attached thereto, constitutes a separate offense. Any person found guilty of such violation or infraction shall, upon conviction, be fined in accordance with TMC chapter 1.16.

(Code 1988, § 13.04.280; Ord. No. 408, § 27, 1985)

12.04.290. - Sewer rates and charges.

A. Sewer rates and charges will be $94.00/equivalent residential unit as determined by Ordinance No. 758.
    1. Shared grinder pumps per TMC 13.08.110 shall reflect a credit of $3.00/ERU on the monthly rate for the independent user providing the electricity to operate the grinder pump.
    2. Shared grinder pumps per TMC 12.08.110 shall reflect an additional charge of $3.00/ERU on the monthly rate for the independent user not providing the electricity to the grinder pump.
B. Normal billing period. The normal billing period for customers shall be a monthly cycle.
C. Billings for services are after the fact and not prorated, services provided prior to the 15th of any month will be billed for that full month.
D. All rates are subject to periodic review by city council.

(Ord. No. 767, § 1, 12-8-2009)

CHAPTER 12.10. - CROSS CONNECTIONS

12.10.010. - Definitions.

Except where specifically designated herein, all words used in this document and the city's guidance manual shall carry their customary meanings. Any definition not found in this section will take its meaning from WAC titles 246 through 290, or as amended, or in the most recent the manual as determined by the state department of health.

Approved backflow prevention assembly , *backflow assembly* or *assembly* means an assembly to counteract backpressures or prevent backsiphonage. This assembly must appear on the list of approved assemblies issued by the state department of health. The assembly must be purchased and installed as a complete unit including two shutoff valves and test cocks.

Auxiliary supply means any water source or system other than City of Tenino's water.

6. *Backflow* means the flow of water or other liquids, gases or solids from any source back into the distribution system. The flow of water in the opposite direction of its intended flow.

Backflow assembly tester means a person holding a valid BAT certificate issued in accordance with WAC 246-290-490 and chapters 18.27, 18.106 and 70.119 RCW.

Backpressure means backflow due to water pressure on the downstream side of the meter which exceeds the operating pressure of the public potable water supply.

Backsiphonage means backflow due to a negative or reduced pressure within the public potable water supply.

Contamination means the entry into or presence in a public water supply system of any substance which may be harmful to health and/or quality of the water.

Cross connection means any physical arrangement where a public water system is connected, directly or indirectly (actual or potential), with any other nondrinkable water system or auxiliary system, wells, sewer, drain conduit, swimming pool, storage reservoir, plumbing fixture, swamp coolers, or any other device which contains, or may contain, contaminated or polluted water, sewage, used water, or other liquid of unknown or unsafe quality which may be capable of imparting contamination or pollution to the public water system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross connections.

Cross connection specialist or *specialist* means a person holding a valid cross connection specialist certificate issued in accordance with the Washington Administrative Code and that is employed by or under contract with the city.

Degree of hazard means the low or high hazard classification that shall be attached to all actual or potential cross connections.

Director means the public works director.

DOH means the Washington Department of Health.

Guidance manual means the most recent edition of the guidance manual written specifically for the city.

High health hazard means the classification assigned to an actual or potential cross connection that could allow a substance of a physical, toxic, or biological nature to backflow into the potable water supply. This substance could cause illness or death.

In-premises protection means a method of protecting the health of consumers served by the customer's plumbing system (i.e., located within the property lines of the customer's premises) by the installation of an approved air gap, backflow prevention assembly or device at the point of hazard.

Local administrative authority means the local official, board, department or agency authorized to administer and enforce the provisions of the uniform plumbing code and all other plumbing codes recognized by the state.

6. *Plumbing hazard* means an internal or plumbing-type cross connection in a consumer's potable water system that may be either a pollutional or a contamination-type hazard. The term "plumbing hazard" includes, but is not limited to, cross connections to toilets, sinks, lavatories, wash trays, domestic washing machines and lawn sprinkling systems. Plumbing-type cross connections can be located in all types of structures including, but not limited to, homes, manufactured homes, apartment houses, hotels and commercial or industrial establishments.

Pollutional hazard means an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

Potable water supply means any system of water supply intended or used for human consumption or other domestic use and meets all requirements established by the Safe Drinking Water Act and the DOH regulations.

Premises means any piece of property to which water is provided including, but not limited to, all improvements, mobile structures and structures located on it.

Premises isolation means a method of protecting a public water system by installation of an approved double check valve assembly or a reduced pressure backflow assembly at the point of service (where the city loses control of the water supply) to separate the customer's plumbing system from the purveyor's distribution system.

Reduced pressure principle backflow prevention assembly, reduced pressure principle assembly or *RP assembly* means an assembly containing two independently acting approved check valves together with a hydraulically operated, mechanically independent pressure differential relief valve located between the check valves. The assembly shall include properly located test cocks and tightly closing shutoff valves at each end of the assembly.

Thermal expansion means the pressure created by the expansion of heated water.

Used water means any water supplied by the city to a customer's property after it has passed through the service connection and is no longer under the control of the city.

(Code 1988, § 13.10.010; Ord. No. 696, § 1:01, 2004)

12.10.020. - Purpose.

The purpose of this chapter is to protect the water system of the city from contamination or pollution due to any existing or potential cross connections as defined in WAC 246-290-010, or as amended, and this chapter.

(Code 1988, § 13.10.020; Ord. No. 696, § 1:02, 2004)

12.10.030. - Cross connections regulated.

A. No cross connections shall be created, installed, used or maintained within the area served by the city, except in accordance with this chapter.

B. The specialist for the city shall carry out or cause inspections to be carried out to determine if any actual

6.

or potential cross connections exist. An assembly commensurate with the degree of hazard, if found necessary, will be required to be installed at the service connection.

C. The owner, occupant or person in control of the property is responsible for all cross connection control within the premises.

D. All high health hazard premises which are defined in table 9 of WAC 246-290-490, or as amended, are required to have premises isolation by installing a reduced pressure principle assembly in accordance with this chapter.

(Code 1988, § 13.10.030; Ord. No. 696, § 1:03, 2004)

12.10.040. - Application and responsibilities.

This chapter applies throughout the city and to every premises and property served by the city. It applies to any premises, public or private, regardless of date of connection to the city water. Every owner, occupant and/or person in control of any concerned premises is responsible for compliance with the terms and provisions contained herein.

(Code 1988, § 13.10.040; Ord. No. 696, § 1:04, 2004)

12.10.050. - Backflow prevention assembly requirements.

(a) A specialist employed by or under contract with the city shall determine the type of backflow assembly to be installed within the area served by the city. All assemblies shall be installed at the service connection unless it is determined by the specialist to install the assembly at an alternate location.

(b) The cross connection shall be eliminated or an assembly shall be required to be installed in each of the following circumstances, but the specialist is in no way limited to the following circumstances:

A. The nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the potable water supply;

B. Premises having any one or more cross connections or potential cross connections as that term is defined in TMC 12.10.010 and the WAC;

C. When a cross connection survey report form is required by the city and has not been received;

D. Internal cross connections are present that are not correctable;

E. Intricate plumbing arrangements exist or plumbing subject to frequent changes are present that make it impractical to ascertain whether or not cross connections exist;

F. There is a repeated history of cross connections being established or re-established;

G. There is unduly restricted entry so that inspections for cross connections cannot be made with sufficient frequency to ensure that cross connections do not exist;

H. Materials, chemicals or any substance or apparatus is being used that if backflow occurred contamination would result;

I. Installation of an approved backflow prevention assembly is deemed to be necessary in the judgment of the specialist to accomplish the purpose of this chapter;

J. Any premises having an auxiliary water supply;

K. In the event an in-premises assembly has not been tested or repaired as required by WAC 246-290-490, or as amended, and this chapter;

L. If it is determined that additions or rearrangements have been made to the plumbing system without obtaining proper permits as required by the city's code enforcement division;

M. When a garden hose attachment is connected to the premises' plumbing, including but not limited to fertilizer applicators, pesticide applicators and radiator flush kits;

N. Wherever the actual or potential of backpressure exists;

O. Wherever the conditions for back-siphonage exist.

(Code 1988, § 13.10.050; Ord. No. 696, § 1:05, 2004)

12.10.060. - Irrigation systems.

All irrigation systems shall be protected in accordance with the plumbing code regulations. In the event any system is equipped with an injector system, or has submerged heads, a reduced pressure principle assembly will be required. If the irrigation system comes directly off the main with a designated line, a minimum of a double check assembly is required. If there is irrigation water supplied by a separate system and that system can be connected to the potable system, an assembly will be installed as required by the WAC.

(Code 1988, § 13.10.060; Ord. No. 696, § 1:06, 2004)

12.10.070. - Fire systems.

An approved double check backflow prevention assembly shall be the minimum protection on all new fire sprinkler systems using piping material that is not approved for potable water use, and/or that does not provide for periodic flow-through. A reduced pressure principle backflow prevention assembly must be installed, if any solution other than the potable water can be introduced into the sprinkler system. Retrofitting on fire sprinkler systems will be required in each of the following circumstances:

A. Where improper maintenance has occurred;

B. On all high hazard systems;

C. Wherever a specialist deems necessary; and

D. Wherever required by the WAC.

(Code 1988, § 13.10.070; Ord. No. 696, § 1:07, 2004)

12.10.080. - Temporary meters and hydrant valves.

Backflow protection will be required on all temporary meters and hydrant valves before any use. The type of assembly will be commensurate with the degree of hazard and will be determined on a case-by-case basis by the city's specialist.

6. ode 1988, § 13.10.080; Ord. No. 696, § 1:08, 2004)

12.10.090. - Mobile units.

Any mobile unit or apparatus, as defined in TMC 12.10.010, which uses the water from any premises within the city's water system shall first obtain a permit from the city and be inspected to ensure appropriate backflow prevention is installed in accordance with the most recent edition of the city's guidance manual. The city reserves the right to revoke the business license of the owner of the apparatus or mobile unit if the owner fails to comply with these procedures.

(Code 1988, § 13.10.090; Ord. No. 696, § 1:09, 2004)

12.10.100. - Right-of-way encroachment.

A. No person shall install or maintain a backflow prevention assembly upon or within any city right-of-way except as provided in this section.
B. The city reserves the right to have an assembly installed in the right-of-way.
C. A backflow prevention assembly required by the city may be installed upon or within any city right-of-way only if the owner proves to the city that there is no other feasible location for installing the assembly, and installing it in the right-of-way will not interfere with traffic or utilities. The city retains the right to approve the location, height, depth, enclosure, and other requisites of the assembly prior to its installation.
D. All permits required by the city code to perform work in the right-of-way shall be obtained.
E. A property owner shall, at the request of the city and at the owner's expense, relocate a backflow prevention assembly which encroaches upon any city right-of-way, when such relocation is necessary for street or utility construction or repairs for purposes of public safety.

(Code 1988, § 13.10.100; Ord. No. 696, § 1:10, 2004)

12.10.110. - Plumbing code.

As a condition of water service, customers shall install, maintain, and operate their piping and plumbing systems in accordance with all state plumbing codes and the 2009 Uniform Plumbing Code, or as amended, and TMC chapters 12.04 and 12.06.

(Code 1988, § 13.10.110; Ord. No. 696, § 1:11, 2004; Ord. No. 744, 7-22-2008)

12.10.120. - Testing and repairs.

(a) Backflow prevention assemblies shall be tested and repaired in accordance with the requirements set out in the WAC, the RCW, and this chapter.
(b) All presently installed backflow prevention assemblies that do not meet the requirements of this chapter, but were approved assemblies for the purpose described herein at the time of installation, are commensurate with the degree of hazard and that have been properly maintained, shall, except for the

6. inspection and maintenance requirements, be excluded from the requirements of these rules so long as the city is ensured that they will satisfactorily protect the utility system. Whenever the existing assembly is moved from the present location, requires more than minimum maintenance, or parts are no longer available, the unit shall be replaced by an approved backflow prevention assembly.

(Code 1988, § 13.10.120; Ord. No. 696, § 1:12, 2004)

12.10.130. - Responsibilities of backflow prevention assembly testers.

(a) All backflow assembly testers operating within the city shall be certified in accordance with all applicable regulations and shall comply with all stipulations in this chapter and the most recent edition of the city's guidance manual. All backflow assembly testers are required to carry a minimum liability insurance policy of $5,000.00.

(b) Testers are required to register with the city in accordance with the most recent edition of the guidance manual.

(Code 1988, § 13.10.130; Ord. No. 696, § 1:13, 2004)

12.10.140. - Maintenance of assemblies.

Backflow prevention assemblies shall be maintained in accordance with the requirements set out in the WAC, or as amended, and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.140; Ord. No. 696, § 1:14, 2004)

12.10.150. - Installation requirements and specifications.

(a) Backflow prevention assemblies shall be installed in accordance with the requirements set out in the WAC and the most recent edition of the city's guidance manual.

(b) In the event the specialist allows a premises isolation assembly to be installed at an alternate location, there shall be no interties or connections between the meter and the premises isolation assembly.

(Code 1988, § 13.10.150; Ord. No. 696, § 1:15, 2004)

12.10.160. - Thermal expansion.

If a closed system has been created by the installation of a backflow prevention assembly, it is the responsibility of the property owner to eliminate the possibility of thermal expansion.

(Code 1988, § 13.10.160; Ord. No. 696, § 1:16, 2004)

12.10.170. - New construction and/or occupancy change.

In all new construction, an approved backflow assembly shall be installed at the service connection. The type of the assembly shall be commensurate with the degree of hazard as determined by a specialist.

(Code 1988, § 13.10.170; Ord. No. 696, § 1:17, 2004)

12.10.180. - Retrofitting.

Retrofitting shall be required at all service connections where an actual or potential cross connection exists, and wherever else the city deems retrofitting necessary to comply with the WAC, this chapter, and the most current edition of the city's guidance manual.

(Code 1988, § 13.10.180; Ord. No. 696, § 1:18, 2004)

12.10.190. - Costs of compliance.

All costs associated with the purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the responsibility of the property owner, their renter, lessee, agent, or personal representative.

(Code 1988, § 13.10.190; Ord. No. 696, § 1:19, 2004)

12.10.200. - Recovery of costs.

(a) Any water customer violating any of the provisions of this chapter and who causes damage to or impairs the city's water system, including, but not limited to, allowing contamination, pollution, any other solution or used water to enter the city's water system, shall be liable to the city for any expense, loss or damage caused by such violation. The city shall collect from the violator for the cost incurred by the city for any cleaning, purifying, repair or replacement work or any other expenses caused by the violation. Refusal to pay the assessed costs shall constitute a violation of this chapter and shall result in the termination of service.

(b) All cost associated with any disconnect fees resulting from the enforcement of this chapter are the sole responsibility of the property owner.

(Code 1988, § 13.10.200; Ord. No. 696, § 1:20, 2004)

12.10.210. - Termination of service.

Failure on the part of any property owner, their renter, lessee, agent or personal representative to discontinue the use of all cross connections, to physically separate cross connections or to abide by all the conditions of this chapter is sufficient cause for the immediate discontinuance of water service by the city to the premises.

(Code 1988, § 13.10.210; Ord. No. 696, § 1:21, 2004)

12.10.220. - Emergency suspension of service.

The director or their designee may, without prior notice, suspend water service to any premises when such suspension is necessary to stop the eminent threat of any actual or potential cross connection as defined in this chapter and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.220; Ord. No. 696, § 1:22, 2004)

12.10.230. - Nonemergency suspension of service.

The director or their designee may suspend, with 24-hour notice, the water supply to any premises where the conditions of this chapter or the most recent edition of the city's guidance manual have been violated.

(Code 1988, § 13.10.230; Ord. No. 696, § 1:23, 2004)

12.10.240. - Falsifying information.

Any person who knowingly makes any false statement, representation, record, report or other document filed or required to be maintained pursuant to this chapter, or who falsifies, tampers with, or knowingly renders inaccurate any backflow assembly, device or method required under this chapter shall (in addition to civil and/or criminal penalties provided by state law) be guilty of a misdemeanor subject to the general penalty clause of City of Tenino's guidance manual.

(Code 1988, § 13.10.240; Ord. No. 696, § 1:24, 2004)

CHAPTER 12.20. - UNIFORM UTILITY BILLING SYSTEM

12.20.001. - Billing generally.

There shall be one uniform billing and collection procedure for all city utility services, including but not limited to water, sewer, and storm sewer.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.005. - Authorized officers designated.

A. The clerk/treasurer, or authorized designee, shall keep an account for water, sewer and storm sewer service used by any person, business, or other entity within the city. Such services shall be paid for by every utility account within the city.

B. The clerk/treasurer, or authorized designee, shall place against these accounts all charges for water, sewer and storm sewer service that are to be paid by every utility account, when these services are used by such person, business or other entity. Any service charges or other charges that are connected with the provision of utility services shall likewise be placed against these accounts. All charges shall be made in accordance with the terms of those ordinances and resolutions of the city establishing the rates and fees for such services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.007. - Creation of accounts; deposits on renter-occupied premises.

6. At the time an account for either residential or commercial renter-occupied premises is requested and before it is authorized, the clerk/treasurer or his/her designee shall require that the person requesting services deposit with the city a sum of money that shall be set by the city council by resolution. This deposit can be reduced to the minimum allowed by ordinance if the property owner agrees in writing to assume financial responsibility for any unpaid balance in excess of the deposit amount and the property owner files such written agreement with the clerk/treasurer or designee prior to the account being established in the tenant's name. This provision does not in any way affect the property owner's liability for charges or the lien rights of the city against the premises to which the services are furnished as provided in TMC 12.20.080. Nothing in this chapter shall prevent the city from requiring additional or new deposits, when the conditions so warrant.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.010. - Bills—Preparation, delivery.

A. The city shall cause a single utility bill, covering all utility services that are furnished by or through the city during the preceding month or accounting period, to be prepared and rendered on a monthly basis to each customer of utility service.

B. Such bill shall be due and payable by the last day of the month from and after the date of mailing.

C. Once prepared, this bill shall be delivered to the customer by depositing it in the United States mail, addressed either to the address shown on the application for utility service or to any change of address that has been submitted by the customer to the city.

D. Deposit in the United States mail pursuant to subsection C. of this section shall be deemed full and complete notice to the customer of the nature and amount of any particular utility billing.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.015. - Budget payment plan.

The clerk/treasurer, or authorized designee, is hereby authorized to create and implement a budget payment plan in accordance with state law. Such a plan shall permit the authorized customer to make payments of utility charges on an annual averaged basis rather than on a monthly basis, with at least one annual adjustment to ensure that the amount paid on an annual basis reflects the actual charges incurred.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.020. - Leak adjustments.

When excessive water meter registration is caused by broken or leaking water service pipes within or abutting upon the premises without the knowledge of the customer, an adjustment may be made upon written application for one month only and for two months in the case of monthly billing during a 12-month period and after repairs have been made. The basis for adjustment shall be the normal consumption for the property in question under similar operating conditions.

6. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.030. - Bills delinquent.

If the bill rendered as provided in TMC 12.20.010 is not paid when due, it shall be considered delinquent ten days after the due date and a late fee that shall be set by the city council by resolution shall be added to the delinquent account. Additionally, in order to reimburse the city for carrying the unpaid balance, the city shall impose interest on the total remaining unpaid balance at a rate that shall be set by the city council by resolution until such time as the bill is paid in full. At no time will the amount of interest actually charged exceed the maximum amount allowable under state law.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.040. - Payment delinquent—Service discontinued.

In the absence of any special arrangement or agreement with the city concerning payment, if a utility bill or any part thereof remains delinquent and unpaid beyond the next subsequent billing cycle, a notice to the effect that if the delinquent utility charges, together with the prior delinquent charges, are not paid in full within seven days from the date of mailing of the notice, the city shall, within 48 hours thereafter, proceed to shut off and discontinue utility services to the premises until all utility charges are paid in full.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.045. - Notice of delinquent account.

A. *Notice.* If an account for utility service remains delinquent beyond seven days, the city shall notify the customer that service will be disconnected without further notice unless the delinquent account and all penalties are immediately paid in full, or special arrangements are made in accordance with TMC 12.20.050. Delivery of the notice shall occur in a way reasonably calculated to apprise the customer of the notice's contents. The notice shall also inform the customer of the date on which service may be disconnected, which shall be not less than 48 hours following delivery of the notice. The notice of delinquent account shall further state that if the consumer has questions or disputes concerning the amount of payment due, he or she may appeal to the clerk/treasurer, or authorized designee, whose address and telephone number shall be stated on the notice of delinquent account.

B. *Disconnection of service.* If no notice is made to the city that the bill is disputed prior to the time indicated in the customer's notice as the date on which service may be disconnected, the city shall proceed by disconnecting water service to the delinquent customer's premises. All reconnections of service shall be subject to the provisions and fees outlined in TMC 12.20.70 or 12.20.075, whichever is applicable.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.050. - Payment delinquency; enforcement actions.

A. The clerk/treasurer, or his designee, is hereby authorized and directed to promulgate administrative policies procedures for the implementation of this chapter.

B. If the customer is unable to pay the full amount of utility charges because of temporary financial difficulties or other hardship, the clerk/treasurer, or his designee, may permit the customer to make deferred payment arrangements upon written application; provided, however, that the city will be under no obligation to enter into any deferred payment agreement with any customer who has not fully and satisfactorily complied with terms of any previous agreement.

C. Failure to abide by the terms of the arrangement shall be cause for shut-off and discontinuance of utility services until the total utility charges that are due are paid in full.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.053. - Deferred payments arrangements—Penalty, assessed.

If arrangements for deferred payments have been made, the clerk/treasurer, or authorized designee, shall assess against such accounts the same penalty fees as set forth in TMC 12.20.030.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.055. - Delinquent account—Refusal of other city services.

If a bill becomes delinquent, no officer, agent, or employee of the city may authorize or permit any further city service or process any application for a permit from the city, when such application has been requested by the person in whose name an account stands delinquent; this requirement shall remain in effect until the delinquent account is paid in full. This section, however, shall not apply to the provision of water, sewer and storm sewer service, but shall apply to connections, inspections, engineering and other like services furnished by the water, sewer and storm sewer utilities.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.057. - Service charge for returned checks.

A service charge, which shall be set by the city council by resolution, shall be imposed upon any customer who, in full or partial payment of a city utility bill, tenders a check, which is thereafter returned to the city as a result of insufficient funds in the customer's checking account.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.060. - Service discontinuance—For other than payment failure.

In addition to nonpayment of a utility bill, the city may shut off and discontinue any or all utility services to a customer for failure to pay connection charges for any utility service furnished to such customer, or for the fraudulent, illegal or unauthorized use or abuse of any utility service, or the failure or refusal of the customer to

6. mply with all rules, regulations or ordinances pertaining to the receipt and use of utility services furnished by the city.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.070. - Disconnection of utility services.

After the discontinuance of service, should a customer continue to fail to pay a delinquent bill pursuant to TMC 12.20.030, the clerk/treasurer, or his/her designee, shall cause services to be physically disconnected (cut off) from the premises. Such services shall be reconnected to the premises only upon full payment of all delinquent utility charges, and correction of any fraudulent, illegal or unauthorized use or abuse of any utility service, applicable to the particular premises, irrespective of who may have incurred the charges or who may have been responsible for the fraudulent, illegal or unauthorized use or abuse of utility services. In addition, one single reconnection fee, which shall be set by the city council by resolution, shall be charged and paid prior to the reconnection of any utility service that was actually cut off and discontinued and that will require such reconnection to be made during regular working hours.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.075. - Reconnection of utility services.

A charge, which shall be set by the city council by resolution, shall be assessed for reconnections made at a customer's request outside of regular working hours. After-hours reconnections shall only be performed after the customer signs a written promissory note indicating that payment of all charges will be made to the city prior to 3:00 p.m. on the following business day. Failure to make payment in accordance with the provisions of the promissory note will result in termination of water services without further notice.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.080. - Liability for charges.

All owners of property shall remain ultimately and legally liable for the payment of any and all utility charges to the premises, regardless of whether such property is used for single-family, multiple dwelling or commercial purposes and regardless of the fact that the billings are made in the name of a tenant or other occupant of the premises. Such billings are for personal convenience only and shall not in any way affect the lien rights of the city against the premises to which the services are furnished.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.090. - Right of lien.

(a) In addition to the right herein provided to shut off and discontinue utility service, the city shall have a lien for delinquent and unpaid utility charges, including any late charges, fees, and interest, against the premises to which such utility service has been furnished or is available. The lien shall be effective for a

total of not to exceed six months' delinquent charges without the necessity of any writing or recording. In order to make such lien effective for more than six months, the clerk/treasurer shall cause to be filed for record in the office of the county auditor of Thurston County a notice in substantially the following form:

Utility Lien Notice

City of Tenino,)
)
v.)

Reputed Owner.)
)

- -

NOTICE IS HEREBY GIVEN that the City of Tenino has and claims a lien for unpaid utility charges against the following described premises situated in Thurston County, Washington, to wit:

(Here insert legal description of premises.)

Said lien is claimed for not exceeding six months charges and interest now delinquent, amounting to $_____, and is also claimed for future utility charges against said premises.

DATED this _____ day of _____, 20___.

CITY OF TENINO
By _____.

(b) The lien notice shall be signed by the clerk/treasurer. The lien notice shall be recorded as prescribed by law. Any costs of such recording shall be added to the delinquent account and will be included in the total amount to be paid prior to removing the lien. Any costs associated with removing such a lien will also be added to the account and must be paid according to the provisions of TMC 12.20.020.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.100. - Out-of-city service—Billing.

With respect to out-of-city utility service furnished by the city, particularly out-of-city sewer service, the clerk/treasurer or authorized designee shall cause monthly bills for such out-of-city utility service to be prepared and mailed to each customer, which bills shall become due and payable the last day of the month from and after the date of mailing. The owner of the premises shall remain at all times responsible for such utility services, irrespective of the actual occupant or user of such services who shall likewise be and remain liable to the city for such utility services. No tenant deposits shall be available on out-of-city utility services.

6. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.110. - Out-of-city service—Charge payment failure—Service discontinuance.

Failure to pay out-of-city utility charges within seven days after mailing of a notice of delinquency substantially in the form provided in TMC 12.20.045, or the failure to comply with any and all other ordinances and/or contract provisions governing out-of-city service, including payment of connection charges and latecomer agreement charges, shall be grounds to immediately disconnect and discontinue all utility services furnished by the city to such premises. Reconnection will be permitted only upon payment of all delinquent charges and compliance with all ordinances and contract provisions, plus payment of all costs expended in the disconnecting and reconnection of such premises to such utility service or services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.120. - Out-of-city service—Right of lien.

Notwithstanding the provisions of TMC 12.20.110, the city reserves the right to any and all liens authorized by law in connection with the collection of unpaid utility charges and to pursue such liens and other available collection or enforcement remedies separately, concurrently or conjunctively.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.130. - Utility lien foreclosure—Authorized when.

The city may foreclose its utility lien in an action in the superior court of Thurston County. All or any of the tracts subject to the lien may be proceeded against in the same action, and all parties appearing of record as owning or claiming to own, having or claiming to have any interest in or lien upon the tracts involved in the action shall be impleaded in the action as parties defendant. An action to foreclose a utility lien pursuant to a lien notice filed as required by this chapter must be commenced within two years from the date of filing thereof. An action to foreclose a six months' lien may be commenced at any time after six months subsequent to the furnishing of the utility service for which payment has not been made. The service of summons and all other proceedings except as provided specifically under this chapter, including appeal, order of sale, sale, redemption and issuance of deed shall be governed by the statutes of the state of Washington now or hereafter in force relating to the foreclosure of mortgages on real property. The terms "judgment debtor" or "successor in interest" in the statutes of the state of Washington governing redemption when applied under this chapter shall include an owner or a vendee. All sales shall be subject to the right of redemption within one year from date of sale. At any time after deed is issued to it pursuant to a foreclosure of a lien, the city may lease or sell or convey the property conveyed thereunder at public or private sale for such price and on such terms as may be determined by the resolution of the city council.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.140. - Utility lien foreclosure—Trial.

6. A utility lien foreclosure action shall be tried before the court without a jury. The court may allow, in addition to the delinquent charges and interest, such attorneys' fees as the court may adjudge reasonable. If the owners and parties interested in any particular account default, the court may enter judgment of foreclosure and sale as to such parties and accounts and the action may proceed as to the remaining defendants and accounts. The judgment shall specify separately the amount of the utility charges, with interest, penalty and costs chargeable to each account. The judgment shall have the effect of a separate judgment as to each account described in the judgment and any appeal should not invalidate or delay the judgment except as to the property concerning which the appeal is taken. The judgment of the court shall order the accounts therein described sold at one general sale, and an order of sale shall issue pursuant thereto for the enforcement of the judgment. Judgment may be entered as to any one or more separate accounts involved in the action and the court shall retain jurisdiction of other properties.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.150. - Utility lien—Enforcement—Alternative method.

As an additional and concurrent method of enforcing the lien authorized under this chapter, the City of Tenino may shut off and discontinue any or all utility services to the premises to which such utility service was furnished after the charges become delinquent and unpaid, and until the charges are paid. The right to enforce the lien by cutting off and refusing utility services shall not be exercised after two years from the date of the recording of the utility lien notice provided under this chapter except to enforce the payment of six months' charges for which no lien notice is required to be recorded.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.160. - Statutes adopted by reference.

A. Chapter 9A.61 of the RCW is adopted in its entirety by reference.

B. RCW 80.28.240 is hereby adopted by reference.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

6.

12.10.010. - Definitions.

Except where specifically designated herein, all words used in this document and the city's guidance manual shall carry their customary meanings. Any definition not found in this section will take its meaning from WAC titles 246 through 290, or as amended, or in the most recent the manual as determined by the state department of health.

Approved backflow prevention assembly , *backflow assembly* or *assembly* means an assembly to counteract backpressures or prevent backsiphonage. This assembly must appear on the list of approved assemblies issued by the state department of health. The assembly must be purchased and installed as a complete unit including two shutoff valves and test cocks.

Auxiliary supply means any water source or system other than City of Tenino's water.

Backflow means the flow of water or other liquids, gases or solids from any source back into the distribution system. The flow of water in the opposite direction of its intended flow.

Backflow assembly tester means a person holding a valid BAT certificate issued in accordance with WAC 246-290-490 and chapters 18.27, 18.106 and 70.119 RCW.

Backpressure means backflow due to water pressure on the downstream side of the meter which exceeds the operating pressure of the public potable water supply.

Backsiphonage means backflow due to a negative or reduced pressure within the public potable water supply.

Contamination means the entry into or presence in a public water supply system of any substance which may be harmful to health and/or quality of the water.

Cross connection means any physical arrangement where a public water system is connected, directly or indirectly (actual or potential), with any other nondrinkable water system or auxiliary system, wells, sewer, drain conduit, swimming pool, storage reservoir, plumbing fixture, swamp coolers, or any other device which contains, or may contain, contaminated or polluted water, sewage, used water, or other liquid of unknown or unsafe quality which may be capable of imparting contamination or pollution to the public water system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross connections.

6. *Cross connection specialist* or *specialist* means a person holding a valid cross connection specialist certificate issued in accordance with the Washington Administrative Code and that is employed by or under contract with the city.

Degree of hazard means the low or high hazard classification that shall be attached to all actual or potential cross connections.

Director means the public works director.

DOH means the Washington Department of Health.

Guidance manual means the most recent edition of the guidance manual written specifically for the city.

High health hazard means the classification assigned to an actual or potential cross connection that could allow a substance of a physical, toxic, or biological nature to backflow into the potable water supply. This substance could cause illness or death.

In-premises protection means a method of protecting the health of consumers served by the customer's plumbing system (i.e., located within the property lines of the customer's premises) by the installation of an approved air gap, backflow prevention assembly or device at the point of hazard.

Local administrative authority means the local official, board, department or agency authorized to administer and enforce the provisions of the uniform plumbing code and all other plumbing codes recognized by the state.

Plumbing hazard means an internal or plumbing-type cross connection in a consumer's potable water system that may be either a pollutional or a contamination-type hazard. The term "plumbing hazard" includes, but is not limited to, cross connections to toilets, sinks, lavatories, wash trays, domestic washing machines and lawn sprinkling systems. Plumbing-type cross connections can be located in all types of structures including, but not limited to, homes, manufactured homes, apartment houses, hotels and commercial or industrial establishments.

Pollutional hazard means an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

Potable water supply means any system of water supply intended or used for human consumption or other domestic use and meets all requirements established by the Safe Drinking Water Act and the DOH regulations.

Premises means any piece of property to which water is provided including, but not limited to, all improvements, mobile structures and structures located on it.

6. *Premises isolation* means a method of protecting a public water system by installation of an approved double check valve assembly or a reduced pressure backflow assembly at the point of service (where the city loses control of the water supply) to separate the customer's plumbing system from the purveyor's distribution system.

Reduced pressure principle backflow prevention assembly, reduced pressure principle assembly or *RP assembly* means an assembly containing two independently acting approved check valves together with a hydraulically operated, mechanically independent pressure differential relief valve located between the check valves. The assembly shall include properly located test cocks and tightly closing shutoff valves at each end of the assembly.

Thermal expansion means the pressure created by the expansion of heated water.

Used water means any water supplied by the city to a customer's property after it has passed through the service connection and is no longer under the control of the city.

(Code 1988, § 13.10.010; Ord. No. 696, § 1:01, 2004)

12.10.020. - Purpose.

The purpose of this chapter is to protect the water system of the city from contamination or pollution due to any existing or potential cross connections as defined in WAC 246-290-010, or as amended, and this chapter.

(Code 1988, § 13.10.020; Ord. No. 696, § 1:02, 2004)

12.10.030. - Cross connections regulated.

A. No cross connections shall be created, installed, used or maintained within the area served by the city, except in accordance with this chapter.
B. The specialist for the city shall carry out or cause inspections to be carried out to determine if any actual or potential cross connections exist. An assembly commensurate with the degree of hazard, if found necessary, will be required to be installed at the service connection.
C. The owner, occupant or person in control of the property is responsible for all cross connection control within the premises.
D. All high health hazard premises which are defined in table 9 of WAC 246-290-490, or as amended, are required to have premises isolation by installing a reduced pressure principle assembly in accordance with this chapter.

(Code 1988, § 13.10.030; Ord. No. 696, § 1:03, 2004)

12.10.040. - Application and responsibilities.

6. This chapter applies throughout the city and to every premises and property served by the city. It applies to any premises, public or private, regardless of date of connection to the city water. Every owner, occupant and/or person in control of any concerned premises is responsible for compliance with the terms and provisions contained herein.

(Code 1988, § 13.10.040; Ord. No. 696, § 1:04, 2004)

12.10.050. - Backflow prevention assembly requirements.

(a) A specialist employed by or under contract with the city shall determine the type of backflow assembly to be installed within the area served by the city. All assemblies shall be installed at the service connection unless it is determined by the specialist to install the assembly at an alternate location.

(b) The cross connection shall be eliminated or an assembly shall be required to be installed in each of the following circumstances, but the specialist is in no way limited to the following circumstances:

A. The nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the potable water supply;

B. Premises having any one or more cross connections or potential cross connections as that term is defined in TMC 12.10.010 and the WAC;

C. When a cross connection survey report form is required by the city and has not been received;

D. Internal cross connections are present that are not correctable;

E. Intricate plumbing arrangements exist or plumbing subject to frequent changes are present that make it impractical to ascertain whether or not cross connections exist;

F. There is a repeated history of cross connections being established or re-established;

G. There is unduly restricted entry so that inspections for cross connections cannot be made with sufficient frequency to ensure that cross connections do not exist;

H. Materials, chemicals or any substance or apparatus is being used that if backflow occurred contamination would result;

I. Installation of an approved backflow prevention assembly is deemed to be necessary in the judgment of the specialist to accomplish the purpose of this chapter;

J. Any premises having an auxiliary water supply;

K. In the event an in-premises assembly has not been tested or repaired as required by WAC 246-290-490, or as amended, and this chapter;

L. If it is determined that additions or rearrangements have been made to the plumbing system without obtaining proper permits as required by the city's code enforcement division;

M. When a garden hose attachment is connected to the premises' plumbing, including but not limited to fertilizer applicators, pesticide applicators and radiator flush kits;

N. Wherever the actual or potential of backpressure exists;

O. Wherever the conditions for back-siphonage exist.

(Code 1988, § 13.10.050; Ord. No. 696, § 1:05, 2004)

12.10.060. - Irrigation systems.

All irrigation systems shall be protected in accordance with the plumbing code regulations. In the event any system is equipped with an injector system, or has submerged heads, a reduced pressure principle assembly will be required. If the irrigation system comes directly off the main with a designated line, a minimum of a double check assembly is required. If there is irrigation water supplied by a separate system and that system can be connected to the potable system, an assembly will be installed as required by the WAC.

(Code 1988, § 13.10.060; Ord. No. 696, § 1:06, 2004)

12.10.070. - Fire systems.

An approved double check backflow prevention assembly shall be the minimum protection on all new fire sprinkler systems using piping material that is not approved for potable water use, and/or that does not provide for periodic flow-through. A reduced pressure principle backflow prevention assembly must be installed, if any solution other than the potable water can be introduced into the sprinkler system. Retrofitting on fire sprinkler systems will be required in each of the following circumstances:

A. Where improper maintenance has occurred;

B. On all high hazard systems;

C. Wherever a specialist deems necessary; and

D. Wherever required by the WAC.

(Code 1988, § 13.10.070; Ord. No. 696, § 1:07, 2004)

12.10.080. - Temporary meters and hydrant valves.

Backflow protection will be required on all temporary meters and hydrant valves before any use. The type of assembly will be commensurate with the degree of hazard and will be determined on a case-by-case basis by the city's specialist.

6. ode 1988, § 13.10.080; Ord. No. 696, § 1:08, 2004)

12.10.090. - Mobile units.

Any mobile unit or apparatus, as defined in TMC 12.10.010, which uses the water from any premises within the city's water system shall first obtain a permit from the city and be inspected to ensure appropriate backflow prevention is installed in accordance with the most recent edition of the city's guidance manual. The city reserves the right to revoke the business license of the owner of the apparatus or mobile unit if the owner fails to comply with these procedures.

(Code 1988, § 13.10.090; Ord. No. 696, § 1:09, 2004)

12.10.100. - Right-of-way encroachment.

A. No person shall install or maintain a backflow prevention assembly upon or within any city right-of-way except as provided in this section.
B. The city reserves the right to have an assembly installed in the right-of-way.
C. A backflow prevention assembly required by the city may be installed upon or within any city right-of-way only if the owner proves to the city that there is no other feasible location for installing the assembly, and installing it in the right-of-way will not interfere with traffic or utilities. The city retains the right to approve the location, height, depth, enclosure, and other requisites of the assembly prior to its installation.
D. All permits required by the city code to perform work in the right-of-way shall be obtained.
E. A property owner shall, at the request of the city and at the owner's expense, relocate a backflow prevention assembly which encroaches upon any city right-of-way, when such relocation is necessary for street or utility construction or repairs for purposes of public safety.

(Code 1988, § 13.10.100; Ord. No. 696, § 1:10, 2004)

12.10.110. - Plumbing code.

As a condition of water service, customers shall install, maintain, and operate their piping and plumbing systems in accordance with all state plumbing codes and the 2009 Uniform Plumbing Code, or as amended, and TMC chapters 12.04 and 12.06.

(Code 1988, § 13.10.110; Ord. No. 696, § 1:11, 2004; Ord. No. 744, 7-22-2008)

12.10.120. - Testing and repairs.

(a) Backflow prevention assemblies shall be tested and repaired in accordance with the requirements set out in the WAC, the RCW, and this chapter.

6.

(b) All presently installed backflow prevention assemblies that do not meet the requirements of this chapter, but were approved assemblies for the purpose described herein at the time of installation, are commensurate with the degree of hazard and that have been properly maintained, shall, except for the inspection and maintenance requirements, be excluded from the requirements of these rules so long as the city is ensured that they will satisfactorily protect the utility system. Whenever the existing assembly is moved from the present location, requires more than minimum maintenance, or parts are no longer available, the unit shall be replaced by an approved backflow prevention assembly.

(Code 1988, § 13.10.120; Ord. No. 696, § 1:12, 2004)

12.10.130. - Responsibilities of backflow prevention assembly testers.

(a) All backflow assembly testers operating within the city shall be certified in accordance with all applicable regulations and shall comply with all stipulations in this chapter and the most recent edition of the city's guidance manual. All backflow assembly testers are required to carry a minimum liability insurance policy of $5,000.00.

(b) Testers are required to register with the city in accordance with the most recent edition of the guidance manual.

(Code 1988, § 13.10.130; Ord. No. 696, § 1:13, 2004)

12.10.140. - Maintenance of assemblies.

Backflow prevention assemblies shall be maintained in accordance with the requirements set out in the WAC, or as amended, and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.140; Ord. No. 696, § 1:14, 2004)

12.10.150. - Installation requirements and specifications.

(a) Backflow prevention assemblies shall be installed in accordance with the requirements set out in the WAC and the most recent edition of the city's guidance manual.

(b) In the event the specialist allows a premises isolation assembly to be installed at an alternate location, there shall be no interties or connections between the meter and the premises isolation assembly.

(Code 1988, § 13.10.150; Ord. No. 696, § 1:15, 2004)

12.10.160. - Thermal expansion.

If a closed system has been created by the installation of a backflow prevention assembly, it is the responsibility of the property owner to eliminate the possibility of thermal expansion.

6. ode 1988, § 13.10.160; Ord. No. 696, § 1:16, 2004)

12.10.170. - New construction and/or occupancy change.

In all new construction, an approved backflow assembly shall be installed at the service connection. The type of the assembly shall be commensurate with the degree of hazard as determined by a specialist.

(Code 1988, § 13.10.170; Ord. No. 696, § 1:17, 2004)

12.10.180. - Retrofitting.

Retrofitting shall be required at all service connections where an actual or potential cross connection exists, and wherever else the city deems retrofitting necessary to comply with the WAC, this chapter, and the most current edition of the city's guidance manual.

(Code 1988, § 13.10.180; Ord. No. 696, § 1:18, 2004)

12.10.190. - Costs of compliance.

All costs associated with the purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the responsibility of the property owner, their renter, lessee, agent, or personal representative.

(Code 1988, § 13.10.190; Ord. No. 696, § 1:19, 2004)

12.10.200. - Recovery of costs.

(a) Any water customer violating any of the provisions of this chapter and who causes damage to or impairs the city's water system, including, but not limited to, allowing contamination, pollution, any other solution or used water to enter the city's water system, shall be liable to the city for any expense, loss or damage caused by such violation. The city shall collect from the violator for the cost incurred by the city for any cleaning, purifying, repair or replacement work or any other expenses caused by the violation. Refusal to pay the assessed costs shall constitute a violation of this chapter and shall result in the termination of service.

(b) All cost associated with any disconnect fees resulting from the enforcement of this chapter are the sole responsibility of the property owner.

(Code 1988, § 13.10.200; Ord. No. 696, § 1:20, 2004)

12.10.210. - Termination of service.

6. Failure on the part of any property owner, their renter, lessee, agent or personal representative to discontinue the use of all cross connections, to physically separate cross connections or to abide by all the conditions of this chapter is sufficient cause for the immediate discontinuance of water service by the city to the premises.

(Code 1988, § 13.10.210; Ord. No. 696, § 1:21, 2004)

12.10.220. - Emergency suspension of service.

The director or their designee may, without prior notice, suspend water service to any premises when such suspension is necessary to stop the eminent threat of any actual or potential cross connection as defined in this chapter and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.220; Ord. No. 696, § 1:22, 2004)

12.10.230. - Nonemergency suspension of service.

The director or their designee may suspend, with 24-hour notice, the water supply to any premises where the conditions of this chapter or the most recent edition of the city's guidance manual have been violated.

(Code 1988, § 13.10.230; Ord. No. 696, § 1:23, 2004)

12.10.240. - Falsifying information.

Any person who knowingly makes any false statement, representation, record, report or other document filed or required to be maintained pursuant to this chapter, or who falsifies, tampers with, or knowingly renders inaccurate any backflow assembly, device or method required under this chapter shall (in addition to civil and/or criminal penalties provided by state law) be guilty of a misdemeanor subject to the general penalty clause of City of Tenino's guidance manual.

(Code 1988, § 13.10.240; Ord. No. 696, § 1:24, 2004)

CHAPTER 12.20. - UNIFORM UTILITY BILLING SYSTEM

12.20.001. - Billing generally.

There shall be one uniform billing and collection procedure for all city utility services, including but not limited to water, sewer, and storm sewer.

6. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.005. - Authorized officers designated.

A. The clerk/treasurer, or authorized designee, shall keep an account for water, sewer and storm sewer service used by any person, business, or other entity within the city. Such services shall be paid for by every utility account within the city.

B. The clerk/treasurer, or authorized designee, shall place against these accounts all charges for water, sewer and storm sewer service that are to be paid by every utility account, when these services are used by such person, business or other entity. Any service charges or other charges that are connected with the provision of utility services shall likewise be placed against these accounts. All charges shall be made in accordance with the terms of those ordinances and resolutions of the city establishing the rates and fees for such services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.007. - Creation of accounts; deposits on renter-occupied premises.

At the time an account for either residential or commercial renter-occupied premises is requested and before it is authorized, the clerk/treasurer or his/her designee shall require that the person requesting services deposit with the city a sum of money that shall be set by the city council by resolution. This deposit can be reduced to the minimum allowed by ordinance if the property owner agrees in writing to assume financial responsibility for any unpaid balance in excess of the deposit amount and the property owner files such written agreement with the clerk/treasurer or designee prior to the account being established in the tenant's name. This provision does not in any way affect the property owner's liability for charges or the lien rights of the city against the premises to which the services are furnished as provided in TMC 12.20.080. Nothing in this chapter shall prevent the city from requiring additional or new deposits, when the conditions so warrant.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.010. - Bills—Preparation, delivery.

A. The city shall cause a single utility bill, covering all utility services that are furnished by or through the city during the preceding month or accounting period, to be prepared and rendered on a monthly basis to each customer of utility service.

B. Such bill shall be due and payable by the last day of the month from and after the date of mailing.

C. Once prepared, this bill shall be delivered to the customer by depositing it in the United States mail, addressed either to the address shown on the application for utility service or to any change of address that has been submitted by the customer to the city.

D. Deposit in the United States mail pursuant to subsection C. of this section shall be deemed full and complete notice to the customer of the nature and amount of any particular utility billing.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.015. - Budget payment plan.

The clerk/treasurer, or authorized designee, is hereby authorized to create and implement a budget payment plan in accordance with state law. Such a plan shall permit the authorized customer to make payments of utility charges on an annual averaged basis rather than on a monthly basis, with at least one annual adjustment to ensure that the amount paid on an annual basis reflects the actual charges incurred.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.020. - Leak adjustments.

When excessive water meter registration is caused by broken or leaking water service pipes within or abutting upon the premises without the knowledge of the customer, an adjustment may be made upon written application for one month only and for two months in the case of monthly billing during a 12-month period and after repairs have been made. The basis for adjustment shall be the normal consumption for the property in question under similar operating conditions.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.030. - Bills delinquent.

If the bill rendered as provided in TMC 12.20.010 is not paid when due, it shall be considered delinquent ten days after the due date and a late fee that shall be set by the city council by resolution shall be added to the delinquent account. Additionally, in order to reimburse the city for carrying the unpaid balance, the city shall impose interest on the total remaining unpaid balance at a rate that shall be set by the city council by resolution until such time as the bill is paid in full. At no time will the amount of interest actually charged exceed the maximum amount allowable under state law.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.040. - Payment delinquent—Service discontinued.

In the absence of any special arrangement or agreement with the city concerning payment, if a utility bill or any part thereof remains delinquent and unpaid beyond the next subsequent billing cycle, a notice to the effect that if the delinquent utility charges, together with the prior delinquent charges, are not paid in full within seven days from the date of mailing of the notice, the city shall, within 48 hours thereafter, proceed to shut off and discontinue utility services to the premises until all utility charges are paid in full.

6. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.045. - Notice of delinquent account.

A. *Notice.* If an account for utility service remains delinquent beyond seven days, the city shall notify the customer that service will be disconnected without further notice unless the delinquent account and all penalties are immediately paid in full, or special arrangements are made in accordance with TMC 12.20.050. Delivery of the notice shall occur in a way reasonably calculated to apprise the customer of the notice's contents. The notice shall also inform the customer of the date on which service may be disconnected, which shall be not less than 48 hours following delivery of the notice. The notice of delinquent account shall further state that if the consumer has questions or disputes concerning the amount of payment due, he or she may appeal to the clerk/treasurer, or authorized designee, whose address and telephone number shall be stated on the notice of delinquent account.

B. *Disconnection of service.* If no notice is made to the city that the bill is disputed prior to the time indicated in the customer's notice as the date on which service may be disconnected, the city shall proceed by disconnecting water service to the delinquent customer's premises. All reconnections of service shall be subject to the provisions and fees outlined in TMC 12.20.70 or 12.20.075, whichever is applicable.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.050. - Payment delinquency; enforcement actions.

A. The clerk/treasurer, or his designee, is hereby authorized and directed to promulgate administrative policies and procedures for the implementation of this chapter.

B. If the customer is unable to pay the full amount of utility charges because of temporary financial difficulties or other hardship, the clerk/treasurer, or his designee, may permit the customer to make deferred payment arrangements upon written application; provided, however, that the city will be under no obligation to enter into any deferred payment agreement with any customer who has not fully and satisfactorily complied with terms of any previous agreement.

C. Failure to abide by the terms of the arrangement shall be cause for shut-off and discontinuance of utility services until the total utility charges that are due are paid in full.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.053. - Deferred payments arrangements—Penalty, assessed.

If arrangements for deferred payments have been made, the clerk/treasurer, or authorized designee, shall assess against such accounts the same penalty fees as set forth in TMC 12.20.030.

6. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.055. - Delinquent account—Refusal of other city services.

If a bill becomes delinquent, no officer, agent, or employee of the city may authorize or permit any further city service or process any application for a permit from the city, when such application has been requested by the person in whose name an account stands delinquent; this requirement shall remain in effect until the delinquent account is paid in full. This section, however, shall not apply to the provision of water, sewer and storm sewer service, but shall apply to connections, inspections, engineering and other like services furnished by the water, sewer and storm sewer utilities.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.057. - Service charge for returned checks.

A service charge, which shall be set by the city council by resolution, shall be imposed upon any customer who, in full or partial payment of a city utility bill, tenders a check, which is thereafter returned to the city as a result of insufficient funds in the customer's checking account.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.060. - Service discontinuance—For other than payment failure.

In addition to nonpayment of a utility bill, the city may shut off and discontinue any or all utility services to a customer for failure to pay connection charges for any utility service furnished to such customer, or for the fraudulent, illegal or unauthorized use or abuse of any utility service, or the failure or refusal of the customer to comply with all rules, regulations or ordinances pertaining to the receipt and use of utility services furnished by the city.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.070. - Disconnection of utility services.

After the discontinuance of service, should a customer continue to fail to pay a delinquent bill pursuant to TMC 12.20.030, the clerk/treasurer, or his/her designee, shall cause services to be physically disconnected (cut off) from the premises. Such services shall be reconnected to the premises only upon full payment of all delinquent utility charges, and correction of any fraudulent, illegal or unauthorized use or abuse of any utility service, applicable to the particular premises, irrespective of who may have incurred the charges or who may have been responsible for the fraudulent, illegal or unauthorized use or abuse of utility services. In addition, one single reconnection fee, which shall be set by the city council by resolution, shall be charged and paid prior to the reconnection of any utility service that was actually cut off and discontinued and that will require such reconnection to be made during regular working hours.

6. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.075. - Reconnection of utility services.

A charge, which shall be set by the city council by resolution, shall be assessed for reconnections made at a customer's request outside of regular working hours. After-hours reconnections shall only be performed after the customer signs a written promissory note indicating that payment of all charges will be made to the city prior to 3:00 p.m. on the following business day. Failure to make payment in accordance with the provisions of the promissory note will result in termination of water services without further notice.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.080. - Liability for charges.

All owners of property shall remain ultimately and legally liable for the payment of any and all utility charges to the premises, regardless of whether such property is used for single-family, multiple dwelling or commercial purposes and regardless of the fact that the billings are made in the name of a tenant or other occupant of the premises. Such billings are for personal convenience only and shall not in any way affect the lien rights of the city against the premises to which the services are furnished.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.090. - Right of lien.

(a) In addition to the right herein provided to shut off and discontinue utility service, the city shall have a lien for delinquent and unpaid utility charges, including any late charges, fees, and interest, against the premises to which such utility service has been furnished or is available. The lien shall be effective for a total of not to exceed six months' delinquent charges without the necessity of any writing or recording. In order to make such lien effective for more than six months, the clerk/treasurer shall cause to be filed for record in the office of the county auditor of Thurston County a notice in substantially the following form:

Utility Lien Notice

City of Tenino,)
)
v.)

Reputed Owner.)
)
- -

NOTICE IS HEREBY GIVEN that the City of Tenino has and claims a lien for unpaid utility charges against the following described premises situated in Thurston County, Washington, to wit:

(Here insert legal description of premises.)

Said lien is claimed for not exceeding six months charges and interest now delinquent, amounting to $_____, and is also claimed for future utility charges against said premises.

DATED this _____ day of _____, 20___.

CITY OF TENINO
By _____.

(b) The lien notice shall be signed by the clerk/treasurer. The lien notice shall be recorded as prescribed by law. Any costs of such recording shall be added to the delinquent account and will be included in the total amount to be paid prior to removing the lien. Any costs associated with removing such a lien will also be added to the account and must be paid according to the provisions of TMC 12.20.020.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.100. - Out-of-city service—Billing.

With respect to out-of-city utility service furnished by the city, particularly out-of-city sewer service, the clerk/treasurer or authorized designee shall cause monthly bills for such out-of-city utility service to be prepared and mailed to each customer, which bills shall become due and payable the last day of the month from and after the date of mailing. The owner of the premises shall remain at all times responsible for such utility services, irrespective of the actual occupant or user of such services who shall likewise be and remain liable to the city for such utility services. No tenant deposits shall be available on out-of-city utility services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.110. - Out-of-city service—Charge payment failure—Service discontinuance.

Failure to pay out-of-city utility charges within seven days after mailing of a notice of delinquency substantially in the form provided in TMC 12.20.045, or the failure to comply with any and all other ordinances and/or contract provisions governing out-of-city service, including payment of connection charges and latecomer agreement charges, shall be grounds to immediately disconnect and discontinue all

6. ility services furnished by the city to such premises. Reconnection will be permitted only upon payment of all delinquent charges and compliance with all ordinances and contract provisions, plus payment of all costs expended in the disconnecting and reconnection of such premises to such utility service or services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.120. - Out-of-city service—Right of lien.

Notwithstanding the provisions of TMC 12.20.110, the city reserves the right to any and all liens authorized by law in connection with the collection of unpaid utility charges and to pursue such liens and other available collection or enforcement remedies separately, concurrently or conjunctively.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.130. - Utility lien foreclosure—Authorized when.

The city may foreclose its utility lien in an action in the superior court of Thurston County. All or any of the tracts subject to the lien may be proceeded against in the same action, and all parties appearing of record as owning or claiming to own, having or claiming to have any interest in or lien upon the tracts involved in the action shall be impleaded in the action as parties defendant. An action to foreclose a utility lien pursuant to a lien notice filed as required by this chapter must be commenced within two years from the date of filing thereof. An action to foreclose a six months' lien may be commenced at any time after six months subsequent to the furnishing of the utility service for which payment has not been made. The service of summons and all other proceedings except as provided specifically under this chapter, including appeal, order of sale, sale, redemption and issuance of deed shall be governed by the statutes of the state of Washington now or hereafter in force relating to the foreclosure of mortgages on real property. The terms "judgment debtor" or "successor in interest" in the statutes of the state of Washington governing redemption when applied under this chapter shall include an owner or a vendee. All sales shall be subject to the right of redemption within one year from date of sale. At any time after deed is issued to it pursuant to a foreclosure of a lien, the city may lease or sell or convey the property conveyed thereunder at public or private sale for such price and on such terms as may be determined by the resolution of the city council.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.140. - Utility lien foreclosure—Trial.

A utility lien foreclosure action shall be tried before the court without a jury. The court may allow, in addition to the delinquent charges and interest, such attorneys' fees as the court may adjudge reasonable. If the owners and parties interested in any particular account default, the court may enter judgment of foreclosure and sale as to such parties and accounts and the action may proceed as to the remaining defendants and accounts. The judgment shall specify separately the amount of the utility charges, with

6. terest, penalty and costs chargeable to each account. The judgment shall have the effect of a separate judgment as to each account described in the judgment and any appeal should not invalidate or delay the judgment except as to the property concerning which the appeal is taken. The judgment of the court shall order the accounts therein described sold at one general sale, and an order of sale shall issue pursuant thereto for the enforcement of the judgment. Judgment may be entered as to any one or more separate accounts involved in the action and the court shall retain jurisdiction of other properties.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.150. - Utility lien—Enforcement—Alternative method.

As an additional and concurrent method of enforcing the lien authorized under this chapter, the City of Tenino may shut off and discontinue any or all utility services to the premises to which such utility service was furnished after the charges become delinquent and unpaid, and until the charges are paid. The right to enforce the lien by cutting off and refusing utility services shall not be exercised after two years from the date of the recording of the utility lien notice provided under this chapter except to enforce the payment of six months' charges for which no lien notice is required to be recorded.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.160. - Statutes adopted by reference.

A. Chapter 9A.61 of the RCW is adopted in its entirety by reference.

B. RCW 80.28.240 is hereby adopted by reference.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

6.

112.20.010. - Purpose and general provisions.

A. *Purpose.* State law (WAC 365-190-080) requires communities to protect critical areas. In order to protect ecologically sensitive and hazardous areas, protect their functions and values, and to allow reasonable use of private property, this chapter establishes protection standards for critical areas and regulates physical development, activity, and use within, adjacent to, or likely to affect critical areas.

B. *Findings.* Critical areas provide valuable biological and physical functions that benefit the city and its residents. Critical areas may also pose a threat to human safety or to public and private property. The beneficial functions and values provided by critical areas include, but are not limited to:

1. Water quality protection and enhancement.
2. Fish and wildlife habitat.
3. Flood water storage.
4. Flood water conveyance and attenuation.
5. Ground water recharge and discharge.
6. Erosion control.
7. Protection from hazards.
8. Recreational opportunities.

C. *Establishment of critical areas.*

1. Critical areas regulated by this chapter include:
    a. Wetlands;
    b. Critical aquifer recharge areas;
    c. Frequently flooded areas;
    d. Geologically hazardous areas; and
    e. Fish and wildlife habitat conservation areas.
2. All areas within the city that meet the definition of at least one critical area, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter.
3. Areas adjacent to critical areas are also subject to the standards of this chapter. Adjacent means any activity located:
    a. On a site bordering a critical area;

Within the critical area's buffer or building setback;

6. Within the critical area's buffer or building setback;

b. Within 300 feet upland from a stream, wetland, or water body;

c. Within the floodplain; or

d. Within 200 feet of a critical aquifer recharge area.

D. *Relationship to other regulations.*

1. These critical areas regulations apply as an overlay in addition to zoning and other regulations adopted by the city.
2. When a property or development is subject to more than one critical area overlay or other regulations apply to a development, the more restrictive applies.
3. Compliance with the provisions of this chapter does not constitute compliance with other federal, state, and local regulations and permit requirements that may be required. The applicant is responsible for complying with these requirements in addition to the process established in this chapter.

E. *Interpretation.* In the interpretation and application of this chapter, the provisions of this chapter are:

1. Considered the minimum requirements necessary;
2. Are liberally construed to serve the purpose of this chapter; and
3. Do not limit or repeal any other provisions under state statute.

F. *Protection of critical areas.*

1. *Equivalent or greater functions.* Any action taken pursuant to this Chapter must result in equivalent or greater functions and values of the critical areas associated with the proposed action, as determined by the best available science.
2. *Mitigation sequencing required.* All actions and developments must be designed and constructed to avoid, minimize, and restore all adverse impacts. Applicants must first demonstrate an inability to avoid or reduce impacts, before restoring and compensating for impacts will be allowed. Activities or uses that result in a net loss of the functions or values of critical areas are prohibited.

G. *Title notification.* Activity in critical areas may require a notice to title, recorded with the Thurston County auditor.

(Ord. No. 880, § 14, 9-12-2017)

112.20.020. - Best available science.

A. *Definition.* Best available science is that scientific information applicable to the critical area prepared by local, state, or federal natural resource agencies, a qualified scientific professional, or team of qualified scientific professionals that is consistent with criteria established in WAC 365-

6. 95-900 through 365-195-925.

B. *Sources.* Sources of the best available science are included in *Citations of Recommended Sources of Best Available Science for Designating and Protecting Critical Areas* , published by the Washington State Department of Community, Trade and Economic Development (now the Washington State Department of Commerce) and as updated, amended or replaced.

C. *Characteristics of a valid scientific process.* In the context of critical areas protection, a valid scientific process is one that produces reliable information useful in understanding the consequences of a local government's regulatory decisions, and in developing critical areas policies and development regulations that will be effective in protecting the functions and values of critical areas. To determine whether information received during the permit review process is reliable scientific information, the community development director must determine whether the source of the information displays the characteristics of a valid scientific process. Such characteristics are as follows:

1. *Peer Review.* The information has been critically reviewed by other persons who are qualified scientific experts in that scientific discipline. The proponents of the information have addressed the criticism of the peer reviewers. Publication in a refereed scientific journal usually indicates that the information has been appropriately peer-reviewed;
2. *Methods.* The methods used to obtain the information are clearly stated and reproducible. The methods are standardized in the pertinent scientific discipline or, if not, the methods have been appropriately peer-reviewed to ensure their reliability and validity;
3. *Logical conclusions and reasonable inferences.* The conclusions presented are based on reasonable assumptions supported by other studies and consistent with the general theory underlying the assumptions. The conclusions are logically and reasonably derived from the assumptions and supported by the data presented. Any gaps in information and inconsistencies with other pertinent scientific information are adequately explained;
4. *Quantitative analysis.* The data have been analyzed using appropriate statistical or quantitative methods;
5. *Context.* The information is placed in proper context. The assumptions, analytical techniques, data, and conclusions are appropriately framed with respect to the prevailing body of pertinent scientific knowledge; and
6. *References.* The assumptions, analytical techniques, and conclusions are well referenced with citations to relevant, credible literature and other pertinent existing information.

D. *Nonscientific information.* Nonscientific information may supplement scientific information, but it is not an adequate substitute for valid and available scientific information. Common sources of nonscientific information include anecdotal information, non-expert opinions, and hearsay.

E.

6. *Absence of valid scientific information.* Where there is an absence of valid scientific information or incomplete scientific information relating to a critical area leading to uncertainty about the risk to critical area function of permitting an alteration of or impact to the critical area, the Community Development Director must:

1. Take a precautionary or no-risk approach that strictly limits development and land use activities until the uncertainty is sufficiently resolved; and
2. Require application of an effective adaptive management program that relies on scientific methods to evaluate how well regulatory and non-regulatory actions protect the critical area. An adaptive management program is a formal and deliberate scientific approach to taking action and obtaining information in the face of uncertainty. An adaptive management program must:
    a. Address funding for the research component of the adaptive management program;
    b. Change course based on the results and interpretation of new information that resolves uncertainties; and
    c. Commit to the appropriate timeframe and scale necessary to reliably evaluate regulatory and non-regulatory actions affecting protection of critical areas and anadromous fisheries.

(Ord. No. 880, § 14, 9-12-2017)

112.20.030. - Applicability, exemptions, and exceptions.

A. *Applicability.*

1. A critical area or buffer must not be altered by any person, company, agency, or applicant except as consistent with the purposes and requirements of this chapter. The provisions of this chapter apply to all:
    a. Lands, uses, and development activity;
    b. Structures and facilities in the city, whether or not a permit or authorization is required; and
    c. Persons, firms, partnerships, corporations, groups, governmental agencies, or other entities that own, lease, or administer land within the City.
2. *Compliance required.* The city must ensure compliance with the requirements of this chapter prior to approving a permit or otherwise issuing authorization to:
    a. Alter the condition of land, water, or vegetation; or
    b. Construct or alter structures or improvements in, over, or on a critical area or associated buffer.

B. *Exemptions.*

1. *Impacts to critical areas.* All exempted activities must use reasonable methods to avoid potential impacts to critical areas. To be exempt from this chapter does not give permission to degrade a critical area or ignore risk from natural hazards. Any incidental damage to, or alteration of, a critical area that is not a necessary outcome of the exempted activity must be restored, rehabilitated, or replaced at the responsible party's expense.
2. *Exempt activities.* The following developments, activities, and associated uses are exempt from the provisions of this chapter, provided they are otherwise consistent with the provisions of other local, state, and federal laws and requirements:
    a. *Emergencies.* Activities necessary to prevent an immediate threat to public health, safety, or welfare, or that pose an immediate risk of damage to private property and require corrective or preventative action in a timeframe too short to allow for compliance with the requirements of this chapter must meet the following standards:
        i. *Minimize impacts.* Emergency actions that create an impact to a critical area or its buffer must use reasonable methods to address the emergency while minimizing possible impacts to the critical area or its buffer.
        ii. *Notification and determination.* The person or agency undertaking emergency action must notify the city within one working day following initiating such action. Within 30 days, the city will determine if the action taken was within the scope of the emergency actions allowed in this subsection. If the city determines that the action taken, or any part of the action taken, was beyond the scope of an allowed emergency action, then enforcement provisions of TMC Section 100.30.130, enforcement, apply.
        iii. *Restoration/mitigation required.*
            a) After the emergency, the person or agency undertaking the action must fully fund and conduct necessary restoration and/or mitigation for any impacts to the critical area and buffers resulting from the emergency action in accordance with an approved critical area report and mitigation plan.
            b) The person or agency undertaking the action must apply for review of the work. The city will review the alteration, critical area report, and mitigation plan in accordance with the review procedures contained herein.
            c) Restoration and/or mitigation activities must be initiated within one year of the date of the emergency, and completed in a timely manner;
    b. *Operation, maintenance, or repair.* Operation, maintenance, or repair of existing structures, infrastructure improvements, utilities, public or private roads, and drainage systems may be exempt provided the activity:
        i. Does not require construction permits;
        ii.

6. oes not further alter or increase the impact to or encroach further within a critical area or buffer; and

iii. Does not increase risks to life or property; and

c. *Passive outdoor activities.* Recreation, education, and scientific research activities that do not degrade the critical area, including fishing, hiking, and bird watching are exempt.

C. *Exceptions.*

1. *Public agencies and utilities.* If the application of this chapter would prohibit a development proposal by a public agency or public utility, the agency or utility may apply for an exception pursuant to TMC Section 112.10.060.

2. *Reasonable use.* If the application of this chapter would deny all reasonable economic use of the subject property, the city must determine if compensation is an appropriate action, or the property owner may apply for an exception pursuant to TMC Section 112.10.060.

(Ord. No. 880, § 14, 9-12-2017)

112.20.040. - Allowed activities.

A. *Critical area report.* Activities allowed under this chapter must be reviewed and approved by the city, but do not require submittal of a separate critical area identification form or critical area report, unless required previously for the underlying permit. The city may apply conditions to the underlying permit or approval to ensure that the allowed activity is consistent with the provisions of this chapter to protect critical areas.

B. *Best management practices required.*

1. All allowed activities must be conducted using the best management practices that result in the least amount of impact to the critical areas. Best management practices must be used for the following:

a. Tree and vegetation protection;

b. Construction management;

c. Erosion and sedimentation control;

d. Water quality protection; and

e. Regulation of chemical applications.

2. The city must observe the use of best management practices to ensure that the activity does not result in degradation to the critical area. Any incidental damage to, or alteration of, a critical area must be restored, rehabilitated, or replaced at the responsible party's expense.

C. *Allowed activities.* The following activities are allowed in critical areas:

1. *Permit requests following critical area review.* Development permits and approvals that involve both discretionary land use approvals and construction approvals if all the following conditions have been met:

a. The provisions of this chapter have been previously addressed as part of another approval;

b. There have been no material changes in the potential impact to the critical area or buffer since the prior review;

c. There is no new information available that is applicable to any critical area review of the site or particular critical area;

d. The permit or approval has not expired or, if no expiration date, no more than five years has elapsed since the issuance of that permit or approval; and

e. Compliance with any standards or conditions placed upon the prior permit or approval has been achieved or secured.

2. *Modifications to existing structures.* Structural modification of, addition to, or replacement of an existing, legally constructed structure that does not further alter or increase the impact to the critical area or buffer, provided:

a. There is no increased risk to life or property as a result of the proposed modification or replacement; and

b. For structures substantially damaged by fire, flood, or act of nature, restoration must be initiated within one year of the date of such damage, as evidenced by the issuance of a valid building permit, and diligently pursued to completion.

3. *Activities within the improved right-of-way.* Except for substations, replacement, modification, installation, or construction of utility facilities, lines, pipes, mains, equipment, or appurtenances may be allowed provided:

a. Such facilities are located within the improved portion of the public right-of-way or a city-authorized private roadway;

b. The activity does not alter a wetland, watercourse, or result in the transport of sediment or increased stormwater;

c. Critical area and/or buffer widths are increased, where possible, equal to the width of the right-of-way improvement, including disturbed areas;

d. Native vegetation is retained or replanted wherever possible along the right-of-way improvement and resulting disturbance; and

e. Invasive species are removed.

4. *Minor utility projects.* Utility projects that have minor or temporary impacts to critical areas, such as the placement of a utility pole, street sign, anchor, vault, or other small component of a utility facility, may be allowed provided:

a. The activity involves disturbance of an area less than 75 square feet;

b. There is no practical alternative to the proposed activity with less impact on critical are

c. The utility project does not significantly impact the function or values of critical areas, is constructed with best management practices, and additional restoration measures are provided; and

d. The activity does not result in sediment transport or increased stormwater runoff.

5. *Public and private pedestrian trails.* Public and private pedestrian trails that are not located in wetlands, fish and wildlife habitat conservation areas, or their buffers, may be allowed subject to the following:

   a. The trail surface meets all other requirements including water quality standards set forth in the locally adopted stormwater management regulations;

   b. Critical area and/or buffer widths are increased, where possible, equal to the width of the trail corridor, including disturbed areas; and

   c. Trails proposed to be located in landslide or erosion hazard areas are constructed in a manner that does not increase the risk of landslide or erosion and in accordance with an approved geotechnical report.

6. *Select vegetation removal activities.* Upon approval from the city, the following vegetation removal activities in a critical area or its buffer may be allowed:

   a. The removal of the following vegetation with hand labor and light equipment:

      i. Invasive and noxious weeds;

      ii. English Ivy (Hedera helix);

      iii. Himalayan blackberry (Rubus discolor, R. procerus);

      iv. Evergreen blackberry (Rubus laciniatus); and

      v. Scotch broom (Cytisus scoparius);

   b. The removal of trees from critical areas and buffers that are hazardous and pose a threat to public safety or an imminent risk of damage to private property, provided that:

      i. The applicant submits a report from a certified arborist, registered landscape architect, or professional forester that documents the hazard and provides a replanting schedule for the replacement trees;

      ii. Tree cutting is limited to pruning and crown thinning, unless otherwise justified by a qualified professional. Where pruning or crown thinning is not sufficient to address the hazard, trees may be removed or converted to wildlife snags;

      iii. All vegetation cut (tree stems, branches, etc.) must be left within the critical area or buffer unless removal is warranted due to the potential for disease or pest transmittal to other healthy vegetation;

      iv.

6. The landowner must replace any trees that are removed with new trees at a ratio of two replacement trees for each tree removed (2:1) within one year in accordance with an approved restoration plan.

a) Replacement trees may be planted at a different, nearby location if it can be determined that planting in the same location would create a new hazard or potentially damage the critical area.

b) Replacement trees must be species that are native and indigenous to the site and a minimum of one inch in diameter-at-breast height (dbh) for deciduous trees and a minimum of six feet in height for evergreen trees as measured from the top of the root ball;

v. If a tree to be removed provides critical habitat, such as an eagle perch, a qualified wildlife biologist must be consulted to determine timing and how best to minimize impacts; and

vi. Hazard trees.

a) Hazard trees may be removed or pruned by the landowner prior to receiving written approval from the city only if the hazard tree poses:

1) An imminent threat or danger to public health or safety;

2) An imminent threat to public or private property; or

3) An imminent threat of serious environmental degradation.

b) Within 14 days of removing a hazard tree, the landowner must submit a restoration plan that demonstrates compliance with the provisions of this chapter;

c. Measures to control a fire or halt the spread of disease or damaging insects consistent with the state Forest Practices Act found in RCW 76.09. The removed vegetation must be replaced in-kind or with similar native species within one year in accordance with an approved restoration plan; and

d. The necessary removal of vegetation or woody debris from a habitat conservation area or wetland as part of an approved alteration or as otherwise provided;

7. *Chemical applications.* The application of herbicides, pesticides, organic or mineral-derived fertilizers, or other hazardous substances, if necessary, as approved by the city and consistent with state department of fish and wildlife management recommendations, state department of agriculture regulations, state department of ecology regulations, and the U.S. Environmental Protection Agency regulations;

8. *Minor site investigative work.* Work necessary for land use submittals, such as surveys, soil logs, percolation tests, and other related activities, where such activities do not require construction of new roads or significant amounts of excavation. In every case, impacts to the critical area must be minimized and disturbed areas must immediately be restored; and

6.

9. *Boundary markers.* Construction or modification of boundary markers.

(Ord. No. 880, § 14, 9-12-2017)

112.20.050. - Critical area protective measures.

A. *Critical area markers and signs.*

1. The boundary at the outer edge of critical area tracts and easements must be delineated with permanent survey stakes as established by local survey standards.
2. The boundary at the outer edge of the critical area or buffer must be identified with temporary signs prior to any site alteration. The temporary signs must be replaced with permanent signs prior to occupancy or use of the site.
3. These provisions may be modified by the community development director as necessary to ensure protection of sensitive features or wildlife needs.

B. *Financial guarantee to ensure mitigation, maintenance, and monitoring.*

1. When required mitigation is not completed prior to final permit approval, the city must require the applicant to post a financial guarantee in a form and amount deemed acceptable by the city. If the development proposal is subject to mitigation, the applicant must post a financial guarantee in a form and amount deemed acceptable by the city to ensure mitigation is fully functional.
2. The bond must be in the amount of 150 percent of the estimated cost of the uncompleted actions or the estimated cost of restoring the functions and values of the critical area that are at risk, whichever is greater.
3. Financial guarantees must remain in effect until the city determines in writing that the standards bonded for have been met. Bonds or other security must be held by the city for a minimum of five years to ensure that the required mitigation has been fully implemented and demonstrated to function, and may be held for longer periods when necessary.
4. Depletion, failure, or collection of bond funds do not discharge the obligation of an applicant or violator to complete required mitigation, maintenance, monitoring, or restoration.
5. Public development proposals may be exempt from having to provide a financial guarantee if public funds have previously been committed for mitigation, maintenance, monitoring, or restoration.
6. Any failure to satisfy critical area requirements established by law or condition including, but not limited to, the failure to provide a monitoring report within 30 days after it is due or comply with other provisions of an approved mitigation plan constitute a default. The city may demand payment of any financial guarantees or require other action authorized by city code or any other law.
7. Funds recovered pursuant to this section must be used to complete the required mitigatio

6.

C. *Critical area inspections.* Reasonable access to the site must be provided to the city, state, and federal agency review staff for the purpose of inspections during any proposal review, restoration, emergency action, or monitoring period.

(Ord. No. 880, § 14, 9-12-2017)

112.20.060. - Wetlands.

A. *Definition.* Wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions.

1. *Includes:*
    a. Swamps.
    b. Marshes.
    c. Bogs.
2. *Does not include:*
    a. Artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities.
    b. Wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway.
3. *May include:*
    a. Artificial wetlands intentionally created for wetland mitigation purposes.

B. *Designation.* All areas within the city meeting the wetland designation criteria in the approved federal wetland delineation manual and applicable regional supplements are hereby designated critical areas and are subject to the provisions of this chapter.

C. *Delineation.* Wetlands must be identified and delineated in accordance with the approved federal wetland delineation manual and applicable regional supplement. Wetland delineations are valid for five years.

D. *Rating.*

1. Wetlands must be rated according to the Washington State Department of Ecology wetland rating system found in the Washington State Wetland Rating System for Western Washington (Ecology Publication #14-06-029) or as revised by Ecology. This document contains the definitions and methods for determining if the criteria below are met.
    a. *Category I wetlands.*
        i. *Definition.* Category I wetlands are those that:
            a) Represent a unique or rare wetland type; or

b) Are more sensitive to disturbance than most wetlands; or

c) Are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or

d) Provide a high level of functions.

ii. *Presence.* Category I wetlands may be located within the city. Wetlands of high conservation value can be designated based on the presence of a rare plant, rare or high-quality common plant community, or both. There are no known rare plants or high-quality wetland plant communities known to occur in the city or its vicinity.

b. *Category II wetlands.*

i. *Definition.* Category II wetlands are those that are difficult, though not impossible to replace, and provide high levels of some functions.

ii. *Presence.* Category II wetlands may be located within the city.

c. *Category III wetlands.*

i. *Definition.* Category III wetlands are wetlands with a moderate level of functions that can often be adequately replaced with a well-planned mitigation project and small interdunal wetlands one acre or less in size.

ii. *Presence.* Category III wetlands are likely located within the city.

d. *Category IV wetlands.*

i. *Definition.* Category IV wetlands are wetlands that have the lowest levels of functions and are often heavily disturbed.

ii. *Presence.* Category IV wetlands are likely located within the city.

2. *Illegal modifications.* Illegal modifications made by the applicant or with the applicant's knowledge do not change the wetland's rating.

E. *Activities allowed in wetlands.* The activities listed below are allowed in wetlands in addition to those activities listed in, and consistent with, the provisions established in Section 112.20.040, allowed activities. An activity listed below does not require a critical area report except when the activity results in a loss of functions or values of a wetland or wetland buffer. Activities allowed in wetlands include:

1. *Conservation.* Soil, water, vegetation, fish, shellfish, and other wildlife conservation or preservation that does not entail changing the structure or functions of the existing wetland.

2. *Low-impact harvesting.* Harvesting wild crops in a manner that is not injurious to natural reproduction of such crops and provided the harvesting does not require soil tilling, crop planting, chemical applications, or wetland alterations as a result of changing topography, water conditions, or water sources.

3.

6. *Utilities.* Drilling for utilities under a wetland; provided, that the drilling does not interrupt the ground water connection to the wetland or percolation of surface water down through the soil column. Specific studies by a hydrologist are necessary to determine whether the ground water connection to the wetland or percolation of surface water down through the soil column is disturbed.

4. *Wetland enhancement by removing nonnative invasive species.* Weeding is restricted to hand removal and weeded material must be removed from the site. Bare areas that remain after weed removal must be revegetated with native shrubs and trees at natural densities. Some hand seeding may also be done over the bare areas with native herbs.

F. *Supplemental information for wetland reports.* In addition to the requirements of Section 112.10.030, critical area reports, a wetland report must also include the following:

1. Existing wetland acreage;
2. A list of all local, state, and/or federal wetland-related permit(s) required for the project;
3. Documentation of any fieldwork performed on the site must include field data sheets for delineations, rating system forms, baseline hydrologic data, etc.
4. A description of the methodologies used to conduct the wetland delineations, wetland ratings, or impact analyses, including references.
5. Wetland rating, including a description of and score for each function, per Section 112.20.060.D of this chapter;
6. Vegetative, faunal, and hydrologic characteristics;
7. To the extent possible, hydrologic information such as estimated water depths within the wetland and estimated hydroperiod patterns based on visual cues;
8. An evaluation of the functions of the wetland and its buffer. Include references for the method used and data sheets.
9. A habitat and native vegetation conservation strategy that addresses methods to protect and enhance on-site habitat and wetland functions.

G. *Compensatory Mitigation.* Mitigation is required according to the sequence outlined in Section 112.10.040, mitigating for impacts. Where impacts to wetlands are unavoidable, compensatory mitigation measures may be utilized and must be consistent with this subsection.

1. *Compensating for lost or affected functions.* The proposed compensatory mitigation must achieve functional equivalency or represent an improvement over existing functions except in the following situations:

a. *Minimal Functions.* The lost wetland provides minimal functions; and

i. The proposed mitigation represents equivalent functions or an improvement over existing functions; or

ii.

6. The proposed mitigation will provide functions shown to be limiting within a watershed through a formal Washington State watershed assessment plan or protocol.

   b. *Out-of-kind mitigation.* Out-of-kind mitigation will best meet formally identified watershed goals, such as replacement of historically diminished wetland types.

2. *On-site mitigation wherever feasible.* On-site mitigation must be provided wherever feasible. Where it is demonstrated that on-site mitigation is not feasible, off-site mitigation may be allowed.

3. *Mitigation Plan.* In addition to the requirements outlined in Section 112.10.040.C., wetland mitigation plans must:

   a. Be consistent with the publication *Wetland Mitigation in Washington State - Part 2: Developing Mitigation Plans* (Ecology Publication #06-06-011b) or as revised by Ecology;

   b. Identify how construction of mitigation projects will be timed to reduce impacts to existing wildlife and vegetation; and

   c. Include a monitoring plan that ensures the goals of the proposed mitigation have been met. Monitoring must occur for at least five years but may be required for a longer period of time to ensure that lost or affected functions have been fully compensated for.

4. *Mitigation action preference.* Mitigation actions that require compensation by restoring, creating, enhancing, or protecting must occur in the following order of preference:

   a. *Restoration.* Restoration may involve one or more of the following:

      i. Re-establishing wetlands that used to exist. Re-establishing wetlands results in an increase in wetland area and functions.

      ii. Rehabilitating existing wetlands that are degraded. Rehabilitation increases wetland functions but does not increase the wetland area.

   b. *Creation/establishment.* Creating or establishing a new wetland area in a location where it did not previously exist. Creating or establishing a wetland area results in an increase in wetland area and functions.

   c. *Enhancement.* Enhancing a wetland to intensify or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes. Enhancing a wetland results in a change in wetland function(s) but may lead to a decline in other wetland functions. Enhancing a wetland does not result in an increase in wetland area.

   d. *Protection/maintenance.* Protecting/maintaining a wetland removes a threat to or prevents the decline of the wetland. Protection/maintenance does not result in an increase in wetland area but may, over time, result in an increase of wetland functions.

5. *Mitigation ratios.*

6.

a. *Minimum ratios.* The following table identifies the minimum amount of mitigation required based on the type of mitigation proposed.

Mitigation Ratio Based on Action (acres proposed per acre impacted)			
Wetland Category	Re-Establishment or Creation	Rehabilitation	Enhancement
Category I	4:1	8:1	16:1
Category II	3:1	6:1	12:1
Category III	2:1	4:1	8:1
Category IV	1.5:1	3:1	6:1

b. *Ratio increases.* The community development director may increase the mitigation ratio or require a different mitigation action under the following circumstances:

i. The proposed impacts are to a category I bog, natural heritage site, or mature forested wetland;

ii. Uncertainty exists as to the probable success of the proposed restoration or creation;

iii. A significant period of time will elapse between the wetland impact and the replication of wetland functions;

iv. Proposed mitigation will result in a lower category wetland or reduced functions relative to the wetland being impacted; or

v. The impact was not authorized when it occurred.

c. *Approved mitigation ratio alternatives.* As an alternative to the table above, the community development director may allow mitigation based on the credit/debit method outlined in *Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington: Final Report* (Ecology Publication #10-06-011), or as revised by Ecology.

H. *Buffers.*

1. *Required buffers.* All physical development and use is required to be set back from wetlands a distance based on the wetland rating and habitat score as follows:

Wetland Category	Required Buffer Based on Habitat Score			
	3-4	5	6-7	8-9
I	100'	140'	220'	300'
II	100'	140'	220'	300'
III	80'	140'	220'	300'
IV	50'	50'	50'	50'

2. *Measurement.* All buffers must be measured perpendicular from the wetland boundary as surveyed in the field.
   a. Buffers for a required mitigation site shall be based on subsection H.1. above.
   b. Buffers must be fully vegetated in order to be included in buffer area calculations. Lawns, walkways, driveways, and other mowed or paved areas shall not be considered buffers or included in buffer area calculations.
3. *Buffer increases.* Buffer widths may be increased on a case-by-case basis as determined by the Community Development Director when a larger buffer is necessary to protect wetland functions and values. This determination must be supported by appropriate documentation showing that it is reasonably related to protection of the functions and values of the wetland. The documentation must include, but is not limited to, the following information:
   a. The wetland is used by a state or federally listed plant or animal species or has essential or outstanding habitat for those species, or has unusual nesting or resting sites such as heron rookeries or raptor nesting trees; or
   b. The adjacent land is susceptible to severe erosion, and erosion-control measures will not effectively prevent adverse wetland impacts; or
   c. The adjacent land has minimal vegetative cover or slopes greater than 30 percent.
4. *Buffer averaging.*
   a. *Wetland protection.* Buffer averaging to improve wetland protection may be permitted when all of the following conditions are met:
      i.

6. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a "dual-rated" wetland with a category I area adjacent to a lower-rated area.

ii. The buffer is increased adjacent to the higher-functioning area of habitat or more-sensitive portion of the wetland and decreased adjacent to the lower-functioning or less-sensitive portion as demonstrated by a critical areas report from a qualified wetland professional.

iii. The total area of the buffer after averaging is equal to the area required without averaging.

iv. The buffer at its narrowest point is never less than either 75 percent of the required width or 75 feet for category I and II, 50 feet for category III, and 25 feet for category IV, whichever is greater.

b. *Reasonable use.* Averaging to allow reasonable use of a parcel may be permitted when all of the following are met:

i. There are no feasible alternatives to the site design that could be accomplished without buffer averaging.

ii. The averaged buffer will not result in degradation of the wetland's functions and values as demonstrated by a critical areas report from a qualified wetland professional.

iii. The total buffer area after averaging is equal to the area required without averaging.

iv. The buffer at its narrowest point is never less than either 75 percent of the required width or 75 feet for category I and II, 50 feet for category III and 25 feet for category IV, whichever is greater.

5. *Maintenance.* Except as otherwise specified or allowed in accordance with this chapter, wetland buffers must be retained in an undisturbed or enhanced condition. Removal of invasive non-native weeds is required for the duration of the mitigation bond.

6. *Impacts.* Impacts to buffers must be mitigated at a rate of one acre of mitigation for one acre of impact. Buffer mitigation must replace those buffer functions lost from development.

7. *Overlapping critical area buffers.* If buffers for two contiguous critical areas overlap (such as buffers for a wildlife habitat area and a wetland), the wider buffer applies.

(Ord. No. 880, § 14, 9-12-2017)

112.20.070. - Critical aquifer recharge areas (CARAs).

A. *Definition.* Critical aquifer recharge areas are areas with a critical recharging effect on aquifers used for potable water, as defined by WAC 365-190-030(3). A critical aquifer recharge area has prevailing geologic conditions associated with infiltration rates that create a high potential for

6. ontamination of ground water resources or contribute significantly to the replenishment of ground water.

1. *Includes:*
    a. Wellhead protection areas, as identified in the City of Tenino Water Plan and mapped by Washington State Department of Health.
    b. Areas having an extreme or high susceptibility to contamination, as identified by the Thurston Geodata Center.

B. *Designation.* All areas within the city meeting one or more of these criteria, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter. Critical aquifer recharge areas must be managed consistent with the best available science.

C. *Standards.*

1. *Activities.*
    a. Activities may only be permitted in a critical aquifer recharge area if the applicant can show that the proposed activity will not cause contaminants to enter the aquifer and that the proposed activity will not adversely affect the recharging of the aquifer.
    b. Activities must comply with the water source protection requirements and recommendations of the U.S. Environmental Protection Agency, Washington State Department of Health, and the Environmental Health Division of Thurston County Public Health and Human Services Department.
2. *Storage tanks.* Storage tanks proposed to be located in a critical aquifer recharge area must comply with local building code requirements and must conform to the following requirements:
    a. *Underground tanks.* All new underground storage facilities proposed for use in the storage of hazardous substances or hazardous wastes must be designed and constructed so as to:
        i. Prevent releases due to corrosion or structural failure for the operational life of the tank;
        ii. Be protected against corrosion, constructed of noncorrosive material, steel clad with a noncorrosive material, or designed to include a secondary containment system to prevent the release or threatened release of any stored substances; and
        iii. Use material in the construction or lining of the tank that is compatible with the substance to be stored.
    b.

6. *boveground tanks.* All new aboveground storage facilities proposed for use in the storage of hazardous substances or hazardous wastes must be designed and constructed so as to:

   i. Not allow the release of a hazardous substance to the ground, ground waters, or surface waters;

   ii. Have a primary containment area enclosing or underlying the tank or part thereof; and

   iii. A secondary containment system either built into the tank structure or a dike system built outside the tank for all tanks.

3. *Vehicle repair and servicing.*

   a. Vehicle repair and servicing must be conducted over impermeable pads and within a covered structure capable of withstanding normally expected weather conditions. Chemicals used in the process of vehicle repair and servicing must be stored in a manner that protects them from weather and provides containment should leaks occur.

   b. Dry wells are prohibited in critical aquifer recharge areas on sites used for vehicle repair and servicing. Dry wells existing on the site prior to facility establishment must be abandoned using techniques approved by the state Department of Ecology prior to commencement of the proposed activity.

4. *Residential use of pesticides and nutrients.* Application of household pesticides, herbicides, and fertilizers must not exceed times and rates specified on the packaging.

5. *Use of reclaimed water for surface percolation or direct recharge.* Water reuse projects for reclaimed water must be in accordance with the adopted water or sewer comprehensive plans that have been approved by the state departments of ecology and health.

   a. Use of reclaimed water for surface percolation must meet the ground water recharge criteria given in RCW 90.46.010(10) and 90.46.080(1). The State Department of Ecology may establish additional discharge limits in accordance with RCW 90.46.080(2).

   b. Direct injection must be in accordance with the standards developed by authority of RCW 90.46.042.

(Ord. No. 880, § 14, 9-12-2017)

112.20.080. - Frequently flooded areas.

A. *Definition.* Frequently flooded areas are lands in the floodplain subject to a one percent or greater chance of flooding in any given year and lands that provide important flood storage, conveyance, and attenuation functions. Classifications of frequently flooded areas include, at a minimum, the 100-year floodplain designation of the Federal Emergency Management Agency and the National Flood Insurance Program.

1. *Includes:*

a. *Areas identified on the flood insurance map(s).* Areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for Thurston County, Washington and Incorporated Areas" dated October 16, 2012, and any revisions thereto, with accompanying flood insurance rate maps (FIRM) dated October 16, 2012, and any revisions thereto. The flood insurance study and accompanying map(s) are hereby adopted by reference, declared part of this chapter, and are available for public review at the city.

B. *Designation.* Frequently flooded areas perform important hydrologic functions and may present a risk to persons and property. Frequently flooded areas are hereby designated critical areas and are subject to the provisions of this chapter and must be managed consistent with the best available science.

C. *Maintenance of records.* Where base flood elevation data is provided through the flood insurance study or required through this chapter, the city must obtain and record the flood elevation certificates of all new or substantially improved structures, whether or not the structure contains a basement. The city must also maintain for public inspection all records of floodplain hazards, certificates of flood-proofing, and flood elevation data.

D. *Standards.*

1. *Critical facilities prohibited.* Critical facilities are prohibited within frequently flooded areas unless there is no other practical alternative.
2. *Septic systems prohibited.* On-site sewage disposal systems, including drain fields, are prohibited within the 100-year floodplain.
3. *Flood elevations.* The base flood elevation for high ground water flood hazard areas corresponds to the elevation of the outer edge of the high ground water flood hazard area.
4. *Delineation of the base flood elevation.* Applicants must submit to the approval authority hydrologic and hydrogeologic studies as necessary to delineate the high ground water flood hazard area and the base flood elevation.
5. *Buffer required.* A minimum buffer of 50 feet is required from the outer edge of the high ground water hazard area or extending to a ground elevation two feet above the base flood elevation, whichever is less.
6. *Infiltration basins.* The bottom of any infiltration facility for stormwater discharge must be located at least six feet above the base flood elevation.
7. *Subdivision proposals.* Subdivision proposals must:
   a. Be consistent with the need to minimize flood damage;
   b. Have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

c. Must have adequate drainage provided to reduce exposure to flood damage.

d. Generate base flood elevation data when it is not available from another authoritative source.

8. *Building permit review.* Where elevation data is not available either through the flood insurance study or from another authoritative source, applications for building permits must be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

9. *Nonresidential construction.* All nonresidential construction must have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy, and be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this section based on their development and/or review of the structural design, specifications and plans.

E. *Warning and disclaimer of liability.* The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by manmade or natural causes. This chapter does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This chapter does not create liability on the part of the city, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this chapter or any administrative decision lawfully made hereunder.

(Ord. No. 880, § 14, 9-12-2017)

112.20.090. - Geologically hazardous areas.

A. *Definition.* Geologically hazardous areas are areas that may not be suitable for development because of their susceptibility to erosion, sliding, earthquakes or other geological events.

1. *Includes:*

a. *Erosion hazard areas.* Erosion hazard areas are those areas identified by the United States Department of Agriculture Soil Conservation Service as having a severe rill and inter-rill erosion hazard. Rill or inter-rill are areas subject to sheet wash, or steep-sided channels resulting from accelerated erosion. The city has limited lands that possess these characteristics, and will therefore regulate any potential erosion hazards through grade and fill regulations pursuant to Title 5, Buildings and Construction, and Title 109, Shoreline Designations.

b. *Landslide Hazard Areas.* Landslide hazard areas are areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of factors including, but not limited to, bedrock, soil, slope, slope aspect, structure, and hydrology. Examples of landslide hazard areas include, but are not limited to:

   i. Areas of historic failures.

   ii. Areas with all three of the following characteristics:

      a) Slopes in excess of 15 percent;

      b) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

      c) Springs or groundwater seepage.

   iii. Areas that have shown movement during the Holocene epoch (from 10,000 years ago to the present) or which are underlain or covered by mass wastage debris of that epoch.

   iv. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials.

   v. Slopes in excess of 80 percent that are subject to rockfall during seismic shaking.

   vi. Areas with a slope of 40 percent or more that have a vertical relief of ten or more feet. This does not include areas composed of consolidated rock. A slope is delineated by establishing its toe and top and is measured by averaging the inclination over at least ten feet of vertical relief.

   vii. Areas that include alluvial or colluvial fans located at the base of steep slopes and drainages.

c. *Seismic hazard areas.* Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting. One indicator of potential for future earthquake damage is a record of earthquake damage in the past. Ground shaking is the primary cause of earthquake damage in Washington. The strength of ground shaking is primarily affected by:

   i. The magnitude of an earthquake;

   ii The distance from the source of an earthquake;

   iii. The type of thickness of geologic materials at the surface; and

   iv. The type of subsurface geologic structure.

B.

6. *Designation.* Geologically hazardous areas pose a threat to the health and safety of citizens when incompatible development is sited in areas of significant hazard. Incompatible development may place itself at risk and increase the hazard to surrounding developments and uses. All areas within the city meeting one or more of these criteria, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter and must be managed consistent with the best available science.

C. *Standards.*

1. *Septic systems prohibited.* On-site sewage disposal systems, including drain fields, are prohibited within erosion and landslide hazard areas and related buffers.
2. *Critical facilities prohibited.* Critical facilities are prohibited within geologically hazardous areas unless there is no other practical alternative.
3. *Point discharges prohibited.* Point discharges from surface water facilities and roof drains onto or upstream from an erosion or landslide hazard area is prohibited.
4. *Buffers.* Buffers are used to eliminate or minimize the risk of property damage, death, or injury resulting from landslides cased in whole or in part by the development. A buffer must be provided from all edges of landslide hazard areas.
    a. *Minimum buffer.* The minimum buffer required is equal to the height of the slope.
    b. *Buffer reduction.* The buffer may be reduced to a minimum of ten feet when a qualified professional demonstrates to the city's satisfaction that the reduction will adequately protect the proposed development, adjacent developments and uses, and the subject critical area.
    c. *Buffer increases.* The city may require a wider buffer when it is necessary to prevent the risk of damage to proposed and existing development.
5. *Alterations.* Alterations of geologically hazardous areas or associated buffers may be allowed only if a hazards analysis has been submitted and certifies that the alterations:
    a. Will not increase the threat of the geological hazard to adjacent properties beyond pre-development conditions;
    b. Will not adversely impact other critical areas;
    c. Are designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than pre-development conditions; and
    d. Are certified to be safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington.
    e. The development will not increase surface water discharge or sedimentation to adjacent properties beyond pre-development conditions;
    f. The development will not decrease slope stability on adjacent properties; and

6. *Vegetation retention.* Removing vegetation in an erosion hazard area, landslide hazard area, or required buffer is prohibited unless otherwise provided for in this chapter or as part of an approved alteration.
7. *Seasonal restriction.* Clearing may only be allowed during the dry season, generally from May 1st to October 1st of each year.
    a. The city may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions.
    b. Timber harvest, not including brush clearing or stump removal, may be allowed during other times of the year provided an approved forest practice permit has been issued by the Washington State Department of Natural Resources.
8. *Utility lines and pipes.* Utility lines and pipes may be permitted in erosion and landslide hazard areas only when the applicant demonstrates that no other practical alternative is available.
    a. Lines or pipes in erosion and landslide hazard areas must be located above ground, properly anchored, and designed so that it will continue to function in the event of an underlying slide.
    b. Stormwater conveyance in erosion and landslide hazard areas must be through a high-density polyethylene pipe with fuse-welded joints, or a similar product that is technically equal or superior.
9. *Land divisions.*
    a. Land that is located wholly within a landslide hazard area or its buffer must not be subdivided.
    b. Land that is located partially within a landslide hazard area or its buffer may be divided; only if each resulting lot has sufficient buildable area outside of, and will not affect, the landslide hazard or its buffer.
    c. Access roads and utilities serving the proposed subdivision may be permitted within the landslide hazard area and buffer only if the city determines that no other feasible alternative exists.

(Ord. No. 880, § 14, 9-12-2017)

112.20.100. - Fish and wildlife habitat conservation areas.

A. *Definition.* Fish and wildlife habitat conservation areas are areas necessary for maintaining species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created.
    1. *Includes:*

a. *Endangered, threatened, and sensitive species.* Habitat areas associated with state or federally designated endangered, threatened, and sensitive species. Designated species known to occur in the city or its vicinity include, but are not limited to, the following:

   i. *Animals:*

      a) Oregon Vesper Sparrow.

      b) Mazama Pocket Gopher (Olympia, Tenino, and Yelm subspecies).

      c) Taylor's Checkerspot Butterfly.

      d) Mardon Skipper Butterfly.

   ii. *Plants:*

      a) Water Howellia.

      b) Golden Paintbrush.

b. *Priority habitats and species.* Priority habitats and species, as identified by the Washington State Department of Fish and Wildlife. Priority habitats and species known to occur in the city or its vicinity include, but are not limited to, the following:

   i. *Habitats:*

      a) Oregon White Oak Woodlands.

      b) West Side Prairie.

      c) Freshwater Wetlands.

   ii. *Species:*

      a) Western Gray Squirrel.

      b) Oregon Vesper Sparrow.

      c) Mazama Pocket Gopher.

c. *Rare plants and high-quality ecosystems.* Areas of rare plant species and high-quality ecosystems identified by the Washington State Department of Natural Resources through the Natural Heritage Program. Rare plant species known to occur in the city or its vicinity include, but are not limited to, the following:

   i. White-Top Aster.

d. *Wildlife corridors and connections.* Land useful or essential for preserving connections between habitat areas and open spaces.

e. *Waters of the state.* Waters of the state, including but not limited to lakes, rivers, ponds, streams, inland waters, underground waters, and salt waters. Scatter Creek is classified as a water of the state. Standards for underground waters are addressed in Section 112.20.070, critical aquifer recharge areas.

f.

6. *Ponds.* Naturally occurring ponds under 20 acres, including their submerged aquatic beds that provide fish or wildlife habitat and artificial ponds intentionally created from dry areas in order to mitigate impacts to ponds. Naturally occurring ponds do not include ponds deliberately designed and created from dry sites, such as canals, detention facilities, wastewater treatment facilities, farm ponds, temporary construction ponds, and landscape amenities unless intentionally created for mitigation purposes. Small ponds are known to occur in the city and its urban growth area.

B. *Designation.* All areas within the city meeting one or more of the criteria in subsection A. above, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter. Fish and wildlife habitat conservation areas must be managed consistent with the best available science.

C. *Standards.*

1. *Indigenous species.* Only plant, wildlife, or fish species that are indigenous to the region may be introduced into a habitat conservation area unless otherwise authorized by a state or federal permit or approval.

2. *Activity approvals.* The city may condition approval of activities that are allowed within or adjacent to a habitat conservation area or its buffers in order to minimize or mitigate any potential adverse impacts. Conditions must be based on the best available science.

3. *Alteration approvals.* Any approval of alterations or impacts to a habitat conservation area must be supported by the best available science.

4. *Mitigation.*

a. *Contiguous corridors.* Mitigation sites must be located to preserve or achieve contiguous wildlife habitat corridors in accordance with a mitigation plan.

i. The mitigation plan must be submitted and approved as part of the critical area report to minimize the isolating effects of development on habitat areas.

ii. Aquatic habitat mitigation areas must be located within the same aquatic ecosystem as the area disturbed.

b. *Equivalent or greater biological functions.* Mitigation areas must:

i. Achieve functional equivalency or represent an improvement of existing biologic and hydrologic functions;

ii. Include mitigation for adverse impacts upstream or downstream from the development proposal site; and

iii. Address each function affected by the alteration to achieve functional equivalency or improvement on a per function basis.

5.

6. *Native growth protection areas required.* Habitat conservation areas and their buffers must be preserved in perpetuity through the use of native growth protection areas and critical area tracts. Native growth protection areas include areas where native vegetation is preserved for the purpose of preventing harm to property and the environment including, but not limited to, the following:

    a. Controlling surface water runoff and erosion.

    b. Maintaining slope stability.

    c. Buffering.

    d. Protecting plants and animal habitat.

6. *Buffers.*

    a. *Buffers Required.* Buffers are used to protect the integrity, functions, and values of each affected habitat. A buffer must be provided when it is needed to protect the habitat conservation area. Buffers must consist of an undisturbed area of native vegetation or areas identified for restoration.

    b. *Buffer width.* Required buffer widths must reflect the sensitivity of the habitat as well as the type and intensity of human activity proposed. Buffer widths must be consistent with the management recommendations issued by the Washington Department of Fish and Wildlife.

    c. *Seasonal restrictions.* When a species is more susceptible to adverse impacts during specific periods of the year, seasonal restrictions may apply. Larger buffers may be required, and activities may be further restricted during the specified season.

    d. *Buffer averaging.* The city may allow the recommended buffer width to be reduced in accordance with a critical area report, the best available science, and the management recommendations issued by the Washington Department of Fish and Wildlife, only if:

        i. Buffer averaging does not reduce stream or habitat functions;

        ii. Buffer averaging provides additional natural resource protection, such as buffer enhancement;

        iii. The total area contained in the buffer after averaging is no less than that which would be contained within the standard buffer; and

        iv. The buffer width is not reduced by more than 25 percent in any location, as recommended by the Washington Department of Fish and Wildlife.

7. *Land divisions.*

    a. Land that is located wholly within a habitat conservation area or its buffer must not be subdivided.

    b.

6. and that is located partially within a habitat conservation area or its buffer may be divided only if the developable portion of each new lot and its access is be located outside of the habitat conservation area and buffer.

c. Access roads and utilities serving the proposed subdivision may be permitted within the habitat conservation area and buffer only if the City determines that no other feasible alternative exists.

8. *Endangered, threatened, and sensitive species.*

a. *Development.* Only development consistent with a management plan established by the Washington Department of Fish and Wildlife or applicable state or federal agency may be allowed in a habitat conservation area or buffer associated with endangered, threatened, or sensitive species.

b. *Protection Measures.* Protection measures identified in a critical area report that has been approved by the city, must be utilized for habitat conservation areas associated with endangered, threatened, or sensitive species.

c. *Alterations to habitat conservation areas.* Approval to alter habitat conservation areas or buffers associated with endangered, threatened, or sensitive species will not occur prior to consulting with:

i. For animal species, the Washington Department of Fish and Wildlife;

ii. For plant species, the Washington State Department of Natural Resources; and

iii. Other appropriate federal or state agencies.

9. *Wetland habitats.* Activities within or adjacent to habitat conservation areas containing wetlands must conform to the wetland standards set forth in Section 112.20.060, wetlands. If non-wetland habitat and wetlands are present at the same location, the provisions of this section or the wetlands section, whichever provides greater protection to the habitat, apply.

(Ord. No. 880, § 14, 9-12-2017)

6.

DISTRIBUTION STANDARDS

City of Tenino
Water System Standards

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WATER

4.01 General

A. These Water System Standards and Specifications are minimum base level performance, design and construction standards used to maintain uniformity of design within the water utility.

B. Any extension of the water system must be approved by the City and conform to these Standards, Department of Health regulations and guidelines, the City of Tenino Water System Plan, and Local Fire District requirements.

C. Proposed plans must show how water shall be supplied and the applicant shall demonstrate whether adequate water pressure and volume shall be maintained in case of fire. An analysis of the system may be required, at the Applicant's cost, if it appears that the system might be inadequate.

D. Anyone desiring to extend or connect to the City water system must contact the City for a Pre-construction Application form. After the completed application is returned to the City, along with any other information that may be required or requested, staff shall determine the conditions of service for connection to the water system.

E. Extension of or connection to City water lines outside of the Tenino Urban Growth Area (UGA) may be limited under the provisions of the Thurston County Comprehensive Plan. The City shall not allow service outside of the UGA without written permission from the County.

4.02 Design Criteria

A. The design of any water extension/connection shall conform to these Standards and all other applicable standards. The layout of extensions shall provide for continuation and/or looping of the existing system. The City has the authority to apply or necessitate items not covered or mentioned in this chapter. .

B. All pipe, valves, meters, hydrants, fitting and special materials shall be new undamaged and designated for use in potable water systems. All labor, equipment and materials shall be in conformance with the Standard Specifications for Road, Bridge and Municipal Construction, WSDOT and APWA, and the specification of the American Water Works Association, expect as modified herein. Materials or additives must be in compliance with NSF Standards 60 and 61 as required in WAC 246-290-220.

C. Watermains shall be sized to provide adequate Peak Hour Demand (PHD) at a minimum residual pressure of 30 psi and Maximum Day Demand (MDD) plus fire flows at a minimum residual pressure of at least 20 psi. Specific fire flow

requirements shall be determined by the City for each development application. However, the quantity of water required shall in no case be less than 500 gpm at 20psi residual pressure for 30 minutes in residential areas; 750 gpm at 20psi residual pressure for 60 minutes multi-family residential and commercial areas; or 1,000gpm at 20psi residual pressure for 60 minutes in industrial areas.

D. The minimum watermain size shall be six (6) inches in diameter where looped. Dead-end mains shall be a minimum of eight (8) inches in diameter. All mains that may be extended or looped must end with an approved mechanical joint gate valve and 3-foot pipe extension, cap and thrust blocking.

E. Larger sized mains may be required in specific areas identified in the Tenino Water System Plan. The City may also require the installation of larger mains if determined necessary to meet fire protection needs, domestic requirements and/or for future service needs.

4.03 Pipe, Valves and Fittings

A. Pipe. All pipe for watermains shall have flexible gasketed joints and shall be PVC or Ductile Iron in accordance with the following specifications:

1. Ductile Iron Pipe: Ductile Iron Pipe shall conform to AWWA C 151 Class 50 or greater if required in accordance with the criteria specified in AWWA C150. Ductile iron pipe shall be cement mortar lined with a bituminous seal coat outside in accordance with AWWA C 104. All pipes shall be joined using rubber gaskets, push-on type or mechanical joint, conforming to AWWA C 111, and be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise.

2. Polyvinyl Chloride (PVC): Six inch and larger PVC pipe shall be AWWA C900, minimum pressure Class 150. All pipe shall be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise and assembled with a non-toxic lubricant.

B. Fittings. All fittings shall be ductile iron compact fittings conforming to AWWA C153 or, AWWA C110 or C111. All fittings shall be cement mortar lined conforming to AWWA C104. All fittings shall be connected by flanges or mechanical joints. Restraining glands shall be provided on all mechanical joints unless otherwise directed.

C. Pipe Installation. Pipe installation shall be in accordance with the Standard Specifications, Standard Details and Standard Plans, except as modified herein.

1. Pipe Cover. A minimum of thirty (36) inches of cover over the pipe and, to the extent practical, a maximum of forty-two (42) inches cover is required from the finished or exiting ground surface, whichever is greater, to the top of the pipe for

all installed transmission, distribution and service piping. The City may allow thirty (30) inches of cover where ductile iron piping is utilized.

2. Tracer Tape and Locate Wire. All pipes and services shall be installed with continuous tracer tape placed twelve to eighteen inches under the proposed finished subgrade. The tracer tape shall be of plastic non-biodegradable, metal core, or backing marked "WATER" that can be detected by a standard metal detector. In addition to tracer tape, toning wire shall be installed over all pipe and services. Toning wire shall be UL listed, type UF, 12-gauge solid coated (blue) copper wire, taped to the top of the pipe and laid loose enough to prevent stretching and damage before being brought up and tied off at the valve operating nut or valve box. If the operating nut is not easily accessible from the ground surface, the copper wire shall be tied off at the valve box in such a way that the wire is easily accessible from the ground surface. Two (2) feet of slack shall be provided to allow for connection to the locator. Toning wire shall be tested prior to acceptance of the pipe system. A written notice from the Contractor to the City must be received two (2) business days prior to when testing is required.

3. Connection to Existing Mains. The City shall be responsible for approving the scope of work for connection to existing watermains. The City shall be consulted regarding fittings or couplings required. It shall be the Contractor's responsibility to verify the location and depth of the existing main and the fittings required to make the connections to the existing main. All excavation, connections, piping, tapping valve fittings, services, anchors, blocking, bedding, backfill, compaction, restoration and other labor and materials required shall be furnished and placed by the Contractor. Tapping or connecting to an existing watermain shall be done in the presence of a City representative. The City shall be given five (5) business days advance notice of a watermain tap or connection to an existing main. Water mains shall not be shut down for taps under most conditions.

4.04 Service Interruption

A. The Contractor shall notify the City five (5) business days prior to a utility shutdown. The City, at its discretion, may re-schedule shutdown and a City representative must be present at any utility shutdown. When shut downs require "field verification" of underground conditions, connection points will be exposed by the Contractor and work requirements shall be verified by the Contractor and the City two (2) business days prior to the shutdown notice. Customers involved with or affected by shutdowns will be notified by the Contractor at least forty-eight (48) hours in advance. Shutdowns will not be permitted on Fridays, weekends, or holidays without written authorization from the City.

B. Shutdowns cannot be scheduled until a Water/Sewer/Stormwater Application has been approved and all applicable fees have been paid in full.

4.05 Hydrants

A. Fire hydrants shall be installed in accordance with the Standard Specifications and the Standard Details .

1. The center of the lowest outlet of the hydrant shall be no less than 18-inches above finished grade. In addition, all hydrants shall be installed with a minimum of a 36-inch unobstructed radius around the hydrant. Hydrants shall be aligned so that pumper ports face toward the road or most probable route of access, if roads are not available, as determined by the appropriate local fire protection authority.

2. When necessary, the City shall require hydrants to be protected by two or more posts, 4-inch diameter x 5 feet high made of either reinforced concrete or steel.

3. Public fire hydrants shall be located within publicly owned easements and rights-of-way.

B. The City, in conjunction with the Fire District shall determine the required hydrant spacing. All hydrants shall be installed and placed in a manner that provides accessibility to Fire equipment as determined by the local fire authority and public works. Unless otherwise required by the City, the following guidelines shall apply for hydrant number and location:

1. In general, hydrants shall be predicated on the location of street intersections wherever possible, and located to minimize the hazard of damage by traffic.

2. Hydrants shall have an average nominal spacing of 600-feet. In no case shall hydrants be placed farther than 700-feet apart and no building shall be more than 350-feet from the nearest hydrant.

3. More stringent spacing may be required if needed to meet specific building or fire code requirements.

4. The spacing distance for hydrants shall be measured along the frontage street(s) and/or accessible side street(s) only. When determining the sufficiency of existing hydrants related to hydrant placement and spacing, hydrants located behind or on parallel streets or alleys, or hydrants with flows less than the minimum fire flows listed in Section 4.03A shall not be considered.

5. When any portion of a proposed building is in excess of 150 feet from a water supply on a public street or right-of-way, privately owned on-site hydrants shall be required. Such hydrants shall be located per the local fire authority and the International Fire Code. The hydrants shall be privately maintained and shall include the appropriate metering and backflow prevention, as noted in these

Standards. A proposed maintenance schedule shall be submitted to the City for review prior to final approval of the engineering plans.

4.06 Valves

A. Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall there be less than one (1) valve every 400 feet in school, commercial or multi-family areas, or 800 feet in residential areas, where customers are being served. Generally, there shall be three (3) valves on each tee and four (4) valves on each cross. Specific requirements for valve spacing shall be made at the plan review stage. All existing valves are to be operated by City employees only.

B. Gate Valves. Gate valves shall be used on all 2- to 12-inch lines. Resilient seated gate valves shall be manufactured and tested in accordance with AWWA C509 or C515 specifications. They shall be equipped with mechanical joints or flanged ends of Class 125 in accordance with ANSI B16-1. Gate valves, 3-inch and larger, shall be iron body, bronze-mounted, double disc and "O"-ring stem seal. Gate valves smaller than 3-inches shall be 125 psi, non-stem rising, wedge disc, all brass or bronze valves with screwed, soldered or flanged ends compatible with the connecting pipe. All valves shall open counterclockwise and, unless otherwise specified, shall be non-rising stem type equipped with standard AWWA 2-inch stem operating nuts. Gate valves shall be Mueller, M & H, Kennedy, Clow R/W or Waterous Series 500.

C. Butterfly Valves. Butterfly valves shall be used on all lines fourteen (14) inches and larger. Butterfly valves shall conform to AWWA C504, Class 150B, with cast iron short body and O-ring stem seals. When installed, they shall have a position indicator which clearly shows position of the disc. All valves shall be equipped with an underground manual operator with AWWA 2-inch square operating nut and shall open with a counterclockwise rotation. Butterfly valves shall be Mueller, Linseal III, Kennedy, or Allis Chalmers.

D. Valve Boxes. All valve boxes shall be in accordance with Standard Details.

4.07 Casing

A. Steel casing pipe shall be schedule 20 steel or equal. Pipe spacers shall have 8-inch runners. Casting pipe and spacers shall be sized for pipe being installed with a minimum of three (3) spacers per section of pipe. The casing pipe shall then be sand-packed and sealed with flexible end seal material secured with stainless pipe bands.

4.08 Combination Air Valve

A. Combination air valves shall be in accordance with the Standard Details. Combination air valves shall be set at high points of water mains. Where possible, pipes are to be graded to prevent the need for a combination air valve.

4.09 Blowoff Assembly

A. A blowoff assembly shall be installed on all permanent dead-end runs and at the designated points of low elevation within the distribution system if a fire hydrant is not located in the immediate vicinity. On watermains that may be extended in the future, the valve that operates the blowoff assembly shall be the same size as the main and provided with a saddle block along the last length of the pipe preceding the valve, in lieu of a thrust block at the end. The blowoff assembly shall be installed in the utility right-of-way.

4.10 Backflow Prevention

A. All water system connections serving buildings or properties with fire sprinklers, irrigations systems or other potential cross-connections as determined by the City, shall comply with the minimum backflow prevention requirements established by the Department of Health (DOH) and the City of Tenino Cross-Connection Control Program.

B. All assemblies must be installed in accordance with the most recent versions of the City of Tenino Cross-Connection Control Program, DOH, UPC, and the PNWS/AWWA Cross-Connection Control Manual. In addition, all assemblies must be inspected and approved by the City's Cross-Connection Specialist (CCS).

C. In-premise installation of backflow assemblies can be installed only with written permission by the City's CCS or may be mandated along with premises isolation when high health hazards are determined to exist by the CCS. All backflow assemblies (premises or in-premises) must be readily accessible to City personnel during regular working hours of 8:00 a.m. to 4:30 p.m. If there is a change of ownership of an in-premise backflow assembly and/or at any time all requirements are not met, the City has the right to enforce premises isolation and shall follow the procedures established in the City of Tenino Cross-Connection Control Plan. The City must be notified within two (2) business days of the completion of a backflow assembly installation. Upon notification, the City's CCS shall then inspect the installation to determine compliance with all applicable requirements.

D. All backflow assembly installations are also required to be tested by a Washington State DOH-certified Backflow Assembly Tester (BAT) with an annual certificate of accuracy for their testing equipment on file with the City. The test results must be delivered to the City showing the backflow assembly having successfully passed the

certified test. The property owner must schedule a backflow test annually thereafter. The City shall release or issue a Certificate of Occupancy only after all backflow assemblies have passed a certified test. A list of approved testers may be obtained from the Washington Environmental Training Resource Center (WETRC) located in Auburn, Washington.

E. All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts and repairs of a backflow assembly are the responsibility of the property owner/user.

F. Failure on the part of any customer to correct all cross-connections in accordance with these Standards is sufficient cause for the immediate discontinuance of public water service to the premises.

4.11 Service Connection

A. Each customer shall have a separate metered service. Master meters may be allowed for service to a complex under single ownership and where multiple service meters is impractical. Types of facilities where master meters may be allowed shall be in accordance with WAC 246-290-496.

B. Services shall be installed by City staff in accordance with the Standard Details. All service connection sizes used for new development shall be determined by the City and installed by the Developer at the time of mainline construction. After the lines have been constructed, tested and approved, the owner may request a water meter. The City shall install a water meter only after all applicable fees paid and the system inspected and approved. For 1½" or larger meters, the meter and gasket shall be supplied by the Contractor. The City shall lock off the setter after the Contractor has installed the meter.

C. For new service to an existing parcel or new parcel fronting an existing main, an application must be submitted to the City. Upon approval of the application and payment of all applicable fees, City staff shall tap the main, and install the meter, box, and setter. The City shall supply the water meter and setter.

D. All labor and material cost for service connections is in addition to any connection or capacity related fees and charges and shall be billed directly to the applicant.

4.12 Watermain/Sanitary Sewer Crossings

A. Transmission and distribution water piping shall be separated at least ten (10) feet horizontally from on-site waste disposal piping, drainfields, and/or gravity sewage pipes and force mains. The Contractor shall maintain a minimum of eighteen (18) inches of vertical separation between sanitary sewers and watermain crossings - with the watermains being at the higher elevation.

B. The longest standard length of water pipe shall be installed so that the joints shall fall equidistant from any sewer crossing. In cases where minimum separation cannot be maintained, it may be necessary to utilize watermain-rated pipe for the sewer line, or to encase the water pipe and/or sewer line in a casing or concrete. No concrete shall be installed unless specifically directed by the City.

C. Additional guidelines to be considered for parallel and crossing installations of water and sewer lines are the DOH Water System Design Manual, DOE Sewage Works Criteria and the "Recommended Standards for Water Works." – Ten State Standards.

4.13 Irrigation

All irrigation systems shall be installed with a backflow prevention assembly in accordance with the City of Tenino Cross-connection Control Program. Irrigation sprinklers shall be situated so as to not wet any public street or sidewalk.

4.14 Staking

A. All surveying and staking shall be performed by a surveying firm licensed in the State of Washington and capable of performing such work.

B. The minimum staking of waterlines shall be as follows:

1. Stake centerline alignment every one hundred (100) feet with cuts and/or fills to bottom of trench maintaining the minimum required depth of cover over pipe. Centerline cuts are not required when road grade is to finished subgrade elevation.

2. Stake location of all fire hydrants, hydrant flange elevations, tees, water meters, setters and other fixtures with cut or fill to finished grade.

4.15 Construction Requirements

A. Pipe placed in the trench shall be sealed with a watertight plug at the end of each day. More frequent use of a watertight plug may be required at the discretion of the City.

B. Trenching and shoring operations shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standards. The Contractor shall maintain the presence of a "competent person" as defined by the Washington State Department of Labor and Industries when any trench excavation and backfill work is being done at the project site.

C. Backfilling shall not commence until the pipe installation has been inspected and approved by the City. Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City.

D. Where governmental agencies other than the City have jurisdictions over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction, but in no case shall the backfilling or compaction be to a lower standard than that of the City.

4.16 Street Patching and Restoration

A. See Chapter 2 of these Standards for requirements regarding street patching and trench restoration.

4.17 Hydrostatic Tests

A. Prior to the acceptance of work, a hydrostatic and pressure leakage test shall be conducted by the Contractor on all newly-constructed water mains, fire lines, fire hydrants leads and stub-outs in accordance with Standard Specifications, and AWWA C600, unless specified otherwise by the City. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor. Prior to calling the City to witness the pressure test, the Contractor shall have all equipment ready for operation and have successfully performed the test to ensure that the pipe is in satisfactory condition.

B. Defective material or workmanship discovered, during a hydrostatic field test shall be replaced by the Contractor at no expense to the City. Whenever it is necessary to replace defective material or correct workmanship, the hydrostatic test shall be re-run at the Contractor's expense until a satisfactory test is obtained. Test pressure shall be maintained while the installation is inspected by the City.

4.18 Sterilization and Flushing

A. Sterilization of watermains shall be accomplished by the Contractor in accordance with the Standard Specifications. At no time shall chlorinated water from a new main be flushed into a body of water, including lakes, rivers, streams, drainage ways, and all waters where fish or other natural water life can be expected. Any discharge into a City sewer system must be approved in advance and in writing by the City. Sample collection should be scheduled with the City at least two (2) business days in advance. Samples can only be taken on Mondays, Tuesdays and Wednesdays.

General Notes (All Projects)

1. The Contractor shall provide all labor, equipment and materials to complete the work in accordance with the City Standards (referred to as "City Standards"), City of Tenino Standard Details (referred to as "Standard Details"), the most recent copy of the Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge and Municipal Construction (referred to as the "Standard Specifications") and WSDOT Standard Plans (referred to as "Standard Plans").

2. A pre-construction meeting shall be held with the City at least three business days prior to the start of construction.

3. The Contractor shall be responsible for all traffic control in accordance with MUTCD. Prior to disruption of any traffic, traffic control plans must be prepared and submitted to the city for approval. No work shall commence until all approved traffic control plans are in place.

4. All vertical and/or horizontal alignment, shall be staked by an engineering or surveying firm capable of performing such work and directed by a surveyor licensed to perform such work in the State of Washington. City datum shall be used for all vertical control.

5. Call the Utilities Underground Location Center at 1-800-424-5555 a minimum of two (2) business days prior to any excavations.

6. The Contractor shall comply with all other permits and requirements of the City and/or other governing authorities or agencies. If construction is to take place in the County right-of-way, the Contractor shall notify the County and obtain all the required approvals and permits.

7. It shall be the responsibility of the Contractor to maintain a copy of the approved construction plans on-site at all times bearing the signature of the City Public Works Director.

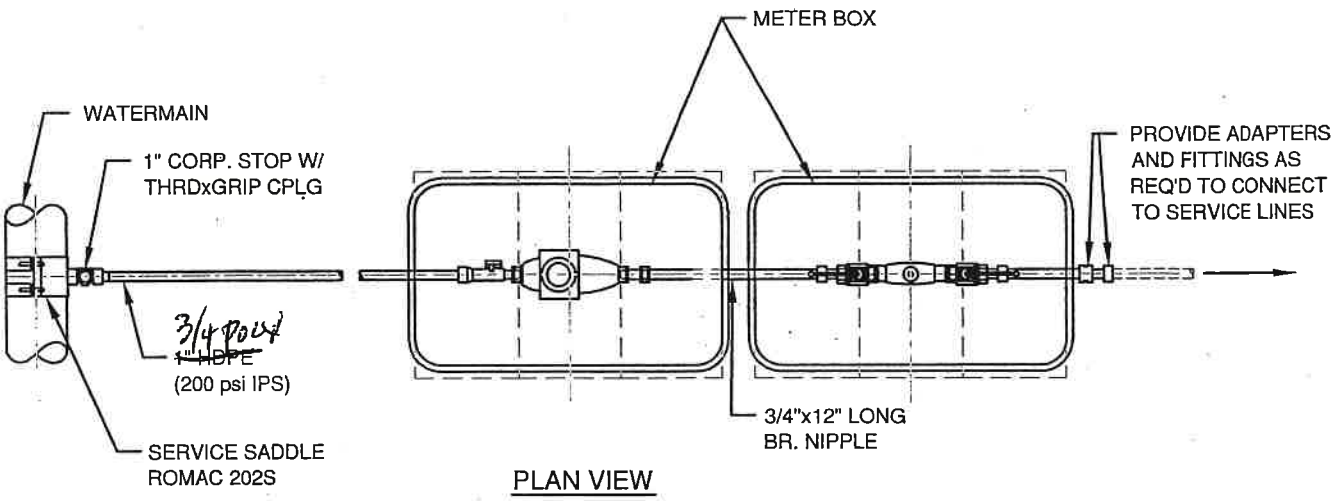
8. Any changes to the design shall first be reviewed and approved by the developer's project engineer and the City Public Works Director prior to implementation.

9. The Contractor shall notify the City five (5) business days prior to a utility shutdown. A City representative must be present for any utility shutdown. The City, at its discretion, may re-schedule shutdown. When shut downs require "field verification" of underground conditions, connection points will be exposed by the Contractor and work requirements shall be verified by the Contractor and the City two (2) business days prior to the shutdown. Customers involved with or affected by shutdowns will be notified by the Contractor at least forty-eight (48) hours in advance. Shutdowns will not be permitted on Fridays, weekends, or holidays without written authorization from the City.

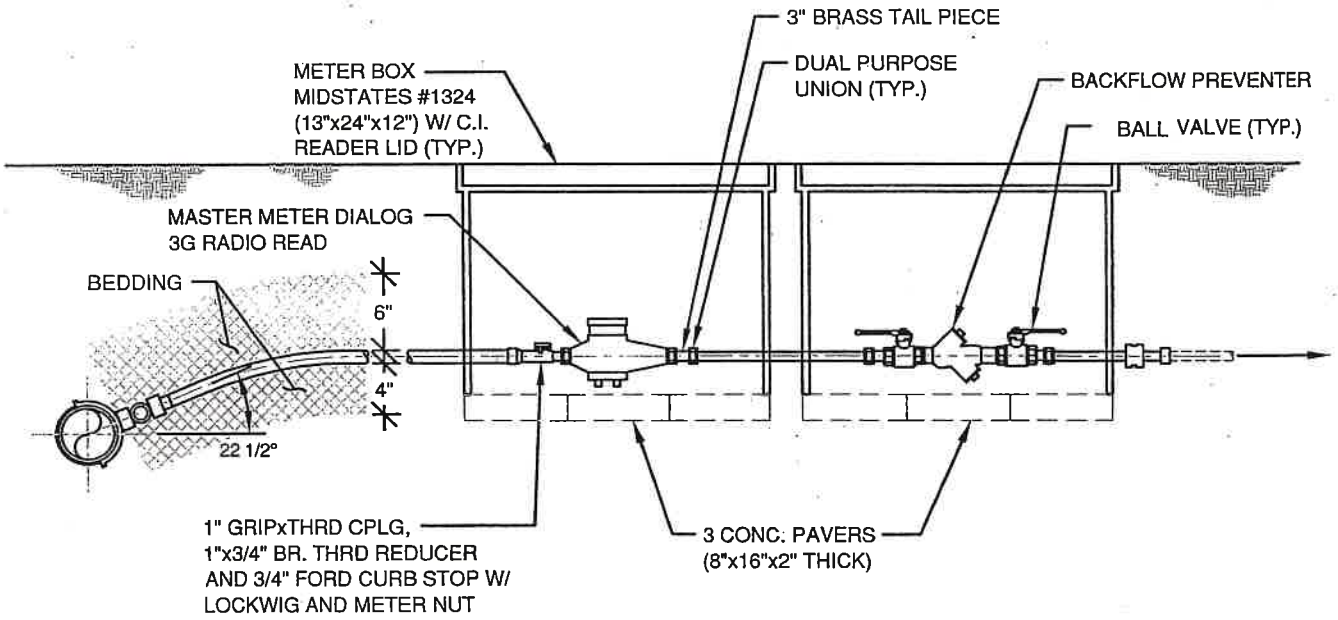
10. Prior to backfill, all buried pipe and appurtenances shall be inspected and approved by a representative of the City. It is the contactor's responsibility to notify the City in advance of all required inspections. Any pipe or appurtenance backfilled prior to inspection shall be re-excavated by the Contractor for inspection at no cost to the city. The Contractor shall retain responsibility to repair all deficiencies and failures revealed during all required testing for acceptance and throughout the duration of the warranty.

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CITY OF TENINO PUBLIC WORKS DEPARTMENT	GENERAL NOTES ALL PROJECTS	REVISED: 08-02-2007	DRAWING NO. 267



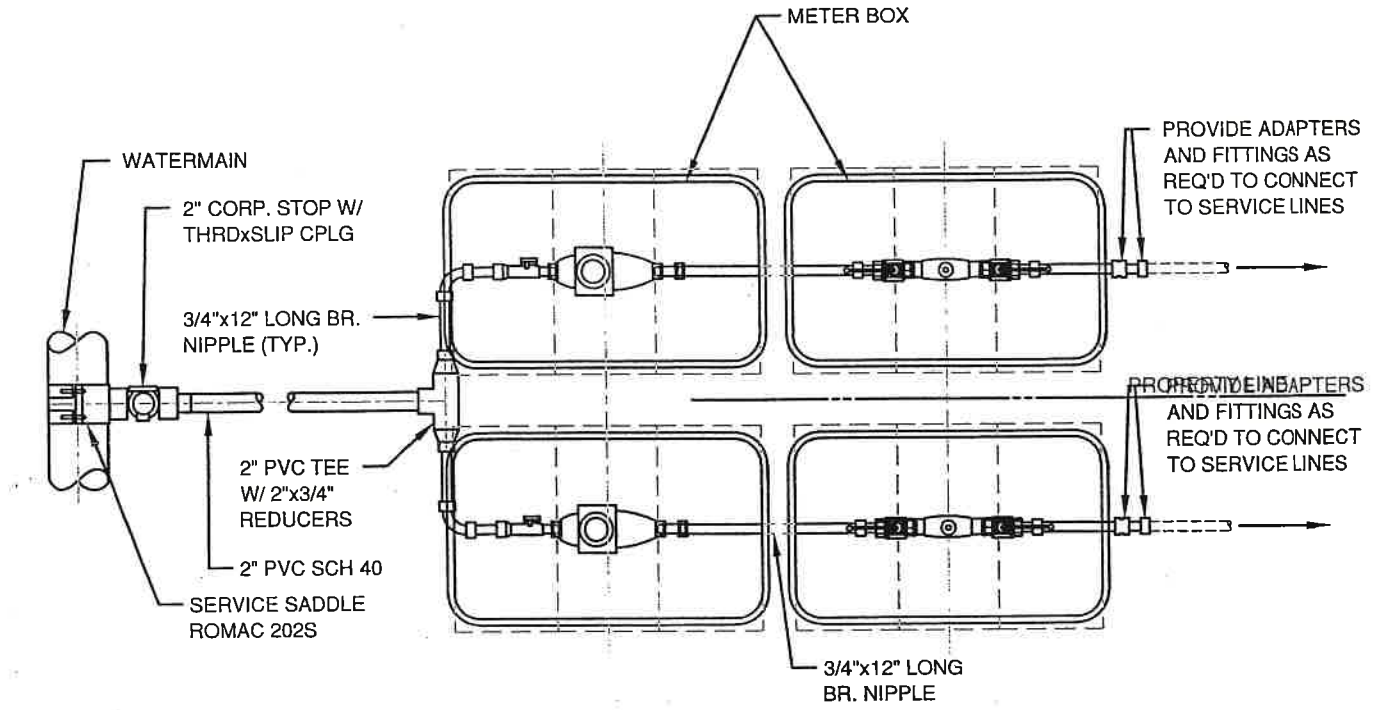
PLAN VIEW



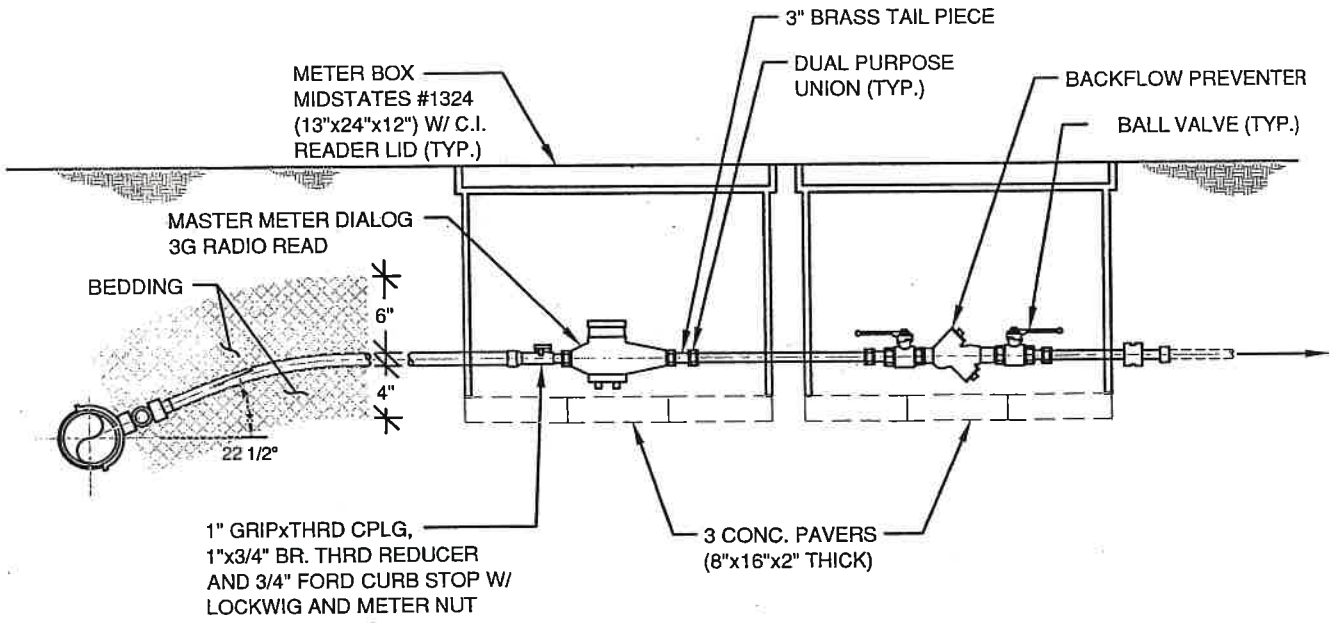
SECTION VIEW

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS 5/8" x 3/4" WATER SERVICE	REVISED: 08/02/2007	DRAWING NO. 268

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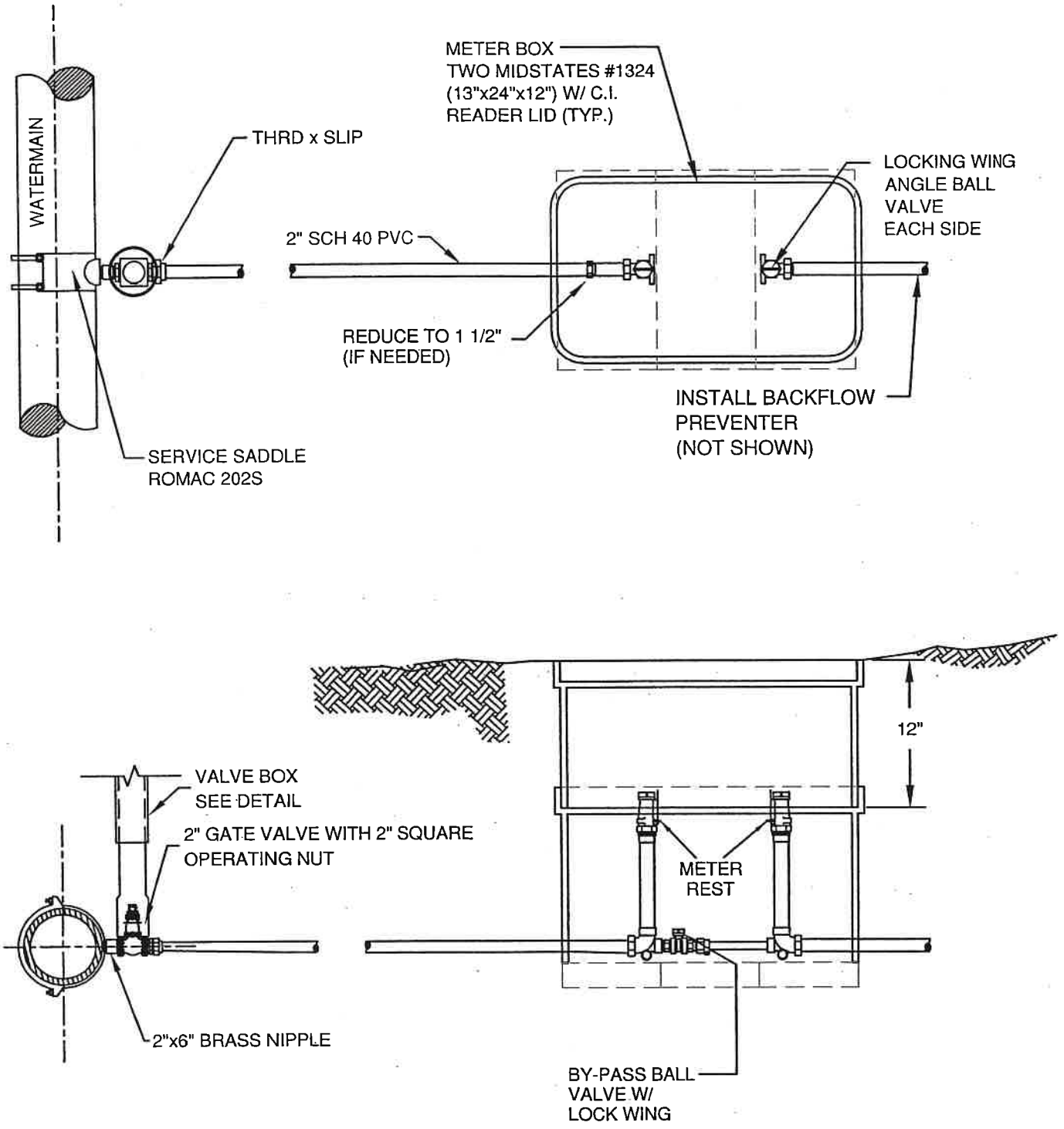
PLAN VIEW



SECTION VIEW

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS DOUBLE 5/8" x 3/4" WATER SERVICE	REVISED: 08/02/2007	DRAWING NO. 269

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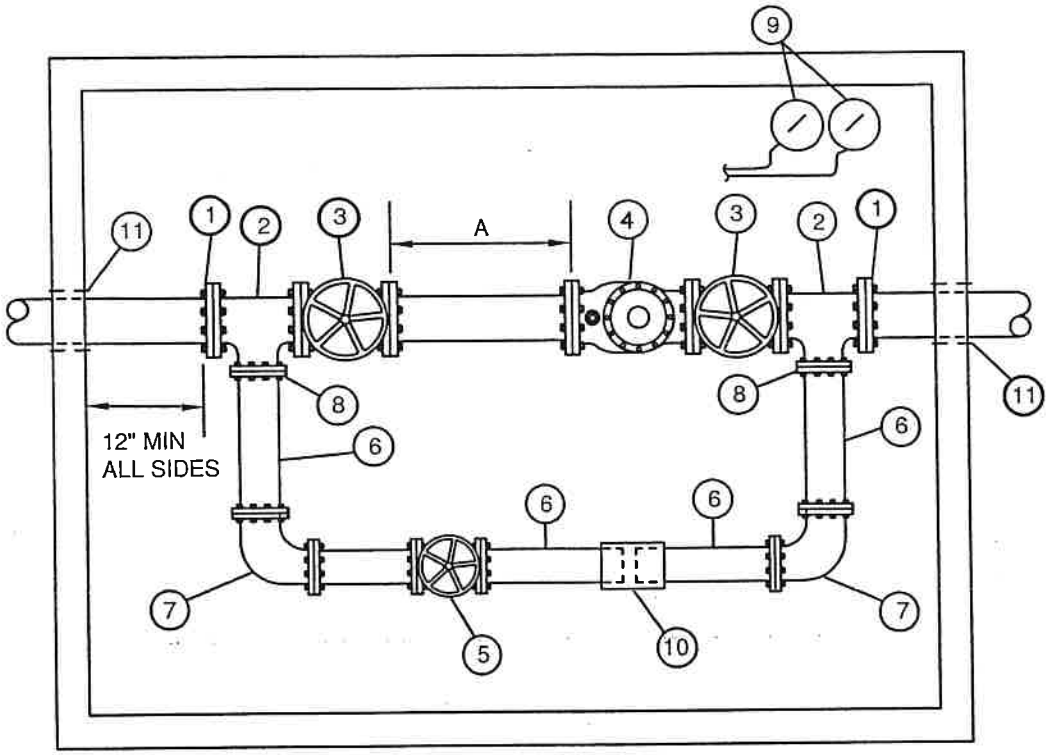


NOTES:

1. COPPER SETTERS SHALL BE:
   1 1/2" - FORD VVF76-12B-13-11-66
   2" - FORD VVF77-12B-17-11-77
2. METER INSTALLED BY CITY AT PROPERTY OWNER'S EXPENSE

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS 1 1/2" - 2" WATER SERVICE W/ BYPASS	REVISED: 08/02/2007	DRAWING NO. 270

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METER	MINIMUM DIMENSION "A"	DOOR SIZE	VAULT DEPTH	TEES
3" COMPOUND	15"	3' X 3'	5'0"	3"X1-1/2"
4" COMPOUND	20"	3' X 3'	5'0"	4"X2"
6" COMPOUND	30"	3' X 3'	5'0"	6"X4"
8" COMPOUND	40"	3' X 6'	5'0"	8"X6"

* VARIES, TO BE DETERMINED BASED ON SPECIFIC PARTS USED.

1. RESTRAINED FLG ADAPTER (RFA)
2. FLG TEE
3. FLG GATE VALVE W/ HAND WHEEL
4. COMPOUND METER
5. GATE VALVE W/HAND WHEEL
6. DUCTILE IRON SPOOL OR BRASS NIPPLES
7. 90° ELBOWS (MATERIAL TO BE SAME AS PIPE)
8. RFA OR BLIND FLG W/ THRD TAP
9. REMOTE READERS
10. MECHANICAL COUPLING OR UNION
11. SEAL ANNULAR SPACE W/ NON-SHRINK GROUT

NOTES:

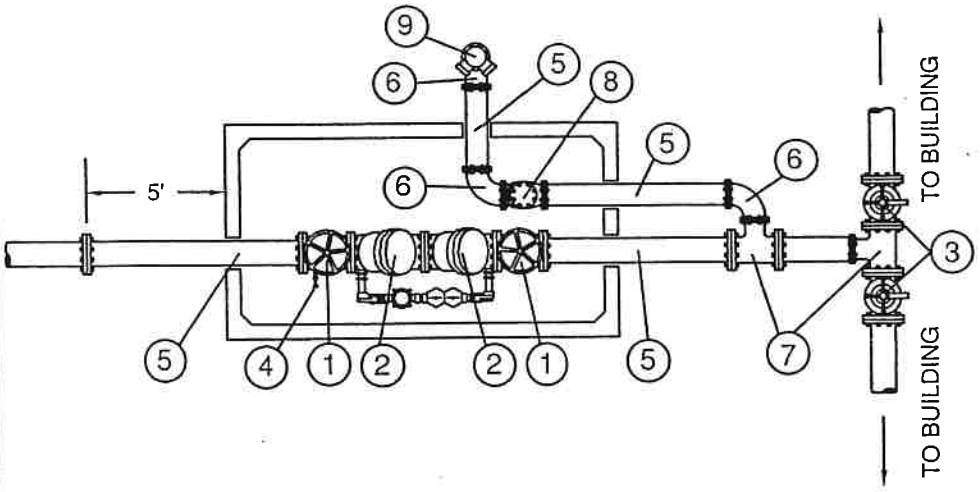
1. VAULTS SHALL BE THE STANDARD PRODUCTS AS MANUFACTURED BY UTILITY VAULT "LA" SERIES OR EQUAL. TOP SECTIONS SHALL INCLUDE HINGED LOCKING COVER (NO. 332P OR 2-332P) HINGED READER LID FOR REMOTE READERS.

2. PIPE AND FIXTURES TO BE SET ON VALVE STANDS INSTALLED ACCORDING TO MANUFACTURERS SPECS.

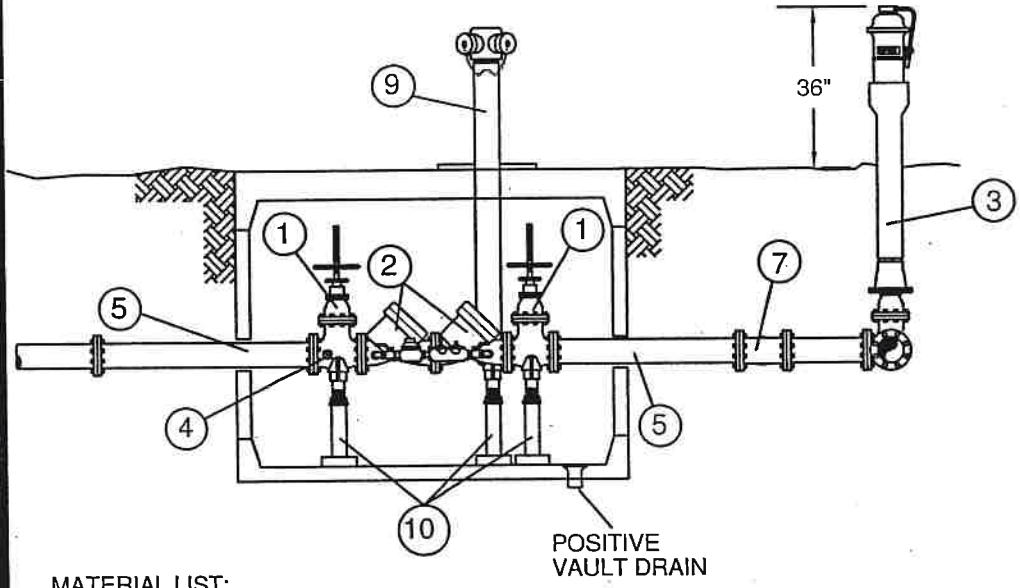
3. DRAINAGE MUST BE PROVIDED FOR THE VAULT.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	COMPOUND WATER METER W/ BYPASS FOR 3"-8" WATER SERVICE	REVISED: 08/02/2007	DRAWING NO. 271

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PLAN



PROFILE

MATERIAL LIST:

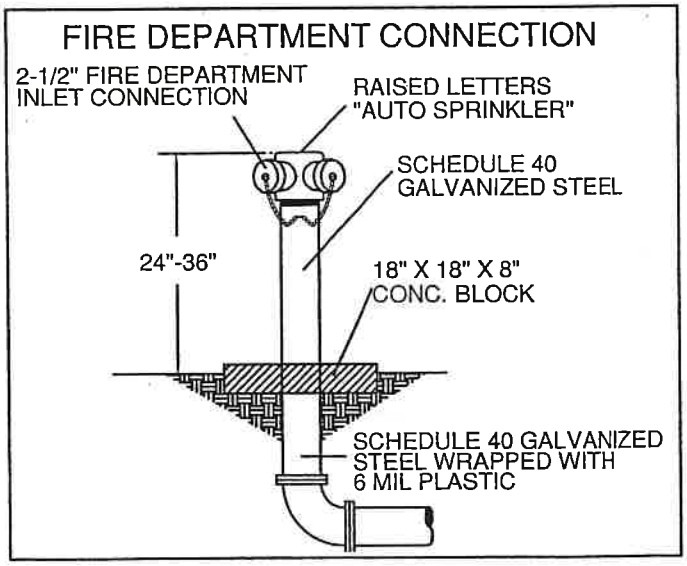
1. FLG GATE VALVE W/ HANDWHEEL
2. DOUBLE CHECK DETECTOR ASSEMBLY FLGxFLG (DOH APPROVED)
3. POST INDICATOR VALVE
4. 3/4" BALL VALVE (TEST COCK)
5. DI PIPE SPOOL
6. DI 90° FLG BEND
7. DI FLG TEE
8. SWING CHECK VALVE W/BALL DRIP ASSEMBLY
9. FIRE DEPARTMENT CONNECTION
10. VALVE STANDS
11. WHERE PIPING PASSES THROUGH CONCRETE WALL PROVIDE 2" CLEARANCE W/ WATERPROOF MASTIC OR FLEXIBLE SEALANT

GENERAL NOTES:

A. PIPE FROM WATER MAIN TO BUILDING SHALL BE CLASS 50 OR 52 DI.

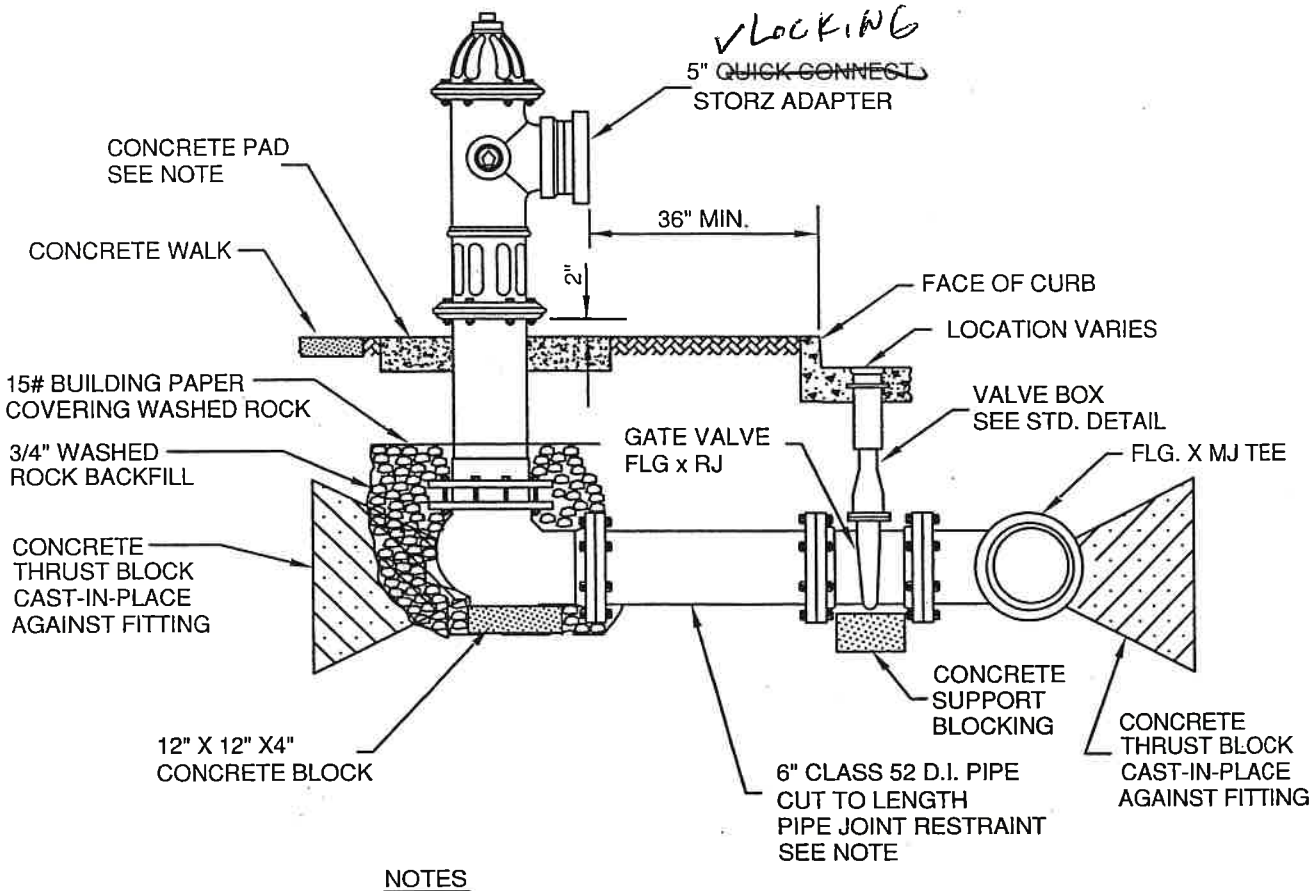
B. INSTALL PLUGS ON ALL TEST COCKS. (FINGER TIGHT)

C. ALL PIPING SHALL BE SIZED BY A LICENSED FIRE SYSTEMS DESIGNER. (MINIMUM OF 4")



CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS FIRE DEPARTMENT CONNECTION W/ DCDA	REVISED: 08/02/2007	DRAWING NO. 272

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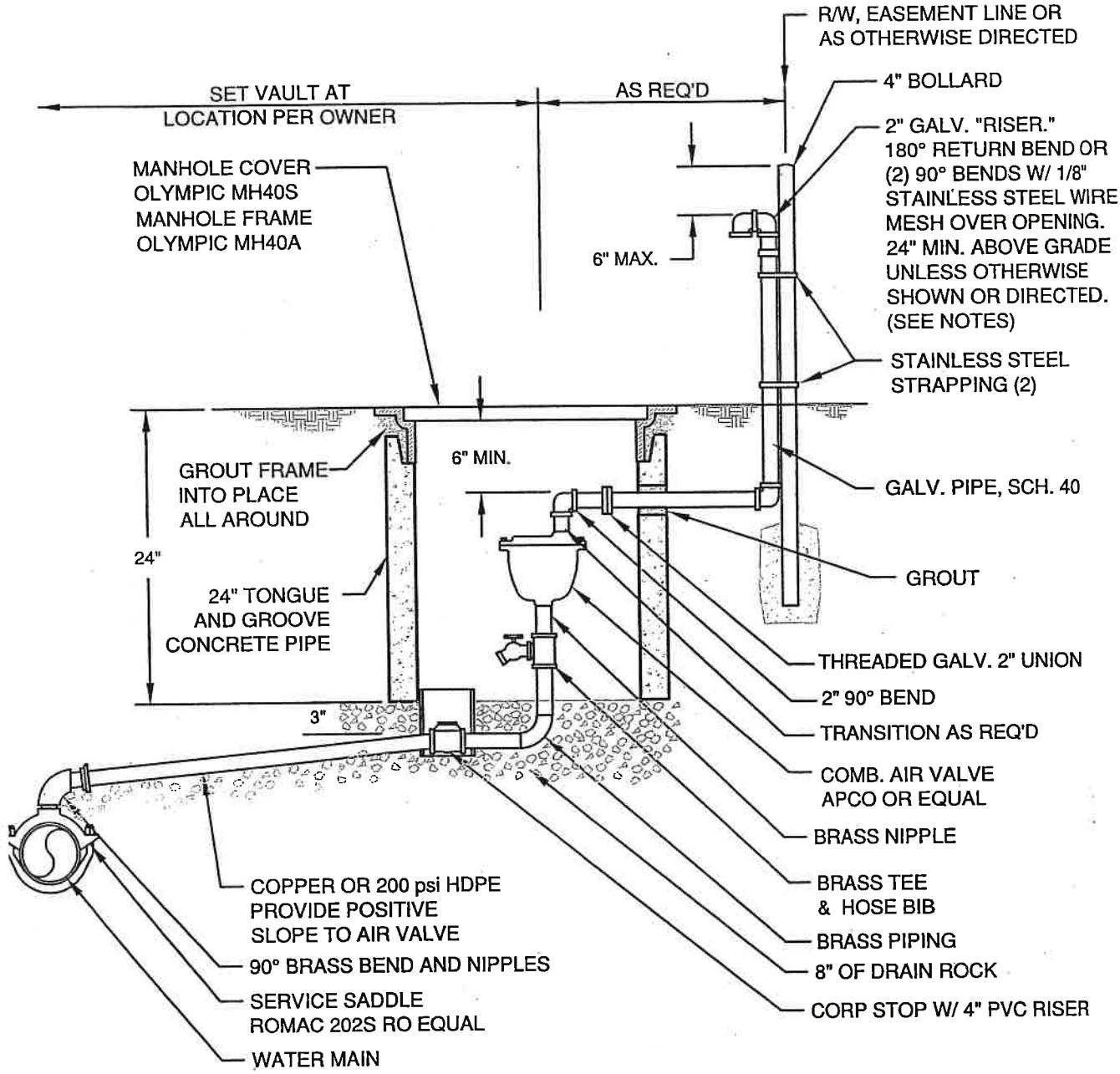


NOTES

1. HYDRANTS SHALL BE LOCATED WITHIN THE STREET RIGHT-OF-WAY, WITH A MINIMUM THREE-FOOT RADIUS UNOBSTRUCTED WORKING AREA.
2. HYDRANT SHALL BE M-H DRESSER 929.
3. HYDRANT SHALL BE PAINTED SUNBURST YELLOW HIGH-GRADE ENAMEL AFTER INSTALLATION.
4. MECHANICAL PIPE JOINTS SHALL BE MEGALUG SERIES RESTRAINING GLANDS.
5. A 4' X 4' X 8" DEEP CONCRETE PAD WILL BE POURED AROUND THE HYDRANT. ENTEND PAD TO 2' BEYOND GATE VALVE WHEN VALVE IS OUTSIDE OF PAVEMENT.
6. MINIMUM HYDRANT BURY SHALL BE 30".
7. INSTALL 4 BOLLARDS AROUND HYDRANT (4' RADIUS) IN UN-PROTECTED LOCATIONS.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS FIRE HYDRANT	REVISED: 08/02/2007	DRAWING NO. 273

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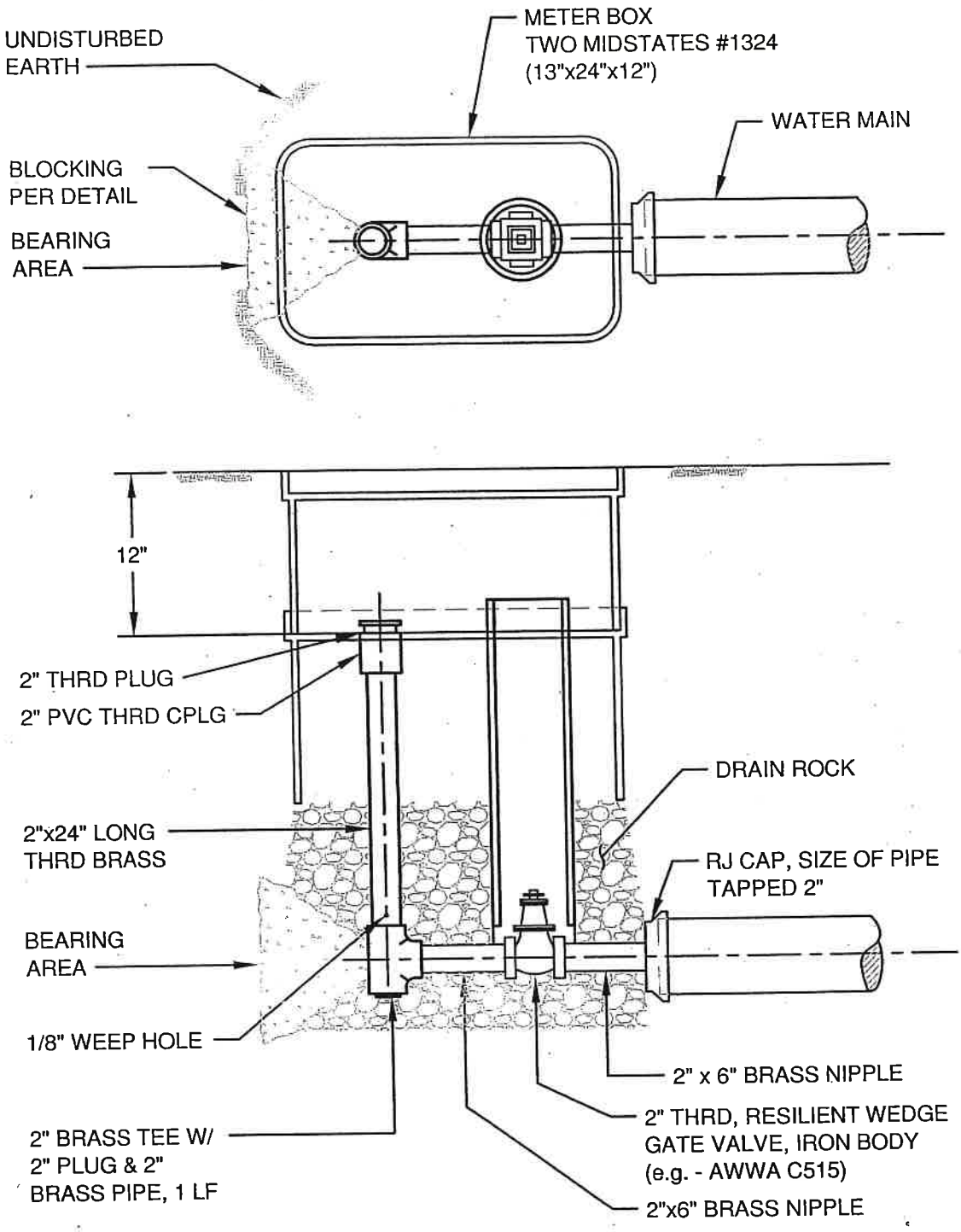


COMBINATION AIR VALVE NOTE:

1. DRAIN TO DAYLIGHT W/ 2" PVC IF APPLICABLE.
2. TERMINATE EXHAUST INSIDE VAULT W/ 90° BEND (DOWN) AND WIRE MESH IF VAULT IS DRAINED TO DAYLIGHT.

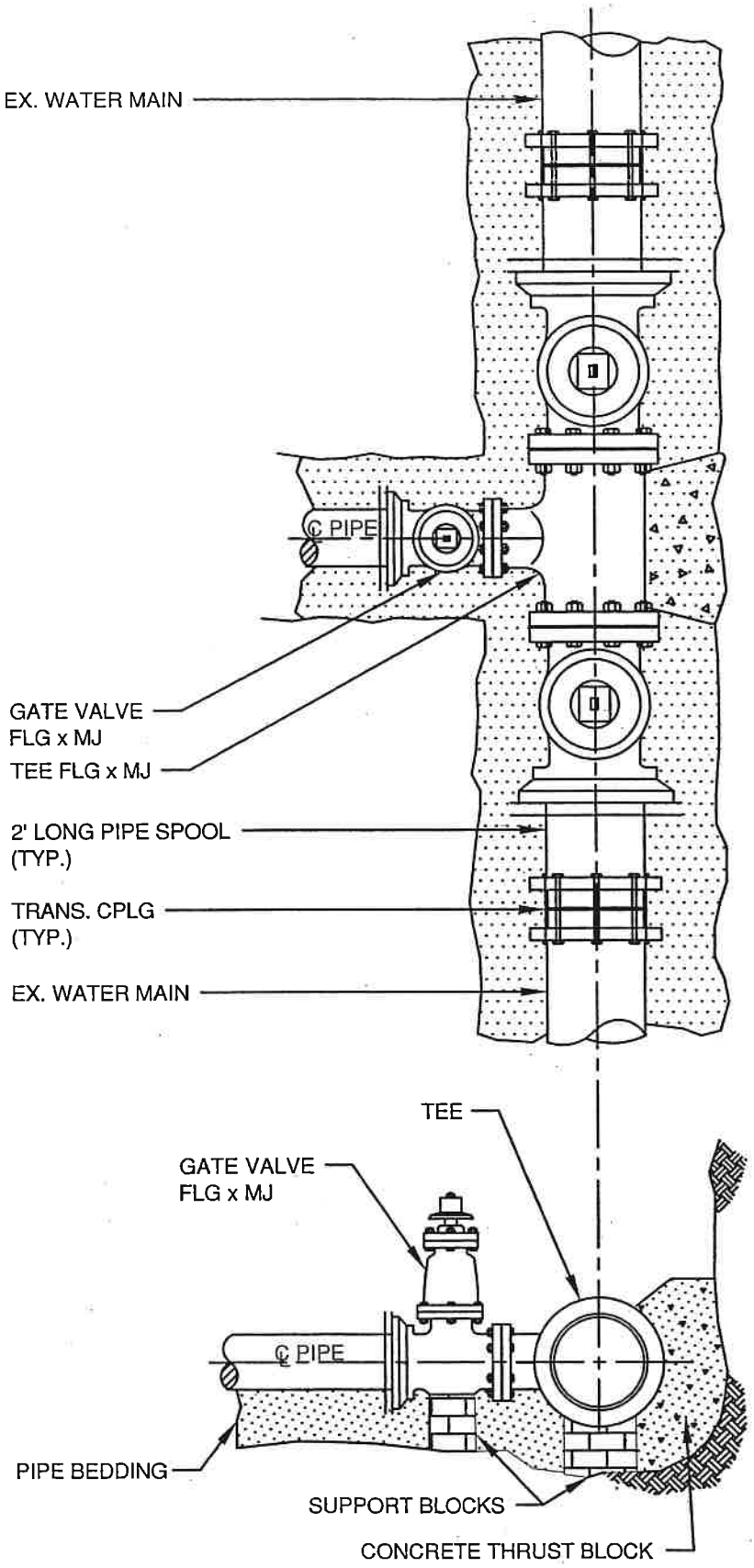
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS COMBINATION AIR VALVE	REVISED: 08/02/2007	DRAWING NO. 274

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-7Comb AV, 8/6/2007 9:00:53 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.



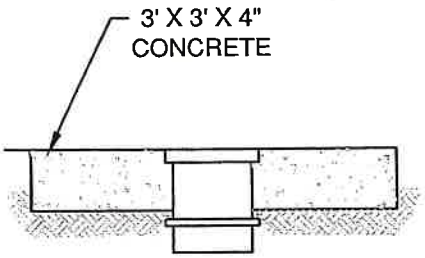
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS BLOW OFF VALVE	REVISED: 08/02/2007	DRAWING NO. 275

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-BBO, 8/6/2007 9:00:54 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

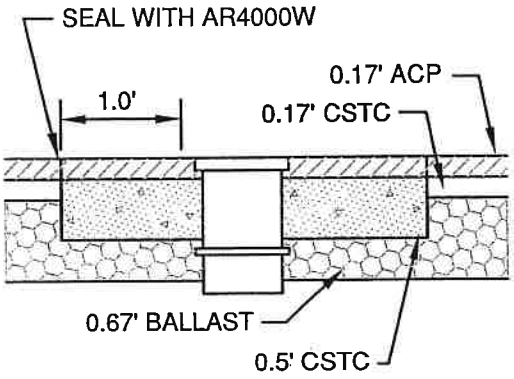


CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS CUT-IN TEE	REVISED: 08/02/2007	DRAWING NO. 276

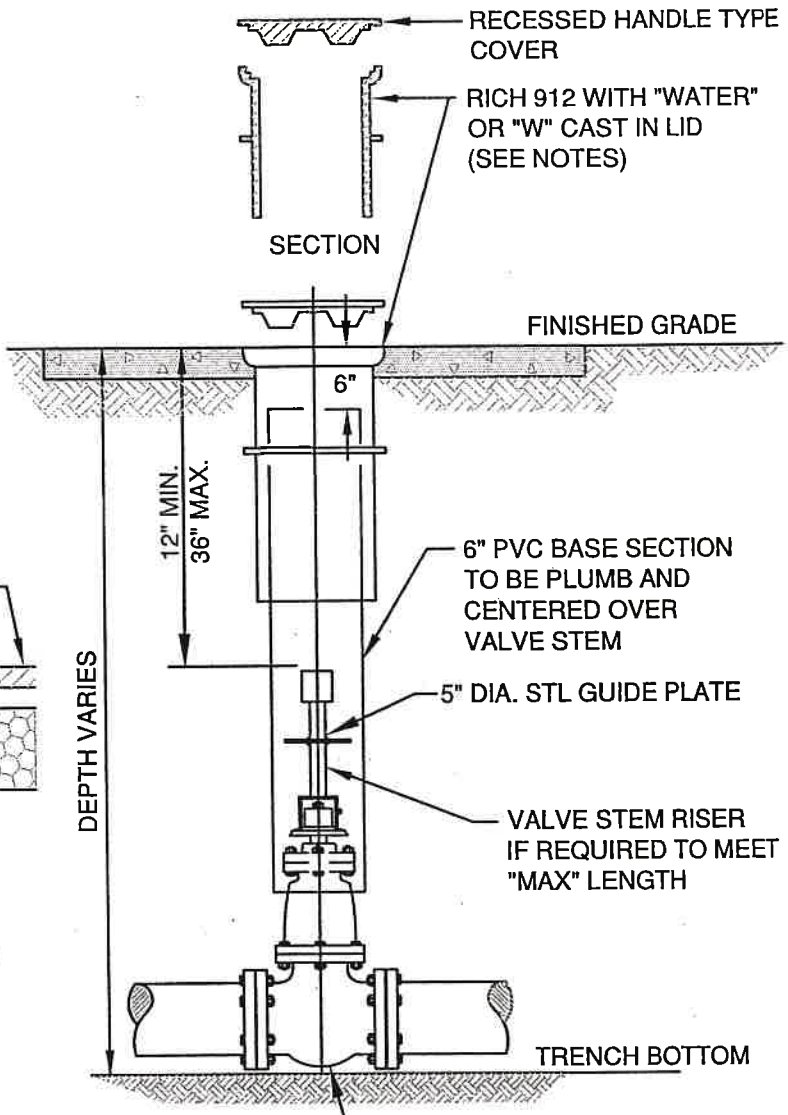
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OUTSIDE PAVED AREA



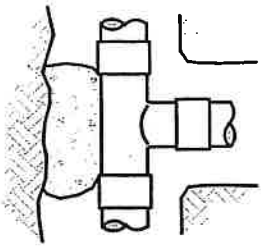
INSIDE PAVED ROADWAY



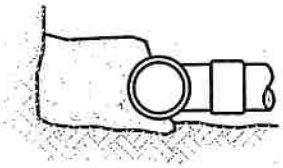
NOTES:
1. ALIGN VALVE COVER EARS IN DIRECTION OF FLOW THROUGH VALVE.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS VALVE BOX	REVISED: 08/02/2007	DRAWING NO. 4

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-10VB, 8/6/2007 9:00:58 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

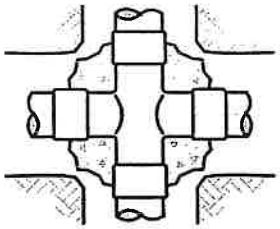


TOP VIEW

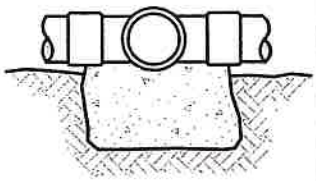


SIDE VIEW

TEE

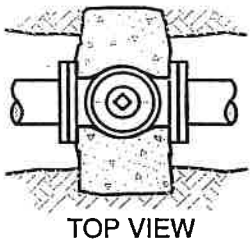


TOP VIEW

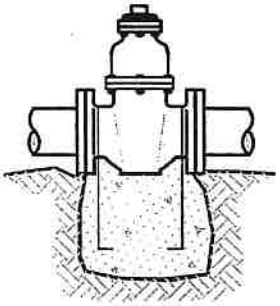


SIDE VIEW

CROSS

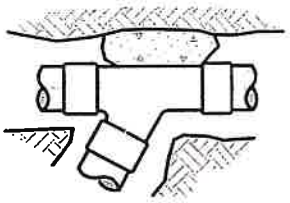


TOP VIEW



SIDE VIEW

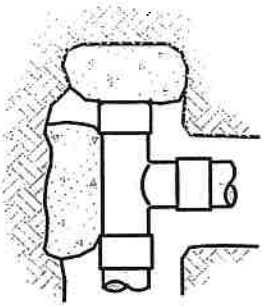
GATE VALVE



WYE

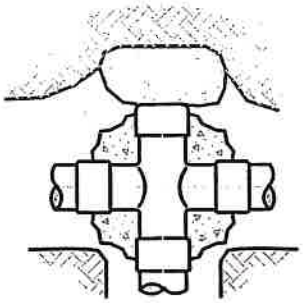


HORIZ. BEND



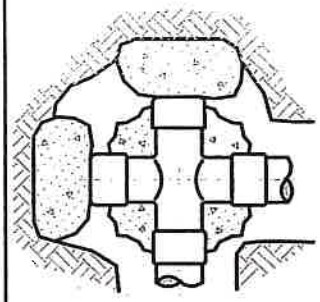
TEE WITH

PLUG



CROSS WITH

PLUG



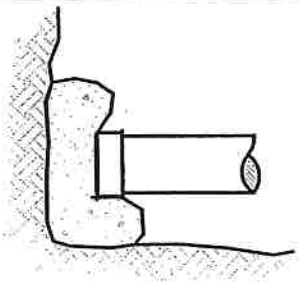
CROSS WITH

PLUGS

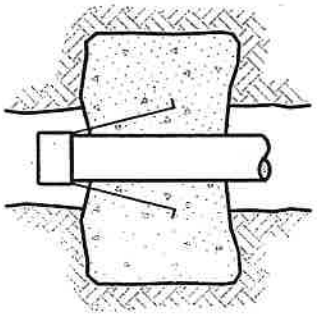


45° - 90°

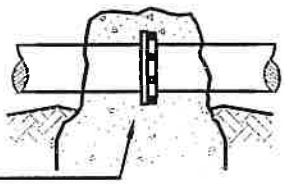
VERTICAL BEND



PLUG OR CAP

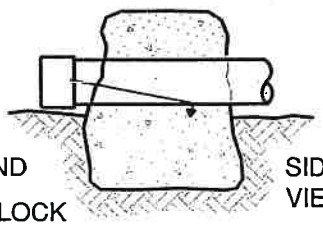


TOP VIEW



LOCKING RETAINER GLAND

ALTERNATIVE STRADDLE BLOCK



SIDE VIEW

DEAD-MAN THRUST BLOCKING

NOTES:

1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. PLASTIC BARRIER SHALL BE PLACED BETWEEN ALL THRUST BLOCKS AND PIPE AND/OR FITTINGS.
3. ANCHOR REBAR SHALL BE 5/8" MINIMUM DIAMETER.
4. CONCRETE DEAD-MAN THRUST BLOCKING MAY BE REQUIRED BY THE CITY, OR ALLOWED AT THE DISCRETION OF THE PUBLIC WORKS DIRECTOR.
5. ALL STANDARD BLOCKING AND THRUST CRITERIA, AS LISTED ON "STANDARD THRUST LOADS DETAIL", SHALL APPLY.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS THRUST BLOCKING	REVISED: 08/02/2007	DRAWING NO. 4

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-11a-TB, 8/6/2007 9:00:57 AM, DFrye, DWF8 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 inches), 1:1, Gibbs & Olson, Inc.

THRUST LOADS

THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

NOTES:

1. BLOCKING SHALL BE COMMERCIAL CONCRETE POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.

2. TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):
   EXAMPLE : 12" - 90° BEND IN SAND AND GRAVEL
   32,000 LBS 3000 LB/S.F. = 10.7 S.F. OF AREA

3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.

4. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

SAFE SOIL BEARING LOADS

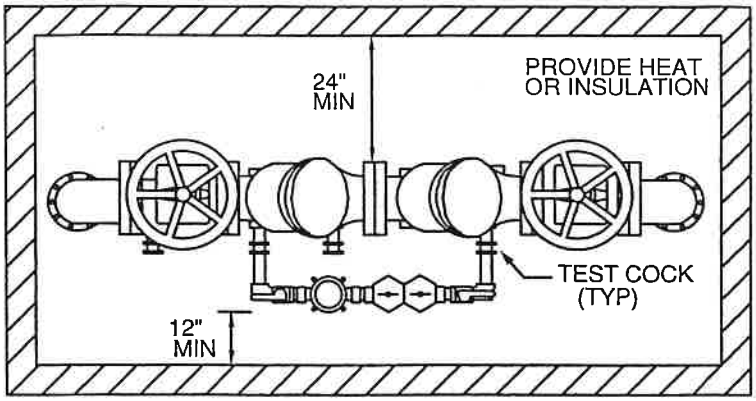
FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

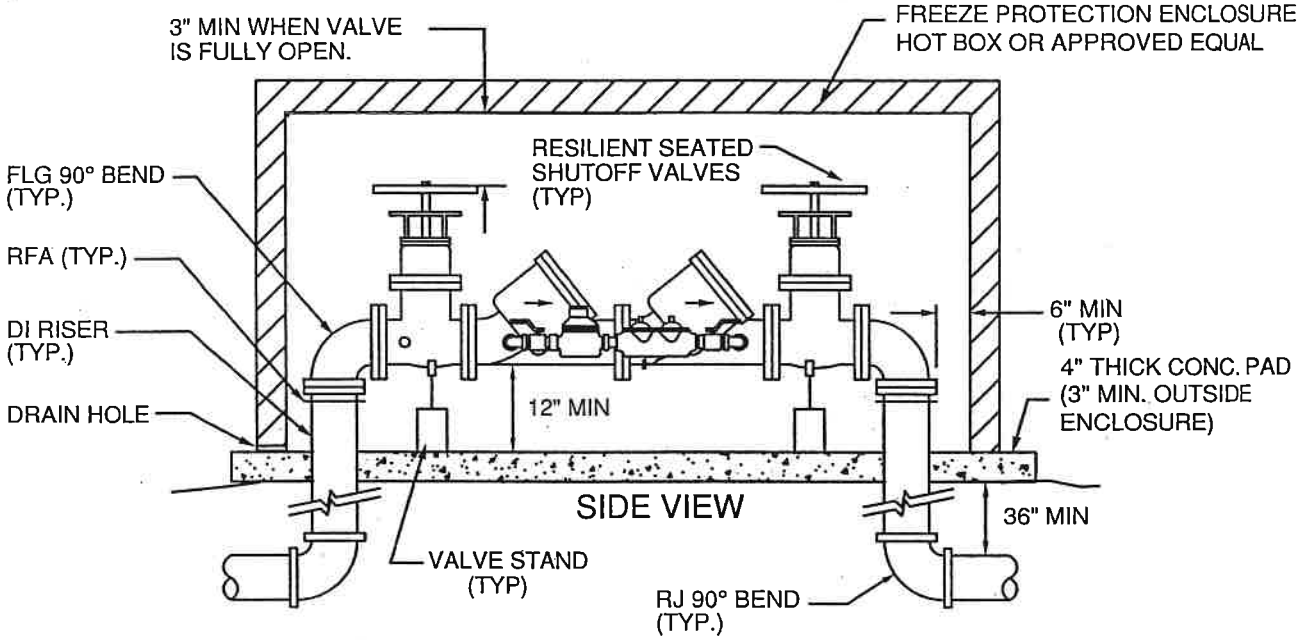
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS THRUST LOADS	REVISED: 08/02/2007	DRAWING NO. 4

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-11-b-TL, 8/6/2007 9:00:59 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

A CITY APPROVED VALVE IS REQ'D BETWEEN THE SUPPLY MAIN AND THE DCDA VALVE



TOP VIEW



SIDE VIEW

ABOVE GROUND INSTALLATION

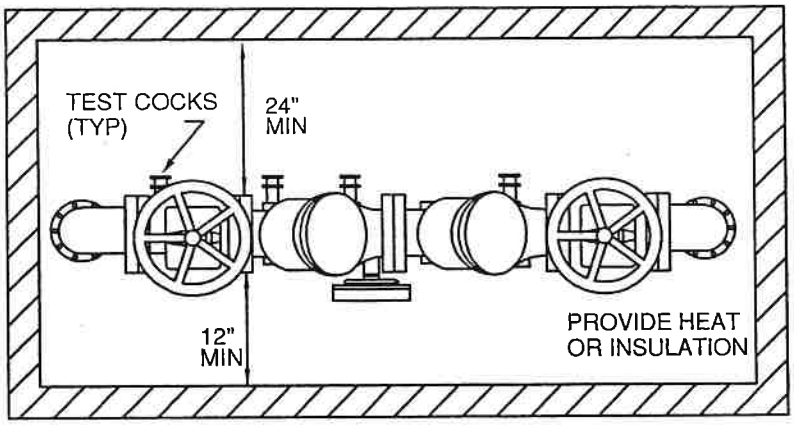
NOTES:

1. DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY (DCDA) SHALL BE ON THE CURRENT WASHINGTON STATE DEPT. OF HEALTH APPROVED LIST AND SHALL BE EQUIPED WITH 4 TEST COCKS AND A RESILIENT SEATED SHUT OFF VALVE MOUNTED AT EACH END.
2. THE BACKFLOW ASSEMBLY SHALL BE TESTED AFTER INSTALLATION BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.
3. ALL PIPE, VALVE, AND FITTING JOINTS FROM THE SUPPLY MAIN, SHALL BE FLANGED OR RESTRAINED.
4. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY.
5. THE BACKFLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND FLOODING.
6. ALL ENCLOSURES SHALL BE PRE-APPROVED BY THE CITY, PRIOR TO INSTALLATION.
7. DCDA SHALL BE INSTALLED AT PROPERTY LINE OF OWNERS PROPERTY.
8. DCDA SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
9. VALVE STANDS SHALL BE INSTALLED ACCORDING TO MANUFACTURERS RECOMMENDATIONS.

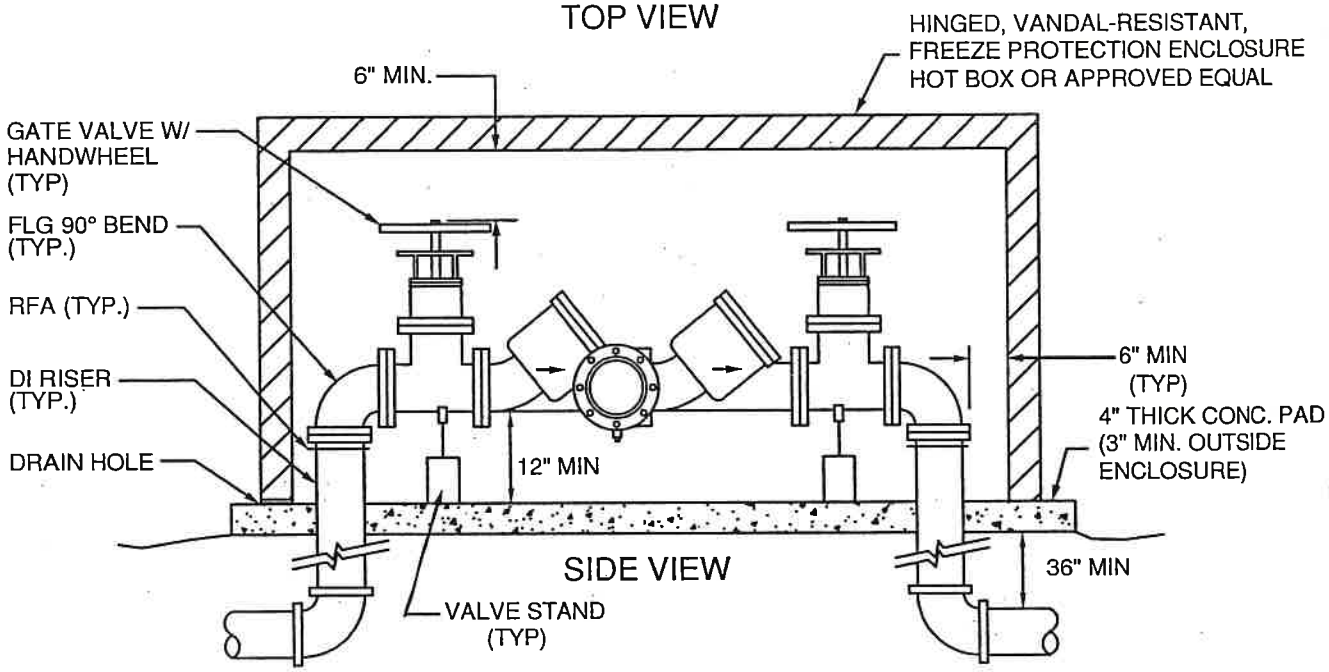
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS DOUBLE CHECK DETECTOR ASS'Y 3" OR LARGER	REVISED: 08/02/2007	DRAWING NO. 280

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-12DCDA, 8/6/2007 9:01:00 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 inches), 1:1, Gibbs & Olson, Inc.

A CITY APPROVED VALVE IS REQ'D. BETWEEN THE SUPPLY MAIN AND THE RPBA VALVE



TOP VIEW



SIDE VIEW

NOTES:

1. REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) SHALL BE ON THE WASHINGTON STATE DEPT. OF HEALTH APPROVED LIST.
2. RPBA SHALL LAY HORIZONTAL AND BE INSTALLED ABOVE GROUND ONLY.
3. RPBA SHALL BE TESTED AFTER INSTALLATION BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.
4. ALL PIPE, VALVE AND FITTING JOINTS FROM THE SUPPLY MAIN, SHALL BE FLANGED OR RESTRAINED.
5. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY.
6. THE BACKFLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND FLOODING.
7. ALL ENCLOSURES SHALL BE PRE-APPROVED BY THE CITY, PRIOR TO INSTALLATION.
8. RPBA SHALL BE INSTALLED AT PROPERTY LINE ON OWNERS SIDE.
9. RPBA SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
10. VALVE STANDS SHALL BE INSTALLED ACCORDING TO MANUFACTURERS RECOMMENDATIONS.
11. TEST COCKS SHALL BE LOCATED SO AS TO FACILITATE ACCESS.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS REDUCED PRESSURE BACKFLOW ASS'Y 3" OR LARGER	REVISED: 08/02/2007	DRAWING NO. 4

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-13RPBA, 8/8/2007 8:01:01 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

Appendix C

DOH Forms

6.

Water Right Self-Assessment Form for Water System Plans

331-372 • 1/13/2017

All water right permits, claims, and certificates must be evaluated in a water right self-assessment for all sources used to supply the water system. The self-assessment compares the parameters and other limitations of existing water rights against current and forecasted water production, as described in your water system plan, to determine whether the rights are adequate to serve your system's current and future water needs.

You must account for all sources of supply and total quantities of water withdrawn from the source. If you purchase water from another purveyor through a non-emergency intertie, you must complete the INTERTIES section of the self-assessment.

A Note on Exempt Wells

If you're seeking DOH approval of a new Group A or Group B water system using an exempt well, you must complete the self-assessment, although certain fields will not apply. Talk to your DOH regional planner about using the Water Right Self-Assessment form for a Small Water System Management Program instead of this version.

Local governments must ensure that an adequate potable water supply is available from the exempt well before issuing a building permit. Before developing a permit exempt well, check with your local authorities on their criteria for establishing an adequate potable water supply for your planned public water system.

Water Right Parameters

Below is a brief description of the parameters associated with a typical water right. For the self-assessment, you only need to describe the last two bulleted items if they apply to your water rights.

Source Type – this refers to whether the source is surface water, groundwater or a spring.

Source Location – this refers to the location of points of groundwater withdrawal or surface water diversion for each right.

Purpose of Use – this refers to the type of use, such as municipal water supply, community domestic, industrial or agricultural purposes.

Place of Use – this describes where water can be put to beneficial use under the right. Under the 2003 Municipal Water Law, RCW 90.03.386, the place of use for a water right held for municipal water supply purposes may be the system's service area as identified in an approved water system plan or small water system management program. See Ecology Policy 2030 for information on how Ecology administers the Municipal Water Law.

Period of Use – this refers to time-of-year limitations in which the water right may be put to use. If any water right has a time-of-year limitation, please include this information in the INTERRUPTIBLE WATER RIGHTS section.

Provisions or Limiting Conditions – this refers to any provisions or conditions placed on the water right. If a water right has a limiting condition or other provision, such as a collection and reporting requirement, other than a time-of year limitation, include this information in the ADDITIONAL COMMENTS section at the bottom of the self-assessment and in the water system plan narrative.

See Ecology Policy 1040 for more information on water right terminology. If you have questions about your water rights, please contact the Ecology regional office in your area.

Completing the Water Right Self-Assessment Form

The self-assessment is a Word document to allow users to make changes or to expand the document. You may use another format, if preferred, as long as all required information is included. Below is a description of all fields and how to complete them. This form is divided into four different sections. Each section is described in the headings below.

See the column identifiers (A, B, C, etc) at the bottom of each column for guidance in completing the necessary calculations.

Water Right Permit, Certificate, or Claim Number: This number is assigned by Ecology when a permit application is filed. It's listed at the top of the permit or certificate. For water right claims, this is the registration number stamped in the lower left hand corner of the claim form.

WFI Source #: Identify the individual sources (e.g. well #1, well #2) as defined on the DOH Water Facilities Inventory form. If a water right is associated with multiple sources, list all sources in the same row in this column. If a source is associated with multiple water rights, identify each water right on a separate row.

If you have any source(s) that is not currently being used (categorized as standby, back-up, or emergency), and the source has an associated water right that is not listed in column #1, please include the source and water right information in the ADDITIONAL COMMENTS section. This will identify that the source is still intended for a beneficial use under RCW 90.03.015(4). See Ecology Policy 1040.

EXISTING WATER RIGHTS SECTION *(olive green color, top section)*

This section refers to existing water rights. It does not include any water right applications that have been submitted to Ecology.

Primary Qi (Instantaneous Quantity): This is also known as instantaneous flow rate. It's the amount of water allowed to be taken under the right from the source during a period of peak operation. For surface water, this is generally expressed in terms of cubic feet per

second (cfs). For groundwater, this is generally expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm. Please indicate the units of measurement you are using for each source. If there are situations where the flow rate will be limited (e.g. limitations established on the source when other sources are utilized), please note them in the ADDITIONAL COMMENTS section in the form and in the WSP narrative.

Non-Additive Qi: This term was formally known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qi quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qi totals.*

Primary Qa (Annual Quantity): This is the amount of water that can be taken from the source under the right on an annual basis. It's usually expressed in terms of acre-feet. An acre-foot is the amount of water necessary to submerge an acre of land to a depth of one foot. One acre-foot equals 43,560 cubic feet or 325,851 gallons of water.

Non-Additive Qa: This term was formerly known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qa quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qa totals.*

CURRENT SOURCE PRODUCTION SECTION *(light green color, top section)*

This section refers to how much water is withdrawn from the source under each water right for the most recent full calendar year. You will need to determine any excess or deficiency for each water right after calculating how much water was withdrawn compared to how much water is allowed under each water right. If demand has decreased over past years, you may wish to include historic maximum production information in the ADDITIONAL COMMENTS section. This will provide a more complete picture of the use of your water rights.

Use the water use data and demand projections from your water system plan to define current and projected water needs. You can determine if you'll need additional water rights based on the comparison of existing water rights, current water production, and projected 10- and 20-year needs.

Total Qi (Instantaneous Quantity): This refers to the total maximum instantaneous flow rate withdrawn from the source under each water right during the most recent calendar year. For surface water, this is expressed in terms of cubic feet per second (cfs). For groundwater, this is expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm.

Current Excess or Deficiency (Qi): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

Total Qa (Annual Quantity): This refers to the total volume of water withdrawn from each source under each water right during the most recent calendar year. It's usually expressed in acre-feet.

Current Excess or Deficiency (Qa): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

10-YEAR FORECASTED SOURCE PRODUCTION SECTION *(light blue color, top section)*

This section refers to how much water you project to withdraw from each source in ten years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 10-year forecasted amounts.

20-YEAR FORECASTED SOURCE PRODUCTION SECTION *(darker blue color, top section)*

This section refers to how much water you project to withdraw from each source in twenty years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 20-year forecasted amounts. If you are unable to provide 20-year forecasts for each source, you may choose to include the combined 20-year total at the bottom.

PENDING WATER RIGHTS SECTION *(second section of form)*

Please complete this section for any water right applications that have been submitted to Ecology. Please include the application number, whether it's a new or a change application, the date submitted, and the total quantities requested.

INTERTIES SECTION *(third section of form)*

This section must be completed by purveyors who purchase any amount of wholesale water. If your system sells water to another public water system, include the quantity sold in the CURRENT SOURCE PRODUCTION section.

Purchasers of wholesale water must account for all water obtained through the intertie for non-emergency supply purposes. This is to ensure that all sources of supply are considered when evaluating whether new water rights are needed within 20 years.

Please identify the maximum quantity of water, expressed in the same manner as the above sections, allowed under each intertie contract. If there are limiting conditions or temporary

agreements that effect the long-term use of the intertie, you must account for such limiting conditions when evaluating the current and forecasted water supply needs in your water system plan.

Finally, purchasers of wholesale water are responsible for ensuring that the underlying water right (held by the purveyor selling water) are adequate for such use. You should confirm that the selling system has accounted for the wholesale area in their water system plan to ensure that the water right authorizes the distribution of water through the intertie.

INTERRUPTIBLE WATER RIGHTS SECTION *(bottom section of form)*

This section refers to water rights that have an annual time-of-year interruption. Please complete this section for any water right listed in the above fields that has a time-of-year interruption. Please include the water right number, describe the limitation, and the time period of interruption. Purveyors with interruptible rights should develop a water shortage response plan as part of their water system plan to describe how demand will be met during periods of interruption through aggressive demand-side conservation, fixing leaks or other means.

ADDITIONAL COMMENTS SECTION *(bottom section of form)*

If the system has any source that is not currently being used on a regular basis (such a source may be categorized as stand-by, back-up, emergency), you should identify the source in this section if the source has an associated water right that is not listed in the above sections. The purpose is to identify that such water rights are still intended for a future beneficial use as required under RCW 90.03.015(4). See Page 2, Item 9 (b) in ECY Policy 2030. For these water rights, please briefly describe the future intended use of the source and when you expect to utilize the water right. This does not refer to sources categorized as seasonal sources.

You should also include any other comments in this section that will explain aspects of your water right portfolio that are not identified above.

6.

Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1. 06869 G2*08779 C	Well No. 1	300 gpm		196 Acre-Feet/Year		-	-	-	-	-	-	-	-	-	-	-	-
2. G2-20933C	Well No 3.	400 gpm		74 Acre-Feet/Year	196 Acre-Feet/Year	-	-	-	-	-	-	-	-	-	-	-	-
	TOTALS =	700 gpm		270 Acre-Feet/Year		243 gpm	457 gpm	212 Acre-Feet/Year	58 Acre-Feet/Year	405 gpm	295 gpm	252 Acre-Feet/Year	18 Acre-Feet/Year	465 gpm	235 gpm	289 Acre-Feet/Year	(19) Acre-Feet/Year
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1.															
2															
3															
TOTALS =															
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
1		
2		
3		

ADDITIONAL COMMENTS:

June 2008
DOH 331-402

Setting Goals to Use Water Efficiently

Why set goals to use water efficiently?

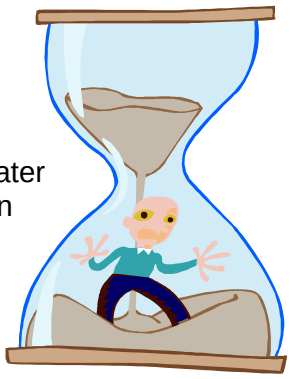
Water system owners, managers, and operators work hard to provide safe and reliable drinking water to their customers. Using water efficiently helps you manage the growing demand for water. One of the most important steps in using water efficiently is setting water efficiency goals. Goals help you track your progress and determine the success of your water use efficiency (WUE) program.

We've heard some water systems ask questions like:

- "Why should we spend the time and money to use water more efficiently?"
- "Why do we need to worry about saving water, there's water all around us?" Usually they are referring to large water bodies such as the Columbia, Snake and Yakima rivers, Lake Washington, and Puget Sound.
- "We've never run out of water before, so why set a goal to use water efficiently?"

In answering these questions, we remind systems how important it is to look at the "big picture" of water efficiency. Consider the value of water not just as a source of revenue, but also for its aesthetic, recreational and environmental benefits, and the benefits to the health of the watershed in which you live. Our water supplies are not endless; demands on the state's water are increasing daily. Understanding that water is a finite resource that we simply cannot do without helps explain why we need to set goals for using water efficiently.

Don't wait until it's too late



The water use efficiency rule is a proactive approach to protecting public health, preserving our state's water resources, and ensuring the efficient use of water. Water systems are in a better position to provide sufficient water to their customers when they take action to reduce the amount of water taken from the resource. Water efficiency becomes even more important in the event of a drought, as climate changes become more evident, as the state's population grows, and as fewer water rights become available to water suppliers.

As you think about setting your goals, consider the water supply in your community and what challenges you may face in the future. Show your community your commitment to protecting the resource. Demonstrate good stewardship by establishing goals that use water in the most efficient way possible.

Where to start

When getting ready to propose a goal, think about how your community can use water more efficiently without sacrificing cultural values. For example, if your community likes to garden, focus on how customers can change their gardening practices to use water more wisely. Consult your local nursery or county cooperative extension program to find materials and ideas you can use to educate your customers. Those water saving ideas can turn into a measurable water savings goal for the community. Here are some things to consider:

- Determine what types of cost-effective measures (such as water saving devices and education) will support the goal.
- Keep your customers informed of new water saving technology, such as soil moisture sensors or water efficient washing machines.
- Show how saving water can reduce other utility bills such as energy, gas, or wastewater.
- Identify a funding source for the measures you use to achieve the goal.
- Establish a timeline for achieving the goal.

Setting your goals

By law, you must establish at least one goal to help your customers use water efficiently. You must use a public process to do so.

Exploring what type of goals to set for your water system begins with stating a clear objective. We encourage you to adopt the most effective and water efficient goals possible. Every goal is specific to each water system. Your objective may involve different motivating factors such as water supply characteristics, infrastructure upgrade needs, social pressures, reducing outdoor water use, or the need to obtain additional connections to meet future demand.

You must evaluate and re-establish your goals every six years ***and*** any time you submit a water system planning document to the Department of Health for approval.

You have the flexibility to determine goals that makes sense for your customers and set as many goals you want.

How efficient can you be?

You might be asking yourself, “How good is good enough? Have I set a goal that the Department of Health will accept? Should I maintain the historic water use patterns of my community?” These are all questions you will need to consider. In many cases, you can find ways to reduce water use; it just takes some creativity to find those water savings.

If you end up establishing a goal to maintain a historic level (such as maintaining consumption at 65 gallons per person per day), you will need to explain to us why you are unable to reduce water use below that level.

The following are examples of acceptable goals:

- Reduce total production from wells by five percent within six years.
- Maintain daily consumption at 65 gallons per person per day for the next two years.

Before establishing your goal in a public meeting, please review the *Getting Started: Water Use Efficiency Guidebook*, DOH 331-375, for more information.

Don’t limit your choices

Many times, water systems only look at their average day demand or average use per person per day when setting goals. Consider establishing a goal that targets specific water users within your customer base. Reducing water use within the commercial or industrial class might be a good option for your goal if those customers use a large percentage of your system’s water.

For example, you might establish a goal to “Reduce industrial customer water use from 40 to 30 percent of total water system production by the year 2014.” You can achieve this by conducting water audits of your industrial customers, providing rebates, evaluating rates, and identifying how reducing water consumption can save them money.

What is the difference between setting goals and meeting the leakage standard?

In addition to setting a goal to reduce consumption by your customers, which you are required to do by law, we also encourage you to set a goal to reduce leakage within your water system. You are required to meet a leakage standard aimed at reducing leaks within your distribution system to no more than 10 percent, but this cannot be your only goal.

We realize that fixing your leaks may be your first priority and is one of the most cost-effective ways to use water efficiently. It’s also a great way to show your customers how you are protecting this important resource and might even encourage behavioral changes in how they use water.

Use education to achieve your goal while installing meters and reducing leaks

We understand that you will need to spend money on reducing leaks and installing meters. For many systems, installing meters and fixing leaks will be a priority and we support those efforts to meet the deadlines.

You can achieve your customer goal without spending a lot of money. Many water systems will rely entirely on education and outreach to achieve their goal. EPA’s WaterSense program is a great tool to help you meet your goal (see sidebar).

Educating your customers about using water efficiently is a requirement of the water use efficiency rule. It’s also one of the easiest things you can do to encourage changes in how your community uses water. As long as you educate your customers once per year, you have met the education requirement.

If you want to educate your customers more than once per year, (which we recommend) you can count it as a measure in your WUE program. The more often you can remind your customers about using water efficiently, the more likely they are to change water use patterns and understand why it’s important.

WaterSense can help!

WaterSense is a voluntary public-private partnership program sponsored by the U.S. Environmental Protection Agency (EPA). Its mission is to promote the value of water and help you and your customers make smart decisions about water use and water-using products.

For more information, visit their website http://www.epa.gov/WaterSense/ or contact the WaterSense Helpline by email at watersense@epa.gov or call 866-WTR-SENS (987-7367)

EPA WaterSense PARTNER

One good point to make: It takes energy to heat water. Using water efficient devices and appliances (such as low-flow shower heads and water efficient washing machines) will save your customers money on their gas and electricity bills and provide a great incentive to lower their water use.

Consider these educational opportunities to reduce water use:

- Add water efficiency tips to your annual Consumer Confidence Report.
- Monthly newspaper advertisements.
- Quarterly newsletter, which could include seasonal water use efficiency ideas.
- Bill stuffers.

Focal points for education and outreach

Many water systems have created demonstration gardens that show how certain landscapes can save a lot of water. Consider starting a demonstration garden or pilot project within your own community to prove how implementing water saving measures will save water. A project like this would count as part of an education and outreach strategy to help achieve your goal.

Achieve the goal using demand-side (customer) measures

There is a difference between demand-side measures and supply-side measures. When you are setting goals for your customers, you must choose demand-side measures.

Demand-side measures reflect actions that affect how much water customers use, and include things such as education programs, rebates for high-efficiency toilets, rate structures based on the amount of water use, water bills that show consumption history, or a program that notifies customers they may have a leak on their property.

Choosing the right WUE measure(s) is critical to helping you achieve your goals. Choose measures that directly relate to your goals. If you are not achieving your goals, try implementing different measures.

Pilot project idea: Select a homeowner that is willing to try out specific water savings measures within their home and compare that to historical water use patterns. Write up their story in your community newsletter to share with others. This will give you a good idea about how well the measure is working. It also gets your customers thinking about how to reduce their water use.

Achieve the leakage standard using supply-side measures

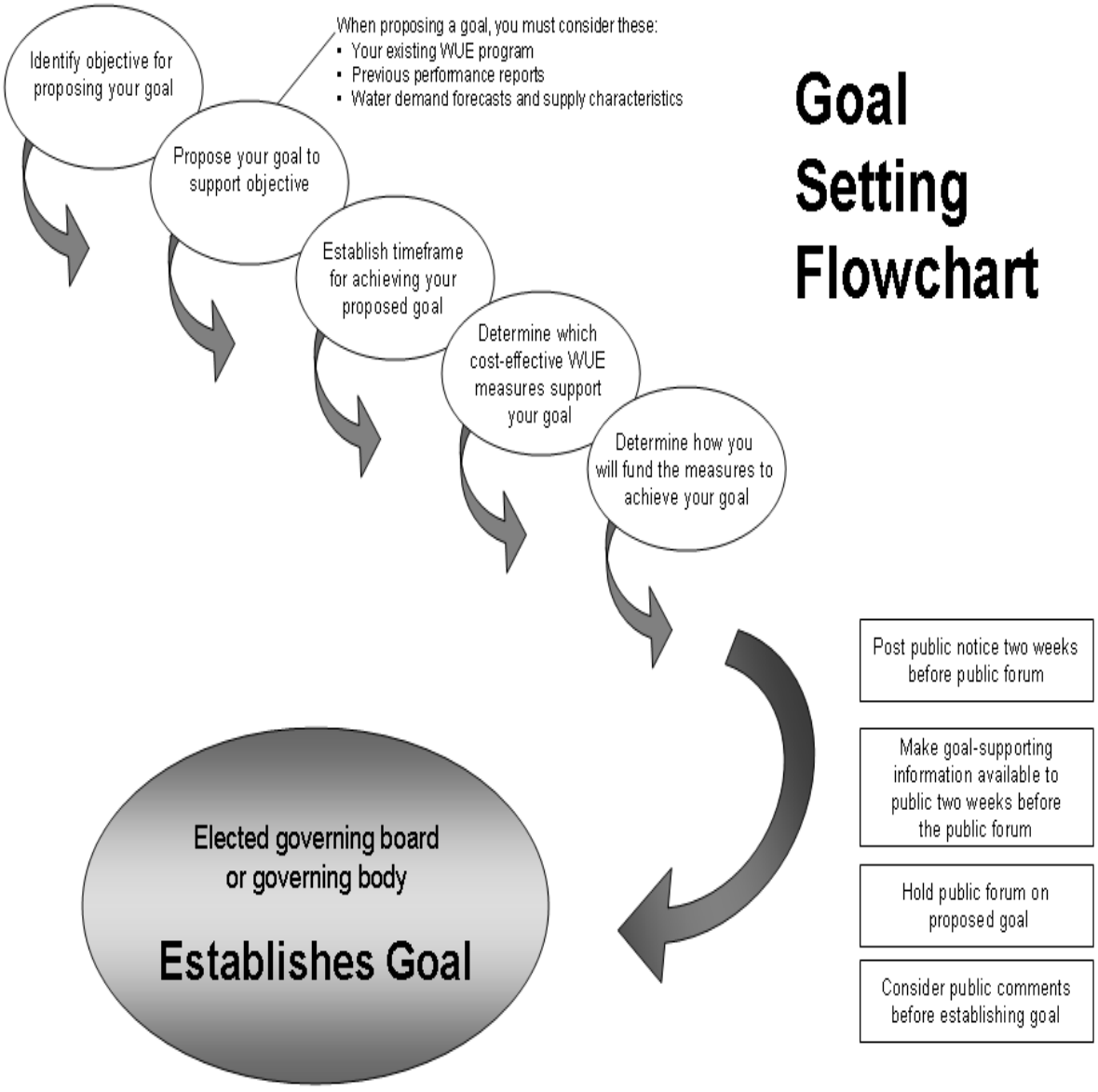
Supply-side measures show how efficiently the water system is operating, and generally include actions that will reduce leakage. They include things like meter replacement programs, source meter calibration, leak detection surveys, and water distribution system audits. You cannot use these types of measures to achieve a customer efficiency goal. These measures will not support a customer goal since they do not have a direct effect on whether customers use water more efficiently. Be careful not to select these with the assumption they will help meet the customer efficiency goal.

Setting goals in a public forum

You must engage your customers and interested members of the public when establishing your WUE goals. This meeting (forum) has many benefits. It gives your customers and the public a chance to affect decisions made by the governing body. It also helps consumers understand the need to use water more efficiently and teaches them how they can help you achieve your goals.

You should be prepared for any of the following three distinct groups to show up at your public meeting:

- Your water system's customers.
- Local community members.
- Special interest groups such as neighboring water systems, environmental organizations, tribal communities, and watershed planning units.



Public notice requirements

You must provide notice at least two weeks in advance of the meeting. The notice must include the following information:

- Purpose of the meeting.
- Date, time, and location for the meeting.
- Where your audience can find additional information supporting your proposed goal.

Use ODW's Website to provide public notice

Our water use efficiency website now has a feature that allows you to announce your goal-setting meeting and meets the public notice requirements. You can start the process by using this link on our website: How to post your goal-setting public forum to our website

Who can help

Seek out vendors and local conservation groups to find water efficiency products and services. The WaterSense website is a great resource to find products, services, manufacturers, retailers, distributors, and water efficient landscape professionals. Also available to help are the following organizations:

The Partnership for Water Conservation
http://www.partners4water.org/
206-957-2199

Evergreen Rural Water of Washington
http://www.erwow.org/
800-272-5981

Don't forget to ask your neighboring water systems about their water use efficiency programs when looking for ideas. Often they have the same questions you do, and together you may be able to form a local partnership for using water efficiently.

For more information

This and other publications are available at
http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater.aspx

Mike Dexel, Water Resources Policy Lead, 360-236-3154

Northwest Region – Kent 253-395-6750

Southwest Region – Tumwater 360-236-3030

Eastern Region – Spokane Valley 509-329-2100

It's Worth Saving Drinking Water

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

6.

6.

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 03/11/2020
Printed: 8/27/2021
WFI Printed For: On-Demand
Submission Reason: Contact 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
87400 7	TENINO CITY OF	THURSTON	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS
TROY L. CANNON [PUBLIC WRKS DIR] PO BOX 4019 TENINO, WA 98589	TENINO, CITY OF JOHN C. MILLARD PO BOX 4019 TENINO, WA 98589 CLERK/TREAS.
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS 149 S HODGDEN CITY TENINO STATE WA ZIP 98589

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 561-1506		Owner Daytime Phone: (360) 264-2368	
Primary Contact Mobile/Cell Phone: (360) 701-8386		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax:	E-mail: xxxxxxxxxxxxxxxxxxx	Fax: (360) 264-5772	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
- [x] 1,000 or more person event for 2 or more days per year
- [ ] Hospital/Clinic
- [ ] Industrial
- [ ] Licensed Residential Facility
- [ ] Lodging
- [x] Recreational / RV Park
- [x] Residential
- [x] School
- [ ] Temporary Farm Worker
- [x] 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)

550,000

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	WELL #1 NO TAG WW				X								X			Y		X				X	89	290	NE SW	38	16N	01W
S02	WELL #2 NO TAG		X												X	Y		X				X	87	133	NE SW	38	16N	01W
S03	WELL #3 NO TAG WW				X								X			Y		X				X	58	350	NE SW	38	16N	01W
S04	WF (S01 & 3)			X									X			N		X				X	58	640	NE SW	36	16N	01W

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6.

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
87400 7	TENINO CITY OF	THURSTON	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?)		685	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	561		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	1		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	34		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	123		
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.	71	71	
28. TOTAL SERVICE CONNECTIONS		756	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 1797

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?	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
B. How many days per month is water accessible to the public?	30	30	30	30	30	30	30	30	30	30	30	30

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month that are NOT alreay included in the residential population?	1439	1439	1439	1439	1439	71	71	71	1439	1439	1439	1439
B. How many days per month are they present?	22	22	22	22	22	22	22	22	22	22	22	22

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	4	4	4	4	4	2	2	2	4	4	4	4

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: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

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Total WFI Printed: 1



Water Facilities Inventory (WFI)

Report Create Date:	8/27/2021		
Water System Id(s):	874007		
Print Data on Distribution Page:	ALL		
Print Copies For:	DOH Copy		
Water System Name:	ALL		
County:	-- Any --		
Region:	ALL		
Group:	ALL		
Type:	ALL		
Permit Renewal Quarter:	ALL		
Water System Is New:	ALL		
Water System Status:	ALL		
Water Status Date From:	ALL	**To**	ALL
Water System Update Date	ALL	**To**	ALL
Owner Number:	ALL		
SMA Number:	ALL		
SMA Name:	ALL		
Active Connection Count From:	ALL	**To:**	ALL
Approved Connection Count	ALL	**To:**	ALL
Full-Time Population From:	ALL	**To:**	ALL
Water System Expanding	ALL		
Source Type:	ALL		
Source Use:	ALL		
WFI Printed For:	On-Demand		

6.

6.

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

Date Submitted: 6/10/2022

Water Use Efficiency
Annual Performance Report - 2021

WS Name: Tenino City of

Water System ID# : 87400 WS County: THURSTON

Report submitted by: *Troy Cannon*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not 100% metered – Did you submit a meter installation plan to DOH? No

Within your meter installation plan, what date did you commit to completing meter installation?

Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period *01/01/2021* To *12/31/2021*

Incomplete or missing data for the year? *No*

If yes, explain:

Total Water Produced & Purchased (TP) – Annual volume gallons	*64,125,027* gallons	
Authorized Consumption (AC) – Annual Volume in gallons	*53,425,010* gallons	
Distribution System Leakage – Annual Volume TP – AC	*10,700,017* gallons	
Distribution System Leakage – DSL = [(TP – AC) / TP] x 100 %	*16.7 %*	
3-year annual average - %	*13.6 %*	*2019, 2020, 2021*

Goal-Setting Information:

Enter the date of most recent public forum to establish WUE goal: *02/24/2009*

Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process.

Customer WUE Goal (Demand Side):

The City plans on implementing a new utility committee to establish new goals. We will focus on consumer education, better leak detection and using reclaimed water for irrigation in the City Park. This will reduce usage for public use by 10% per year.

Customer (Demand Side) Goal Progress:

Additional Information Regarding Supply and Demand Side WUE Efforts

6.

Describe Progress in Reaching Goals:

- Estimate how much water you saved.
- Report progress toward meeting goals within your established timeframe.
- Identify any WUE measures you are currently implementing.
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day for the next two years) you must explain why you are unable to reduce water use below that level.

The following questions will help DOH better understand water usage, water resources management and drought response. The data will be used to provide technical assistance, not for regulatory purposes.

All questions are voluntary

Month	Date of Measurement	Static Water Level (feet below measuring point)	Dynamic Water Level (feet below measuring point)
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Water level data:

Please provide the following information (if known) to help us better utilize the water level data.

Well tag Id number:

Well depth:

Water level accuracy (within 0.01 ft < 1 ft ~ 1 ft)

Completion type (e.g., cased open interval, cased open-ended, cased open-ended with perforations, etc…)

Location coordinates (latitude, longitude) and accuracy of the coordinates (< 1ft, ~1ft, >1000ft)

Water level parameter name (e.g. depth below measuring point, depth below top of casing, depth below ground surface)

Elevation of top of casing OR elevation of measuring point if different than top of casing (as specified in question 7)

6.

Monthly/Seasonal Water Usage:

What was your maximum daily water demand for the previous year (in gallons per day)?

Month	Volume of Water Produced in gallons
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

Water shortage response:

Did you activate any level of water shortage response plan the previous year?

☐ Yes ☐ No ☐ There was no need to

If you activated a water shortage response plan the previous year, what level did you activate? (Check all that apply)

☐ Advisory Conservation ☐ Voluntary Conservation

☐ Mandatory Conservation ☐ Rationing ☐ Other

What factors caused your water shortage the previous year?

☐ Drought ☐ Fire ☐ Landslides ☐ Earthquakes

☐ Flooding ☐ Water Supply Limitations ☐ Other

Do not mail, fax, or email this report to DOH

6.

6.

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

Public Water System
Cross-Connection Control Activities
Annual Summary Report for ____

Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information

PWS ID:	PWS Name:	County:
Provide name and certification number of CCS who develops and implements your CCC program.		
CCS Name (Last, First & MI):		CCS Phone: (___) ___-____
CCS Cert. No.:	BAT Cert. No. (if applicable):	
CCS is (check one): PWS owner or employee ☐	On contract to PWS ☐	Volunteer or other ☐

Part 2: Status of Cross-Connection Control (CCC) Program at end of Reporting Year

PWS has (check one box in each column below):	
A written CCC program plan Y ☐ N ☐	CCC implementation activities Y ☐ N ☐

(CCC program plan may be a separate document or part of water system plan or small water system management program.)

Provide information about PWS's specific CCC Program Elements. ***Check one box in each column for each row***.

Program Element Number	**Description of Element [See WAC 246-290-490(3)]**	**This Program Element is Currently:**	
		Included in Written Program	**Being Implemented or is Completed**
1	Legal Authority Established	Y ☐ N ☐	Y ☐ N ☐
2	Hazard Evaluation Procedures and Schedules	Y ☐ N ☐	Y ☐ N ☐
3	CCC Procedures and Schedules	Y ☐ N ☐	Y ☐ N ☐
4	Certified CCS Provided	Y ☐ N ☐	Y ☐ N ☐
5	Backflow Preventer Inspection and Testing	Y ☐ N ☐	Y ☐ N ☐
6	Testing Quality Control Assurance Program	Y ☐ N ☐	Y ☐ N ☐
7	Backflow Incident Response Procedures	Y ☐ N ☐	Y ☐ N ☐
8	Public Education Program	Y ☐ N ☐	Y ☐ N ☐
9	CCC Records	Y ☐ N ☐	Y ☐ N ☐
10	Reclaimed Water Permit	Y ☐ N ☐ N/A ☐	Y ☐ N ☐ N/A ☐

Did you check one box in EACH of the above columns for EACH row?

Part 3A: System Characteristics

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). **Estimate if necessary**.

Type of Service Connection	**Number**
Residential (as defined by PWS)	
All Other (include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	
Total Number of Connections	

6.

Part 3B: Cross-Connection Control for High-Hazard Premises or Systems Served by the PWS

If PWS does not serve any high-hazard premises or systems, check here ☐ and go to Part 4.

- Complete all cells. Count only premises PWS serves water to. Enter zero (0) if PWS doesn't serve such premises.
- **Report data as accurately as possible. DOH currently bases CCC compliance actions on this information.**

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections			
	A. Being Served Water by PWS[1]	**B. With Premises Isolation by AG or RP[2]**	**C. With Column B AG Inspected or RP Tested**	**D. Granted Exception from Mandatory Premises Isolation**
Agricultural (farms and dairies)				
Beverage bottling plants (including breweries)				
Car washes				
Chemical plants				
Commercial laundries and dry cleaners				
Both reclaimed water and potable water provided				
Film processing facilities				
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies				
Food processing plants (including canneries, slaughter houses, rendering plants)				
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, blood plasma centers and mortuaries. **Please complete Part 3C on next page.**				
Dedicated irrigation systems using purveyor's water supply *and* with chemical addition[4]				
Laboratories				
Metal plating industries				
Petroleum processing or storage plants				
Piers and docks				
Radioactive material processing plants or nuclear reactors				
Survey access denied or restricted				
Wastewater lift/pump stations (non-residential only)				
Wastewater treatment plants				
Unapproved auxiliary water supply interconnected with potable water supply				
Other high-hazard premises (please list):[5]				
Totals				

[1] Count multiple connections or parallel installations to the same premises as ***separate*** connections.

[2] Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVAs or DCDAs installed for premises isolation.

[3] Count only those connections ***whose premises isolation preventers*** were inspected (AG) or tested (RPBA) during report year.

[4] For example, dedicated lines to irrigation systems in parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RPBA) 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, e.g.,: *other manufacturing* or *other commercial*. ***If needed, attach additional sheet giving same information as requested in table.***

6.

Part 3C: Cross-Connection Control for Medical Premises Served by the PWS

If PWS does not serve any medical premises of the types shown below, check here ☐ and go to Part 4.

- Complete all cells. **Do not count the same premises more than once.**
- Count only premises PWS serves water to. Enter zero (0) if PWS doesn't serve such premises.
- Report data as accurately as possible. DOH will base CCC compliance actions on this information.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of year			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG or RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Mandatory Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)				
Facilities for Treatment and Care of Patients not Located in Hospitals Counted Above				
Same day surgery centers				
Out-patient clinics and offices				
Alternative health out-patient clinics and offices				
Psychiatric out-patient clinics and offices				
Chiropractors				
Hospice care centers				
Childbirth centers				
Kidney dialysis centers				
Blood centers				
Dental clinics and offices				
Facilities for Housing Patients				
Nursing homes				
Boarding homes				
Residential treatment centers				
Other Medical-Related Facilities				
Mortuaries				
Morgues and autopsy facilities (not in hospitals)				
Veterinarian offices, clinics, and hospitals				
All other (describe in Part 6: Comments on pg 6)				
Totals				

[1] Count multiple connections or parallel installations to the same premises as ***separate*** connections.

[2] Count only connections with premises isolation AGs or RPs (RPBA or RPDA). Don't include connections with in-premises protection only or connections with DCVAs or DCDAs installed for premises isolation.

[3] Count only connections whose premises isolation preventers were inspected (AG) or tested (RP's) during report year. The number in Column C can't be larger than the number in Column B in the same row.

6.

Part 4A: Backflow Preventer Inventory and Testing Data

- Complete all cells. **Count only backflow preventers relied on to protect the PWS.** Enter zero (0), if there are no backflow preventers in that category.
- **If PWS records don't distinguish between premises isolation and in-premises protection preventers, enter all data in rows 1-6 and check box above row 1.**
- Count AVBs on irrigation systems only. **If you don't track AVBs, check the box above the "AVB" column.**
- Count multiple tests (or failures) for any particular backflow preventer as one test (or failure).
- Count each assembly separately for multiple service connections or parallel installations. Count RPDAs and DCDAs as single assemblies (don't count bypass separately).
- Count assemblies installed on dedicated fire or irrigation lines as Premises Isolation Assemblies.

If PWS doesn't track AVBs, check here. ☐

	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. ***If In-Premises Protection preventers are also included, check here*** ☐**.**									
Rows 1 – 3 pertain ONLY to Premises Isolation preventers in service at beginning of the year _____(fill in report year)									
1	In service at beginning of year								
2	Inspected and/or tested[1]								
3	Failed inspection or test this yea								
Rows 4 – 6 pertain ONLY to NEW Premises Isolation preventers installed during the reporting year									
4	New preventers installed[2]								
5	Inspected and/or tested[1]								
6	Failed inspection or test[3]								
7	Preventers taken out of service this year[3]								
Premises Isolation Total at end of year [4]									
In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.									
Rows 8 – 10 pertain ONLY *to In-Premises Protection Preventers in service at beginning of* ***report year***									
8	In service at beginning of year								
9	Inspected and/or tested[1]								
10	Failed inspection or test this year								
Rows 11 – 13 pertain ONLY to NEW In-Premises Protection preventers installed during the reporting year									
11	New preventers installed[2]								
12	Inspected and/or tested[1]								
13	Failed inspection or test this year								
14	Preventers taken out of service[3]								
In-Premises Protection Total at end of year[4]									
Grand Total at end of reporting year									

[1] Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only using DOH/USC test procedures).
[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at beginning of the report year. Replacement preventers may be of a different type than the original.
[3] New or existing preventers taken out of service, whether or not they were replaced by the same type or different type of preventer.
[4] Total at end of the year should be equal to the number of preventers in service at beginning of year plus those installed during the year minus the number of preventers taken out of service during the reporting year.

6.

Part 4B: Other Implementation Activities

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New service connections evaluated for cross-connection hazards to PWS.	
New service connections requiring backflow protection to protect the PWS.[1]	
Existing service connections evaluated for cross-connection hazards to PWS.	
Existing service connections requiring backflow protection to protect the PWS.[1, 2]	
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b).[3]	
CCC enforcement actions taken by PWS.[4]	

[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 to High-Health Hazard Premises Isolation Requirements Form (green) for each exception granted during the year.

[4] "Enforcement actions" mean actions taken by the PWS (such as water shut-off, PWS installation of backflow preventer, etc.) when the customer fails to comply with PWS's CCC requirements.

Part 5: Backflow Incidents, Risk Factors, and Indicators During Report Year:_____

Complete only one column for each row. Check "Data Not Available" if PWS doesn't track such data.

	Backflow Incidents, Risk Factors, and Indicators	Number (Enter 0 if none)	Check if Data Not Available
Backflow Incidents			
1	Backflow incidents that contaminated the PWS.[5]		☐
2	Backflow incidents that contaminated the customer's drinking water system ***only***.[5]		☐
Risk Factors for Backflow			
3	Distribution main breaks per 100 miles of pipe.		☐
4	Low-pressure events (<20 psi in PWS distribution system).		☐
5	Water outage events.		☐
Indicators of Possible Backflow			
6	Total health-related complaints received by PWS.[6]		☐
7	Received during BWA or PN events.[7]		☐
8	Received during low pressure or water outage events.		☐
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).		☐
10	Received during BWA or PN events.[7]		☐
11	Received during low pressure or water outage events.		☐

[5] Purveyors must submit a completed DOH Backflow Incident Report form for each backflow incident known to contaminate the public water system. DOH is also interested in receiving information on backflow incidents that contaminated the customer's drinking water system only. The DOH Incident Report form, Form #331-243, is available on the Office of Drinking Water (ODW) website at http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-457-F.pdf or from ODW on request.

[6] Such as stomachache, headache, vomiting, diarrhea, skin rashes, etc.

[7] "**BWA**" means ***Boil Water Advisory*** and **"PN"** means ***Public Notification*** for water quality reasons.

6.

Part 6: Comments and Clarifications

Enter comments or clarifications to any of the information included in this report. ***Please date the comment.***

Part No.	Comment	Date

Part 7: Report Completion Information

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name (print) [1]:		Title:
Signature:		Date:
Phone: (___) ___-____	E-mail: _____@_____	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
PWS Mgr./Owner Name (print) [2]:		Title:
Signature:	Op. Cert. No.:	Date:

[1] CCC Program Manager is generally the CCS responsible for developing and implementing the PWS's CCC Program.

[2] The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program. This person doesn't need to be in charge of the entire water system.

If you have a question or comment regarding this form, you can find contact information at https://www.doh.wa.gov/communityandenvironment/drinkingwater or email us at CCCprogram@doh.wa.gov.

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

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6.

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

Local Government Consistency Determination Form

Water System Name: City of Tenino PWS ID: 87400

Planning/Engineering Document Title: Water System Plan Plan Date: April 2023

Local Government with Jurisdiction Conducting Review: _____

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.	1-6; Fig 1-2	
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.	2-13	
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.	1-9	
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.	1-9	
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.	Full WSP to be provided after review of Ch. 2	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

_____ _____

Signature Date

_____

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents,** a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.

b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*

d) All **service area policies** for how new water service will be provided to new customers.

e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

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6.

Irrigation & Landscaping

Guideline 7

Did you know: Gardening professionals agree most lawns and yards receive more water than they need. Over-watering creates run-off that carries toxic fertilizers and pesticides into our streams. This not only harms wildlife and your plants, it wastes water and money, too! The following tips help protect the environment, keep your yard healthy, and save you money on your water bill.

General

1. Apply water only as fast as the soil absorbs it.
2. Water in the evening or early morning when evaporation is least likely to occur. Use drip irrigation during the day for little evaporation water loss. Do not water when it's windy.
3. Water only once a week. Water less often if your plants need less moisture (see Guideline 3—Lawn Watering).

Irrigation & Sprinklers

1. A properly designed and installed irrigation system should be included as a water conservation tool. Automated irrigation systems offer the ultimate in both control and distribution of water over other watering systems.
2. Keep your sprinkler system in good repair. Fix leaks and adjust sprinkler heads to eliminate over-spray onto paved areas or buildings. Investigate unusual runoff or puddling.



3. Turn off your sprinkler system at the first sign of saturation or [6.] off to allow the water to soak in. Water again in an hour or if needed.
4. Make sure the controller of your automated sprinkler system is properly set to achieve minimum watering levels.

Landscaping

1. Consider alternate landscaping practices. Reduce turf area or use groundcovers and/or mulches instead of turf. Generally, groundcovers use less water than turf areas.
2. Use low water using turf varieties. Consult your county extension office or local nursery to identify low water using turf varieties for your area.
3. Aerate to reduce thatch (dead grass) buildup in turf areas in spring or fall. Thatch restricts penetration of water, air and nutrients. Aeration will also increase water penetration in compacted soils.
4. Consider using organic fertilizer. Consult a nursery or landscape professional for a well balanced fertilizer program.
5. Spot spray weeds as needed and consider an integrated pest management program to control bugs and/or disease.
6. Use mulches such as bark compost to help planting beds retain moisture.
7. Consider water consumption when selecting plants. Some plants use more water than others. Consult a good gardening book or your local nursery to determine which low water using plants are correct for your area.
8. Plant placement is important. Remember, right plant, right place! Shade loving plants don't do well if placed in the sun and will require excessive watering to survive. Place plants with similar water needs in common areas so all can benefit from the same application of water.

More Information

Washington State Department of Health
Office of Drinking Water
P.O. Box 47828 • Olympia, WA 98504-7828
(360) 236-3100 • 1-800-521-0323
doh.wa.gov/DrinkingWater

DOH 331-120-7

6.

S. F. No. 7361—(Rev. 10-69)—10-69—5M. 15860.

6.

CERTIFICATE RECORD NO. 14, PAGE NO. 6869-A

STATE OF WASHINGTON, COUNTY OF Thurston

CERTIFICATE OF GROUND WATER RIGHT

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

THIS IS TO CERTIFY *That* TOWN OF TENINO

of Tenino, Washington, *has made proof to the satisfaction of the Department of Water Resources of a right to the use of the public ground waters of the State of Washington from* a well *located within* Stephen Hogden D.L.C. No. 38 within Town of Tenino of Sec. 19, Twp. 16 N., R. 1 W. W.M., *for the purpose(s) of* municipal supply *under and specifically subject to provisions contained in Ground Water Permit No.* 8428 *issued by the Department 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 Department of Water Resources and entered of record in Volume* 14 *at page* 6869-A; *that the priority of the right hereby confirmed dates from* June 5, 1967; *that the quantity of ground water under the right hereby confirmed for the aforesaid purposes, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 300 gallons per minute, 196 acre-feet per year, each year, for municipal supply.

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

Area served by Town of Tenino.

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

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

WITNESS the seal and signature of the Assistant Director, Division of Water Management, Department of Water Resources, affixed this 5th *day of* June, *19* 70.

Glen H. Liedlen

Assistant Director
Division of Water Management
Department of Water Resources

Engineering Data

OK.

6.

Ground Water Permit No......

Certificate of Ground Water Right

Recorded in the Department of Water Resources, Olympia, Washington, in Book No...... *of Ground Water Right Certificates, on page*....., *on the* .....*day of*..... *19*.....

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

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

.....

STATE PRINTING PLANT, OLYMPIA, WASHINGTON

6.

6.

ADD P.O.W.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
SUPERSEDING

CERTIFICATE OF WATER RIGHT

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

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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 19, 1973	G2-20933	G2-20933	G2-20933

NAME
City of Tenino

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)

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

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #2 and #3

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	400	270*

QUANTITY, TYPE OF USE, PERIOD OF USE

74 acre-feet per year(primary)	Municipal supply	Year-round, as needed
*196 acre-feet per year(supplemental)	Municipal supply	Year-round, as needed

*(Supplemental to existing rights)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
Well #2) 1320 feet south and 1220 feet west of the northeast corner of Section 19.
Well #3) 1300 feet south and 1225 feet west of the northeast corner of Section 19.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼NE¼	19	16	1W	23	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Tenino

PROVISIONS

"This superseding certificate will be issued as partially supplemental to existing water right certificate 6869, and to the City's vested claim. The annual quantity of water allocated to Tenino under all existing rights shall not exceed 270 acre-feet per year. 196 acre-feet are considered supplemental, 74 acre-feet per year primary."

Nothing in this approval shall be construed as lessening or enlarging any water rights represented by Water Right Claim No. (claim no.). The water use authorized under this filing (fill in with water right no.) shall be considered supplemental to any water rights confirmed for said claim as a result of a general adjudication through Superior Court, should adjudication be undertaken.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

The well access port shall be maintained at all times.

Water levels shall be measured and recorded using a consistent methodology, in accordance with accepted industry standards. Such measurements shall be made at least monthly. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record.

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

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

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

this 13th *day of* October, *19* 94.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK VH

by Gale Blomstrom

FOR COUNTY USE ONLY

Appendix D

Water Quality

Coliform Monitoring Plan for: City of Tenino

A. System Information

Plan Date: 12-27-2021

Water System Name Tenino Water System	**County** Thurston	**System I.D. Number** 87400
Name of Plan Preparer Gerald Mickelsen	**Position** Consultant	**Daytime Phone** **360-425-0991**
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S01: Well #1 No Tag WW, 89 ft, 290 gpm S02: Well #2 No Tag, 87 ft, 133 gpm S03: Well #3 No Tag WW, 58 ft, 350 gpm S04: WF (S01 & 3), 58 ft, 640 gpm	
Storage: List and Describe	(2) 275,000-gal glass lined steel tanks	
Treatment: Source Number & Process	S01 - S04: disinfection and corrosion control	
Pressure Zones: Number and name	One pressure zone	
Population by Pressure Zone	2,030	
Number of Routine Samples Required Monthly by Regulation:		Sep – May: 4 Jun – Aug: 2
Number of Sample Sites Needed to Represent the Distribution System:		7
***Request DOH Approval of Triggered Source Monitoring Plan?**		**Yes** ☐ **No** ☒

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name Thurston County Public Health Dept. Water Quality Lab	**Office Phone 360-867-2631** **After Hours Phone - -**
Address 412 Lilly Rd NE, Olympia, WA 98506	**Cell Phone - -** **Email** environmental_health@co.thurston.wa.us
Hours of Operation Monday – Friday: 9am – 4pm	
Contact Name _____	
Emergency Laboratory Name _____	**Office Phone - -** **After Hours Phone - -**
Address _____	**Cell Phone - -** **Email** _____
Hours of Operation _____	
Contact Name _____	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		

D. Routine, Repeat, and Triggered Source Sample Locations

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
1. Lesmeister 519 Huston St	**1-1.** 499 Huston St **1-2.** 535 Huston St **1-3.**	**S01** **S02** **S03** **S04**
2. Public Works 418 Wichman St S	**2-1.** 449 Wichman St S **2-2.** 388 Wichman St S **2-3.**	**S01** **S02** **S03** **S04**
3. City Hall 149 Hodgden St S	**3-1.** 125 Sussex Ave E **3-2.** 172 Central Ave E **3-3.**	**S01** **S02** **S03** **S04**
4. Deoskey 150 Stitham Ln	**4-1.** 100 Lemieux Ln **4-2.** 120 Stitham Ln **4-3.** 155 Stitham Ln	**S01** **S02** **S03** **S04**

*** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

_____

_____

_____

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

N/A

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	**1, 2, 3, 4**	**July**	**1, 2**
February	**1, 2, 3, 4**	**August**	**2, 3**
March	**1, 2, 3, 4**	**September**	**1, 2, 3, 4**
April	**1, 2, 3, 4**	**October**	**1, 2, 3, 4**
May	**1, 2, 3, 4**	**November**	**1, 2, 3, 4**
June	**3, 4**	**December**	**1, 2, 3, 4**

G. Level 1 and Level 2 Assessment Contact Information

Name **Troy Cannon**	**Office Phone 360-561-1506** **After Hours Phone 360-701-8386**
Address **PO Box 4019** **Tenino, WA 98589**	**Email tcannon@cityoftenino.org**
Name **Courtney Sheldon**	**Office Phone 360-264-2368** **After Hours Phone - -**
Address **PO Box 4019** **Tenino, WA 98589**	**Email csheldon@cityoftenino.org**

H. *E. coli*-Present Sample Response

Distribution System *E. Coli* Response Plan

If we have *E. coli* in our distribution system, we will immediately:

1. Call DOH. (360) 236-3030 or 1-877-481-4901 after hours.
2. Record description of sample collection locations,
3. Collect repeat and triggered source samples per Part D and two other routine monitoring sites.
4. Collect a sample from the nearest active well.
5. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 2-4.

E. coli-Present Triggered Source Sample Response Plan

If we have *E. coli* in any source, we will immediately:

1. Call DOH. (360) 236-3030 or 1-877-481-4901 after hours.
2. Take repeat samples.
3. Issue boil water advisory.
4. Inform local media of boil water advisory.

I. System Map



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City of Tenino
Figure 3-1
Water Distribution Map

Generated on: 11/30/2023

Water Quality Monitoring Schedule

System: TENINO CITY OF **PWS ID: 87400 7** **Region: SOUTHWEST**
Contact: Troy L Cannon **Group: A - Comm** **County: THURSTON**

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

	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	Jun 2024	Jul 2024	Aug 2024	Sep 2024	Oct 2024
Coliform Monitoring Population	3336	3336	3336	3336	3336	3336	3336	1968	1968	1968	3336	3336
Number of Routine Samples Required	4	4	4	4	4	4	4	2	2	2	4	4

- 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 2021 - Dec 2023	standard - 3 year	09/19/2023		
Asbestos	1	Jan 2020 - Dec 2028	standard - 9 year	10/09/2018	Oct 2027	
Total Trihalomethane (THM)	1	Jan 2023 - Dec 2023	reduced - 1 year	09/19/2023		
Halo-Acetic Acids (HAA5)	1	Jan 2023 - Dec 2023	reduced - 1 year	09/19/2023		

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

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 S04 *WF (S01 & 3)* *Well Field* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Nitrate	1	Jan 2023 - Dec 2023	standard - 1 year	04/11/2023		
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/06/2018	Sep 2027	
Iron	1	Jan 2023 - Dec 2025	standard - 3 year	04/11/2023		
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	03/24/2022		
Herbicides	1	Jan 2023 - Dec 2031	waiver - 9 year	07/08/2016	Jun 2024	
Pesticides	0	Jan 2023 - Dec 2025	waiver - 3 year	07/08/2016		
PFAS	1	Jan 2023 - Dec 2025	standard - 3 year		***Mar 2023***	***Past Due***
Soil Fumigants	0	Jan 2023 - Dec 2025	waiver - 3 year			
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	05/13/2015		
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	05/13/2015		

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

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2023
Submit CCR certification form to ODW (Community systems only):	10/01/2023
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2023
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

Southwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Sophia Petro: (564) 669-0856 or sophia.petro@doh.wa.gov
For questions regarding DBPs:	Regina Grimm, p.e.: (360) 236-3035 or regina.grimm@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Southwest Office: (360) 236-3030 or SWRO.Coli@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.

Appendix E

Hydraulic Model Results

```
* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 11.113  03-10-2023                             *
*  Company:  GibbsOlson    Serial #:  592186               *
*  Interface:  KYnetic                                     *
*   Licensed for Pipe2018                                  *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 Date & Time:  Tue Apr 18 16:14:41 2023

 Master File : t:\projects\0751 tenino\5021 water system update\kypipe modeling\imports\water-distr-map_.KYP\water-distr-map_.P2K

              ************************************************
               S U M M A R Y   O F   O R I G I N A L   D A T A
              ************************************************


 U N I T S   S P E C I F I E D

    FLOWRATE ............ = gallons/minute
    HEAD (HGL) .......... = feet
    PRESSURE ............ = psig


 R E G U L A T I N G   V A L V E   D A T A

       VALVE       VALVE          VALVE
       LABEL       TYPE         SETTING
                              (ft or gpm)
 ----------------------------------------
Well Pump No  Const_FLOW_Pump       0.00
Well Pump No  Const_FLOW_Pump       0.00


 P I P E L I N E   D A T A

   STATUS CODE:   XX -CLOSED PIPE    CV -CHECK VALVE

   P I P E             NODE NAMES       LENGTH  DIAMETER  ROUGHNESS    MINOR
   N A M E            #1       #2        (ft)     (in)      COEFF.  LOSS COEFF.
 ---------------------------------------------------------------------------------
       P-1            J-1      J-10      564.56     8.00  140.0000       0.00
      P-10            J-8      J-11      209.15     2.00  140.0000       0.00
     P-100         J-145      J-62      192.29     4.00  140.0000       0.00
     P-101         J-109     J-146      280.46     4.00  140.0000       0.00
     P-102         J-146     J-128      302.88     4.00  140.0000       0.00
     P-103         J-147     J-102      254.28     8.00  140.0000       0.00
     P-104         J-148     J-147      302.70     8.00  140.0000       0.00
     P-105         J-129     J-147      301.36     8.00  140.0000       0.00
     P-106         J-129      J-61      134.92     8.00  140.0000       0.00
     P-107         J-132     J-150      348.86     8.00  140.0000       0.00
     P-108         J-150      J-60      186.99     8.00  140.0000       0.00
     P-109         J-230     J-151       35.93     6.00  140.0000       0.00
      P-11          J-12       J-9      123.31     2.00  140.0000       0.00
     P-110         J-151      J-54      304.12     6.00  140.0000       0.00
     P-111         J-152     J-174      269.57     6.00  140.0000       0.00
     P-112         J-174     J-155      296.45     6.00  140.0000       0.00
     P-113         J-155      J-44      363.91     6.00  140.0000       0.00
     P-114         J-157      J-58      216.49     8.00  140.0000       0.00
     P-115         J-158      J-52      353.86     8.00  140.0000       0.00
     P-116         J-159     J-158      273.19     8.00  140.0000       0.00
     P-117         J-159     J-160      329.29     8.00  140.0000       0.00
     P-118         J-160     J-161      303.54     8.00  140.0000       0.00
     P-119         J-161      J-27      127.34     8.00  140.0000       0.00
      P-12          J-13      J-14      572.52     4.00  140.0000       0.00
     P-120          J-34     J-161      307.34     8.00  140.0000       0.00
     P-121         J-161     J-163      185.32     8.00  140.0000       0.00
     P-122         J-163      J-39      192.72     6.00  140.0000       0.00
     P-123         J-165     J-163      303.05     4.00  140.0000       0.00
     P-124         J-101     J-165      332.73     4.00  140.0000       0.00
     P-125         J-101     J-167      271.81     4.00  140.0000       0.00
     P-126         J-167      J-51      303.40     4.00  140.0000       0.00
     P-127          J-95      J-47       32.62     6.00  130.0000       0.00
     P-128          J-50      J-49      302.12     6.00  130.0000       0.00
```

20 Year MDD + Fireflow Model Results

P-129	J-28	J-94	334.01	4.00	140.0000	0.00
P-13	J-16	J-36	577.26	4.00	140.0000	0.00
P-130	J-170	J-94	265.61	4.00	140.0000	0.00
P-131	J-48	J-170	303.50	4.00	140.0000	0.00
P-132	J-172	J-48	628.16	4.00	140.0000	0.00
P-133	J-172	J-129	300.73	4.00	140.0000	0.00
P-134	J-173	J-155	186.72	2.00	110.0000	0.00
P-135	J-159	J-174	323.79	2.00	110.0000	0.00
P-136	J-152	J-158	316.93	8.00	140.0000	0.00
P-137	J-54	J-176	85.83	6.00	140.0000	0.00
P-138	J-151	J-55	99.62	6.00	140.0000	0.00
P-139	J-179	J-59	187.39	4.00	140.0000	0.00
P-14	J-17	J-24	261.74	6.00	140.0000	0.00
P-140	J-181	J-172	139.90	4.00	140.0000	0.00
P-141	J-148	J-172	299.37	4.00	140.0000	0.00
P-142	J-183	J-49	113.95	4.00	130.0000	0.00
P-143	J-185	J-51	82.56	4.00	140.0000	0.00
P-144	J-187	J-48	298.52	8.00	140.0000	0.00
P-145	J-167	J-158	185.97	8.00	140.0000	0.00
P-146	J-96	J-170	137.72	4.00	140.0000	0.00
P-147	J-188	J-170	98.91	4.00	140.0000	0.00
P-148	J-189	J-188	199.79	2.00	110.0000	0.00
P-149	J-165	J-47	297.61	6.00	140.0000	0.00
P-15	J-18	J-19	273.18	6.00	140.0000	0.00
P-150	J-165	J-160	186.91	6.00	140.0000	0.00
P-151	J-1	J-28	267.19	8.00	140.0000	0.00
P-152	J-28	J-29	137.63	8.00	140.0000	0.00
P-153	J-29	J-163	292.61	8.00	140.0000	0.00
P-154	J-39	J-194	106.34	6.00	140.0000	0.00
P-155	J-195	J-72	275.99	2.00	110.0000	0.00
P-156	J-196	J-134	351.31	8.00	140.0000	0.00
P-157	J-196	J-69	359.98	8.00	140.0000	0.00
P-158	J-198	J-74	227.49	2.00	140.0000	0.00
P-159	J-88	J-89	67.89	2.00	140.0000	0.00
P-16	J-4	J-57	534.18	8.00	140.0000	0.00
P-160	J-201	J-89	104.40	2.00	140.0000	0.00
P-161	J-203	J-204	135.42	6.00	140.0000	0.00
P-162	J-12	J-13	398.64	4.00	140.0000	0.00
P-163	J-205	J-12	5.00	6.00	130.0000	0.00
P-164	J-207	J-11	5.00	6.00	130.0000	0.00
P-165	J-11	J-16	311.07	2.00	110.0000	0.00
P-166	J-209	J-210	60.83	6.00	130.0000	0.00
P-167	J-209	J-211	210.94	2.00	140.0000	0.00
P-168	J-212	J-209	210.94	2.00	140.0000	0.00
P-169	J-209	J-213	30.61	6.00	130.0000	0.00
P-17	J-19	J-20	1953.66	12.00	130.0000	0.00
P-170	J-15	J-41	38.95	2.00	110.0000	0.00
P-171	J-40	J-43	477.34	6.00	140.0000	0.00
P-172	J-218	J-43	24.72	6.00	140.0000	0.00
P-173	J-220	J-218	30.00	6.00	130.0000	0.00
P-174	J-222	J-220	30.00	6.00	130.0000	0.00
P-175	J-223	J-221	30.00	6.00	130.0000	0.00
P-176	J-222	J-223	60.00	6.00	130.0000	0.00
P-177	J-194	J-27	82.95	6.00	140.0000	0.00
P-178	J-1	J-189	598.02	8.00	140.0000	0.00
P-179	J-189	J-187	308.50	8.00	140.0000	0.00
P-18	J-21	J-23	739.67	6.00	140.0000	0.00
P-180	J-151	J-225	392.61	6.00	130.0000	0.00
P-181	J-225O-Well Pum		109.68	6.00	130.0000	0.00
P-182	J-225O-Well Pum		109.40	6.00	130.0000	0.00
P-183	J-230	J-82	134.15	6.00	140.0000	0.00
P-184	J-82	J-123	718.84	6.00	140.0000	0.00
P-185	J-56	J-123	367.50	6.00	140.0000	0.00
P-186	J-389	J-388	52.82	6.00	130.0000	0.00
P-187	J-58	J-150	75.19	8.00	140.0000	0.00
P-188	J-59	J-180	301.08	4.00	140.0000	0.00
P-189	J-60	J-107	400.92	8.00	140.0000	0.00
P-19	J-57	J-21	1177.27	6.00	140.0000	0.00
P-190	J-243	J-383	38.70	6.00	130.0000	0.00
P-191	J-245	J-76	40.10	2.00	110.0000	0.00
P-192	J-247	J-78	146.24	2.00	140.0000	0.00
P-193	J-62	J-250	52.07	2.00	140.0000	0.00
P-194	J-251	J-250	78.84	2.00	140.0000	0.00
P-195	J-143	J-253	184.93	8.00	140.0000	0.00
P-196	J-254	J-143	5.00	6.00	130.0000	0.00
P-197	J-141	J-86	313.12	6.00	140.0000	0.00
P-198	J-133	J-256	526.22	6.00	140.0000	0.00
P-199	J-87	J-258	196.59	6.00	140.0000	0.00
P-2	J-10	J-3	42.14	8.00	130.0000	0.00
P-20	J-37	J-15	578.48	8.00	140.0000	0.00
P-200	J-258	J-259	133.73	4.00	140.0000	0.00
P-201	J-115	J-111	40.58	6.00	140.0000	0.00
P-202	J-111	J-112	108.93	6.00	140.0000	0.00
P-203	J-260	J-116	27.25	6.00	130.0000	0.00

6.

20 Year MDD + Fireflow Model Results

P-204	J-103	J-262	634.08	8.00	140.0000	0.00
P-205	J-262	J-263	355.80	8.00	140.0000	0.00
P-206	J-264	J-263	242.99	6.00	140.0000	0.00
P-207	J-113	J-262	303.07	6.00	140.0000	0.00
P-208	J-113	J-264	390.94	6.00	140.0000	0.00
P-209	J-264	J-265	498.95	6.00	140.0000	0.00
P-21	J-3	J-26	418.42	8.00	130.0000	0.00
P-210	J-250	J-104	71.65	2.00	140.0000	0.00
P-211	J-358	J-119	124.38	6.00	140.0000	0.00
P-212	I-Well PumWell	No. 1	16.31	6.00	130.0000	0.00
P-213	J-197	J-136	120.34	8.00	140.0000	0.00
P-214	I-Well PumWell	No. 3	17.14	6.00	130.0000	0.00
P-215	J-103	J-115	556.01	6.00	140.0000	0.00
P-216	J-120	J-88	238.04	6.00	140.0000	0.00
P-217	J-82	J-56	1379.66	6.00	140.0000	0.00
P-218	J-123	J-106	143.58	6.00	140.0000	0.00
P-219	J-125	J-68	71.81	8.00	140.0000	0.00
P-22	J-26	J-28	416.33	4.00	140.0000	0.00
P-220	J-284	J-124	19.69	6.00	130.0000	0.00
P-221	J-84	J-171	1858.48	8.00	130.0000	0.00
P-222	J-77	J-139	1497.31	6.00	140.0000	0.00
P-223	J-127	J-87	1184.74	8.00	140.0000	0.00
P-224	J-87	J-110	123.95	8.00	140.0000	0.00
P-225	J-146	J-93	862.64	6.00	140.0000	0.00
P-226	J-63	J-64	304.15	6.00	140.0000	0.00
P-227	J-78	J-77	192.73	2.00	140.0000	0.00
P-228	J-140	J-139	26.45	6.00	140.0000	0.00
P-229	J-75	J-137	1372.85	6.00	140.0000	0.00
P-23	J-29	J-30	348.98	6.00	130.0000	0.00
P-230	J-63	J-304	213.47	2.00	140.0000	0.00
P-231	J-305	J-65	51.77	6.00	130.0000	0.00
P-232	J-62	J-144	88.34	4.00	140.0000	0.00
P-233	J-61	J-132	143.54	8.00	140.0000	0.00
P-234	J-147	J-149	30.30	8.00	140.0000	0.00
P-235	J-143	J-255	5.00	6.00	130.0000	0.00
P-236	J-145	J-108	544.61	8.00	140.0000	0.00
P-237	J-64	J-128	290.01	6.00	140.0000	0.00
P-238	J-168	J-59	313.86	4.00	140.0000	0.00
P-239	J-169	J-61	296.86	6.00	130.0000	0.00
P-24	J-18	J-31	562.52	8.00	140.0000	0.00
P-240	J-65	J-66	36.13	6.00	140.0000	0.00
P-241	J-134	J-135	104.44	8.00	140.0000	0.00
P-242	J-49	J-169	326.57	6.00	130.0000	0.00
P-243	J-48	J-50	136.63	8.00	140.0000	0.00
P-244	J-50	J-167	302.42	8.00	140.0000	0.00
P-245	J-52	J-332	197.62	2.00	110.0000	0.00
P-246	J-52	J-157	285.26	8.00	140.0000	0.00
P-247	J-54	J-152	297.60	6.00	140.0000	0.00
P-248	J-51	J-168	15.20	4.00	140.0000	0.00
P-249	J-51	J-186	48.68	4.00	140.0000	0.00
P-25	J-31	J-32	537.17	8.00	140.0000	0.00
P-250	J-55	J-178	225.29	6.00	140.0000	0.00
P-251	J-47	J-29	302.61	6.00	130.0000	0.00
P-252	J-66	J-133	926.55	6.00	140.0000	0.00
P-253	J-44	J-34	27.54	8.00	140.0000	0.00
P-254	J-86	J-137	60.97	6.00	140.0000	0.00
P-255	J-24	J-37	50.43	6.00	140.0000	0.00
P-256	J-45	J-354	261.04	2.00	110.0000	0.00
P-257	J-42	J-45	70.29	6.00	140.0000	0.00
P-258	J-357	J-358	204.66	6.00	140.0000	0.00
P-259	J-135	J-197	236.97	8.00	140.0000	0.00
P-26	J-32	J-33	484.59	8.00	140.0000	0.00
P-260	J-64	J-362	239.05	2.00	140.0000	0.00
P-261	J-55	J-58	482.97	2.00	110.0000	0.00
P-262	J-116	J-365	49.95	2.00	140.0000	0.00
P-263	J-365	J-366	35.47	1.50	140.0000	0.00
P-264	J-124	J-357	179.43	6.00	140.0000	0.00
P-265	J-136	J-271	120.75	2.00	140.0000	0.00
P-266	J-358	J-368	150.58	6.00	140.0000	0.00
P-267	J-136	J-153	219.04	8.00	140.0000	0.00
P-268	J-371	J-256	186.41	6.00	140.0000	0.00
P-269	J-371	J-86	160.94	6.00	140.0000	0.00
P-27	J-33	J-40	502.13	8.00	140.0000	0.00
P-270	J-202	J-90	57.05	2.00	110.0000	0.00
P-271	J-91	J-90	69.29	2.00	110.0000	0.00
P-272	J-376	J-379	163.66	2.00	140.0000	0.00
P-273	J-378	J-379	68.46	2.00	140.0000	0.00
P-274	J-22	R-2	9.86	14.00	130.0000	0.00
P-275	J-164	J-382	102.35	2.00	140.0000	0.00
P-276	J-383	J-384	113.12	2.00	140.0000	0.00
P-277	J-78	J-386	152.39	2.00	140.0000	0.00
P-278	J-56	J-389	151.47	6.00	130.0000	0.00
P-279	J-389	J-390	93.46	2.00	140.0000	0.00
P-28	J-33	J-35	162.74	6.00	130.0000	0.00

20 Year MDD + Fireflow Model Results

P-280	J-389	J-391	70.93	2.00	140.0000	0.00
P-281	J-17	J-30	16.38	6.00	130.0000	0.00
P-282	J-9	J-2	250.43	8.00	140.0000	0.00
P-283	J-24	J-42	568.60	2.00	110.0000	0.00
P-284	J-42	J-355	34.61	2.00	110.0000	0.00
P-285	J-83	J-81	343.03	4.00	140.0000	0.00
P-286	J-69	J-378	267.73	6.00	140.0000	0.00
P-287	J-98	J-95	258.46	6.00	130.0000	0.00
P-288	J-93	J-99	24.03	4.00	140.0000	0.00
P-289	J-148	J-187	627.71	8.00	140.0000	0.00
P-29	J-14	J-53	569.92	4.00	140.0000	0.00
P-290	J-203	J-6	474.49	8.00	140.0000	0.00
P-291	J-210	J-5	261.30	8.00	140.0000	0.00
P-292	J-218	J-221	30.00	6.00	130.0000	0.00
P-293	J-99	J-118	275.19	4.00	140.0000	0.00
P-294	J-153	J-84	103.07	8.00	140.0000	0.00
P-295	J-153	J-154	901.99	8.00	140.0000	0.00
P-296	J-120	J-73	537.55	6.00	140.0000	0.00
P-297	J-171	J-156	634.86	8.00	130.0000	0.00
P-298	J-156	J-130	20.94	8.00	130.0000	0.00
P-299	J-5	J-8	339.80	6.00	140.0000	0.00
P-3	J-4	J-210	258.43	8.00	140.0000	0.00
P-30	J-31	J-53	327.83	8.00	140.0000	0.00
P-300	J-8	J-9	272.62	6.00	140.0000	0.00
P-301	J-45	J-13	315.32	6.00	140.0000	0.00
P-302	J-379	J-377	110.96	2.00	140.0000	0.00
P-303	J-383	J-60	50.74	6.00	130.0000	0.00
P-304	J-91	J-74	172.40	6.00	140.0000	0.00
P-305	J-92	J-71	34.04	6.00	140.0000	0.00
P-306	J-46	J-2	314.13	8.00	140.0000	0.00
P-307	J-3	J-42	259.90	6.00	140.0000	0.00
P-308	J-27	J-162	370.90	8.00	140.0000	0.00
P-309	J-39	J-164	34.82	6.00	140.0000	0.00
P-31	J-41	J-38	116.56	2.00	110.0000	0.00
P-310	J-40	J-44	263.96	8.00	140.0000	0.00
P-311	J-43	J-217	79.70	6.00	140.0000	0.00
P-312	J-177	J-125	50.56	8.00	140.0000	0.00
P-313	J-107	J-230	655.50	6.00	140.0000	0.00
P-314	J-109	J-127	869.66	8.00	140.0000	0.00
P-32	J-26	J-17	148.18	8.00	130.0000	0.00
P-33	J-14	J-36	280.82	6.00	140.0000	0.00
P-34	J-10	J-46	698.76	8.00	140.0000	0.00
P-35	J-156	J-171	623.82	8.00	130.0000	0.00
P-36	J-13	J-16	277.39	6.00	140.0000	0.00
P-37	J-12	J-206	5.00	6.00	130.0000	0.00
P-38	J-15	J-25	98.84	8.00	140.0000	0.00
P-39	J-53	J-25	252.22	8.00	140.0000	0.00
P-4	J-5	J-203	143.82	8.00	140.0000	0.00
P-40	J-41	J-215	24.36	2.00	110.0000	0.00
P-41	J-57	J-19	41.50	8.00	140.0000	0.00
P-42	J-36	J-18	50.38	6.00	140.0000	0.00
P-43	J-37	J-14	330.97	6.00	140.0000	0.00
P-44	J-16	J-4	335.26	6.00	140.0000	0.00
P-45	J-11	J-208	5.00	6.00	130.0000	0.00
P-46	J-7	J-67	496.58	8.00	140.0000	0.00
P-47	J-6	J-177	538.73	8.00	140.0000	0.00
P-48	J-68	J-69	66.80	8.00	130.0000	0.00
P-49	J-177	J-92	580.44	6.00	140.0000	0.00
P-5	J-6	J-7	359.15	8.00	140.0000	0.00
P-50	J-71	J-72	1074.70	6.00	140.0000	0.00
P-51	J-72	J-73	331.33	6.00	140.0000	0.00
P-52	J-142	J-109	283.10	4.00	140.0000	0.00
P-53	J-74	J-378	231.53	6.00	140.0000	0.00
P-54	J-20	J-23	23.33	14.00	130.0000	0.00
P-55	J-22	R-1	9.86	12.00	130.0000	0.00
P-56	J-92	J-74	314.41	2.00	110.0000	0.00
P-57	J-79	J-80	308.00	4.00	140.0000	0.00
P-58	J-80	J-83	23.91	4.00	140.0000	0.00
P-59	J-120	J-83	264.92	4.00	140.0000	0.00
P-6	J-7	J-2	451.49	8.00	140.0000	0.00
P-60	J-125	J-85	69.51	2.00	130.0000	0.00
P-61	J-23	J-22	247.07	14.00	130.0000	0.00
P-62	J-88	J-91	151.68	6.00	140.0000	0.00
P-63	J-89	J-202	95.35	2.00	140.0000	0.00
P-64	J-90	J-373	77.16	2.00	110.0000	0.00
P-65	J-94	J-95	132.18	4.00	140.0000	0.00
P-66	J-96	J-98	5.04	6.00	130.0000	0.00
P-67	J-97	J-98	115.52	4.00	140.0000	0.00
P-68	J-50	J-96	306.54	6.00	130.0000	0.00
P-69	J-100	J-101	94.40	4.00	140.0000	0.00
P-7	J-7	J-8	569.47	8.00	140.0000	0.00
P-70	J-102	J-145	39.77	8.00	140.0000	0.00
P-71	J-75	J-105	36.23	6.00	130.0000	0.00
P-72	J-106	J-107	43.64	8.00	130.0000	0.00

P-73	J-108	J-109	54.64	8.00	130.0000	0.00
P-74	J-110	J-111	709.01	8.00	140.0000	0.00
P-75	J-112	J-113	156.89	6.00	140.0000	0.00
P-76	J-114	J-103	624.45	6.00	140.0000	0.00
P-77	J-114	J-116	211.83	6.00	140.0000	0.00
P-78	J-117	J-114	206.16	6.00	140.0000	0.00
P-79	J-118	J-117	1353.90	6.00	140.0000	0.00
P-80	J-110	J-121	250.37	4.00	140.0000	0.00
P-81	J-117	J-121	307.78	4.00	140.0000	0.00
P-82	J-121	J-122	652.43	6.00	140.0000	0.00
P-83	J-122	J-115	87.48	6.00	140.0000	0.00
P-84	J-99	J-124	267.64	6.00	140.0000	0.00
P-85	J-127	J-93	263.31	4.00	140.0000	0.00
P-86	J-126	J-127	331.31	8.00	140.0000	0.00
P-87	J-128	J-118	863.93	4.00	140.0000	0.00
P-88	J-129	J-146	1020.43	6.00	140.0000	0.00
P-89	J-131	J-63	30.24	6.00	140.0000	0.00
P-9	J-46	J-9	197.53	6.00	140.0000	0.00
P-90	J-132	J-131	504.53	6.00	130.0000	0.00
P-91	J-131	J-65	37.87	6.00	140.0000	0.00
P-92	J-66	J-75	319.45	6.00	140.0000	0.00
P-93	J-76	J-77	224.89	6.00	140.0000	0.00
P-94	J-138	J-140	25.51	6.00	140.0000	0.00
P-95	J-140	J-141	135.56	6.00	140.0000	0.00
P-96	J-107	J-76	44.82	6.00	140.0000	0.00
P-97	J-142	J-143	140.23	4.00	140.0000	0.00
P-99	J-144	J-142	588.43	4.00	140.0000	0.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		6.10	282.00	
J-10		5.60	281.30	
J-100		0.40	288.60	
J-101		3.00	290.20	
J-102		1.30	307.90	
J-103		7.80	290.30	
J-104		0.30	309.60	
J-105		0.20	277.40	
J-106		0.80	280.00	
J-107		4.90	279.20	
J-108		2.50	312.40	
J-109		6.30	312.50	
J-11		2.20	288.10	
J-110		4.70	309.20	
J-111		3.80	308.20	
J-112		1.20	307.80	
J-113		3.70	306.00	
J-114		4.50	296.00	
J-115		3.00	308.40	
J-116		1.20	303.60	
J-117		8.00	299.60	
J-118		10.70	304.70	
J-119		0.50	309.90	
J-12		2.20	283.60	
J-120		4.40	258.50	
J-121		5.20	308.70	
J-122		3.20	308.80	
J-123		5.30	281.50	
J-124		2.10	308.90	
J-125		0.80	263.90	
J-126		1.40	307.20	
J-127		11.30	310.20	
J-128		6.20	286.90	
J-129		7.60	296.40	
J-13		6.80	286.00	
J-130		0.10	282.50	
J-131		2.50	284.30	
J-132		4.30	286.40	
J-133		6.30	291.60	
J-134		1.90	258.30	
J-135		1.40	258.90	
J-136		1.90	269.10	
J-137		6.20	279.00	
J-138		0.10	279.60	
J-139		6.50	277.90	
J-14		7.60	285.70	
J-140		0.80	279.40	

J-141		1.90	279.90
J-142		4.30	308.60
J-143		1.40	308.50
J-144		2.90	308.20
J-145		3.30	308.90
J-146		10.60	307.20
J-147		3.80	305.20
J-148		5.30	304.60
J-149		0.10	306.30
J-15		3.10	280.50
J-150		2.60	279.50
J-151		3.60	275.20
J-152		3.90	277.40
J-153		5.20	277.30
J-154		3.90	263.50
J-155		3.70	278.10
J-156		5.50	282.20
J-157		2.10	281.00
J-158		4.90	286.10
J-159		4.00	287.40
J-16		6.40	287.20
J-160		3.50	287.80
J-161		3.90	287.90
J-162		1.60	283.80
J-163		4.20	289.50
J-164		0.50	287.90
J-165		4.80	290.60
J-167		4.60	287.40
J-168		1.50	286.00
J-169		2.70	290.10
J-17		1.80	289.60
J-170		3.40	286.90
J-171		13.40	275.20
J-172		5.90	294.70
J-173		0.80	284.80
J-174		3.90	278.50
J-176		0.40	279.20
J-177		5.00	264.80
J-178		1.00	281.00
J-179		0.80	281.00
J-18		3.80	281.60
J-180		1.30	290.20
J-181		0.60	290.20
J-183		0.50	287.60
J-185		0.40	285.80
J-186		0.20	286.60
J-187		5.30	296.80
J-188		1.30	286.30
J-189		4.80	290.70
J-19		9.80	275.30
J-194		0.90	287.00
J-195		1.20	281.10
J-196		3.00	259.80
J-197		1.50	264.10
J-198		1.00	260.70
J-2		4.40	275.00
J-20	reservoir co	8.50	459.90
J-201		0.40	258.60
J-202		0.60	259.10
J-203		3.20	287.50
J-204		0.60	288.40
J-205		0.00	283.60
J-206		0.00	283.70
J-207		0.00	288.30
J-208		0.00	287.90
J-209		2.20	285.70
J-21		8.30	269.00
J-210		2.50	285.10
J-211		0.90	284.30
J-212		0.90	284.80
J-213		0.10	285.60
J-215		0.10	281.50
J-217		0.30	275.30
J-218		0.30	273.80
J-22	reservoir co	1.30	477.30
J-220		0.20	273.30
J-221		0.20	274.20
J-222		0.40	273.40
J-223		0.40	274.80
J-225		3.50	273.50
J-23	reservoir co	4.40	460.10
J-230		3.60	275.00
J-24		3.70	287.80
J-243		0.20	278.30

20 Year MDD + Fireflow Model Results

J-245	0.20	278.90
J-247	0.60	276.30
J-25	1.50	279.10
J-250	0.80	309.40
J-251	0.30	308.00
J-253	0.80	308.20
J-254	0.00	308.10
J-255	0.00	308.90
J-256	3.10	288.60
J-258	1.40	308.30
J-259	0.60	308.50
J-26	4.20	287.70
J-260	0.10	304.90
J-262	5.50	300.50
J-263	2.50	303.80
J-264	4.80	304.00
J-265	2.10	303.30
J-27	2.50	286.60
J-271	0.50	276.30
J-28	4.90	288.60
J-284	0.10	309.20
J-29	4.70	291.80
J-3	3.10	282.90
J-30	1.60	289.70
J-304	0.90	295.30
J-305	0.20	284.70
J-31	6.10	269.30
J-32	4.40	269.00
J-33	5.00	269.60
J-332	0.90	279.90
J-34	1.40	278.90
J-35	0.70	272.50
J-354	1.10	280.20
J-355	0.10	282.50
J-357	1.70	309.10
J-358	2.00	309.80
J-36	3.90	282.50
J-362	1.00	301.60
J-365	0.40	303.30
J-366	0.20	302.20
J-368	0.60	310.20
J-37	4.10	287.40
J-371	1.50	281.40
J-373	0.30	259.40
J-376	0.70	260.60
J-377	0.50	261.70
J-378	2.50	262.20
J-379	1.50	261.60
J-38	0.50	280.60
J-382	0.40	289.40
J-383	0.90	277.20
J-384	0.50	277.60
J-386	0.70	276.50
J-388	0.20	282.30
J-389	1.60	282.20
J-39	1.40	288.20
J-390	0.40	281.00
J-391	0.30	283.00
J-4	4.80	284.40
J-40	5.40	275.00
J-41	0.80	280.80
J-42	3.90	283.60
J-43	2.50	273.80
J-44	2.80	278.10
J-45	2.80	284.20
J-46	5.20	273.90
J-47	2.70	288.80
J-48	5.90	287.70
J-49	3.20	289.20
J-5	3.20	286.90
J-50	4.50	287.30
J-51	2.00	286.00
J-52	3.60	282.90
J-53	5.00	276.40
J-54	3.00	276.90
J-55	3.50	278.10
J-56	8.20	280.60
J-57	7.60	277.20
J-58	3.30	279.90
J-59	3.50	283.60
J-6	5.80	275.20
J-60	2.70	277.70
J-61	2.50	289.50
J-62	1.40	309.20

J-63		2.30	284.20	
J-64		3.50	285.50	
J-65		0.60	285.00	
J-66		5.60	283.90	
J-67		2.10	278.20	
J-68		0.60	262.90	
J-69		3.00	262.20	
J-7		8.00	276.20	
J-71		4.70	272.90	
J-72		7.20	279.80	
J-73		3.70	258.80	
J-74		4.10	261.20	
J-75		7.50	277.10	
J-76		1.40	279.20	
J-77		8.20	282.40	
J-78		2.10	277.40	
J-79		1.30	260.80	
J-8		6.10	286.90	
J-80		1.40	259.40	
J-81		1.50	258.10	
J-82		9.60	273.70	
J-83		2.70	258.70	
J-84		8.40	280.00	
J-85		0.30	263.40	
J-86		2.30	278.80	
J-87		6.40	308.30	
J-88		2.00	259.80	
J-89		1.10	258.20	
J-9		3.60	279.70	
J-90		0.80	259.60	
J-91		1.70	260.80	
J-92		4.00	272.20	
J-93		4.90	309.00	
J-94		3.10	286.30	
J-95		1.80	288.60	
J-96		1.90	287.50	
J-97		0.50	289.30	
J-98		1.60	287.40	
J-99		2.50	308.80	
R-1	275,000 gal	----	467.00	478.00
R-2	275,000 gal	----	467.00	478.00
Well No. 1		----	279.10	279.10
Well No. 3		----	271.70	271.70
O-Well Pum	300 gpm capa	0.00	279.10	
O-Well Pum	400 gpm capa	0.00	271.70	
I-Well Pum	300 gpm capa	0.00	279.10	
I-Well Pum	400 gpm capa	0.00	271.70	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 10
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 312
NUMBER OF END NODES .....(J) = 256
NUMBER OF PRIMARY LOOPS .....(L) = 53
NUMBER OF SUPPLY NODES .....(F) = 4
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.77827E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

6.

20 Year MDD + Fireflow Model Results

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-10	-174.46	0.35	0.00	1.11	0.63	0.63
P-10	J-8	J-11	-3.26	0.07	0.00	0.33	0.34	0.34
P-100	J-145	J-62	14.06	0.03	0.00	0.36	0.17	0.17
P-101	J-109	J-146	4.93	0.01	0.00	0.13	0.02	0.02
P-102	J-146	J-128	2.51	0.00	0.00	0.06	0.01	0.01
P-103	J-147	J-102	95.71	0.05	0.00	0.61	0.21	0.21
P-104	J-148	J-147	94.23	0.06	0.00	0.60	0.20	0.20
P-105	J-129	J-147	5.38	0.00	0.00	0.03	0.00	0.00
P-106	J-129	J-61	-36.01	0.00	0.00	0.23	0.03	0.03
P-107	J-132	J-150	-49.54	0.02	0.00	0.32	0.06	0.06
P-108	J-150	J-60	34.37	0.01	0.00	0.22	0.03	0.03
P-109	J-230	J-151	-41.42	0.01	0.00	0.47	0.18	0.18
P-11	J-12	J-9	8.26	0.23	0.00	0.84	1.89	1.89
P-110	J-151	J-54	-52.53	0.08	0.00	0.60	0.28	0.28
P-111	J-152	J-174	-51.02	0.07	0.00	0.58	0.26	0.26
P-112	J-174	J-155	-54.78	0.09	0.00	0.62	0.30	0.30
P-113	J-155	J-44	-59.28	0.13	0.00	0.67	0.35	0.35
P-114	J-157	J-58	90.29	0.04	0.00	0.58	0.19	0.19
P-115	J-158	J-52	96.89	0.07	0.00	0.62	0.21	0.21
P-116	J-159	J-158	107.68	0.07	0.00	0.69	0.26	0.26
P-117	J-159	J-160	-111.82	0.09	0.00	0.71	0.28	0.28
P-118	J-160	J-161	-112.42	0.08	0.00	0.72	0.28	0.28
P-119	J-161	J-27	-6.58	0.00	0.00	0.04	0.00	0.00
P-12	J-13	J-14	-4.33	0.01	0.00	0.11	0.02	0.02
P-120	J-34	J-161	69.50	0.04	0.00	0.44	0.11	0.11
P-121	J-161	J-163	-40.24	0.01	0.00	0.26	0.04	0.04
P-122	J-163	J-39	13.88	0.00	0.00	0.16	0.02	0.02
P-123	J-165	J-163	-19.03	0.09	0.00	0.49	0.30	0.30
P-124	J-101	J-165	-19.21	0.10	0.00	0.49	0.31	0.31
P-125	J-101	J-167	15.81	0.06	0.00	0.40	0.21	0.21
P-126	J-167	J-51	9.70	0.03	0.00	0.25	0.09	0.09
P-127	J-95	J-47	-51.42	0.01	0.00	0.58	0.30	0.30
P-128	J-50	J-49	46.53	0.08	0.00	0.53	0.25	0.25
P-129	J-28	J-94	23.28	0.15	0.00	0.59	0.44	0.44
P-13	J-16	J-36	3.88	0.01	0.00	0.10	0.02	0.02
P-130	J-170	J-94	-18.86	0.08	0.00	0.48	0.30	0.30
P-131	J-48	J-170	-16.97	0.07	0.00	0.43	0.25	0.25
P-132	J-172	J-48	-16.96	0.15	0.00	0.43	0.24	0.24
P-133	J-172	J-129	14.52	0.06	0.00	0.37	0.18	0.18
P-134	J-173	J-155	-0.80	0.01	0.00	0.08	0.04	0.04
P-135	J-159	J-174	0.14	0.00	0.00	0.01	0.00	0.00
P-136	J-152	J-158	-8.82	0.00	0.00	0.06	0.00	0.00
P-137	J-54	J-176	0.40	0.00	0.00	0.00	0.00	0.00
P-138	J-151	J-55	4.02	0.00	0.00	0.05	0.00	0.00
P-139	J-179	J-59	-0.80	0.00	0.00	0.02	0.00	0.00
P-14	J-17	J-24	-113.01	0.30	0.00	1.28	1.14	1.14
P-140	J-181	J-172	-0.60	0.00	0.00	0.02	0.00	0.00
P-141	J-148	J-172	4.06	0.01	0.00	0.10	0.02	0.02
P-142	J-183	J-49	-0.50	0.00	0.00	0.01	0.00	0.00
P-143	J-185	J-51	-0.40	0.00	0.00	0.01	0.00	0.00
P-144	J-187	J-48	12.67	0.00	0.00	0.08	0.00	0.00
P-145	J-167	J-158	2.93	0.00	0.00	0.02	0.00	0.00
P-146	J-96	J-170	1.26	0.00	0.00	0.03	0.00	0.00
P-147	J-188	J-170	0.24	0.00	0.00	0.01	0.00	0.00
P-148	J-189	J-188	1.54	0.03	0.00	0.16	0.13	0.13
P-149	J-165	J-47	-7.87	0.00	0.00	0.09	0.01	0.01
P-15	J-18	J-19	-308.16	2.00	0.00	3.50	7.31	7.31
P-150	J-165	J-160	2.90	0.00	0.00	0.03	0.00	0.00
P-151	J-1	J-28	40.46	0.01	0.00	0.26	0.04	0.04
P-152	J-28	J-29	45.84	0.01	0.00	0.29	0.05	0.05
P-153	J-29	J-163	77.35	0.04	0.00	0.49	0.14	0.14
P-154	J-39	J-194	11.58	0.00	0.00	0.13	0.02	0.02
P-155	J-195	J-72	-1.20	0.02	0.00	0.12	0.08	0.08
P-156	J-196	J-134	43.70	0.02	0.00	0.28	0.05	0.05
P-157	J-196	J-69	-46.70	0.02	0.00	0.30	0.05	0.05
P-158	J-198	J-74	-1.00	0.01	0.00	0.10	0.04	0.04
P-159	J-88	J-89	1.66	0.01	0.00	0.17	0.10	0.10
P-16	J-4	J-57	-392.14	1.50	0.00	2.50	2.81	2.81
P-160	J-201	J-89	-0.40	0.00	0.00	0.04	0.01	0.01
P-161	J-203	J-204	0.60	0.00	0.00	0.01	0.00	0.00
P-162	J-12	J-13	-10.46	0.04	0.00	0.27	0.10	0.10
P-163	J-205	J-12	0.00	0.00	0.00	0.00	0.00	0.00
P-164	J-207	J-11	0.00	0.00	0.00	0.00	0.00	0.00
P-165	J-11	J-16	-5.46	0.43	0.00	0.56	1.37	1.37
P-166	J-209	J-210	-4.10	0.00	0.00	0.05	0.00	0.00
P-167	J-209	J-211	0.90	0.01	0.00	0.09	0.03	0.03
P-168	J-212	J-209	-0.90	0.01	0.00	0.09	0.03	0.03
P-169	J-209	J-213	0.10	0.00	0.00	0.00	0.00	0.00
P-17	J-19	J-20	-611.21	1.99	0.00	1.73	1.02	1.02

6.

20 Year MDD + Fireflow Model Results

P-170	J-15	J-41	1.40	0.00	0.00	0.14	0.11	0.11
P-171	J-40	J-43	4.30	0.00	0.00	0.05	0.00	0.00
P-172	J-218	J-43	-1.50	0.00	0.00	0.02	0.00	0.00
P-173	J-220	J-218	-0.60	0.00	0.00	0.01	0.00	0.00
P-174	J-222	J-220	-0.40	0.00	0.00	0.00	0.00	0.00
P-175	J-223	J-221	-0.40	0.00	0.00	0.00	0.00	0.00
P-176	J-222	J-223	0.00	0.00	0.00	0.00	0.00	0.00
P-177	J-194	J-27	10.68	0.00	0.00	0.12	0.01	0.01
P-178	J-1	J-189	127.90	0.21	0.00	0.82	0.35	0.35
P-179	J-189	J-187	121.56	0.10	0.00	0.78	0.32	0.32
P-18	J-21	J-23	-114.79	0.87	0.00	1.30	1.17	1.17
P-180	J-151	J-225	3.50	0.00	0.00	0.04	0.00	0.00
P-181	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-182	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-183	J-230	J-82	24.09	0.01	0.00	0.27	0.07	0.07
P-184	J-82	J-123	8.22	0.01	0.00	0.09	0.01	0.01
P-185	J-56	J-123	-4.43	0.00	0.00	0.05	0.00	0.00
P-186	J-389	J-388	0.20	0.00	0.00	0.00	0.00	0.00
P-187	J-58	J-150	86.51	0.01	0.00	0.55	0.17	0.17
P-188	J-59	J-180	1.30	0.00	0.00	0.03	0.00	0.00
P-189	J-60	J-107	30.07	0.01	0.00	0.19	0.02	0.02
P-19	J-57	J-21	-106.49	1.20	0.00	1.21	1.02	1.02
P-190	J-243	J-383	-0.20	0.00	0.00	0.00	0.00	0.00
P-191	J-245	J-76	-0.20	0.00	0.00	0.02	0.00	0.00
P-192	J-247	J-78	-0.60	0.00	0.00	0.06	0.01	0.01
P-193	J-62	J-250	1.40	0.00	0.00	0.14	0.07	0.07
P-194	J-251	J-250	-0.30	0.00	0.00	0.03	0.00	0.00
P-195	J-143	J-253	0.80	0.00	0.00	0.01	0.00	0.00
P-196	J-254	J-143	0.00	0.00	0.00	0.00	0.00	0.00
P-197	J-141	J-86	14.08	0.01	0.00	0.16	0.02	0.02
P-198	J-133	J-256	-1.07	0.00	0.00	0.01	0.00	0.00
P-199	J-87	J-258	2.00	0.00	0.00	0.02	0.00	0.00
P-2	J-10	J-3	-61.58	0.00	0.00	0.39	0.10	0.10
P-20	J-37	J-15	-45.57	0.03	0.00	0.29	0.05	0.05
P-200	J-258	J-259	0.60	0.00	0.00	0.02	0.00	0.00
P-201	J-115	J-111	-12.88	0.00	0.00	0.15	0.02	0.02
P-202	J-111	J-112	14.38	0.00	0.00	0.16	0.03	0.03
P-203	J-260	J-116	-0.10	0.00	0.00	0.00	0.00	0.00
P-204	J-103	J-262	5.42	0.00	0.00	0.03	0.00	0.00
P-205	J-262	J-263	4.51	0.00	0.00	0.03	0.00	0.00
P-206	J-264	J-263	-2.01	0.00	0.00	0.02	0.00	0.00
P-207	J-113	J-262	4.59	0.00	0.00	0.05	0.00	0.00
P-208	J-113	J-264	4.89	0.00	0.00	0.06	0.00	0.00
P-209	J-264	J-265	2.10	0.00	0.00	0.02	0.00	0.00
P-21	J-3	J-26	26.35	0.01	0.00	0.17	0.02	0.02
P-210	J-250	J-104	0.30	0.00	0.00	0.03	0.00	0.00
P-211	J-358	J-119	0.50	0.00	0.00	0.01	0.00	0.00
P-212	I-Well PumWell No. 1		0.00	0.00	0.00	0.00	0.00	0.00
P-213	J-197	J-136	38.90	0.00	0.00	0.25	0.04	0.04
P-214	I-Well PumWell No. 3		0.00	0.00	0.00	0.00	0.00	0.00
P-215	J-103	J-115	-8.72	0.01	0.00	0.10	0.01	0.01
P-216	J-120	J-88	-9.13	0.00	0.00	0.10	0.01	0.01
P-217	J-82	J-56	6.27	0.01	0.00	0.07	0.01	0.01
P-218	J-123	J-106	-1.51	0.00	0.00	0.02	0.00	0.00
P-219	J-125	J-68	75.62	0.01	0.00	0.48	0.13	0.13
P-22	J-26	J-28	33.56	0.36	0.00	0.86	0.87	0.87
P-220	J-284	J-124	-0.10	0.00	0.00	0.00	0.00	0.00
P-221	J-84	J-171	19.00	0.02	0.00	0.12	0.01	0.01
P-222	J-77	J-139	23.38	0.09	0.00	0.27	0.06	0.06
P-223	J-127	J-87	53.07	0.08	0.00	0.34	0.07	0.07
P-224	J-87	J-110	44.67	0.01	0.00	0.29	0.05	0.05
P-225	J-146	J-93	29.37	0.08	0.00	0.33	0.09	0.09
P-226	J-63	J-64	21.74	0.02	0.00	0.25	0.05	0.05
P-227	J-78	J-77	-3.40	0.07	0.00	0.35	0.37	0.37
P-228	J-140	J-139	-16.88	0.00	0.00	0.19	0.03	0.03
P-229	J-75	J-137	0.09	0.00	0.00	0.00	0.00	0.00
P-23	J-29	J-30	-98.20	0.35	0.00	1.11	1.01	1.01
P-230	J-63	J-304	0.90	0.01	0.00	0.09	0.03	0.03
P-231	J-305	J-65	-0.20	0.00	0.00	0.00	0.00	0.00
P-232	J-62	J-144	11.26	0.01	0.00	0.29	0.11	0.11
P-233	J-61	J-132	1.62	0.00	0.00	0.01	0.00	0.00
P-234	J-147	J-149	0.10	0.00	0.00	0.00	0.00	0.00
P-235	J-143	J-255	0.00	0.00	0.00	0.00	0.00	0.00
P-236	J-145	J-108	77.05	0.08	0.00	0.49	0.14	0.14
P-237	J-64	J-128	17.24	0.01	0.00	0.20	0.04	0.04
P-238	J-168	J-59	5.60	0.01	0.00	0.14	0.03	0.03
P-239	J-169	J-61	40.13	0.06	0.00	0.46	0.19	0.19
P-24	J-18	J-31	198.97	0.45	0.00	1.27	0.80	0.80
P-240	J-65	J-66	18.62	0.00	0.00	0.21	0.04	0.04
P-241	J-134	J-135	41.80	0.00	0.00	0.27	0.04	0.04
P-242	J-49	J-169	42.83	0.07	0.00	0.49	0.22	0.22
P-243	J-48	J-50	6.78	0.00	0.00	0.04	0.00	0.00
P-244	J-50	J-167	1.42	0.00	0.00	0.01	0.00	0.00
P-245	J-52	J-332	0.90	0.01	0.00	0.09	0.05	0.05

20 Year MDD + Fireflow Model Results

P-246	J-52	J-157	92.39	0.06	0.00	0.59	0.19	0.19
P-247	J-54	J-152	-55.93	0.09	0.00	0.63	0.31	0.31
P-248	J-51	J-168	7.10	0.00	0.00	0.18	0.05	0.05
P-249	J-51	J-186	0.20	0.00	0.00	0.01	0.00	0.00
P-25	J-31	J-32	152.78	0.26	0.00	0.98	0.49	0.49
P-250	J-55	J-178	1.00	0.00	0.00	0.01	0.00	0.00
P-251	J-47	J-29	-61.99	0.13	0.00	0.70	0.43	0.43
P-252	J-66	J-133	5.23	0.00	0.00	0.06	0.00	0.00
P-253	J-44	J-34	70.90	0.00	0.00	0.45	0.12	0.12
P-254	J-86	J-137	6.11	0.00	0.00	0.07	0.01	0.01
P-255	J-24	J-37	-118.42	0.06	0.00	1.34	1.24	1.24
P-256	J-45	J-354	1.10	0.02	0.00	0.11	0.07	0.07
P-257	J-42	J-45	-93.31	0.06	0.00	1.06	0.80	0.80
P-258	J-357	J-358	3.10	0.00	0.00	0.04	0.00	0.00
P-259	J-135	J-197	40.40	0.01	0.00	0.26	0.04	0.04
P-26	J-32	J-33	148.38	0.23	0.00	0.95	0.47	0.47
P-260	J-64	J-362	1.00	0.01	0.00	0.10	0.04	0.04
P-261	J-55	J-58	-0.48	0.01	0.00	0.05	0.02	0.02
P-262	J-116	J-365	0.60	0.00	0.00	0.06	0.01	0.01
P-263	J-365	J-366	0.20	0.00	0.00	0.04	0.01	0.01
P-264	J-124	J-357	4.80	0.00	0.00	0.05	0.00	0.00
P-265	J-136	J-271	0.50	0.00	0.00	0.05	0.01	0.01
P-266	J-358	J-368	0.60	0.00	0.00	0.01	0.00	0.00
P-267	J-136	J-153	36.50	0.01	0.00	0.23	0.03	0.03
P-268	J-371	J-256	4.17	0.00	0.00	0.05	0.00	0.00
P-269	J-371	J-86	-5.67	0.00	0.00	0.06	0.00	0.00
P-27	J-33	J-40	142.68	0.22	0.00	0.91	0.43	0.43
P-270	J-202	J-90	-0.44	0.00	0.00	0.04	0.01	0.01
P-271	J-91	J-90	1.54	0.01	0.00	0.16	0.13	0.13
P-272	J-376	J-379	-0.70	0.00	0.00	0.07	0.02	0.02
P-273	J-378	J-379	2.70	0.02	0.00	0.28	0.24	0.24
P-274	J-22	R-2	-444.10	0.00	0.00	0.93	0.27	0.27
P-275	J-164	J-382	0.40	0.00	0.00	0.04	0.01	0.01
P-276	J-383	J-384	0.50	0.00	0.00	0.05	0.01	0.01
P-277	J-78	J-386	0.70	0.00	0.00	0.07	0.02	0.02
P-278	J-56	J-389	2.50	0.00	0.00	0.03	0.00	0.00
P-279	J-389	J-390	0.40	0.00	0.00	0.04	0.01	0.01
P-28	J-33	J-35	0.70	0.00	0.00	0.01	0.00	0.00
P-280	J-389	J-391	0.30	0.00	0.00	0.03	0.00	0.00
P-281	J-17	J-30	99.80	0.02	0.00	1.13	1.04	1.04
P-282	J-9	J-2	10.78	0.00	0.00	0.07	0.00	0.00
P-283	J-24	J-42	1.72	0.09	0.00	0.18	0.16	0.16
P-284	J-42	J-355	0.10	0.00	0.00	0.01	0.00	0.00
P-285	J-83	J-81	1.50	0.00	0.00	0.04	0.00	0.00
P-286	J-69	J-378	25.32	0.02	0.00	0.29	0.07	0.07
P-287	J-98	J-95	-50.94	0.08	0.00	0.58	0.30	0.30
P-288	J-93	J-99	23.88	0.01	0.00	0.61	0.46	0.46
P-289	J-148	J-187	-103.59	0.15	0.00	0.66	0.24	0.24
P-29	J-14	J-53	16.48	0.13	0.00	0.42	0.23	0.23
P-290	J-203	J-6	151.09	0.23	0.00	0.96	0.48	0.48
P-291	J-210	J-5	254.86	0.33	0.00	1.63	1.27	1.27
P-292	J-218	J-221	0.60	0.00	0.00	0.01	0.00	0.00
P-293	J-99	J-118	14.38	0.05	0.00	0.37	0.18	0.18
P-294	J-153	J-84	27.40	0.00	0.00	0.17	0.02	0.02
P-295	J-153	J-154	3.90	0.00	0.00	0.02	0.00	0.00
P-296	J-120	J-73	-2.17	0.00	0.00	0.02	0.00	0.00
P-297	J-171	J-156	2.79	0.00	0.00	0.02	0.00	0.00
P-298	J-156	J-130	0.10	0.00	0.00	0.00	0.00	0.00
P-299	J-5	J-8	96.77	0.29	0.00	1.10	0.86	0.86
P-3	J-4	J-210	261.46	0.34	0.00	1.67	1.33	1.33
P-30	J-31	J-53	40.09	0.01	0.00	0.26	0.04	0.04
P-300	J-8	J-9	52.97	0.08	0.00	0.60	0.28	0.28
P-301	J-45	J-13	-97.21	0.27	0.00	1.10	0.86	0.86
P-302	J-379	J-377	0.50	0.00	0.00	0.05	0.01	0.01
P-303	J-383	J-60	-1.60	0.00	0.00	0.02	0.00	0.00
P-304	J-91	J-74	-16.03	0.01	0.00	0.18	0.03	0.03
P-305	J-92	J-71	18.97	0.00	0.00	0.22	0.04	0.04
P-306	J-46	J-2	-76.84	0.04	0.00	0.49	0.14	0.14
P-307	J-3	J-42	-91.03	0.20	0.00	1.03	0.76	0.76
P-308	J-27	J-162	1.60	0.00	0.00	0.01	0.00	0.00
P-309	J-39	J-164	0.90	0.00	0.00	0.01	0.00	0.00
P-31	J-41	J-38	0.50	0.00	0.00	0.05	0.02	0.02
P-310	J-40	J-44	132.98	0.10	0.00	0.85	0.38	0.38
P-311	J-43	J-217	0.30	0.00	0.00	0.00	0.00	0.00
P-312	J-177	J-125	76.72	0.01	0.00	0.49	0.14	0.14
P-313	J-107	J-230	-13.73	0.02	0.00	0.16	0.02	0.02
P-314	J-109	J-127	65.18	0.09	0.00	0.42	0.10	0.10
P-32	J-26	J-17	-11.41	0.00	0.00	0.07	0.00	0.00
P-33	J-14	J-36	-105.36	0.28	0.00	1.20	1.00	1.00
P-34	J-10	J-46	-118.48	0.21	0.00	0.76	0.31	0.31
P-35	J-156	J-171	-2.81	0.00	0.00	0.02	0.00	0.00
P-36	J-13	J-16	-110.14	0.30	0.00	1.25	1.09	1.09
P-37	J-12	J-206	0.00	0.00	0.00	0.00	0.00	0.00
P-38	J-15	J-25	-50.07	0.01	0.00	0.32	0.06	0.06

P-39	J-53	J-25	51.57	0.02	0.00	0.33	0.07	0.07
P-4	J-5	J-203	154.89	0.07	0.00	0.99	0.50	0.50
P-40	J-41	J-215	0.10	0.00	0.00	0.01	0.00	0.00
P-41	J-57	J-19	-293.25	0.07	0.00	1.87	1.64	1.64
P-42	J-36	J-18	-105.38	0.05	0.00	1.20	1.00	1.00
P-43	J-37	J-14	-76.96	0.19	0.00	0.87	0.56	0.56
P-44	J-16	J-4	-125.88	0.47	0.00	1.43	1.39	1.39
P-45	J-11	J-208	0.00	0.00	0.00	0.00	0.00	0.00
P-46	J-7	J-67	2.10	0.00	0.00	0.01	0.00	0.00
P-47	J-6	J-177	105.70	0.13	0.00	0.67	0.25	0.25
P-48	J-68	J-69	75.02	0.01	0.00	0.48	0.15	0.15
P-49	J-177	J-92	23.98	0.04	0.00	0.27	0.06	0.06
P-5	J-6	J-7	39.59	0.01	0.00	0.25	0.04	0.04
P-50	J-71	J-72	14.27	0.03	0.00	0.16	0.02	0.02
P-51	J-72	J-73	5.87	0.00	0.00	0.07	0.00	0.00
P-52	J-142	J-109	1.86	0.00	0.00	0.05	0.00	0.00
P-53	J-74	J-378	-20.12	0.01	0.00	0.23	0.05	0.05
P-54	J-20	J-23	-619.71	0.01	0.00	1.29	0.49	0.49
P-55	J-22	R-1	-296.10	0.00	0.00	0.84	0.27	0.27
P-56	J-92	J-74	1.01	0.02	0.00	0.10	0.06	0.06
P-57	J-79	J-80	-1.30	0.00	0.00	0.03	0.00	0.00
P-58	J-80	J-83	-2.70	0.00	0.00	0.07	0.01	0.01
P-59	J-120	J-83	6.90	0.01	0.00	0.18	0.05	0.05
P-6	J-7	J-2	70.46	0.05	0.00	0.45	0.12	0.12
P-60	J-125	J-85	0.30	0.00	0.00	0.03	0.00	0.00
P-61	J-23	J-22	-738.90	0.17	0.00	1.54	0.68	0.68
P-62	J-88	J-91	-12.80	0.00	0.00	0.15	0.02	0.02
P-63	J-89	J-202	0.16	0.00	0.00	0.02	0.00	0.00
P-64	J-90	J-373	0.30	0.00	0.00	0.03	0.01	0.01
P-65	J-94	J-95	1.32	0.00	0.00	0.03	0.00	0.00
P-66	J-96	J-98	-48.84	0.00	0.00	0.55	0.28	0.28
P-67	J-97	J-98	-0.50	0.00	0.00	0.01	0.00	0.00
P-68	J-50	J-96	-45.67	0.07	0.00	0.52	0.24	0.24
P-69	J-100	J-101	-0.40	0.00	0.00	0.01	0.00	0.00
P-7	J-7	J-8	-40.97	0.02	0.00	0.26	0.04	0.04
P-70	J-102	J-145	94.41	0.01	0.00	0.60	0.20	0.20
P-71	J-75	J-105	0.20	0.00	0.00	0.00	0.00	0.00
P-72	J-106	J-107	-2.31	0.00	0.00	0.01	0.00	0.00
P-73	J-108	J-109	74.55	0.01	0.00	0.48	0.15	0.15
P-74	J-110	J-111	31.06	0.02	0.00	0.20	0.03	0.03
P-75	J-112	J-113	13.18	0.00	0.00	0.15	0.02	0.02
P-76	J-114	J-103	4.50	0.00	0.00	0.05	0.00	0.00
P-77	J-114	J-116	1.90	0.00	0.00	0.02	0.00	0.00
P-78	J-117	J-114	10.90	0.00	0.00	0.12	0.01	0.01
P-79	J-118	J-117	17.23	0.05	0.00	0.20	0.03	0.03
P-80	J-110	J-121	8.91	0.02	0.00	0.23	0.07	0.07
P-81	J-117	J-121	-1.67	0.00	0.00	0.04	0.00	0.00
P-82	J-121	J-122	2.04	0.00	0.00	0.02	0.00	0.00
P-83	J-122	J-115	-1.16	0.00	0.00	0.01	0.00	0.00
P-84	J-99	J-124	7.00	0.00	0.00	0.08	0.01	0.01
P-85	J-127	J-93	-0.59	0.00	0.00	0.02	0.00	0.00
P-86	J-126	J-127	-1.40	0.00	0.00	0.01	0.00	0.00
P-87	J-128	J-118	13.55	0.14	0.00	0.35	0.16	0.16
P-88	J-129	J-146	37.55	0.15	0.00	0.43	0.15	0.15
P-89	J-131	J-63	24.94	0.00	0.00	0.28	0.07	0.07
P-9	J-46	J-9	-46.85	0.04	0.00	0.53	0.22	0.22
P-90	J-132	J-131	46.86	0.13	0.00	0.53	0.26	0.26
P-91	J-131	J-65	19.42	0.00	0.00	0.22	0.04	0.04
P-92	J-66	J-75	7.79	0.00	0.00	0.09	0.01	0.01
P-93	J-76	J-77	34.98	0.03	0.00	0.40	0.13	0.13
P-94	J-138	J-140	-0.10	0.00	0.00	0.00	0.00	0.00
P-95	J-140	J-141	15.98	0.00	0.00	0.18	0.03	0.03
P-96	J-107	J-76	36.58	0.01	0.00	0.42	0.14	0.14
P-97	J-142	J-143	2.20	0.00	0.00	0.06	0.01	0.01
P-99	J-144	J-142	8.36	0.04	0.00	0.21	0.07	0.07

~@Well Pum-RV I-Well PumO-Well Pum
~@Well Pum-RV I-Well PumO-Well Pum

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		6.10	472.60	282.00	190.60	82.59
J-10		5.60	472.96	281.30	191.66	83.05
J-100		0.40	472.35	288.60	183.75	79.62
J-101		3.00	472.35	290.20	182.15	78.93
J-102		1.30	472.03	307.90	164.13	71.12
J-103		7.80	471.74	290.30	181.44	78.62
J-104		0.30	471.98	309.60	162.38	70.37
J-105		0.20	471.95	277.40	194.55	84.31

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J-106	0.80	472.09	280.00	192.09	83.24
J-107	4.90	472.09	279.20	192.89	83.59
J-108	2.50	471.95	312.40	159.55	69.14
J-109	6.30	471.94	312.50	159.44	69.09
J-11	2.20	473.36	288.10	185.26	80.28
J-110	4.70	471.76	309.20	162.56	70.44
J-111	3.80	471.74	308.20	163.54	70.87
J-112	1.20	471.74	307.80	163.94	71.04
J-113	3.70	471.74	306.00	165.74	71.82
J-114	4.50	471.74	296.00	175.74	76.15
J-115	3.00	471.74	308.40	163.34	70.78
J-116	1.20	471.74	303.60	168.14	72.86
J-117	8.00	471.74	299.60	172.14	74.59
J-118	10.70	471.79	304.70	167.09	72.40
J-119	0.50	471.84	309.90	161.94	70.17
J-12	2.20	473.45	283.60	189.85	82.27
J-120	4.40	473.08	258.50	214.58	92.98
J-121	5.20	471.74	308.70	163.04	70.65
J-122	3.20	471.74	308.80	162.94	70.61
J-123	5.30	472.09	281.50	190.59	82.59
J-124	2.10	471.84	308.90	162.94	70.61
J-125	0.80	473.14	263.90	209.24	90.67
J-126	1.40	471.85	307.20	164.65	71.35
J-127	11.30	471.85	310.20	161.65	70.05
J-128	6.20	471.93	286.90	185.03	80.18
J-129	7.60	472.08	296.40	175.68	76.13
J-13	6.80	473.49	286.00	187.49	81.24
J-130	0.10	473.03	282.50	190.53	82.56
J-131	2.50	471.96	284.30	187.66	81.32
J-132	4.30	472.09	286.40	185.69	80.46
J-133	6.30	471.95	291.60	180.35	78.15
J-134	1.90	473.08	258.30	214.78	93.07
J-135	1.40	473.08	258.90	214.18	92.81
J-136	1.90	473.06	269.10	203.96	88.38
J-137	6.20	471.95	279.00	192.95	83.61
J-138	0.10	471.96	279.60	192.36	83.36
J-139	6.50	471.96	277.90	194.06	84.09
J-14	7.60	473.50	285.70	187.80	81.38
J-140	0.80	471.96	279.40	192.56	83.44
J-141	1.90	471.96	279.90	192.06	83.23
J-142	4.30	471.94	308.60	163.34	70.78
J-143	1.40	471.94	308.50	163.44	70.82
J-144	2.90	471.98	308.20	163.78	70.97
J-145	3.30	472.02	308.90	163.12	70.69
J-146	10.60	471.93	307.20	164.73	71.38
J-147	3.80	472.08	305.20	166.88	72.32
J-148	5.30	472.14	304.60	167.54	72.60
J-149	0.10	472.08	306.30	165.78	71.84
J-15	3.10	473.34	280.50	192.84	83.57
J-150	2.60	472.11	279.50	192.61	83.46
J-151	3.60	472.11	275.20	196.91	85.33
J-152	3.90	472.29	277.40	194.89	84.45
J-153	5.20	473.06	277.30	195.76	84.83
J-154	3.90	473.06	263.50	209.56	90.81
J-155	3.70	472.45	278.10	194.35	84.22
J-156	5.50	473.03	282.20	190.83	82.69
J-157	2.10	472.16	281.00	191.16	82.84
J-158	4.90	472.29	286.10	186.19	80.68
J-159	4.00	472.36	287.40	184.96	80.15
J-16	6.40	473.79	287.20	186.59	80.86
J-160	3.50	472.45	287.80	184.65	80.02
J-161	3.90	472.54	287.90	184.64	80.01
J-162	1.60	472.54	283.80	188.74	81.79
J-163	4.20	472.54	289.50	183.04	79.32
J-164	0.50	472.54	287.90	184.64	80.01
J-165	4.80	472.45	290.60	181.85	78.80
J-167	4.60	472.29	287.40	184.89	80.12
J-168	1.50	472.26	286.00	186.26	80.71
J-169	2.70	472.14	290.10	182.04	78.89
J-17	1.80	472.95	289.60	183.35	79.45
J-170	3.40	472.36	286.90	185.46	80.37
J-171	13.40	473.03	275.20	197.83	85.73
J-172	5.90	472.14	294.70	177.44	76.89
J-173	0.80	472.44	284.80	187.64	81.31
J-174	3.90	472.36	278.50	193.86	84.01
J-176	0.40	472.20	279.20	193.00	83.63
J-177	5.00	473.15	264.80	208.35	90.28
J-178	1.00	472.11	281.00	191.11	82.82
J-179	0.80	472.25	281.00	191.25	82.88
J-18	3.80	473.83	281.60	192.23	83.30
J-180	1.30	472.25	290.20	182.05	78.89
J-181	0.60	472.14	290.20	181.94	78.84
J-183	0.50	472.21	287.60	184.61	80.00
J-185	0.40	472.26	285.80	186.46	80.80

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J-186		0.20	472.26	286.60	185.66	80.45
J-187		5.30	472.29	296.80	175.49	76.05
J-188		1.30	472.36	286.30	186.06	80.63
J-189		4.80	472.39	290.70	181.69	78.73
J-19		9.80	475.83	275.30	200.53	86.89
J-194		0.90	472.54	287.00	185.54	80.40
J-195		1.20	473.06	281.10	191.96	83.18
J-196		3.00	473.10	259.80	213.30	92.43
J-197		1.50	473.07	264.10	208.97	90.55
J-198		1.00	473.08	260.70	212.38	92.03
J-2		4.40	473.21	275.00	198.21	85.89
J-20	reservoir co	8.50	477.82	459.90	17.92	7.76
J-201		0.40	473.08	258.60	214.48	92.94
J-202		0.60	473.08	259.10	213.98	92.72
J-203		3.20	473.51	287.50	186.01	80.60
J-204		0.60	473.51	288.40	185.11	80.21
J-205		0.00	473.45	283.60	189.85	82.27
J-206		0.00	473.45	283.70	189.75	82.22
J-207		0.00	473.36	288.30	185.06	80.19
J-208		0.00	473.36	287.90	185.46	80.37
J-209		2.20	473.91	285.70	188.21	81.56
J-21		8.30	476.96	269.00	207.96	90.12
J-210		2.50	473.91	285.10	188.81	81.82
J-211		0.90	473.91	284.30	189.61	82.16
J-212		0.90	473.91	284.80	189.11	81.95
J-213		0.10	473.91	285.60	188.31	81.60
J-215		0.10	473.34	281.50	191.84	83.13
J-217		0.30	472.67	275.30	197.37	85.53
J-218		0.30	472.67	273.80	198.87	86.18
J-22	reservoir co	1.30	478.00	477.30	0.70	0.30
J-220		0.20	472.67	273.30	199.37	86.39
J-221		0.20	472.67	274.20	198.47	86.00
J-222		0.40	472.67	273.40	199.27	86.35
J-223		0.40	472.67	274.80	197.87	85.74
J-225		3.50	472.11	273.50	198.61	86.07
J-23	reservoir co	4.40	477.83	460.10	17.73	7.68
J-230		3.60	472.11	275.00	197.11	85.41
J-24		3.70	473.25	287.80	185.45	80.36
J-243		0.20	472.10	278.30	193.80	83.98
J-245		0.20	472.08	278.90	193.18	83.71
J-247		0.60	471.98	276.30	195.68	84.80
J-25		1.50	473.35	279.10	194.25	84.17
J-250		0.80	471.98	309.40	162.58	70.45
J-251		0.30	471.98	308.00	163.98	71.06
J-253		0.80	471.94	308.20	163.74	70.95
J-254		0.00	471.94	308.10	163.84	71.00
J-255		0.00	471.94	308.90	163.04	70.65
J-256		3.10	471.95	288.60	183.35	79.45
J-258		1.40	471.77	308.30	163.47	70.84
J-259		0.60	471.77	308.50	163.27	70.75
J-26		4.20	472.95	287.70	185.25	80.28
J-260		0.10	471.74	304.90	166.84	72.30
J-262		5.50	471.74	300.50	171.24	74.20
J-263		2.50	471.74	303.80	167.94	72.77
J-264		4.80	471.74	304.00	167.74	72.69
J-265		2.10	471.73	303.30	168.43	72.99
J-27		2.50	472.54	286.60	185.94	80.57
J-271		0.50	473.06	276.30	196.76	85.26
J-28		4.90	472.59	288.60	183.99	79.73
J-284		0.10	471.84	309.20	162.64	70.48
J-29		4.70	472.58	291.80	180.78	78.34
J-3		3.10	472.96	282.90	190.06	82.36
J-30		1.60	472.94	289.70	183.24	79.40
J-304		0.90	471.95	295.30	176.65	76.55
J-305		0.20	471.95	284.70	187.25	81.14
J-31		6.10	473.38	269.30	204.08	88.43
J-32		4.40	473.12	269.00	204.12	88.45
J-33		5.00	472.89	269.60	203.29	88.09
J-332		0.90	472.21	279.90	192.31	83.33
J-34		1.40	472.57	278.90	193.67	83.92
J-35		0.70	472.89	272.50	200.39	86.84
J-354		1.10	473.20	280.20	193.00	83.63
J-355		0.10	473.16	282.50	190.66	82.62
J-357		1.70	471.84	309.10	162.74	70.52
J-358		2.00	471.84	309.80	162.04	70.22
J-36		3.90	473.78	282.50	191.28	82.89
J-362		1.00	471.93	301.60	170.33	73.81
J-365		0.40	471.74	303.30	168.44	72.99
J-366		0.20	471.74	302.20	169.54	73.47
J-368		0.60	471.84	310.20	161.64	70.04
J-37		4.10	473.31	287.40	185.91	80.56
J-371		1.50	471.95	281.40	190.55	82.57
J-373		0.30	473.08	259.40	213.68	92.59
J-376		0.70	473.08	260.60	212.48	92.08

20 Year MDD + Fireflow Model Results

J-377		0.50	473.08	261.70	211.38	91.60
J-378		2.50	473.10	262.20	210.90	91.39
J-379		1.50	473.09	261.60	211.49	91.64
J-38		0.50	473.34	280.60	192.74	83.52
J-382		0.40	472.54	289.40	183.14	79.36
J-383		0.90	472.10	277.20	194.90	84.46
J-384		0.50	472.10	277.60	194.50	84.28
J-386		0.70	471.98	276.50	195.48	84.71
J-388		0.20	472.09	282.30	189.79	82.24
J-389		1.60	472.09	282.20	189.89	82.29
J-39		1.40	472.54	288.20	184.34	79.88
J-390		0.40	472.09	281.00	191.09	82.81
J-391		0.30	472.09	283.00	189.09	81.94
J-4		4.80	474.26	284.40	189.86	82.27
J-40		5.40	472.67	275.00	197.67	85.66
J-41		0.80	473.34	280.80	192.54	83.43
J-42		3.90	473.16	283.60	189.56	82.14
J-43		2.50	472.67	273.80	198.87	86.18
J-44		2.80	472.57	278.10	194.47	84.27
J-45		2.80	473.22	284.20	189.02	81.91
J-46		5.20	473.17	273.90	199.27	86.35
J-47		2.70	472.45	288.80	183.65	79.58
J-48		5.90	472.29	287.70	184.59	79.99
J-49		3.20	472.21	289.20	183.01	79.31
J-5		3.20	473.58	286.90	186.68	80.90
J-50		4.50	472.29	287.30	184.99	80.16
J-51		2.00	472.26	286.00	186.26	80.71
J-52		3.60	472.22	282.90	189.32	82.04
J-53		5.00	473.37	276.40	196.97	85.35
J-54		3.00	472.20	276.90	195.30	84.63
J-55		3.50	472.11	278.10	194.01	84.07
J-56		8.20	472.09	280.60	191.49	82.98
J-57		7.60	475.76	277.20	198.56	86.04
J-58		3.30	472.12	279.90	192.22	83.30
J-59		3.50	472.25	283.60	188.65	81.75
J-6		5.80	473.28	275.20	198.08	85.84
J-60		2.70	472.10	277.70	194.40	84.24
J-61		2.50	472.09	289.50	182.59	79.12
J-62		1.40	471.99	309.20	162.79	70.54
J-63		2.30	471.95	284.20	187.75	81.36
J-64		3.50	471.94	285.50	186.44	80.79
J-65		0.60	471.95	285.00	186.95	81.01
J-66		5.60	471.95	283.90	188.05	81.49
J-67		2.10	473.27	278.20	195.07	84.53
J-68		0.60	473.13	262.90	210.23	91.10
J-69		3.00	473.12	262.20	210.92	91.40
J-7		8.00	473.27	276.20	197.07	85.40
J-71		4.70	473.11	272.90	200.21	86.76
J-72		7.20	473.08	279.80	193.28	83.76
J-73		3.70	473.08	258.80	214.28	92.85
J-74		4.10	473.09	261.20	211.89	91.82
J-75		7.50	471.95	277.10	194.85	84.44
J-76		1.40	472.09	279.20	192.89	83.58
J-77		8.20	472.06	282.40	189.66	82.18
J-78		2.10	471.99	277.40	194.59	84.32
J-79		1.30	473.07	260.80	212.27	91.98
J-8		6.10	473.29	286.90	186.39	80.77
J-80		1.40	473.07	259.40	213.67	92.59
J-81		1.50	473.07	258.10	214.97	93.15
J-82		9.60	472.10	273.70	198.40	85.97
J-83		2.70	473.07	258.70	214.37	92.89
J-84		8.40	473.06	280.00	193.06	83.66
J-85		0.30	473.14	263.40	209.74	90.89
J-86		2.30	471.95	278.80	193.15	83.70
J-87		6.40	471.77	308.30	163.47	70.84
J-88		2.00	473.08	259.80	213.28	92.42
J-89		1.10	473.08	258.20	214.88	93.11
J-9		3.60	473.21	279.70	193.51	83.86
J-90		0.80	473.08	259.60	213.48	92.51
J-91		1.70	473.09	260.80	212.29	91.99
J-92		4.00	473.11	272.20	200.91	87.06
J-93		4.90	471.85	309.00	162.85	70.57
J-94		3.10	472.44	286.30	186.14	80.66
J-95		1.80	472.44	288.60	183.84	79.67
J-96		1.90	472.36	287.50	184.86	80.11
J-97		0.50	472.37	289.30	183.07	79.33
J-98		1.60	472.37	287.40	184.97	80.15
J-99		2.50	471.84	308.80	163.04	70.65
R-1	275,000 gal	----	478.00	467.00	11.00	4.77
R-2	275,000 gal	----	478.00	467.00	11.00	4.77
Well No. 1		----	279.10	279.10	0.00	0.00
Well No. 3		----	271.70	271.70	0.00	0.00
O-Well Pum	300 gpm capa	0.00	472.11	279.10	193.01	83.64
O-Well Pum	400 gpm capa	0.00	472.11	271.70	200.41	86.85

I-Well Pum	300 gpm capa	0.00	279.10	279.10	0.00	0.00
I-Well Pum	400 gpm capa	0.00	271.70	271.70	0.00	0.00

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-81	93.15	J-22	0.30
J-89	93.11	R-1	4.77
J-134	93.07	R-2	4.77
J-120	92.98	J-23	7.68
J-201	92.94	J-20	7.76
J-83	92.89	J-109	69.09
J-73	92.85	J-108	69.14
J-135	92.81	J-368	70.04
J-202	92.72	J-127	70.05
J-373	92.59	J-119	70.17

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-15	3.50	P-234	0.00
P-16	2.50	P-298	0.00
P-41	1.87	P-229	0.00
P-17	1.73	P-169	0.00
P-3	1.67	P-203	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-15	7.31	P-234	0.00
P-16	2.81	P-298	0.00
P-11	1.89	P-229	0.00
P-41	1.64	P-94	0.00
P-44	1.39	P-169	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-15	7.31	P-234	0.00
P-16	2.81	P-298	0.00
P-11	1.89	P-229	0.00
P-41	1.64	P-94	0.00
P-44	1.39	P-169	0.00

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
Well Pump No	FCV-2	0.00	BOOSTED	0.00	83.64	0.00
Well Pump No	FCV-2	0.00	BOOSTED	0.00	86.85	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	296.10	275,000 gal
R-2	444.10	275,000 gal

Well No. 1 0.00
Well No. 3 0.00

NET SYSTEM INFLOW = 740.20
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 740.20

==========

FireFlow/Hydrant Report
Fireflow/Hydrant Report:

Scenario: No Title
Global Demand Factor for this Scenario: 1.000

Specified Minimum Pressure(psi): 20.0
Minimum Static Pressure(psi) : 20.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2

Hose Constant = 0.00

Hydrant Node	Hydrant Constant	Elevation	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2 gpm	Flow Capacity	NFPA Color
H-83	0.0	282.2	82.6	3356.3	2963.4	J-109	2963.4	BLUE
H-54	0.0	307.5	71.3	2238.9	2197.1	J-108	2197.1	BLUE
H-30	0.0	279.2	83.7	2500.4			2500.4	BLUE
H-49	0.0	280.6	83.0	2730.1	2483.9	J-109	2483.9	BLUE
H-50	0.0	279.9	83.3	2741.9	2468.0	J-109	2468.0	BLUE
H-38	0.0	284.1	81.5	2749.6	2529.8	J-109	2529.8	BLUE
H-31	0.0	287.4	80.1	2846.7	2614.2	J-109	2614.2	BLUE
H-26	0.0	288.0	80.0	2975.9	2713.7	J-109	2713.7	BLUE
H-34	0.0	287.1	80.3	2002.8			2002.8	BLUE
H-37	0.0	292.4	77.9	1408.9			1408.9	GREEN
H-23	0.0	289.5	79.5	3101.0	3022.2	J-109	3022.2	BLUE
H-75	0.0	296.0	76.3	1683.6			1683.6	BLUE
H-33	0.0	286.4	80.6	1574.7			1574.7	BLUE
H-29	0.0	290.7	78.8	2658.7			2658.7	BLUE
H-8	0.0	280.8	83.9	3954.9	3631.5	J-109	3631.5	BLUE
H-28	0.0	282.4	82.4	3142.4	2767.6	J-109	2767.6	BLUE
H-27	0.0	292.6	78.0	2956.1	2746.2	J-109	2746.2	BLUE
H-13	0.0	284.1	82.5	4270.2	3883.3	J-109	3883.3	BLUE
H-5	0.0	288.4	80.2	2559.6			2559.6	BLUE
H-6	0.0	285.6	81.6	2894.4			2894.4	BLUE
H-7	0.0	287.3	82.3	10732.2	9433.6	J-109	9433.6	BLUE
H-42	0.0	272.3	86.6	2282.3			2282.3	BLUE
H-43	0.0	277.5	84.3	2187.9			2187.9	BLUE
H-47	0.0	282.6	82.1	2128.5			2128.5	BLUE
H-48	0.0	282.3	82.2	1652.3			1652.3	BLUE
H-51	0.0	277.6	84.3	2335.9			2335.9	BLUE
H-59	0.0	291.5	78.2	1602.0			1602.0	BLUE
H-69	0.0	304.2	72.6	1252.5			1252.5	GREEN
H-73	0.0	306.1	71.8	1372.9			1372.9	GREEN
H-72	0.0	306.0	71.8	1435.0			1435.0	GREEN
H-79	0.0	302.7	73.2	1454.8			1454.8	GREEN
H-74	0.0	303.1	73.1	1104.0			1104.0	GREEN
H-64	0.0	311.2	69.6	1049.7			1049.7	GREEN
H-71	0.0	308.6	70.7	1481.2			1481.2	GREEN
H-3	0.0	259.4	92.6	1800.1			1800.1	BLUE
H-44	0.0	279.9	83.3	1932.4			1932.4	BLUE
H-45	0.0	280.6	83.0	1872.3			1872.3	BLUE
H-46	0.0	280.8	82.9	1875.0			1875.0	BLUE
H-63	0.0	309.0	70.6	1298.1			1298.1	GREEN
H-78	0.0	274.8	85.9	1331.7	1292.2	J-130	1292.2	GREEN
H-60	0.0	281.6	82.5	1717.7			1717.7	BLUE
H-62	0.0	308.9	70.6	1674.3			1674.3	BLUE
H-58	0.0	279.1	83.6	1698.8			1698.8	BLUE
H-56	0.0	284.7	81.1	1986.9			1986.9	BLUE
H-55	0.0	286.5	80.4	1883.2			1883.2	BLUE
H-39	0.0	277.2	84.5	2701.7	2574.4	J-109	2574.4	BLUE
H-9	0.0	267.6	89.1	3543.5	3141.2	J-109	3141.2	BLUE
H-10	0.0	264.4	90.5	3330.5	3036.9	J-109	3036.9	BLUE
H-11	0.0	271.7	87.2	2377.0			2377.0	BLUE
H-16	0.0	274.8	86.0	3397.0	3294.7	J-109	3294.7	BLUE
H-4	0.0	260.8	92.0	2387.8	2332.3	J-195	2332.3	BLUE

20 Year MDD + Fireflow Model Results

H-35	0.0	304.1	72.8	2443.3	2401.6	J-109	2401.6	BLUE
H-36	0.0	298.7	75.2	2627.0	2510.7	J-109	2510.7	BLUE
H-76	0.0	278.2	84.4	1696.7	1677.9	J-130	1677.9	BLUE
H-77	0.0	267.4	89.1	1648.9			1648.9	BLUE
H-1	0.0	258.1	93.2	1712.5	1670.9	J-195	1670.9	BLUE
H-14	0.0	287.7	80.5	3062.3			3062.3	BLUE
H-12	0.0	275.8	85.6	3402.5	3180.8	J-109	3180.8	BLUE
H-17	0.0	281.6	83.0	3155.4			3155.4	BLUE
H-25	0.0	277.6	84.5	3076.8	2764.9	J-109	2764.9	BLUE
H-24	0.0	275.0	85.7	1698.1			1698.1	BLUE
H-40	0.0	275.7	85.1	2402.8			2402.8	BLUE
H-41	0.0	273.5	86.1	2333.9			2333.9	BLUE
H-53	0.0	315.1	68.0	1959.6			1959.6	BLUE
H-19	0.0	285.2	81.6	3157.3			3157.3	BLUE
H-22	0.0	276.7	85.1	3412.3	3092.6	J-109	3092.6	BLUE
H-80	0.0	286.0	81.0	1213.7			1213.7	GREEN
H-81	0.0	289.0	79.7	1200.0			1200.0	GREEN
H-82	0.0	283.1	82.3	1230.9			1230.9	GREEN
H-18	0.0	286.1	81.3	3105.7			3105.7	BLUE
H-21	0.0	279.8	83.9	3234.0	3170.5	J-109	3170.5	BLUE
H-20	0.0	287.2	80.7	3131.3			3131.3	BLUE
H-15	0.0	279.9	83.8	3309.5			3309.5	BLUE
H-2	0.0	275.6	85.6	1639.6			1639.6	BLUE
H-84	0.0	309.1	70.6	1139.2			1139.2	GREEN
H-32	0.0	289.2	79.4	1342.6			1342.6	GREEN
H-67	0.0	309.3	70.4	1556.7			1556.7	BLUE
H-70	0.0	285.7	80.6	1567.2	1512.4	J-260	1512.4	BLUE
H-68	0.0	298.7	75.0	1477.4	1458.7	J-260	1458.7	GREEN
H-65	0.0	305.5	72.1	1431.1			1431.1	GREEN
H-66	0.0	306.9	71.4	1375.9			1375.9	GREEN
H-61	0.0	311.0	69.7	1613.3			1613.3	BLUE
H-52	0.0	284.4	81.3	2244.9			2244.9	BLUE
H-57	0.0	276.4	84.7	1876.6			1876.6	BLUE

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*                                                                 *
*  Pipe Network Modeling Software                                 *
*                                                                 *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                     *
*  Version: 11.113  03-10-2023                                    *
*  Company:  GibbsOlson     Serial #:  592186                     *
*  Interface:  KYnetic                                            *
*   Licensed for Pipe2018                                         *
*                                                                 *
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 Date & Time:  Tue Apr 18 15:44:43 2023

 Master File : t:\projects\0751 tenino\5021 water system update\kypipe modeling\imports\water-distr-map_.KYP\water-distr-map_.P2K


              ************************************************
               S U M M A R Y   O F   O R I G I N A L   D A T A
              ************************************************


 U N I T S   S P E C I F I E D

    FLOWRATE ............ = gallons/minute
    HEAD (HGL) .......... = feet
    PRESSURE ............ = psig


 R E G U L A T I N G   V A L V E   D A T A

       VALVE       VALVE          VALVE
       LABEL       TYPE         SETTING
                               (ft or gpm)
 ----------------------------------------
Well Pump No  Const_FLOW_Pump       0.00
Well Pump No  Const_FLOW_Pump       0.00


 P I P E L I N E   D A T A

   STATUS CODE:   XX -CLOSED PIPE    CV -CHECK VALVE

   P I P E             NODE NAMES       LENGTH  DIAMETER  ROUGHNESS    MINOR
   N A M E            #1        #2       (ft)     (in)      COEFF.  LOSS COEFF.
 ---------------------------------------------------------------------------
       P-1            J-1      J-10      564.56     8.00  140.0000       0.00
      P-10            J-8      J-11      209.15     2.00  140.0000       0.00
     P-100         J-145      J-62      192.29     4.00  140.0000       0.00
     P-101         J-109     J-146      280.46     4.00  140.0000       0.00
     P-102         J-146     J-128      302.88     4.00  140.0000       0.00
     P-103         J-147     J-102      254.28     8.00  140.0000       0.00
     P-104         J-148     J-147      302.70     8.00  140.0000       0.00
     P-105         J-129     J-147      301.36     8.00  140.0000       0.00
     P-106         J-129      J-61      134.92     8.00  140.0000       0.00
     P-107         J-132     J-150      348.86     8.00  140.0000       0.00
     P-108         J-150      J-60      186.99     8.00  140.0000       0.00
     P-109         J-230     J-151       35.93     6.00  140.0000       0.00
      P-11          J-12       J-9      123.31     2.00  140.0000       0.00
     P-110         J-151      J-54      304.12     6.00  140.0000       0.00
     P-111         J-152     J-174      269.57     6.00  140.0000       0.00
     P-112         J-174     J-155      296.45     6.00  140.0000       0.00
     P-113         J-155      J-44      363.91     6.00  140.0000       0.00
     P-114         J-157      J-58      216.49     8.00  140.0000       0.00
     P-115         J-158      J-52      353.86     8.00  140.0000       0.00
     P-116         J-159     J-158      273.19     8.00  140.0000       0.00
     P-117         J-159     J-160      329.29     8.00  140.0000       0.00
     P-118         J-160     J-161      303.54     8.00  140.0000       0.00
     P-119         J-161      J-27      127.34     8.00  140.0000       0.00
      P-12          J-13      J-14      572.52     4.00  140.0000       0.00
     P-120          J-34     J-161      307.34     8.00  140.0000       0.00
     P-121         J-161     J-163      185.32     8.00  140.0000       0.00
     P-122         J-163      J-39      192.72     6.00  140.0000       0.00
     P-123         J-165     J-163      303.05     4.00  140.0000       0.00
     P-124         J-101     J-165      332.73     4.00  140.0000       0.00
     P-125         J-101     J-167      271.81     4.00  140.0000       0.00
     P-126         J-167      J-51      303.40     4.00  140.0000       0.00
     P-127          J-95      J-47       32.62     6.00  130.0000       0.00
     P-128          J-50      J-49      302.12     6.00  130.0000       0.00
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20 Year PHD Model Results

P-129	J-28	J-94	334.01	4.00	140.0000	0.00
P-13	J-16	J-36	577.26	4.00	140.0000	0.00
P-130	J-170	J-94	265.61	4.00	140.0000	0.00
P-131	J-48	J-170	303.50	4.00	140.0000	0.00
P-132	J-172	J-48	628.16	4.00	140.0000	0.00
P-133	J-172	J-129	300.73	4.00	140.0000	0.00
P-134	J-173	J-155	186.72	2.00	110.0000	0.00
P-135	J-159	J-174	323.79	2.00	110.0000	0.00
P-136	J-152	J-158	316.93	8.00	140.0000	0.00
P-137	J-54	J-176	85.83	6.00	140.0000	0.00
P-138	J-151	J-55	99.62	6.00	140.0000	0.00
P-139	J-179	J-59	187.39	4.00	140.0000	0.00
P-14	J-17	J-24	261.74	6.00	140.0000	0.00
P-140	J-181	J-172	139.90	4.00	140.0000	0.00
P-141	J-148	J-172	299.37	4.00	140.0000	0.00
P-142	J-183	J-49	113.95	4.00	130.0000	0.00
P-143	J-185	J-51	82.56	4.00	140.0000	0.00
P-144	J-187	J-48	298.52	8.00	140.0000	0.00
P-145	J-167	J-158	185.97	8.00	140.0000	0.00
P-146	J-96	J-170	137.72	4.00	140.0000	0.00
P-147	J-188	J-170	98.91	4.00	140.0000	0.00
P-148	J-189	J-188	199.79	2.00	110.0000	0.00
P-149	J-165	J-47	297.61	6.00	140.0000	0.00
P-15	J-18	J-19	273.18	6.00	140.0000	0.00
P-150	J-165	J-160	186.91	6.00	140.0000	0.00
P-151	J-1	J-28	267.19	8.00	140.0000	0.00
P-152	J-28	J-29	137.63	8.00	140.0000	0.00
P-153	J-29	J-163	292.61	8.00	140.0000	0.00
P-154	J-39	J-194	106.34	6.00	140.0000	0.00
P-155	J-195	J-72	275.99	2.00	110.0000	0.00
P-156	J-196	J-134	351.31	8.00	140.0000	0.00
P-157	J-196	J-69	359.98	8.00	140.0000	0.00
P-158	J-198	J-74	227.49	2.00	140.0000	0.00
P-159	J-88	J-89	67.89	2.00	140.0000	0.00
P-16	J-4	J-57	534.18	8.00	140.0000	0.00
P-160	J-201	J-89	104.40	2.00	140.0000	0.00
P-161	J-203	J-204	135.42	6.00	140.0000	0.00
P-162	J-12	J-13	398.64	4.00	140.0000	0.00
P-163	J-205	J-12	5.00	6.00	130.0000	0.00
P-164	J-207	J-11	5.00	6.00	130.0000	0.00
P-165	J-11	J-16	311.07	2.00	110.0000	0.00
P-166	J-209	J-210	60.83	6.00	130.0000	0.00
P-167	J-209	J-211	210.94	2.00	140.0000	0.00
P-168	J-212	J-209	210.94	2.00	140.0000	0.00
P-169	J-209	J-213	30.61	6.00	130.0000	0.00
P-17	J-19	J-20	1953.66	12.00	130.0000	0.00
P-170	J-15	J-41	38.95	2.00	110.0000	0.00
P-171	J-40	J-43	477.34	6.00	140.0000	0.00
P-172	J-218	J-43	24.72	6.00	140.0000	0.00
P-173	J-220	J-218	30.00	6.00	130.0000	0.00
P-174	J-222	J-220	30.00	6.00	130.0000	0.00
P-175	J-223	J-221	30.00	6.00	130.0000	0.00
P-176	J-222	J-223	60.00	6.00	130.0000	0.00
P-177	J-194	J-27	82.95	6.00	140.0000	0.00
P-178	J-1	J-189	598.02	8.00	140.0000	0.00
P-179	J-189	J-187	308.50	8.00	140.0000	0.00
P-18	J-21	J-23	739.67	6.00	140.0000	0.00
P-180	J-151	J-225	392.61	6.00	130.0000	0.00
P-181	J-225O-Well Pum		109.68	6.00	130.0000	0.00
P-182	J-225O-Well Pum		109.40	6.00	130.0000	0.00
P-183	J-230	J-82	134.15	6.00	140.0000	0.00
P-184	J-82	J-123	718.84	6.00	140.0000	0.00
P-185	J-56	J-123	367.50	6.00	140.0000	0.00
P-186	J-389	J-388	52.82	6.00	130.0000	0.00
P-187	J-58	J-150	75.19	8.00	140.0000	0.00
P-188	J-59	J-180	301.08	4.00	140.0000	0.00
P-189	J-60	J-107	400.92	8.00	140.0000	0.00
P-19	J-57	J-21	1177.27	6.00	140.0000	0.00
P-190	J-243	J-383	38.70	6.00	130.0000	0.00
P-191	J-245	J-76	40.10	2.00	110.0000	0.00
P-192	J-247	J-78	146.24	2.00	140.0000	0.00
P-193	J-62	J-250	52.07	2.00	140.0000	0.00
P-194	J-251	J-250	78.84	2.00	140.0000	0.00
P-195	J-143	J-253	184.93	8.00	140.0000	0.00
P-196	J-254	J-143	5.00	6.00	130.0000	0.00
P-197	J-141	J-86	313.12	6.00	140.0000	0.00
P-198	J-133	J-256	526.22	6.00	140.0000	0.00
P-199	J-87	J-258	196.59	6.00	140.0000	0.00
P-2	J-10	J-3	42.14	8.00	130.0000	0.00
P-20	J-37	J-15	578.48	8.00	140.0000	0.00
P-200	J-258	J-259	133.73	4.00	140.0000	0.00
P-201	J-115	J-111	40.58	6.00	140.0000	0.00
P-202	J-111	J-112	108.93	6.00	140.0000	0.00
P-203	J-260	J-116	27.25	6.00	130.0000	0.00

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20 Year PHD Model Results

P-204	J-103	J-262	634.08	8.00	140.0000	0.00
P-205	J-262	J-263	355.80	8.00	140.0000	0.00
P-206	J-264	J-263	242.99	6.00	140.0000	0.00
P-207	J-113	J-262	303.07	6.00	140.0000	0.00
P-208	J-113	J-264	390.94	6.00	140.0000	0.00
P-209	J-264	J-265	498.95	6.00	140.0000	0.00
P-21	J-3	J-26	418.42	8.00	130.0000	0.00
P-210	J-250	J-104	71.65	2.00	140.0000	0.00
P-211	J-358	J-119	124.38	6.00	140.0000	0.00
P-212	I-Well PumWell	No. 1	16.31	6.00	130.0000	0.00
P-213	J-197	J-136	120.34	8.00	140.0000	0.00
P-214	I-Well PumWell	No. 3	17.14	6.00	130.0000	0.00
P-215	J-103	J-115	556.01	6.00	140.0000	0.00
P-216	J-120	J-88	238.04	6.00	140.0000	0.00
P-217	J-82	J-56	1379.66	6.00	140.0000	0.00
P-218	J-123	J-106	143.58	6.00	140.0000	0.00
P-219	J-125	J-68	71.81	8.00	140.0000	0.00
P-22	J-26	J-28	416.33	4.00	140.0000	0.00
P-220	J-284	J-124	19.69	6.00	130.0000	0.00
P-221	J-84	J-171	1858.48	8.00	130.0000	0.00
P-222	J-77	J-139	1497.31	6.00	140.0000	0.00
P-223	J-127	J-87	1184.74	8.00	140.0000	0.00
P-224	J-87	J-110	123.95	8.00	140.0000	0.00
P-225	J-146	J-93	862.64	6.00	140.0000	0.00
P-226	J-63	J-64	304.15	6.00	140.0000	0.00
P-227	J-78	J-77	192.73	2.00	140.0000	0.00
P-228	J-140	J-139	26.45	6.00	140.0000	0.00
P-229	J-75	J-137	1372.85	6.00	140.0000	0.00
P-23	J-29	J-30	348.98	6.00	130.0000	0.00
P-230	J-63	J-304	213.47	2.00	140.0000	0.00
P-231	J-305	J-65	51.77	6.00	130.0000	0.00
P-232	J-62	J-144	88.34	4.00	140.0000	0.00
P-233	J-61	J-132	143.54	8.00	140.0000	0.00
P-234	J-147	J-149	30.30	8.00	140.0000	0.00
P-235	J-143	J-255	5.00	6.00	130.0000	0.00
P-236	J-145	J-108	544.61	8.00	140.0000	0.00
P-237	J-64	J-128	290.01	6.00	140.0000	0.00
P-238	J-168	J-59	313.86	4.00	140.0000	0.00
P-239	J-169	J-61	296.86	6.00	130.0000	0.00
P-24	J-18	J-31	562.52	8.00	140.0000	0.00
P-240	J-65	J-66	36.13	6.00	140.0000	0.00
P-241	J-134	J-135	104.44	8.00	140.0000	0.00
P-242	J-49	J-169	326.57	6.00	130.0000	0.00
P-243	J-48	J-50	136.63	8.00	140.0000	0.00
P-244	J-50	J-167	302.42	8.00	140.0000	0.00
P-245	J-52	J-332	197.62	2.00	110.0000	0.00
P-246	J-52	J-157	285.26	8.00	140.0000	0.00
P-247	J-54	J-152	297.60	6.00	140.0000	0.00
P-248	J-51	J-168	15.20	4.00	140.0000	0.00
P-249	J-51	J-186	48.68	4.00	140.0000	0.00
P-25	J-31	J-32	537.17	8.00	140.0000	0.00
P-250	J-55	J-178	225.29	6.00	140.0000	0.00
P-251	J-47	J-29	302.61	6.00	130.0000	0.00
P-252	J-66	J-133	926.55	6.00	140.0000	0.00
P-253	J-44	J-34	27.54	8.00	140.0000	0.00
P-254	J-86	J-137	60.97	6.00	140.0000	0.00
P-255	J-24	J-37	50.43	6.00	140.0000	0.00
P-256	J-45	J-354	261.04	2.00	110.0000	0.00
P-257	J-42	J-45	70.29	6.00	140.0000	0.00
P-258	J-357	J-358	204.66	6.00	140.0000	0.00
P-259	J-135	J-197	236.97	8.00	140.0000	0.00
P-26	J-32	J-33	484.59	8.00	140.0000	0.00
P-260	J-64	J-362	239.05	2.00	140.0000	0.00
P-261	J-55	J-58	482.97	2.00	110.0000	0.00
P-262	J-116	J-365	49.95	2.00	140.0000	0.00
P-263	J-365	J-366	35.47	1.50	140.0000	0.00
P-264	J-124	J-357	179.43	6.00	140.0000	0.00
P-265	J-136	J-271	120.75	2.00	140.0000	0.00
P-266	J-358	J-368	150.58	6.00	140.0000	0.00
P-267	J-136	J-153	219.04	8.00	140.0000	0.00
P-268	J-371	J-256	186.41	6.00	140.0000	0.00
P-269	J-371	J-86	160.94	6.00	140.0000	0.00
P-27	J-33	J-40	502.13	8.00	140.0000	0.00
P-270	J-202	J-90	57.05	2.00	110.0000	0.00
P-271	J-91	J-90	69.29	2.00	110.0000	0.00
P-272	J-376	J-379	163.66	2.00	140.0000	0.00
P-273	J-378	J-379	68.46	2.00	140.0000	0.00
P-274	J-22	R-2	9.86	14.00	130.0000	0.00
P-275	J-164	J-382	102.35	2.00	140.0000	0.00
P-276	J-383	J-384	113.12	2.00	140.0000	0.00
P-277	J-78	J-386	152.39	2.00	140.0000	0.00
P-278	J-56	J-389	151.47	6.00	130.0000	0.00
P-279	J-389	J-390	93.46	2.00	140.0000	0.00
P-28	J-33	J-35	162.74	6.00	130.0000	0.00

20 Year PHD Model Results

P-280	J-389	J-391	70.93	2.00	140.0000	0.00
P-281	J-17	J-30	16.38	6.00	130.0000	0.00
P-282	J-9	J-2	250.43	8.00	140.0000	0.00
P-283	J-24	J-42	568.60	2.00	110.0000	0.00
P-284	J-42	J-355	34.61	2.00	110.0000	0.00
P-285	J-83	J-81	343.03	4.00	140.0000	0.00
P-286	J-69	J-378	267.73	6.00	140.0000	0.00
P-287	J-98	J-95	258.46	6.00	130.0000	0.00
P-288	J-93	J-99	24.03	4.00	140.0000	0.00
P-289	J-148	J-187	627.71	8.00	140.0000	0.00
P-29	J-14	J-53	569.92	4.00	140.0000	0.00
P-290	J-203	J-6	474.49	8.00	140.0000	0.00
P-291	J-210	J-5	261.30	8.00	140.0000	0.00
P-292	J-218	J-221	30.00	6.00	130.0000	0.00
P-293	J-99	J-118	275.19	4.00	140.0000	0.00
P-294	J-153	J-84	103.07	8.00	140.0000	0.00
P-295	J-153	J-154	901.99	8.00	140.0000	0.00
P-296	J-120	J-73	537.55	6.00	140.0000	0.00
P-297	J-171	J-156	634.86	8.00	130.0000	0.00
P-298	J-156	J-130	20.94	8.00	130.0000	0.00
P-299	J-5	J-8	339.80	6.00	140.0000	0.00
P-3	J-4	J-210	258.43	8.00	140.0000	0.00
P-30	J-31	J-53	327.83	8.00	140.0000	0.00
P-300	J-8	J-9	272.62	6.00	140.0000	0.00
P-301	J-45	J-13	315.32	6.00	140.0000	0.00
P-302	J-379	J-377	110.96	2.00	140.0000	0.00
P-303	J-383	J-60	50.74	6.00	130.0000	0.00
P-304	J-91	J-74	172.40	6.00	140.0000	0.00
P-305	J-92	J-71	34.04	6.00	140.0000	0.00
P-306	J-46	J-2	314.13	8.00	140.0000	0.00
P-307	J-3	J-42	259.90	6.00	140.0000	0.00
P-308	J-27	J-162	370.90	8.00	140.0000	0.00
P-309	J-39	J-164	34.82	6.00	140.0000	0.00
P-31	J-41	J-38	116.56	2.00	110.0000	0.00
P-310	J-40	J-44	263.96	8.00	140.0000	0.00
P-311	J-43	J-217	79.70	6.00	140.0000	0.00
P-312	J-177	J-125	50.56	8.00	140.0000	0.00
P-313	J-107	J-230	655.50	6.00	140.0000	0.00
P-314	J-109	J-127	869.66	8.00	140.0000	0.00
P-32	J-26	J-17	148.18	8.00	130.0000	0.00
P-33	J-14	J-36	280.82	6.00	140.0000	0.00
P-34	J-10	J-46	698.76	8.00	140.0000	0.00
P-35	J-156	J-171	623.82	8.00	130.0000	0.00
P-36	J-13	J-16	277.39	6.00	140.0000	0.00
P-37	J-12	J-206	5.00	6.00	130.0000	0.00
P-38	J-15	J-25	98.84	8.00	140.0000	0.00
P-39	J-53	J-25	252.22	8.00	140.0000	0.00
P-4	J-5	J-203	143.82	8.00	140.0000	0.00
P-40	J-41	J-215	24.36	2.00	110.0000	0.00
P-41	J-57	J-19	41.50	8.00	140.0000	0.00
P-42	J-36	J-18	50.38	6.00	140.0000	0.00
P-43	J-37	J-14	330.97	6.00	140.0000	0.00
P-44	J-16	J-4	335.26	6.00	140.0000	0.00
P-45	J-11	J-208	5.00	6.00	130.0000	0.00
P-46	J-7	J-67	496.58	8.00	140.0000	0.00
P-47	J-6	J-177	538.73	8.00	140.0000	0.00
P-48	J-68	J-69	66.80	8.00	130.0000	0.00
P-49	J-177	J-92	580.44	6.00	140.0000	0.00
P-5	J-6	J-7	359.15	8.00	140.0000	0.00
P-50	J-71	J-72	1074.70	6.00	140.0000	0.00
P-51	J-72	J-73	331.33	6.00	140.0000	0.00
P-52	J-142	J-109	283.10	4.00	140.0000	0.00
P-53	J-74	J-378	231.53	6.00	140.0000	0.00
P-54	J-20	J-23	23.33	14.00	130.0000	0.00
P-55	J-22	R-1	9.86	12.00	130.0000	0.00
P-56	J-92	J-74	314.41	2.00	110.0000	0.00
P-57	J-79	J-80	308.00	4.00	140.0000	0.00
P-58	J-80	J-83	23.91	4.00	140.0000	0.00
P-59	J-120	J-83	264.92	4.00	140.0000	0.00
P-6	J-7	J-2	451.49	8.00	140.0000	0.00
P-60	J-125	J-85	69.51	2.00	130.0000	0.00
P-61	J-23	J-22	247.07	14.00	130.0000	0.00
P-62	J-88	J-91	151.68	6.00	140.0000	0.00
P-63	J-89	J-202	95.35	2.00	140.0000	0.00
P-64	J-90	J-373	77.16	2.00	110.0000	0.00
P-65	J-94	J-95	132.18	4.00	140.0000	0.00
P-66	J-96	J-98	5.04	6.00	130.0000	0.00
P-67	J-97	J-98	115.52	4.00	140.0000	0.00
P-68	J-50	J-96	306.54	6.00	130.0000	0.00
P-69	J-100	J-101	94.40	4.00	140.0000	0.00
P-7	J-7	J-8	569.47	8.00	140.0000	0.00
P-70	J-102	J-145	39.77	8.00	140.0000	0.00
P-71	J-75	J-105	36.23	6.00	130.0000	0.00
P-72	J-106	J-107	43.64	8.00	130.0000	0.00

P-73	J-108	J-109	54.64	8.00	130.0000	0.00
P-74	J-110	J-111	709.01	8.00	140.0000	0.00
P-75	J-112	J-113	156.89	6.00	140.0000	0.00
P-76	J-114	J-103	624.45	6.00	140.0000	0.00
P-77	J-114	J-116	211.83	6.00	140.0000	0.00
P-78	J-117	J-114	206.16	6.00	140.0000	0.00
P-79	J-118	J-117	1353.90	6.00	140.0000	0.00
P-80	J-110	J-121	250.37	4.00	140.0000	0.00
P-81	J-117	J-121	307.78	4.00	140.0000	0.00
P-82	J-121	J-122	652.43	6.00	140.0000	0.00
P-83	J-122	J-115	87.48	6.00	140.0000	0.00
P-84	J-99	J-124	267.64	6.00	140.0000	0.00
P-85	J-127	J-93	263.31	4.00	140.0000	0.00
P-86	J-126	J-127	331.31	8.00	140.0000	0.00
P-87	J-128	J-118	863.93	4.00	140.0000	0.00
P-88	J-129	J-146	1020.43	6.00	140.0000	0.00
P-89	J-131	J-63	30.24	6.00	140.0000	0.00
P-9	J-46	J-9	197.53	6.00	140.0000	0.00
P-90	J-132	J-131	504.53	6.00	130.0000	0.00
P-91	J-131	J-65	37.87	6.00	140.0000	0.00
P-92	J-66	J-75	319.45	6.00	140.0000	0.00
P-93	J-76	J-77	224.89	6.00	140.0000	0.00
P-94	J-138	J-140	25.51	6.00	140.0000	0.00
P-95	J-140	J-141	135.56	6.00	140.0000	0.00
P-96	J-107	J-76	44.82	6.00	140.0000	0.00
P-97	J-142	J-143	140.23	4.00	140.0000	0.00
P-99	J-144	J-142	588.43	4.00	140.0000	0.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		10.60	282.00	
J-10		9.70	281.30	
J-100		0.70	288.60	
J-101		5.20	290.20	
J-102		2.20	307.90	
J-103		13.40	290.30	
J-104		0.50	309.60	
J-105		0.30	277.40	
J-106		1.40	280.00	
J-107		8.40	279.20	
J-108		4.40	312.40	
J-109		11.00	312.50	
J-11		3.80	288.10	
J-110		7.90	309.20	
J-111		6.30	308.20	
J-112		2.00	307.80	
J-113		6.30	306.00	
J-114		7.70	296.00	
J-115		5.00	308.40	
J-116		2.20	303.60	
J-117		13.80	299.60	
J-118		18.40	304.70	
J-119		0.90	309.90	
J-12		3.80	283.60	
J-120		7.80	258.50	
J-121		8.90	308.70	
J-122		5.40	308.80	
J-123		9.10	281.50	
J-124		3.40	308.90	
J-125		1.40	263.90	
J-126		2.40	307.20	
J-127		19.50	310.20	
J-128		10.70	286.90	
J-129		12.90	296.40	
J-13		11.40	286.00	
J-130		0.20	282.50	
J-131		4.20	284.30	
J-132		7.40	286.40	
J-133		10.70	291.60	
J-134		3.40	258.30	
J-135		2.60	258.90	
J-136		3.40	269.10	
J-137		10.60	279.00	
J-138		0.20	279.60	
J-139		11.30	277.90	
J-14		12.90	285.70	
J-140		1.40	279.40	

J-141		3.30	279.90
J-142		7.40	308.60
J-143		2.40	308.50
J-144		5.00	308.20
J-145		5.70	308.90
J-146		18.20	307.20
J-147		6.50	305.20
J-148		9.00	304.60
J-149		0.20	306.30
J-15		5.30	280.50
J-150		4.60	279.50
J-151		6.10	275.20
J-152		6.50	277.40
J-153		9.10	277.30
J-154		6.70	263.50
J-155		6.30	278.10
J-156		9.50	282.20
J-157		3.70	281.00
J-158		8.30	286.10
J-159		6.80	287.40
J-16		11.10	287.20
J-160		6.00	287.80
J-161		6.80	287.90
J-162		2.70	283.80
J-163		7.20	289.50
J-164		1.10	287.90
J-165		8.30	290.60
J-167		7.80	287.40
J-168		2.40	286.00
J-169		4.60	290.10
J-17		3.10	289.60
J-170		5.90	286.90
J-171		23.00	275.20
J-172		10.00	294.70
J-173		1.40	284.80
J-174		6.60	278.50
J-176		0.60	279.20
J-177		8.70	264.80
J-178		1.70	281.00
J-179		1.40	281.00
J-18		6.60	281.60
J-180		2.20	290.20
J-181		1.00	290.20
J-183		0.80	287.60
J-185		0.60	285.80
J-186		0.40	286.60
J-187		9.10	296.80
J-188		2.20	286.30
J-189		8.20	290.70
J-19		16.70	275.30
J-194		1.40	287.00
J-195		2.00	281.10
J-196		5.30	259.80
J-197		2.70	264.10
J-198		1.70	260.70
J-2		7.50	275.00
J-20	reservoir co	14.60	459.90
J-201		0.80	258.60
J-202		1.10	259.10
J-203		5.60	287.50
J-204		1.00	288.40
J-205		0.00	283.60
J-206		0.00	283.70
J-207		0.00	288.30
J-208		0.00	287.90
J-209		3.80	285.70
J-21		14.20	269.00
J-210		4.20	285.10
J-211		1.60	284.30
J-212		1.60	284.80
J-213		0.20	285.60
J-215		0.20	281.50
J-217		0.60	275.30
J-218		0.60	273.80
J-22	reservoir co	2.00	477.30
J-220		0.40	273.30
J-221		0.40	274.20
J-222		0.60	273.40
J-223		0.60	274.80
J-225		6.10	273.50
J-23	reservoir co	7.50	460.10
J-230		6.10	275.00
J-24		6.50	287.80
J-243		0.30	278.30

20 Year PHD Model Results

J-245	0.30	278.90
J-247	1.10	276.30
J-25	2.60	279.10
J-250	1.50	309.40
J-251	0.60	308.00
J-253	1.40	308.20
J-254	0.00	308.10
J-255	0.00	308.90
J-256	5.30	288.60
J-258	2.50	308.30
J-259	1.00	308.50
J-26	7.30	287.70
J-260	0.20	304.90
J-262	9.50	300.50
J-263	4.40	303.80
J-264	8.40	304.00
J-265	3.70	303.30
J-27	4.20	286.60
J-271	0.90	276.30
J-28	8.60	288.60
J-284	0.10	309.20
J-29	8.00	291.80
J-3	5.30	282.90
J-30	2.70	289.70
J-304	1.60	295.30
J-305	0.40	284.70
J-31	10.60	269.30
J-32	7.60	269.00
J-33	8.50	269.60
J-332	1.50	279.90
J-34	2.50	278.90
J-35	1.20	272.50
J-354	1.90	280.20
J-355	0.30	282.50
J-357	2.80	309.10
J-358	3.50	309.80
J-36	6.80	282.50
J-362	1.80	301.60
J-365	0.70	303.30
J-366	0.30	302.20
J-368	1.10	310.20
J-37	7.10	287.40
J-371	2.60	281.40
J-373	0.60	259.40
J-376	1.20	260.60
J-377	0.80	261.70
J-378	4.20	262.20
J-379	2.50	261.60
J-38	0.90	280.60
J-382	0.80	289.40
J-383	1.50	277.20
J-384	0.80	277.60
J-386	1.10	276.50
J-388	0.40	282.30
J-389	2.70	282.20
J-39	2.50	288.20
J-390	0.70	281.00
J-391	0.50	283.00
J-4	8.30	284.40
J-40	9.10	275.00
J-41	1.40	280.80
J-42	6.90	283.60
J-43	4.30	273.80
J-44	4.80	278.10
J-45	4.70	284.20
J-46	9.00	273.90
J-47	4.60	288.80
J-48	10.00	287.70
J-49	5.40	289.20
J-5	5.50	286.90
J-50	7.70	287.30
J-51	3.30	286.00
J-52	6.20	282.90
J-53	8.50	276.40
J-54	5.00	276.90
J-55	6.00	278.10
J-56	14.00	280.60
J-57	12.90	277.20
J-58	5.80	279.90
J-59	5.90	283.60
J-6	10.20	275.20
J-60	4.80	277.70
J-61	4.30	289.50
J-62	2.50	309.20

J-63		4.00	284.20	
J-64		6.10	285.50	
J-65		1.00	285.00	
J-66		9.50	283.90	
J-67		3.70	278.20	
J-68		1.00	262.90	
J-69		5.20	262.20	
J-7		13.90	276.20	
J-71		8.20	272.90	
J-72		12.30	279.80	
J-73		6.40	258.80	
J-74		7.00	261.20	
J-75		12.80	277.10	
J-76		2.30	279.20	
J-77		14.20	282.40	
J-78		3.60	277.40	
J-79		2.30	260.80	
J-8		10.20	286.90	
J-80		2.50	259.40	
J-81		2.50	258.10	
J-82		16.50	273.70	
J-83		4.70	258.70	
J-84		14.50	280.00	
J-85		0.50	263.40	
J-86		4.00	278.80	
J-87		11.20	308.30	
J-88		3.40	259.80	
J-89		2.00	258.20	
J-9		6.30	279.70	
J-90		1.50	259.60	
J-91		2.90	260.80	
J-92		6.90	272.20	
J-93		8.50	309.00	
J-94		5.50	286.30	
J-95		3.10	288.60	
J-96		3.30	287.50	
J-97		0.90	289.30	
J-98		2.80	287.40	
J-99		4.20	308.80	
R-1	275,000 gal	----	467.00	480.00
R-2	275,000 gal	----	467.00	480.00
Well No. 1		----	279.10	279.10
Well No. 3		----	271.70	271.70
O-Well Pum	300 gpm capa	0.00	279.10	
O-Well Pum	400 gpm capa	0.00	271.70	
I-Well Pum	300 gpm capa	0.00	279.10	
I-Well Pum	400 gpm capa	0.00	271.70	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 10
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 312
NUMBER OF END NODES .....(J) = 256
NUMBER OF PRIMARY LOOPS .....(L) = 53
NUMBER OF SUPPLY NODES .....(F) = 4
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.37016E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

6.

20 Year PHD Model Results

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-10	-299.31	0.96	0.00	1.91	1.71	1.71
P-10	J-8	J-11	-5.63	0.19	0.00	0.57	0.93	0.93
P-100	J-145	J-62	24.39	0.09	0.00	0.62	0.48	0.48
P-101	J-109	J-146	8.36	0.02	0.00	0.21	0.07	0.07
P-102	J-146	J-128	4.31	0.01	0.00	0.11	0.02	0.02
P-103	J-147	J-102	164.85	0.14	0.00	1.05	0.57	0.57
P-104	J-148	J-147	162.07	0.17	0.00	1.03	0.55	0.55
P-105	J-129	J-147	9.47	0.00	0.00	0.06	0.00	0.00
P-106	J-129	J-61	-61.96	0.01	0.00	0.40	0.09	0.09
P-107	J-132	J-150	-85.15	0.06	0.00	0.54	0.17	0.17
P-108	J-150	J-60	58.79	0.02	0.00	0.38	0.08	0.08
P-109	J-230	J-151	-71.24	0.02	0.00	0.81	0.49	0.49
P-11	J-12	J-9	14.29	0.64	0.00	1.46	5.21	5.21
P-110	J-151	J-54	-90.35	0.23	0.00	1.03	0.75	0.75
P-111	J-152	J-174	-87.57	0.19	0.00	0.99	0.71	0.71
P-112	J-174	J-155	-93.97	0.24	0.00	1.07	0.81	0.81
P-113	J-155	J-44	-101.67	0.34	0.00	1.15	0.94	0.94
P-114	J-157	J-58	155.13	0.11	0.00	0.99	0.50	0.50
P-115	J-158	J-52	166.53	0.20	0.00	1.06	0.58	0.58
P-116	J-159	J-158	184.66	0.19	0.00	1.18	0.70	0.70
P-117	J-159	J-160	-191.66	0.25	0.00	1.22	0.75	0.75
P-118	J-160	J-161	-192.88	0.23	0.00	1.23	0.76	0.76
P-119	J-161	J-27	-11.23	0.00	0.00	0.07	0.00	0.00
P-12	J-13	J-14	-7.51	0.03	0.00	0.19	0.05	0.05
P-120	J-34	J-161	119.62	0.10	0.00	0.76	0.31	0.31
P-121	J-161	J-163	-68.84	0.02	0.00	0.44	0.11	0.11
P-122	J-163	J-39	23.93	0.01	0.00	0.27	0.06	0.06
P-123	J-165	J-163	-32.65	0.25	0.00	0.83	0.82	0.82
P-124	J-101	J-165	-32.95	0.28	0.00	0.84	0.84	0.84
P-125	J-101	J-167	27.05	0.16	0.00	0.69	0.58	0.58
P-126	J-167	J-51	16.20	0.07	0.00	0.41	0.22	0.22
P-127	J-95	J-47	-88.37	0.03	0.00	1.00	0.83	0.83
P-128	J-50	J-49	79.85	0.21	0.00	0.91	0.69	0.69
P-129	J-28	J-94	39.94	0.40	0.00	1.02	1.20	1.20
P-13	J-16	J-36	6.51	0.02	0.00	0.17	0.04	0.04
P-130	J-170	J-94	-32.34	0.22	0.00	0.83	0.81	0.81
P-131	J-48	J-170	-29.05	0.20	0.00	0.74	0.66	0.66
P-132	J-172	J-48	-29.12	0.42	0.00	0.74	0.67	0.67
P-133	J-172	J-129	25.00	0.15	0.00	0.64	0.50	0.50
P-134	J-173	J-155	-1.40	0.02	0.00	0.14	0.11	0.11
P-135	J-159	J-174	0.20	0.00	0.00	0.02	0.00	0.00
P-136	J-152	J-158	-14.88	0.00	0.00	0.09	0.01	0.01
P-137	J-54	J-176	0.60	0.00	0.00	0.01	0.00	0.00
P-138	J-151	J-55	6.90	0.00	0.00	0.08	0.01	0.01
P-139	J-179	J-59	-1.40	0.00	0.00	0.04	0.00	0.00
P-14	J-17	J-24	-194.38	0.81	0.00	2.21	3.11	3.11
P-140	J-181	J-172	-1.00	0.00	0.00	0.03	0.00	0.00
P-141	J-148	J-172	6.88	0.01	0.00	0.18	0.05	0.05
P-142	J-183	J-49	-0.80	0.00	0.00	0.02	0.00	0.00
P-143	J-185	J-51	-0.60	0.00	0.00	0.02	0.00	0.00
P-144	J-187	J-48	21.41	0.00	0.00	0.14	0.01	0.01
P-145	J-167	J-158	5.05	0.00	0.00	0.03	0.00	0.00
P-146	J-96	J-170	2.16	0.00	0.00	0.06	0.01	0.01
P-147	J-188	J-170	0.45	0.00	0.00	0.01	0.00	0.00
P-148	J-189	J-188	2.65	0.07	0.00	0.27	0.36	0.36
P-149	J-165	J-47	-13.38	0.01	0.00	0.15	0.02	0.02
P-15	J-18	J-19	-530.22	5.45	0.00	6.02	19.96	19.96
P-150	J-165	J-160	4.77	0.00	0.00	0.05	0.00	0.00
P-151	J-1	J-28	69.40	0.03	0.00	0.44	0.11	0.11
P-152	J-28	J-29	78.45	0.02	0.00	0.50	0.14	0.14
P-153	J-29	J-163	132.62	0.11	0.00	0.85	0.38	0.38
P-154	J-39	J-194	19.53	0.00	0.00	0.22	0.04	0.04
P-155	J-195	J-72	-2.00	0.06	0.00	0.20	0.21	0.21
P-156	J-196	J-134	76.00	0.05	0.00	0.49	0.13	0.13
P-157	J-196	J-69	-81.30	0.05	0.00	0.52	0.15	0.15
P-158	J-198	J-74	-1.70	0.02	0.00	0.17	0.10	0.10
P-159	J-88	J-89	3.15	0.02	0.00	0.32	0.32	0.32
P-16	J-4	J-57	-675.08	4.11	0.00	4.31	7.69	7.69
P-160	J-201	J-89	-0.80	0.00	0.00	0.08	0.03	0.03
P-161	J-203	J-204	1.00	0.00	0.00	0.01	0.00	0.00
P-162	J-12	J-13	-18.09	0.11	0.00	0.46	0.28	0.28
P-163	J-205	J-12	0.00	0.00	0.00	0.00	0.00	0.00
P-164	J-207	J-11	0.00	0.00	0.00	0.00	0.00	0.00
P-165	J-11	J-16	-9.43	1.17	0.00	0.96	3.77	3.77
P-166	J-209	J-210	-7.20	0.00	0.00	0.08	0.01	0.01
P-167	J-209	J-211	1.60	0.02	0.00	0.16	0.09	0.09
P-168	J-212	J-209	-1.60	0.02	0.00	0.16	0.09	0.09
P-169	J-209	J-213	0.20	0.00	0.00	0.00	0.00	0.00
P-17	J-19	J-20	-1051.64	5.44	0.00	2.98	2.78	2.78

20 Year PHD Model Results

P-170	J-15	J-41	2.50	0.01	0.00	0.26	0.32	0.32
P-171	J-40	J-43	7.50	0.00	0.00	0.09	0.01	0.01
P-172	J-218	J-43	-2.60	0.00	0.00	0.03	0.00	0.00
P-173	J-220	J-218	-1.00	0.00	0.00	0.01	0.00	0.00
P-174	J-222	J-220	-0.60	0.00	0.00	0.01	0.00	0.00
P-175	J-223	J-221	-0.60	0.00	0.00	0.01	0.00	0.00
P-176	J-222	J-223	0.00	0.00	0.00	0.00	0.00	0.00
P-177	J-194	J-27	18.13	0.00	0.00	0.21	0.04	0.04
P-178	J-1	J-189	219.31	0.57	0.00	1.40	0.96	0.96
P-179	J-189	J-187	208.47	0.27	0.00	1.33	0.87	0.87
P-18	J-21	J-23	-197.46	2.37	0.00	2.24	3.20	3.20
P-180	J-151	J-225	6.10	0.00	0.00	0.07	0.01	0.01
P-181	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-182	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-183	J-230	J-82	41.48	0.02	0.00	0.47	0.18	0.18
P-184	J-82	J-123	14.19	0.02	0.00	0.16	0.02	0.02
P-185	J-56	J-123	-7.51	0.00	0.00	0.09	0.01	0.01
P-186	J-389	J-388	0.40	0.00	0.00	0.00	0.00	0.00
P-187	J-58	J-150	148.54	0.04	0.00	0.95	0.47	0.47
P-188	J-59	J-180	2.20	0.00	0.00	0.06	0.01	0.01
P-189	J-60	J-107	51.39	0.03	0.00	0.33	0.07	0.07
P-19	J-57	J-21	-183.26	3.29	0.00	2.08	2.79	2.79
P-190	J-243	J-383	-0.30	0.00	0.00	0.00	0.00	0.00
P-191	J-245	J-76	-0.30	0.00	0.00	0.03	0.01	0.01
P-192	J-247	J-78	-1.10	0.01	0.00	0.11	0.05	0.05
P-193	J-62	J-250	2.60	0.01	0.00	0.27	0.22	0.22
P-194	J-251	J-250	-0.60	0.00	0.00	0.06	0.01	0.01
P-195	J-143	J-253	1.40	0.00	0.00	0.01	0.00	0.00
P-196	J-254	J-143	0.00	0.00	0.00	0.00	0.00	0.00
P-197	J-141	J-86	24.03	0.02	0.00	0.27	0.06	0.06
P-198	J-133	J-256	-1.77	0.00	0.00	0.02	0.00	0.00
P-199	J-87	J-258	3.50	0.00	0.00	0.04	0.00	0.00
P-2	J-10	J-3	-106.36	0.01	0.00	0.68	0.29	0.29
P-20	J-37	J-15	-78.52	0.08	0.00	0.50	0.14	0.14
P-200	J-258	J-259	1.00	0.00	0.00	0.03	0.00	0.00
P-201	J-115	J-111	-22.12	0.00	0.00	0.25	0.06	0.06
P-202	J-111	J-112	24.87	0.01	0.00	0.28	0.07	0.07
P-203	J-260	J-116	-0.20	0.00	0.00	0.00	0.00	0.00
P-204	J-103	J-262	9.43	0.00	0.00	0.06	0.00	0.00
P-205	J-262	J-263	7.94	0.00	0.00	0.05	0.00	0.00
P-206	J-264	J-263	-3.54	0.00	0.00	0.04	0.00	0.00
P-207	J-113	J-262	8.00	0.00	0.00	0.09	0.01	0.01
P-208	J-113	J-264	8.56	0.00	0.00	0.10	0.01	0.01
P-209	J-264	J-265	3.70	0.00	0.00	0.04	0.00	0.00
P-21	J-3	J-26	44.82	0.02	0.00	0.29	0.06	0.06
P-210	J-250	J-104	0.50	0.00	0.00	0.05	0.01	0.01
P-211	J-358	J-119	0.90	0.00	0.00	0.01	0.00	0.00
P-212	I-Well PumWell No. 1		0.00	0.00	0.00	0.00	0.00	0.00
P-213	J-197	J-136	67.30	0.01	0.00	0.43	0.11	0.11
P-214	I-Well PumWell No. 3		0.00	0.00	0.00	0.00	0.00	0.00
P-215	J-103	J-115	-15.14	0.02	0.00	0.17	0.03	0.03
P-216	J-120	J-88	-15.78	0.01	0.00	0.18	0.03	0.03
P-217	J-82	J-56	10.79	0.02	0.00	0.12	0.01	0.01
P-218	J-123	J-106	-2.42	0.00	0.00	0.03	0.00	0.00
P-219	J-125	J-68	131.22	0.03	0.00	0.84	0.37	0.37
P-22	J-26	J-28	57.59	0.98	0.00	1.47	2.36	2.36
P-220	J-284	J-124	-0.10	0.00	0.00	0.00	0.00	0.00
P-221	J-84	J-171	32.70	0.06	0.00	0.21	0.03	0.03
P-222	J-77	J-139	40.23	0.25	0.00	0.46	0.17	0.17
P-223	J-127	J-87	91.19	0.22	0.00	0.58	0.19	0.19
P-224	J-87	J-110	76.49	0.02	0.00	0.49	0.14	0.14
P-225	J-146	J-93	50.44	0.22	0.00	0.57	0.26	0.26
P-226	J-63	J-64	37.57	0.05	0.00	0.43	0.15	0.15
P-227	J-78	J-77	-5.80	0.19	0.00	0.59	0.98	0.98
P-228	J-140	J-139	-28.93	0.00	0.00	0.33	0.09	0.09
P-229	J-75	J-137	0.24	0.00	0.00	0.00	0.00	0.00
P-23	J-29	J-30	-168.51	0.96	0.00	1.91	2.74	2.74
P-230	J-63	J-304	1.60	0.02	0.00	0.16	0.09	0.09
P-231	J-305	J-65	-0.40	0.00	0.00	0.00	0.00	0.00
P-232	J-62	J-144	19.29	0.03	0.00	0.49	0.31	0.31
P-233	J-61	J-132	2.79	0.00	0.00	0.02	0.00	0.00
P-234	J-147	J-149	0.20	0.00	0.00	0.00	0.00	0.00
P-235	J-143	J-255	0.00	0.00	0.00	0.00	0.00	0.00
P-236	J-145	J-108	132.55	0.21	0.00	0.85	0.38	0.38
P-237	J-64	J-128	29.67	0.03	0.00	0.34	0.10	0.10
P-238	J-168	J-59	9.50	0.03	0.00	0.24	0.08	0.08
P-239	J-169	J-61	69.05	0.16	0.00	0.78	0.53	0.53
P-24	J-18	J-31	342.17	1.23	0.00	2.18	2.19	2.19
P-240	J-65	J-66	31.77	0.00	0.00	0.36	0.11	0.11
P-241	J-134	J-135	72.60	0.01	0.00	0.46	0.12	0.12
P-242	J-49	J-169	73.65	0.19	0.00	0.84	0.59	0.59
P-243	J-48	J-50	11.35	0.00	0.00	0.07	0.00	0.00
P-244	J-50	J-167	2.00	0.00	0.00	0.01	0.00	0.00
P-245	J-52	J-332	1.50	0.02	0.00	0.15	0.13	0.13

20 Year PHD Model Results

P-246	J-52	J-157	158.83	0.15	0.00	1.01	0.53	0.53
P-247	J-54	J-152	-95.95	0.25	0.00	1.09	0.84	0.84
P-248	J-51	J-168	11.90	0.00	0.00	0.30	0.13	0.13
P-249	J-51	J-186	0.40	0.00	0.00	0.01	0.00	0.00
P-25	J-31	J-32	262.48	0.72	0.00	1.68	1.34	1.34
P-250	J-55	J-178	1.70	0.00	0.00	0.02	0.00	0.00
P-251	J-47	J-29	-106.35	0.35	0.00	1.21	1.17	1.17
P-252	J-66	J-133	8.93	0.01	0.00	0.10	0.01	0.01
P-253	J-44	J-34	122.12	0.01	0.00	0.78	0.32	0.32
P-254	J-86	J-137	10.36	0.00	0.00	0.12	0.01	0.01
P-255	J-24	J-37	-203.84	0.17	0.00	2.31	3.40	3.40
P-256	J-45	J-354	1.90	0.05	0.00	0.19	0.19	0.19
P-257	J-42	J-45	-160.73	0.15	0.00	1.82	2.19	2.19
P-258	J-357	J-358	5.50	0.00	0.00	0.06	0.00	0.00
P-259	J-135	J-197	70.00	0.03	0.00	0.45	0.12	0.12
P-26	J-32	J-33	254.88	0.61	0.00	1.63	1.27	1.27
P-260	J-64	J-362	1.80	0.03	0.00	0.18	0.11	0.11
P-261	J-55	J-58	-0.80	0.02	0.00	0.08	0.04	0.04
P-262	J-116	J-365	1.00	0.00	0.00	0.10	0.04	0.04
P-263	J-365	J-366	0.30	0.00	0.00	0.05	0.02	0.02
P-264	J-124	J-357	8.30	0.00	0.00	0.09	0.01	0.01
P-265	J-136	J-271	0.90	0.00	0.00	0.09	0.03	0.03
P-266	J-358	J-368	1.10	0.00	0.00	0.01	0.00	0.00
P-267	J-136	J-153	63.00	0.02	0.00	0.40	0.10	0.10
P-268	J-371	J-256	7.07	0.00	0.00	0.08	0.01	0.01
P-269	J-371	J-86	-9.67	0.00	0.00	0.11	0.01	0.01
P-27	J-33	J-40	245.18	0.59	0.00	1.56	1.18	1.18
P-270	J-202	J-90	-0.75	0.00	0.00	0.08	0.03	0.03
P-271	J-91	J-90	2.85	0.03	0.00	0.29	0.41	0.41
P-272	J-376	J-379	-1.20	0.01	0.00	0.12	0.05	0.05
P-273	J-378	J-379	4.50	0.04	0.00	0.46	0.61	0.61
P-274	J-22	R-2	-763.89	0.01	0.00	1.59	0.73	0.73
P-275	J-164	J-382	0.80	0.00	0.00	0.08	0.03	0.03
P-276	J-383	J-384	0.80	0.00	0.00	0.08	0.03	0.03
P-277	J-78	J-386	1.10	0.01	0.00	0.11	0.05	0.05
P-278	J-56	J-389	4.30	0.00	0.00	0.05	0.00	0.00
P-279	J-389	J-390	0.70	0.00	0.00	0.07	0.02	0.02
P-28	J-33	J-35	1.20	0.00	0.00	0.01	0.00	0.00
P-280	J-389	J-391	0.50	0.00	0.00	0.05	0.01	0.01
P-281	J-17	J-30	171.21	0.05	0.00	1.94	2.82	2.82
P-282	J-9	J-2	18.69	0.00	0.00	0.12	0.01	0.01
P-283	J-24	J-42	2.96	0.25	0.00	0.30	0.44	0.44
P-284	J-42	J-355	0.30	0.00	0.00	0.03	0.01	0.01
P-285	J-83	J-81	2.50	0.00	0.00	0.06	0.01	0.01
P-286	J-69	J-378	43.72	0.05	0.00	0.50	0.20	0.20
P-287	J-98	J-95	-87.36	0.21	0.00	0.99	0.81	0.81
P-288	J-93	J-99	40.74	0.03	0.00	1.04	1.24	1.24
P-289	J-148	J-187	-177.95	0.41	0.00	1.14	0.65	0.65
P-29	J-14	J-53	28.33	0.36	0.00	0.72	0.63	0.63
P-290	J-203	J-6	260.41	0.63	0.00	1.66	1.32	1.32
P-291	J-210	J-5	439.03	0.91	0.00	2.80	3.47	3.47
P-292	J-218	J-221	1.00	0.00	0.00	0.01	0.00	0.00
P-293	J-99	J-118	24.74	0.14	0.00	0.63	0.49	0.49
P-294	J-153	J-84	47.20	0.01	0.00	0.30	0.06	0.06
P-295	J-153	J-154	6.70	0.00	0.00	0.04	0.00	0.00
P-296	J-120	J-73	-4.02	0.00	0.00	0.05	0.00	0.00
P-297	J-171	J-156	4.83	0.00	0.00	0.03	0.00	0.00
P-298	J-156	J-130	0.20	0.00	0.00	0.00	0.00	0.00
P-299	J-5	J-8	166.52	0.79	0.00	1.89	2.34	2.34
P-3	J-4	J-210	450.43	0.94	0.00	2.87	3.64	3.64
P-30	J-31	J-53	69.08	0.04	0.00	0.44	0.11	0.11
P-300	J-8	J-9	90.88	0.21	0.00	1.03	0.76	0.76
P-301	J-45	J-13	-167.33	0.74	0.00	1.90	2.36	2.36
P-302	J-379	J-377	0.80	0.00	0.00	0.08	0.03	0.03
P-303	J-383	J-60	-2.60	0.00	0.00	0.03	0.00	0.00
P-304	J-91	J-74	-28.08	0.01	0.00	0.32	0.09	0.09
P-305	J-92	J-71	32.92	0.00	0.00	0.37	0.12	0.12
P-306	J-46	J-2	-131.47	0.12	0.00	0.84	0.37	0.37
P-307	J-3	J-42	-156.48	0.54	0.00	1.78	2.08	2.08
P-308	J-27	J-162	2.70	0.00	0.00	0.02	0.00	0.00
P-309	J-39	J-164	1.90	0.00	0.00	0.02	0.00	0.00
P-31	J-41	J-38	0.90	0.01	0.00	0.09	0.05	0.05
P-310	J-40	J-44	228.58	0.27	0.00	1.46	1.04	1.04
P-311	J-43	J-217	0.60	0.00	0.00	0.01	0.00	0.00
P-312	J-177	J-125	133.12	0.02	0.00	0.85	0.38	0.38
P-313	J-107	J-230	-23.66	0.04	0.00	0.27	0.06	0.06
P-314	J-109	J-127	111.89	0.24	0.00	0.71	0.28	0.28
P-32	J-26	J-17	-20.07	0.00	0.00	0.13	0.01	0.01
P-33	J-14	J-36	-181.16	0.77	0.00	2.06	2.73	2.73
P-34	J-10	J-46	-202.65	0.58	0.00	1.29	0.83	0.83
P-35	J-156	J-171	-4.87	0.00	0.00	0.03	0.00	0.00
P-36	J-13	J-16	-189.31	0.82	0.00	2.15	2.96	2.96
P-37	J-12	J-206	0.00	0.00	0.00	0.00	0.00	0.00
P-38	J-15	J-25	-86.32	0.02	0.00	0.55	0.17	0.17

20 Year PHD Model Results

P-39	J-53	J-25	88.92	0.05	0.00	0.57	0.18	0.18
P-4	J-5	J-203	267.01	0.20	0.00	1.70	1.38	1.38
P-40	J-41	J-215	0.20	0.00	0.00	0.02	0.00	0.00
P-41	J-57	J-19	-504.71	0.19	0.00	3.22	4.49	4.49
P-42	J-36	J-18	-181.45	0.14	0.00	2.06	2.74	2.74
P-43	J-37	J-14	-132.42	0.51	0.00	1.50	1.53	1.53
P-44	J-16	J-4	-216.34	1.27	0.00	2.45	3.80	3.80
P-45	J-11	J-208	0.00	0.00	0.00	0.00	0.00	0.00
P-46	J-7	J-67	3.70	0.00	0.00	0.02	0.00	0.00
P-47	J-6	J-177	183.40	0.37	0.00	1.17	0.69	0.69
P-48	J-68	J-69	130.22	0.03	0.00	0.83	0.42	0.42
P-49	J-177	J-92	41.58	0.10	0.00	0.47	0.18	0.18
P-5	J-6	J-7	66.81	0.04	0.00	0.43	0.11	0.11
P-50	J-71	J-72	24.72	0.07	0.00	0.28	0.07	0.07
P-51	J-72	J-73	10.42	0.00	0.00	0.12	0.01	0.01
P-52	J-142	J-109	3.09	0.00	0.00	0.08	0.01	0.01
P-53	J-74	J-378	-35.02	0.03	0.00	0.40	0.13	0.13
P-54	J-20	J-23	-1066.24	0.03	0.00	2.22	1.35	1.35
P-55	J-22	R-1	-509.31	0.01	0.00	1.44	0.73	0.73
P-56	J-92	J-74	1.75	0.05	0.00	0.18	0.17	0.17
P-57	J-79	J-80	-2.30	0.00	0.00	0.06	0.01	0.01
P-58	J-80	J-83	-4.80	0.00	0.00	0.12	0.02	0.02
P-59	J-120	J-83	12.00	0.03	0.00	0.31	0.13	0.13
P-6	J-7	J-2	120.28	0.14	0.00	0.77	0.32	0.32
P-60	J-125	J-85	0.50	0.00	0.00	0.05	0.01	0.01
P-61	J-23	J-22	-1271.20	0.46	0.00	2.65	1.87	1.87
P-62	J-88	J-91	-22.32	0.01	0.00	0.25	0.06	0.06
P-63	J-89	J-202	0.35	0.00	0.00	0.04	0.01	0.01
P-64	J-90	J-373	0.60	0.00	0.00	0.06	0.02	0.02
P-65	J-94	J-95	2.10	0.00	0.00	0.05	0.01	0.01
P-66	J-96	J-98	-83.66	0.00	0.00	0.95	0.75	0.75
P-67	J-97	J-98	-0.90	0.00	0.00	0.02	0.00	0.00
P-68	J-50	J-96	-78.20	0.20	0.00	0.89	0.66	0.66
P-69	J-100	J-101	-0.70	0.00	0.00	0.02	0.00	0.00
P-7	J-7	J-8	-71.07	0.07	0.00	0.45	0.12	0.12
P-70	J-102	J-145	162.65	0.02	0.00	1.04	0.55	0.55
P-71	J-75	J-105	0.30	0.00	0.00	0.00	0.00	0.00
P-72	J-106	J-107	-3.82	0.00	0.00	0.02	0.00	0.00
P-73	J-108	J-109	128.15	0.02	0.00	0.82	0.41	0.41
P-74	J-110	J-111	53.29	0.05	0.00	0.34	0.07	0.07
P-75	J-112	J-113	22.87	0.01	0.00	0.26	0.06	0.06
P-76	J-114	J-103	7.69	0.00	0.00	0.09	0.01	0.01
P-77	J-114	J-116	3.40	0.00	0.00	0.04	0.00	0.00
P-78	J-117	J-114	18.79	0.01	0.00	0.21	0.04	0.04
P-79	J-118	J-117	29.61	0.13	0.00	0.34	0.10	0.10
P-80	J-110	J-121	15.30	0.05	0.00	0.39	0.20	0.20
P-81	J-117	J-121	-2.98	0.00	0.00	0.08	0.01	0.01
P-82	J-121	J-122	3.42	0.00	0.00	0.04	0.00	0.00
P-83	J-122	J-115	-1.98	0.00	0.00	0.02	0.00	0.00
P-84	J-99	J-124	11.80	0.00	0.00	0.13	0.02	0.02
P-85	J-127	J-93	-1.20	0.00	0.00	0.03	0.00	0.00
P-86	J-126	J-127	-2.40	0.00	0.00	0.02	0.00	0.00
P-87	J-128	J-118	23.28	0.38	0.00	0.59	0.44	0.44
P-88	J-129	J-146	64.58	0.41	0.00	0.73	0.40	0.40
P-89	J-131	J-63	43.17	0.01	0.00	0.49	0.19	0.19
P-9	J-46	J-9	-80.18	0.12	0.00	0.91	0.60	0.60
P-90	J-132	J-131	80.54	0.35	0.00	0.91	0.70	0.70
P-91	J-131	J-65	33.17	0.00	0.00	0.38	0.12	0.12
P-92	J-66	J-75	13.34	0.01	0.00	0.15	0.02	0.02
P-93	J-76	J-77	60.23	0.08	0.00	0.68	0.36	0.36
P-94	J-138	J-140	-0.20	0.00	0.00	0.00	0.00	0.00
P-95	J-140	J-141	27.33	0.01	0.00	0.31	0.08	0.08
P-96	J-107	J-76	62.83	0.02	0.00	0.71	0.38	0.38
P-97	J-142	J-143	3.80	0.00	0.00	0.10	0.02	0.02
P-99	J-144	J-142	14.29	0.10	0.00	0.36	0.18	0.18

~@Well Pum-RV I-Well PumO-Well Pum
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N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		10.60	465.26	282.00	183.26	79.41
J-10		9.70	466.22	281.30	184.92	80.13
J-100		0.70	464.57	288.60	175.97	76.25
J-101		5.20	464.57	290.20	174.37	75.56
J-102		2.20	463.70	307.90	155.80	67.51
J-103		13.40	462.90	290.30	172.60	74.79
J-104		0.50	463.57	309.60	153.97	66.72
J-105		0.30	463.49	277.40	186.09	80.64

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20 Year PHD Model Results

J-106	1.40	463.87	280.00	183.87	79.68
J-107	8.40	463.87	279.20	184.67	80.02
J-108	4.40	463.47	312.40	151.07	65.46
J-109	11.00	463.45	312.50	150.95	65.41
J-11	3.80	467.32	288.10	179.22	77.66
J-110	7.90	462.97	309.20	153.77	66.63
J-111	6.30	462.92	308.20	154.72	67.04
J-112	2.00	462.91	307.80	155.11	67.21
J-113	6.30	462.90	306.00	156.90	67.99
J-114	7.70	462.91	296.00	166.91	72.33
J-115	5.00	462.92	308.40	154.52	66.96
J-116	2.20	462.90	303.60	159.30	69.03
J-117	13.80	462.91	299.60	163.31	70.77
J-118	18.40	463.04	304.70	158.34	68.62
J-119	0.90	463.17	309.90	153.27	66.42
J-12	3.80	467.56	283.60	183.96	79.72
J-120	7.80	466.54	258.50	208.04	90.15
J-121	8.90	462.92	308.70	154.22	66.83
J-122	5.40	462.92	308.80	154.12	66.78
J-123	9.10	463.87	281.50	182.37	79.03
J-124	3.40	463.17	308.90	154.27	66.85
J-125	1.40	466.71	263.90	202.81	87.88
J-126	2.40	463.21	307.20	156.01	67.60
J-127	19.50	463.21	310.20	153.01	66.30
J-128	10.70	463.42	286.90	176.52	76.49
J-129	12.90	463.84	296.40	167.44	72.56
J-13	11.40	467.67	286.00	181.67	78.72
J-130	0.20	466.41	282.50	183.91	79.69
J-131	4.20	463.50	284.30	179.20	77.65
J-132	7.40	463.85	286.40	177.45	76.90
J-133	10.70	463.48	291.60	171.88	74.48
J-134	3.40	466.55	258.30	208.25	90.24
J-135	2.60	466.54	258.90	207.64	89.98
J-136	3.40	466.50	269.10	197.40	85.54
J-137	10.60	463.49	279.00	184.49	79.94
J-138	0.20	463.52	279.60	183.92	79.70
J-139	11.30	463.52	277.90	185.62	80.44
J-14	12.90	467.70	285.70	182.00	78.87
J-140	1.40	463.52	279.40	184.12	79.78
J-141	3.30	463.51	279.90	183.61	79.56
J-142	7.40	463.45	308.60	154.85	67.10
J-143	2.40	463.45	308.50	154.95	67.14
J-144	5.00	463.56	308.20	155.36	67.32
J-145	5.70	463.68	308.90	154.78	67.07
J-146	18.20	463.43	307.20	156.23	67.70
J-147	6.50	463.84	305.20	158.64	68.74
J-148	9.00	464.01	304.60	159.41	69.08
J-149	0.20	463.84	306.30	157.54	68.27
J-15	5.30	467.28	280.50	186.78	80.94
J-150	4.60	463.91	279.50	184.41	79.91
J-151	6.10	463.93	275.20	188.73	81.78
J-152	6.50	464.41	277.40	187.01	81.04
J-153	9.10	466.48	277.30	189.18	81.98
J-154	6.70	466.47	263.50	202.97	87.96
J-155	6.30	464.84	278.10	186.74	80.92
J-156	9.50	466.41	282.20	184.21	79.82
J-157	3.70	464.06	281.00	183.06	79.32
J-158	8.30	464.41	286.10	178.31	77.27
J-159	6.80	464.60	287.40	177.20	76.79
J-16	11.10	468.49	287.20	181.29	78.56
J-160	6.00	464.85	287.80	177.05	76.72
J-161	6.80	465.08	287.90	177.18	76.78
J-162	2.70	465.08	283.80	181.28	78.55
J-163	7.20	465.10	289.50	175.60	76.09
J-164	1.10	465.09	287.90	177.19	76.78
J-165	8.30	464.85	290.60	174.25	75.51
J-167	7.80	464.41	287.40	177.01	76.70
J-168	2.40	464.34	286.00	178.34	77.28
J-169	4.60	464.01	290.10	173.91	75.36
J-17	3.10	466.21	289.60	176.61	76.53
J-170	5.90	464.61	286.90	177.71	77.01
J-171	23.00	466.41	275.20	191.21	82.86
J-172	10.00	463.99	294.70	169.29	73.36
J-173	1.40	464.82	284.80	180.02	78.01
J-174	6.60	464.60	278.50	186.10	80.64
J-176	0.60	464.16	279.20	184.96	80.15
J-177	8.70	466.73	264.80	201.93	87.50
J-178	1.70	463.93	281.00	182.93	79.27
J-179	1.40	464.31	281.00	183.31	79.44
J-18	6.60	468.61	281.60	187.01	81.04
J-180	2.20	464.31	290.20	174.11	75.45
J-181	1.00	463.99	290.20	173.79	75.31
J-183	0.80	464.20	287.60	176.60	76.53
J-185	0.60	464.34	285.80	178.54	77.37

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20 Year PHD Model Results

J-186		0.40	464.34	286.60	177.74	77.02
J-187		9.10	464.42	296.80	167.62	72.63
J-188		2.20	464.61	286.30	178.31	77.27
J-189		8.20	464.68	290.70	173.98	75.39
J-19		16.70	474.06	275.30	198.76	86.13
J-194		1.40	465.08	287.00	178.08	77.17
J-195		2.00	466.49	281.10	185.39	80.33
J-196		5.30	466.60	259.80	206.80	89.61
J-197		2.70	466.51	264.10	202.41	87.71
J-198		1.70	466.55	260.70	205.85	89.20
J-2		7.50	466.92	275.00	191.92	83.16
J-20	reservoir co	14.60	479.50	459.90	19.60	8.49
J-201		0.80	466.52	258.60	207.92	90.10
J-202		1.10	466.52	259.10	207.42	89.88
J-203		5.60	467.72	287.50	180.22	78.10
J-204		1.00	467.72	288.40	179.32	77.71
J-205		0.00	467.56	283.60	183.96	79.72
J-206		0.00	467.56	283.70	183.86	79.67
J-207		0.00	467.32	288.30	179.02	77.58
J-208		0.00	467.32	287.90	179.42	77.75
J-209		3.80	468.83	285.70	183.13	79.35
J-21		14.20	477.16	269.00	208.16	90.20
J-210		4.20	468.83	285.10	183.73	79.61
J-211		1.60	468.81	284.30	184.51	79.95
J-212		1.60	468.81	284.80	184.01	79.74
J-213		0.20	468.83	285.60	183.23	79.40
J-215		0.20	467.27	281.50	185.77	80.50
J-217		0.60	465.45	275.30	190.15	82.40
J-218		0.60	465.45	273.80	191.65	83.05
J-22	reservoir co	2.00	479.99	477.30	2.69	1.17
J-220		0.40	465.45	273.30	192.15	83.27
J-221		0.40	465.45	274.20	191.25	82.88
J-222		0.60	465.45	273.40	192.05	83.22
J-223		0.60	465.45	274.80	190.65	82.62
J-225		6.10	463.93	273.50	190.43	82.52
J-23	reservoir co	7.50	479.53	460.10	19.43	8.42
J-230		6.10	463.91	275.00	188.91	81.86
J-24		6.50	467.03	287.80	179.23	77.66
J-243		0.30	463.90	278.30	185.60	80.43
J-245		0.30	463.85	278.90	184.95	80.15
J-247		1.10	463.58	276.30	187.28	81.15
J-25		2.60	467.30	279.10	188.20	81.55
J-250		1.50	463.57	309.40	154.17	66.81
J-251		0.60	463.57	308.00	155.57	67.41
J-253		1.40	463.45	308.20	155.25	67.27
J-254		0.00	463.45	308.10	155.35	67.32
J-255		0.00	463.45	308.90	154.55	66.97
J-256		5.30	463.48	288.60	174.88	75.78
J-258		2.50	462.98	308.30	154.68	67.03
J-259		1.00	462.98	308.50	154.48	66.94
J-26		7.30	466.21	287.70	178.51	77.35
J-260		0.20	462.90	304.90	158.00	68.47
J-262		9.50	462.90	300.50	162.40	70.37
J-263		4.40	462.90	303.80	159.10	68.94
J-264		8.40	462.90	304.00	158.90	68.86
J-265		3.70	462.90	303.30	159.60	69.16
J-27		4.20	465.08	286.60	178.48	77.34
J-271		0.90	466.49	276.30	190.19	82.42
J-28		8.60	465.23	288.60	176.63	76.54
J-284		0.10	463.17	309.20	153.97	66.72
J-29		8.00	465.21	291.80	173.41	75.14
J-3		5.30	466.23	282.90	183.33	79.44
J-30		2.70	466.16	289.70	176.46	76.47
J-304		1.60	463.48	295.30	168.18	72.88
J-305		0.40	463.50	284.70	178.80	77.48
J-31		10.60	467.38	269.30	198.08	85.83
J-32		7.60	466.66	269.00	197.66	85.65
J-33		8.50	466.05	269.60	196.45	85.13
J-332		1.50	464.18	279.90	184.28	79.86
J-34		2.50	465.17	278.90	186.27	80.72
J-35		1.20	466.05	272.50	193.55	83.87
J-354		1.90	466.88	280.20	186.68	80.89
J-355		0.30	466.77	282.50	184.27	79.85
J-357		2.80	463.17	309.10	154.07	66.76
J-358		3.50	463.17	309.80	153.37	66.46
J-36		6.80	468.47	282.50	185.97	80.59
J-362		1.80	463.42	301.60	161.82	70.12
J-365		0.70	462.90	303.30	159.60	69.16
J-366		0.30	462.90	302.20	160.70	69.64
J-368		1.10	463.17	310.20	152.97	66.29
J-37		7.10	467.20	287.40	179.80	77.91
J-371		2.60	463.49	281.40	182.09	78.90
J-373		0.60	466.52	259.40	207.12	89.75
J-376		1.20	466.55	260.60	205.95	89.24

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J-377		0.80	466.55	261.70	204.85	88.77
J-378		4.20	466.60	262.20	204.40	88.57
J-379		2.50	466.56	261.60	204.96	88.81
J-38		0.90	467.26	280.60	186.66	80.89
J-382		0.80	465.08	289.40	175.68	76.13
J-383		1.50	463.90	277.20	186.70	80.90
J-384		0.80	463.89	277.60	186.29	80.73
J-386		1.10	463.58	276.50	187.08	81.07
J-388		0.40	463.87	282.30	181.57	78.68
J-389		2.70	463.87	282.20	181.67	78.72
J-39		2.50	465.09	288.20	176.89	76.65
J-390		0.70	463.87	281.00	182.87	79.24
J-391		0.50	463.87	283.00	180.87	78.38
J-4		8.30	469.77	284.40	185.37	80.33
J-40		9.10	465.45	275.00	190.45	82.53
J-41		1.40	467.27	280.80	186.47	80.80
J-42		6.90	466.77	283.60	183.17	79.38
J-43		4.30	465.45	273.80	191.65	83.05
J-44		4.80	465.18	278.10	187.08	81.07
J-45		4.70	466.93	284.20	182.73	79.18
J-46		9.00	466.80	273.90	192.90	83.59
J-47		4.60	464.85	288.80	176.05	76.29
J-48		10.00	464.41	287.70	176.71	76.58
J-49		5.40	464.20	289.20	175.00	75.83
J-5		5.50	467.92	286.90	181.02	78.44
J-50		7.70	464.41	287.30	177.11	76.75
J-51		3.30	464.34	286.00	178.34	77.28
J-52		6.20	464.21	282.90	181.31	78.57
J-53		8.50	467.34	276.40	190.94	82.74
J-54		5.00	464.16	276.90	187.26	81.15
J-55		6.00	463.93	278.10	185.83	80.53
J-56		14.00	463.87	280.60	183.27	79.42
J-57		12.90	473.88	277.20	196.68	85.23
J-58		5.80	463.95	279.90	184.05	79.75
J-59		5.90	464.31	283.60	180.71	78.31
J-6		10.20	467.10	275.20	191.90	83.16
J-60		4.80	463.90	277.70	186.20	80.69
J-61		4.30	463.85	289.50	174.35	75.55
J-62		2.50	463.58	309.20	154.38	66.90
J-63		4.00	463.50	284.20	179.30	77.69
J-64		6.10	463.45	285.50	177.95	77.11
J-65		1.00	463.50	285.00	178.50	77.35
J-66		9.50	463.49	283.90	179.59	77.82
J-67		3.70	467.06	278.20	188.86	81.84
J-68		1.00	466.68	262.90	203.78	88.30
J-69		5.20	466.65	262.20	204.45	88.60
J-7		13.90	467.06	276.20	190.86	82.71
J-71		8.20	466.62	272.90	193.72	83.94
J-72		12.30	466.54	279.80	186.74	80.92
J-73		6.40	466.54	258.80	207.74	90.02
J-74		7.00	466.57	261.20	205.37	88.99
J-75		12.80	463.49	277.10	186.39	80.77
J-76		2.30	463.85	279.20	184.65	80.02
J-77		14.20	463.77	282.40	181.37	78.60
J-78		3.60	463.58	277.40	186.18	80.68
J-79		2.30	466.50	260.80	205.70	89.14
J-8		10.20	467.13	286.90	180.23	78.10
J-80		2.50	466.50	259.40	207.10	89.75
J-81		2.50	466.50	258.10	208.40	90.31
J-82		16.50	463.89	273.70	190.19	82.41
J-83		4.70	466.50	258.70	207.80	90.05
J-84		14.50	466.47	280.00	186.47	80.80
J-85		0.50	466.71	263.40	203.31	88.10
J-86		4.00	463.49	278.80	184.69	80.03
J-87		11.20	462.98	308.30	154.68	67.03
J-88		3.40	466.55	259.80	206.75	89.59
J-89		2.00	466.52	258.20	208.32	90.27
J-9		6.30	466.92	279.70	187.22	81.13
J-90		1.50	466.53	259.60	206.93	89.67
J-91		2.90	466.55	260.80	205.75	89.16
J-92		6.90	466.62	272.20	194.42	84.25
J-93		8.50	463.21	309.00	154.21	66.82
J-94		5.50	464.83	286.30	178.53	77.36
J-95		3.10	464.83	288.60	176.23	76.37
J-96		3.30	464.61	287.50	177.11	76.75
J-97		0.90	464.62	289.30	175.32	75.97
J-98		2.80	464.62	287.40	177.22	76.79
J-99		4.20	463.18	308.80	154.38	66.90
R-1	275,000 gal	----	480.00	467.00	13.00	5.63
R-2	275,000 gal	----	480.00	467.00	13.00	5.63
Well No. 1		----	279.10	279.10	0.00	0.00
Well No. 3		----	271.70	271.70	0.00	0.00
O-Well Pum	300 gpm capa	0.00	463.93	279.10	184.83	80.09
O-Well Pum	400 gpm capa	0.00	463.93	271.70	192.23	83.30

I-Well Pum	300 gpm capa	0.00	279.10	279.10	0.00	0.00
I-Well Pum	400 gpm capa	0.00	271.70	271.70	0.00	0.00

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-81	90.31	J-22	1.17
J-89	90.27	R-1	5.63
J-134	90.24	R-2	5.63
J-21	90.20	J-23	8.42
J-120	90.15	J-20	8.49
J-201	90.10	J-109	65.41
J-83	90.05	J-108	65.46
J-73	90.02	J-368	66.29
J-135	89.98	J-127	66.30
J-202	89.88	J-119	66.42

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-15	6.02	P-220	0.00
P-16	4.31	P-234	0.00
P-41	3.22	P-298	0.00
P-17	2.98	P-169	0.00
P-3	2.87	P-203	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-15	19.96	P-234	0.00
P-16	7.69	P-298	0.00
P-11	5.21	P-220	0.00
P-41	4.49	P-94	0.00
P-44	3.80	P-169	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-15	19.96	P-234	0.00
P-16	7.69	P-298	0.00
P-11	5.21	P-220	0.00
P-41	4.49	P-94	0.00
P-44	3.80	P-169	0.00

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
Well Pump No	FCV-2	0.00	BOOSTED	0.00	80.09	0.00
Well Pump No	FCV-2	0.00	BOOSTED	0.00	83.30	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	509.31	275,000 gal
R-2	763.89	275,000 gal

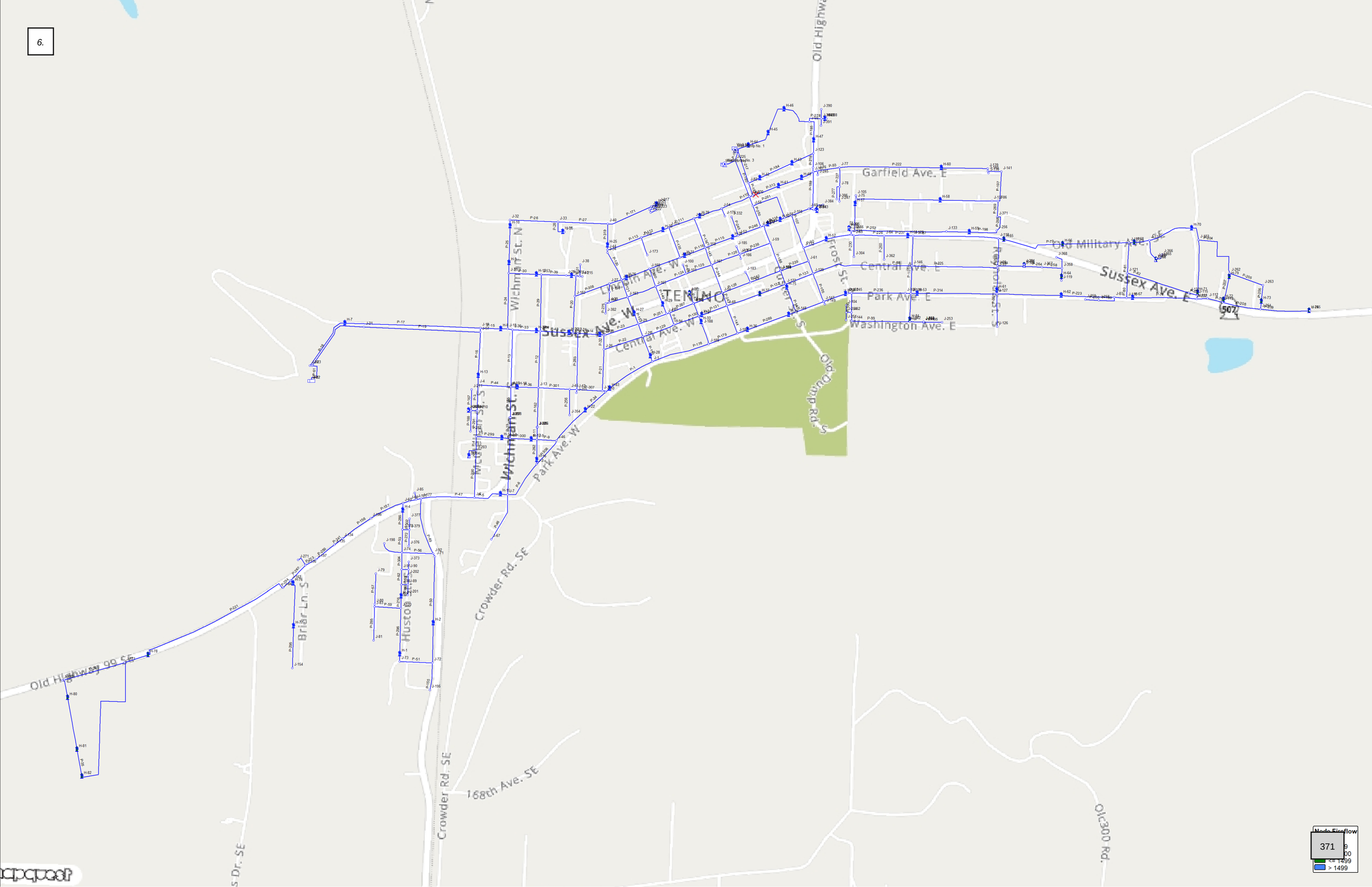
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      Well No. 1        0.00
      Well No. 3        0.00

 NET SYSTEM INFLOW  =   1273.20
 NET SYSTEM OUTFLOW =      0.00
 NET SYSTEM DEMAND  =   1273.20


          ***** HYDRAULIC ANALYSIS COMPLETED *****
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6.

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Old Highway 99 SE
Briar Ln. SE
Crowder Rd. SE
168th Ave. SE
Old Military Rd. E
Garfield Ave. E
Central Ave. E
Park Ave. E
Washington Ave. E
Sussex Ave. E
Old Dump Rd.
Node Flowrate
371
<= 1499
> 1499

Appendix F

Public Correspondence

<Date>

<County Emergency Management>
<County "Community Development>
<Department of Ecology>
<Department of Natural Resources>

Subject: City of Tenino Water System – Wellhead Protection Areas.

Dear (Agency/Local Government):

As part of the wellhead protection program for the City of Tenino Water System, we are hereby informing you of the findings of our wellhead protection area delineation. This is in accordance with State regulations (WAC 246-290-135).

The City of Tenino Water System has approximately 833 service connections, and serves a population of approximately 2,030 people. The State Department of Health has not yet rated our new drinking water sources, but they are likely to be classified as "moderate to highly susceptible". This means that our drinking water supply can be vulnerable to contamination.

The enclosed map shows the 1, 5, and 10-year time of travel boundaries for our wellhead protection area. Any ground water contamination that occurs within this wellhead protection area has the potential to reach our well. It is therefore of utmost importance to us that all reasonable steps be taken to ensure that land use activities within this area do not contaminate our customers' drinking water supplies.

Thank you for your support in protecting our drinking water. If you have any questions, please call me at (360) 264-2368.

Sincerely,

Troy Cannon
Public Works Director
City of Tenino

6.

<Date>

<General Land Owner>
<Address>
<City>, <State> <zip>

Subject: City of Tenino Water System – Wellhead Protection Areas.

Dear _____

In order to protect the drinking water supply for the customers of City of Tenino, we are developing a wellhead protection program in accordance with State requirements. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supplies (see attached). This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an assessment of activities within our wellhead protection area that have the potential to impact water quality. We have not identified any potential issues with your property, but we wanted to let you know that the way you use your property may have an impact on our drinking water supply. We realize you may already be aware of these issues and are careful to protect the environment. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

If you have any questions regarding appropriate land management practices, please contact the Department of Natural Resources or the Department of Ecology. If you have any questions regarding this correspondence or our wellhead protection program in general, please call me at (360) 264-2368.

Sincerely,

Troy Cannon
Public Works Director
City of Tenino

6.

<Date>

<Agricultural Land Owner>
<Address>
<City>, <State> <zip>

Subject: City of Tenino Water System – Wellhead Protection Areas.

Dear _____

In order to protect the drinking water supply for the customers of City of Tenino, we are developing a wellhead protection program in accordance with State requirements. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supplies (see attached). This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an assessment of activities within our wellhead protection area that have the potential to impact water quality. It is apparent that the primary us of your property is agricultural. Some agricultural practices, such as pesticide and herbicide application, may have the potential to affect our customers' drinking water supply. We realize you may already be aware of these issues and are careful to protect the environment. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

If you have any questions regarding appropriate land management practices, please contact the Department of Natural Resources or the Department of Ecology. If you have any questions regarding this correspondence or our wellhead protection program in general, please call me at (360) 264-2368.

Sincerely,

Troy Cannon
Public Works Director
City of Tenino

6.

CITY OF TENINO
COMPLAINT / ACTION FORM

149 S Hodgden Street, P O Box 4019
Tenino, WA 98589
(360) 264-2368

To Be Completed by Person Making Complaint

NOTE: Your personal information will be protected pursuant to RCW 42.17.310(1)(e). However, in the event that this matter enters the courts, you may be called as a witness.

Your Name: _____ **Phone:** _____
(Please Print)

Mailing Address: _____
Street Address or P O Box *City* *State* *Zip*

Complaint: _____

(use back if more room is needed)

Your Signature (Required): **Date:** _____

For Internal Use Only

Date Received: _____ **By:** _____

Route Copy To:
- ☐ Mayor
- ☐ City Clerk
- ☐ Building Inspector
- ☐ Public Works
- ☐ Police
- ☐ Animal Control

DEPARTMENT ACTION TAKEN:

Department: _____ **Date received by Dept:** _____

Investigation & Response: _____

By: _____ **Date:** _____

After final action send original complaint and a copy of all documents to the City Clerk.

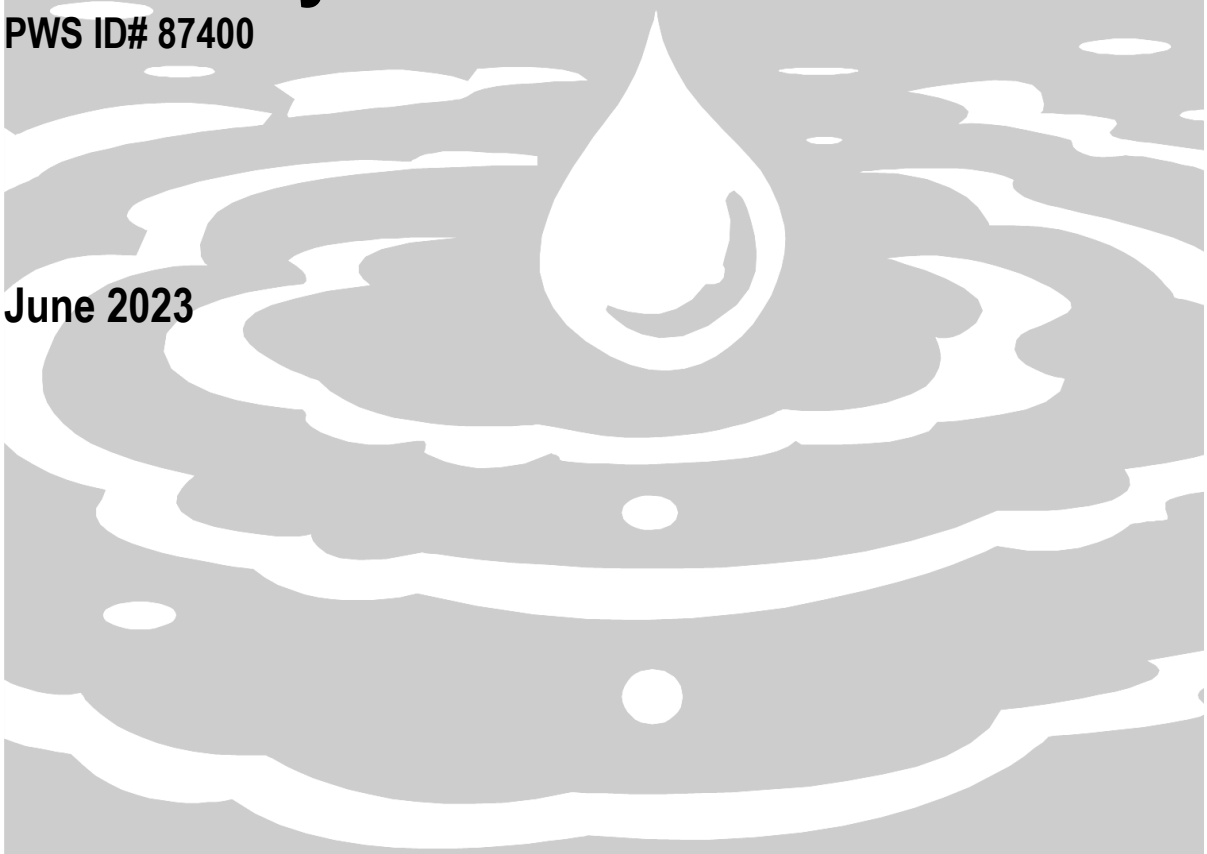
Appendix G

Emergency Response Plan
and
Water Shortage Response Plan

Emergency Response Plan

City of Tenino Water System

PWS ID# 87400



June 2023

Adapted From: Emergency Response Planning Guide for Public Drinking Water Systems - DOH PUB. #331-211

6.

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6.

Introduction: Protecting public health

Safe and reliable drinking water is vital to every community. Emergency response planning is an essential part of managing a drinking water system. Most public water systems have had routine operating emergencies such as pipe breaks, pump malfunctions, coliform contamination, and power outages. These are manageable if the water system has an emergency response plan that can be put into action quickly. More serious non-routine emergencies may result from intentional acts of sabotage, chemical spills, floods, earthquakes, windstorms, or droughts. These can drastically affect the system and the community that depends on it.

Each emergency has unique effects on different parts of a water system. Floods can cause widespread bacterial contamination, earthquakes can damage sources and distribution systems, and storms can disrupt power supplies. The common element is that each emergency may threaten the system's ability to deliver safe and reliable drinking water.

Emergency response planning is a process by which water system managers and staff explore vulnerabilities, make improvements, and establish procedures to follow in an emergency. It is also a process that encourages people to form partnerships and get to know one another. Preparing a response plan and practicing it can save lives, prevent illness, enhance system security, minimize property damage, and lessen liability.

The operations and maintenance section of the state rule, Chapter 246-290-415 (2)(b) WAC, requires public water systems in Washington to have an emergency response plan as part of a water system plan or small water system management program. It also requires that systems employ reasonable security measures to protect the raw water intake facilities, water treatment processes, storage facilities, pump-houses, and distribution systems from possible damage or intruders.

This guidance document can be used to help meet the requirement for developing an emergency response program. Other methods or formats can also be used to meet the emergency response program requirement.

How to use this document

Developing an emergency response plan can take a lot of time and effort. The purpose of this document is to make the job easier and help create a plan that works for your water system. The document is intended for use by any water system and may be modified to fit the specific needs of each system.

Section 1.
Emergency response mission and goals

Stating a mission and goals for emergency response is an important first step because it helps a water system focus on the important aspects of the plan. The mission statement and goals should reflect the system's obligation to protect the health and safety of its customers, staff, and assets – and be able to maintain or restore safe and reliable drinking water. Developing partnerships with key response agencies should be reflected in the goals.

System personnel should begin by understanding what needs to be accomplished during an emergency. Protecting your customers' health is paramount. If the water has been contaminated, you must notify customers quickly. Then you must resolve the situation at hand and restore safe and reliable water throughout the system. In any event, there are a series of general steps that a water system should take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate actions to save lives.
3. Take action to reduce injuries and system damage.
4. Make repairs based on priority demand.

Return the system to normal operation.

Emergency response mission and goals

Mission statement for emergency response	In an emergency, the mission of the City is to protect the health of our customers by being prepared to respond immediately to a variety of events that may result in contamination of the water or disruption of supplying water.
Goal 1	Be able to quickly identify an emergency and initiate timely and effective response action.
Goal 2	Be able to quickly notify local, state, and federal agencies to assist in the response.
Goal 3	Protect public health by being able to quickly determine if the water is not safe to drink or use and being able to immediately notify customers effectively of the situation and advise them of appropriate protective action.
Goal 4	To be able to quickly respond and repair damages to minimize system down time.

Section 2.
System Information

In any emergency, a water system needs to have basic information available for both system personnel, and external parties such as emergency responders, repair people, the media, and others. Basic information that should be presented in the emergency response plan are the system's ID number, system name, system address or location, directions to the system, population served, number of service connections, system owner, and information about the person in charge of managing the emergency. Below is basic water system information.

System information

System identification number	87400	
System name and address	City of Tenino 149 S Hodgen Street Tenino, Washington 98589	
Basic description and location of system facilities	The water system has two groundwater wells of 94' and 93' depth. Each well utilizes disinfection and pH adjustment for treatment. The wells pump into the distribution grid at common location and fill the two steel storage tanks on Lemon Hill.	
Population served and service connections from Division of Drinking Water records.	2,030 people	833 connections
Name, title, and phone number of person responsible for maintaining and implementing the emergency plan.	Troy Cannon Public Works Director	(360) 264-2368 Phone (360) 261-1506 Phone (360) 264-5772 FAX

Section 3.
Chain of Command – Lines of Authority

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 the entire emergency.

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.

The first response 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.

Chain of command – lines of authority

Name and title	Responsibilities during an emergency	Contact numbers
Mayor	Policy making and final decisions.	
Public Works Director	Responsible for overall management and decision making for the water system. The Public Works Director is the lead for managing the emergency, providing information to regulatory agencies, the public and news media. All communications to external parties are to be routed through the Public Works Director.	(360) 264-2368 Phone (360) 261-1506 Director of Public Works
Lead Water System Operator	In charge of operating the water system, performing inspections, maintenance and sampling and relaying critical information, assessing facilities, and providing recommendations to the Public Works Director.	Cell:
City Clerk	Responsible for administrative functions in the office including receiving phone calls and keeping a log of events. This person will provide a standard pre-scripted message to those who call with general questions. Additional information will be released through the Public Works Director.	Phone: (360) 264-2368
Field Staff	Supports the lead water system operator.	(360) 951-0876

Assembly Areas and Accountability: Obtain an accurate account of personnel using designated assembly areas where personnel should gather. *The designated gathering place for water system personnel is the public works shop. The designated command center is City Hall.*

Section 4.
Events that Cause Emergencies

Why do emergencies happen? There are a variety of reasons including:

- Natural disasters.
- Accidents.
- Deliberate acts of vandalism or terrorism.
- System neglect or deferred maintenance.

An emergency may affect the entire water system or only isolated sections. Each type of event can cause different types of damage to system components or contamination resulting in a disruption in service. These evaluations should be reflected in the water system's vulnerability assessment and procedures for responding to specific events that are discussed later in this document.

Natural Disasters

More common natural disasters that may impact the City include:

Earthquakes: The Nisqually earthquake in February 2001, although not severe, caused problems for water systems in western Washington. Distribution pipes and service lines broke, storage reservoirs shifted, and buildings were damaged. Although no major outages were reported, it was a serious reminder that these things can and do happen.

Floods: Floods are a common event in the Pacific Northwest. They can cause widespread contamination as turbid waters carry bacteria that can overflow sources, transmission lines, treatment facilities, and pumping facilities. Floods can also ruin electrical components and telemetry systems.

High winds: Pacific Northwest storms often generate winds in excess of 50 miles an hour and have exceeded hurricane-force sustained winds of 74 miles an hour or greater from time-to-time. These storms often disrupt power and damage water system facilities.

Human-caused events

Human-caused events that can result in a water system emergency include chemical spills, vandalism, terrorism, cyber-attack, fires, construction accidents, and basic neglect of maintaining the system.

Vandalism: Vandalism is generally a spur-of-the-moment act using materials at hand rather than pre-planned or pre-meditated activities. Vandals often break into systems, damage facilities, and paint graffiti. These acts are relatively easy to prevent by enhancing security, increasing lighting, installing locks on doors and hatches, and putting up security fencing.

Terrorism: Acts of terrorism are conducted by someone whose intent is to instill fear or induce harm to people and facilities. Acts of terrorism are a very real threat in America. Even though it may seem unlikely, it would only take one well-staged event to undermine confidence in drinking

water safety. Being prepared and knowing what to look for are crucial elements of preventing an attack on the system.

System neglect: System neglect, often referred to as deferred maintenance, is a major cause of emergencies. System components that are aging and need replacement go without attention for so long that they fail, causing an emergency. Drinking water systems need to continuously evaluate facilities and replace them before a massive failure occurs. In one case, a drinking water system continuously put off repairing its major transmission line that traversed a hillside in town. The line finally failed and caused an immense slide, destroying a number of homes and causing significant damage.

Construction accidents: Construction accidents sometime fall into the category of a routine operating emergency. For example, when a contractor damages a water line and the system needs to be shut down for repair. If the response is not timely and effective, this kind of incident can turn into a serious emergency. The system may lose pressure, resulting in serious backflow incidents that contaminate the water. The utility must be aware of construction in and around the system and be prepared to respond quickly to an accident if it happens.

In preparing a plan, you may not consider it necessary to do an extensive analysis of a rare event such as a tornado in the Pacific Northwest. However, analyzing the impacts of an earthquake, flood, or storm is important because they happen quite often in Washington. Consider the probability of an event and its likely effect on the water system. Then focus on the actions needed to reduce impacts and respond in a timely and effective manner.

Example: Events that cause emergencies

Type of event	Probability or risk (High – Med – Low)	Comments
Earthquake	Low to Medium	Only minor earthquake exposures historically.
Flood	Low	Both Wells are not located in areas susceptible to flooding.
High winds	Low	Back-up power for Well No. 3 and communication telemetry is buried.
Ice storm	Low	Low probability that and event will impact water service.
Drought	Low	Local aquifers are not affected by typical drought conditions.
Terrorism	Low	Vulnerability assessment was conducted in 2004
Construction accident	Low	Pipes are typically well documented and located prior to construction.
Chemical spill	Moderate	Aquifer is moderately susceptible to chemical spills.

Section 5.
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.

An assessment of severity, once decided, 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 alternative method of communicating if cell phones and pagers won't work.

In classifying the severity of an emergency, define as many levels and descriptions as you find useful. The following is a four-level example for a water system supplied by groundwater that has been used in many settings. This is just an example; you may choose to classify emergencies in some other way. Smaller systems may prefer a three-level scheme; some larger systems may want to use five or more levels.

Level I – Normal (Routine) Emergency: The system experiences a normal emergency, such as a line break or power outage. System personnel are able to handle the problem with minimal outside assistance. In this situation is not likely that public health will be immediately jeopardized. Although it is important to begin responding, system personnel should have no difficulty remaining calm and thoroughly working through the situation. Normal events can usually be resolved within 24 hours.

Example: Level I emergency

Description: Level I emergencies:

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

The system has specific response activities identified for these types of emergencies, including proper sampling, disinfection, and pressure testing activities. System personnel are advised and are directed to work on the problem and are usually capable of resolving the problem within 24 hours. If it is determined that the problem will take longer than 24 hours to resolve and storage is likely to be drawn down below a safe operating level, the situation will be elevated to level II.

Level II – Minor Emergency (Alert Status): The system experiences minor disruption in supply or has indications of possible contamination where it may need to coordinate with DOH and consider issuing a health advisory to customers. In these types of emergencies, public health may be jeopardized, so it is important for system personnel to be on alert and initiate a quick response. Minor emergencies can usually be resolved within 72 hours.

Example: Level II emergency

Description: Level II emergencies:

- Disruption in supply such as a transmission main line break, pump failure with a potential for backflow, and loss of pressure.
- Storage is not adequate to handle disruption in supply.
- An initial positive coliform or E. coli sample.
- An initial primary chemical contaminant sample.
- A disruption in chlorine/chemical feed from the groundwater sources.
- A minor act of vandalism.
- Drought, with a noticeable and continuing decline of water level in the well.

Level III – Significant Emergency: The system experiences significant mechanical or contamination problems where disruption in supply is inevitable and issuance of a health advisory is needed to protect public health. Major emergencies should be reported to DOH as soon as possible to determine the best available means to protect customers' health. System personnel are directed to the situation, and outside entities are notified to aid in the response. Major emergencies may require more than 72 hours to resolve.

Example: Level III emergency

Description: Level III or actual emergencies:

- A verified acute confirmed coliform MCL or E. coli/fecal positive sample requiring immediate consideration of a health advisory notice to customers.
- A confirmed sample of another primary contaminant requiring immediate consideration of a health advisory notice to customers.
- A loss or complete malfunction of the water treatment facilities for the surface water source, including chlorination.
- A major line break or other system failure resulting in a water shortage or requiring system shutdown.
- An act of vandalism or terrorist threat such as intrusion or damage to a primary facility.
- An immediate threat to public health of the customers and an advisory is required.
- Severe drought significantly affecting well yield.

Level IV – Catastrophic Disaster/Major Emergency: The system experiences major damage or contamination from a natural disaster, an accident, or an act of terrorism. These 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.

Example: Level IV emergency

Description: Level IV or major emergencies:

- Natural or Human event that shuts down the system or severely impacts sources, lines, etc.
- Act of terrorism possibly contaminating the water system with biological or chemical agents.
- Flood that infiltrates system facilities and sources.
- Storm that significantly damages power grid and system facilities.
- Mudslide or other earth shift that causes failure of transmission or loss of water in well.

Section 6.
Emergency Notification

During most emergencies, it will be necessary to quickly notify a variety of parties.

Preparation for such notification has 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.

Notification procedures

These procedures describe how to make notifications to specific parties, who is responsible for conducting the notifications, who assists in the notifications, and what methods are used to complete them.

Who is responsible:	The Mayor is ultimately responsible for making the decision to notify customers regarding contamination, potential water shortage or the need for water use restrictions. The Mayor will consult with Public Works Director and the water system operator to make the decision. Once the decision is made procedures for notification will be initiated.
Procedures:	• Mayor and Public Works Director confer with key staff to verify problems. • Public Works Director consults with staff and DOH to develop message. • Mayor approves message. • Public Works Director, with assistance from staff prepares door hangers, signs and/or radio message. • Water system operator continues to investigate problem and make repairs as necessary. • Notifications will be distributed by newspaper and radio stations for all levels of emergency. Signs at key locations and on main travel routes will be utilized for extreme high hazard events. • An administrative support person will be assigned by the City Clerk to read a pre-scripted message to phone callers and log in each phone call. • Water system operator will continuously update the Public Works Director. • Once the emergency situation is resolved, re-notify customers and media.

Notification call-up list

Call-up lists should be comprehensive, including local law enforcement, DOH Division of Drinking Water regional office, Department of Ecology spill response, local mayors and city officials, local health officials, safety officials, local emergency responders ,water testing laboratories, and service/repair providers. A list of priority customers, such as hospitals, nursing homes, clinics, and schools should also be maintained for immediate notification. See the following pages for comprehensive notification lists.

Local Notification List (area code 360 unless otherwise noted)

ORGANIZATION	CONTACT	TELEPHONE	TELEPHONE	EMAIL
Fire Department	Duty Person		911	
Police Department	Joe Vukich		911	
FBI Field Office			(206) 622-0460	
Health Department				
Primacy Agency District Office	Reg. Engr. DOH		1-877-481-4901	
Local Hospital				
Local Emergency Planning Committee			911	
EMS	Duty Person		911	
Local Pharmacy				
Local Nursing Homes				
Local Schools	Tenino School District			
Local Prisons				
Local Government Official				
Local Hazmat Team				
Water System Operator	Troy Cannon			
Neighboring Water System				
Neighboring Water System				
Other				

Service/Repair Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (N
Electrician			
Electrician			
Electric Utility Company			
Gas Utility Company			
Sewer Utility Company	City of Tenino		
Telephone Utility Company			
Plumber			
Pump Specialist			

Pump Specialist			
“Dig Safe” or local equivalent	Utility Locate	1-800-553-4344	
Soil Excavator/Backhoe Operator			
Equipment Rental (Power Generators)			
Equipment Rental (Chlorinators)	TMG Services	253-779-4160	1-800-562-2310
Equipment Rental (Portable Fencing)			
Equipment Repairman			
Radio/Telemetry Repair Service			
Bottled Water Source			
Bulk Water Hauler	LTI, Inc.	1-800-530-6455	
Pump Supplier			
Well Drillers			
Pipe Supplier			
Chemical Supplier			
Local/Regional Analytical Laboratory			

State Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)
Drinking Water Primacy Agency	_____, Regional Engineer, WSDOH	(360) 236-3030	1-877-481-4901
Department of Environmental Protection (or state equivalent)	Department of Ecology	(360) 407-6300	NA
Department of Health			
Emergency Management Agency			
Hazmat Hotline	Dale Jensen, Ecology Spill Response	(360) 407-7450	(360) 407-7450

Media Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)
Designated Water System Spokesperson	Mayor		
Newspaper - Local			
Newspaper – Regional/State			
Radio			
Radio			

Television	KOMO, KING	1-TVTIPS-KOMO, 206-448-5555	
Television	KIRO, FOX	(206) 728-7777	

Section 7.
Water Quality Sampling

The ERP needs to identify and address special water sampling and monitoring issues that may arise during and after a major event. Some water sampling and monitoring issues to consider include:

- Identifying proper sampling procedures for different types of contaminants;
- Obtaining sample containers;
- Identifying who is responsible for taking samples;
- Confirming laboratory capabilities and certifications; and
- Interpreting monitoring or laboratory results.

The following is guidance for basic testing that is common for most emergency conditions:

Coliform Bacteria: Most pathogens that contaminate water supplies come from the feces of humans or animals. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. It is, however, relatively quick, easy, and inexpensive to test water for coliform bacteria. All systems must have a coliform monitoring plan, as required by drinking water regulations that designates sampling sites, procedures, laboratory requirements, and contact numbers. This plan is an integral part of the emergency response plan. In the event of an emergency, testing for coliform is a standard first test, and if coliform is detected it is a signal that the system may be contaminated. Coliform bacteria generally do not cause illness, but their presence indicates that other disease-causing organisms (pathogens) may be in the water system.

Chlorine Residual: In chlorinated systems, this test indicates if materials introduced into the water have created a demand for the chlorine, leaving lower-than-normal or no residual and signaling the need for further evaluations.

Cyanide/Other: Cyanide or other specific contaminant tests are not easily performed, but should be done immediately if cyanide or other specific contamination is suspected. Cyanide, in particular, is very toxic, causing death upon ingestion. If contamination is suspected, DOH Division of Drinking Water regional office personnel are available to help identify what testing should be done.

If intentional sabotage of the system or contamination of the water is suspected, this may be a crime scene. Call your local law enforcement and DOH Division of Drinking Water regional office, and be sure not to disturb any potential evidence.

Water quality sampling

Sampling parameter	Do we have procedures? Yes/No	Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)
Coliform Bacteria	Lewis County Health Department Lab - Chehalis. Arrange non-working hour samples through the County Emergency Management office when needed.	Basic guidance for collecting samples is included in the current Coliform Monitoring Plan (CMP). Specific procedures for emergencies will not differ with regard to sampling techniques, but will change with regard to sample locations
Chlorine Residual	Water Department has equipment to conduct chlorine residual analysis.	Conduct samples at locations upstream and downstream of suspected areas. Sample as many times as warranted to positively confirm that contamination does or does not exist.
Nitrate/Nitrite	Samples must be analyzed at the State Public Health Lab or at a private Lab.	Conduct samples at wells. Sample as many times as warranted to positively confirm that contamination does or does not exist.
Cyanide/Other	Special Samples must be analyzed at the State Public Health Lab or at a private Lab.	Special sampling will be based on a specific known or suspected threat. The City will likely have to confer with DOH and other outside experts to determine the best course of action and sampling locations.

Section 8.
Effective Communication

Effective communications is a key element of emergency response. Make sure you have a well thought out communications strategy in place as part of your emergency response plan. If you haven't planned ahead by the time a crisis hits, it's too late. How you communicate with your employees, customers, and the media can affect the outcome of the situation.

Preparation for such notification has 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.

Communication Tips

Do:

- Be prepared.
- Designate a spokesperson.
- Provide complete, accurate, and timely information.
- Tell the truth.
- Express empathy.
- Acknowledge uncertainty and offer to get back with more information later.
- Document your communications.

Do not:

- Speculate on the cause or outcome of an incident.
- Blame or debate.
- Minimize or brush off concerns of customers.
- Treat inquiries from interested parties as an annoying distraction from the real business of emergency response.

Designated public spokesperson

Spokesperson	Alternate 1	Alternate 2
Public Works Director	Mayor	As Assigned

Key messages

Develop possible messages in advance, and update them as the emergency develops:

- We are taking this incident seriously and doing everything we can to resolve it.
- Our primary concern is protecting our customers' health.
- Another important concern is keeping the system operational and preventing damage.
- What we know right now is _____
- The information we have is incomplete. We will keep you informed as soon as we know more.
- We have contacted state and local officials to help us respond effectively.
- If you think you may be ill or need medical advice, contact a physician.
- We are sampling the water and doing tests to determine whether there is contamination.
-

Health Advisories

During events when water quality and human health are in question, it may be necessary to issue a health advisory that gives advice or recommendations to water system customers on how to protect their health when drinking water is considered unsafe. These advisories are issued when the health risks to the consumers are sufficient, in the estimation of the water system or state or local health officials, to warrant such advice.

Health advisories usually take the form of a drinking water warning or boil water advisory. Communication during these times is critical. Health advisories should always be well thought out and provide very clear messages. Once initiated, a health advisor cannot be rescinded without prior consent by DOH.

The Division of Drinking Water has put together a number of tools, including fact sheets, brochures, forms, and templates to help prepare for a health advisory. These are on the Web at: http://www.doh.wa.gov/ehp/dw and in the Coliform Monitoring Plan

Section 9.
The Vulnerability Assessment

Community water systems serving populations greater than 3,300 persons are now being required by the Environmental Protection Agency to identify vulnerabilities to intentional acts of terrorism. This document uses the term vulnerability assessment to mean the process by which the water system evaluates each water system component for weaknesses or deficiencies that may make the system susceptible to damage or failure during a natural or human-caused emergency. The City conducted this exercise in 2004. The results are on file at City Hall. The information is considered to be sensitive and is made available to staff only as needed.

Other, less sensitive vulnerability information is provided in the following:

Facility vulnerability assessment and improvements identification

System component	Description and condition	Vulnerability	Improvements or mitigating actions
Source	Two groundwater wells are in relatively unconfined geologic settings. The sources are in excellent condition.	The wells are most vulnerable to large chemical spills upstream.	City is addressing vulnerability by planning to implement a well in the southwest service area.
Storage	The tanks are in sound condition.	City has redundant tanks with proper security systems installed. No specific vulnerability identified.	No current deficiencies.
Treatment	Treatment systems are sound and reliable.	Redundant systems and control safeguards at each well have mitigated most vulnerabilities.	No current deficiencies.
Computer and telemetry system	Telemetry system at the wells and storage tanks. All systems are in good operating condition.	The lease lines to the Main Reservoir are buried.	No current deficiencies.

Section 10.
Response Actions for Specific Events

Develop a detailed response plan for each type of emergency event that the system may experience. In any event there are a series of general steps that a water system should take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate actions to save lives.
3. Take action to reduce injuries and system damage.
4. Make repairs based on priority demand.
5. Return the system to normal operation.

Knowing the various elements of emergency response planning and keeping in mind these general steps will help you develop response actions for specific events.

Establishing response actions for specific events

There are numerous events which may cause an emergency that are dictated by the system's size, complexity, type of source, and geographic location. As discussed before, likely causes of emergencies in our state that a system should consider are power outages, transmission or distribution line breaks, chlorine treatment failure, surface water treatment malfunction, source pump failures, microbial (coliform, E. coli) contamination, chemical contamination, acts of terrorism, vandalism, loss of water in the well, drought, floods, ice storms, earthquakes, and hazardous spills in the vicinity of sources or distribution lines. In any of these situations your priority is the protection of people using the water. Be observant of what is going on around you, and if you suspect vandalism or terrorism, contact local law enforcement and make every effort to preserve evidence. Based on previous section of this ERP, the water system has relatively low vulnerability to most events other than Power Outage, Microbial Contamination, Flood and High Winds. The following addresses specific response to those events.

Microbial (coliform, E. coli) contamination

Assessment	The water system is vulnerable to microbial contamination, both acute and non-acute.
Immediate actions	1. Call DOH immediately. 2. Consult Coliform Monitoring Plan for basic information and guidelines. 3. Notify system and take follow up samples as required. This may include various levels of notification and sampling. The general steps will mostly be prescribed by DOH.
Notifications	1. DOH - to obtain specific instructions 2. Customers – to describe severity of event and specific actions to take during and after (as needed).
Follow-up actions	1. Additional sampling in the following month.

High Winds

Assessment	The water system is vulnerable to high winds that can affect power supply and telemetry, but service is not typically impacted by them. Storage capacity is able to supply the system for multiple days until power and telemetry is restored.
Immediate actions	1. Operate wells manually until telemetry systems can be repaired. 2. Call phone company to make sure that lease line is a priority.
Notifications	1. Phone company to make sure telemetry cables are a priority.
Follow-up actions	1. Inspect reservoir and well telemetry system operation to ensure proper operation.

Section 11.
Alternative Water Sources

It is important to evaluate potential alternative water supplies ahead of time to ensure the water is safe and the supply is available. Sources that the water system may use when the primary sources cannot meet demands are defined as "emergency sources." They are used only when required by extreme, and mostly unpredictable, circumstances. Alternative sources might include emergency or back-up wells, surface water sources, or springs.

Another important consideration is whether the water system can establish an intertie with an approved water supply that might benefit both systems in an emergency. Other alternatives include bottled water suppliers or a local tanker truck that could bring in water for various uses.

Intertie to adjacent water supply system

Water systems within one-quarter mile of our system	Feasibility of connecting
Intertie not currently available	

Short-term outages might be due to contamination or electrical power outages. If your CWS has been contaminated, a public health notification such as "boil water," "do not drink," or "do not use," may be issued by the drinking water primacy agency. If a "boil water" notice is issued, no alternative water source is needed. If a "do not drink" order is issued, then the suspect water can still be used for other activities that do not involve ingestion of the water. In this situation, it will only be necessary to provide an alternate drinking water supply for consumption and related activities such as food preparation.

A "do not use" order is much more restrictive. In this case, a sufficient alternate water source is needed to supply water for consumption, hygiene, and emergency needs. A "do not use" notice may also have implications with respect to water used for firefighting. Although a prohibition on use of water for firefighting is likely to occur only if the water is contaminated with certain substances, an alternate source of firefighting water, such as a pond, river, or stream, may be necessary in this event.

Alternate source(s) of water

Alternative sources	Names	Phone	Availability	Is the water safe for drinking?
Bottled water suppliers				
Tanker trucks in the area available to deliver bulk water	LTI, Inc. (the contract haulers for Dairy Gold in Chehalis)	360-256-2577 or 1-800-530-6455	9,000 gallons in less than 8 hours	Yes, If taken from a compliant public water system.

Section 12.
Curtailing Water Use

An emergency may require reducing water usage. Possible measures include restrictions on landscape watering, car washing, filling of swimming pools and hot tubs, and other nonessential activities such as cleaning driveways and sidewalks. There can be various combinations of voluntary and mandatory measures. The water system should develop and formally adopt measures through ordinance, resolution, or by-laws.

Curtailing water use

Water curtailment measures	Actions
Stage 1 - Voluntary: Request reduction in outside water usage including watering lawns, washing cars, etc. Stage 2 - Mandatory: Require reduction in outside water usage including watering lawns, washing cars, etc. Initiate specific council action through resolution to enact temporary policy for charges and penalties.	Upon making the decision that curtailment is needed: 1. Draft door hanger with curtailment messages. 2. Post on customer doors. 3. Contact local media to announce message. 4. Monitor system usage and spot check meter usage as needed. 5. Continue message as long as curtailment is warranted.

As part of this effort, consider ways to inform customers about the need to curtail water use. Examples include door-to-door postings, phone contact, posting of signs in visible community areas, and contacting the news media. Curtailment messages should be pre-scripted to ensure proper messages are delivered.

Section 13.
Returning to Normal Operation

As the emergency passes and you regain control, the system must prepare to return to normal operating condition. 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 back-up generator is disconnected. Or it could mean the system has to obtain the proper number of satisfactory coliform tests and disinfect the system in order to lift a health advisory.

Many factors might need to be considered before you decide to return to normal operation. For example:

- Has the system been repaired to the point that it can meet demand?
- Has the system operator 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 standards?
- Is there adequate staff to operate and manage the system?
- Do federal, state, and local agencies support returning to normal operation?
- Have you developed the proper public messages?

The emergency response plan should include a discussion of the follow-up actions and staff responsibilities that the system must take before returning to normal operation.

Returning to normal operations

Action	Description and actions
Inspect, flush, and disinfect the system,	Water system operator and support staff inspect all system facilities, ensure all water quality tests have been done and the system has been flushed and disinfected if necessary. Water system operator makes a report to the water system manager. Water system manager makes decision on current condition of system.
Verification of water quality	Water system manager verifies water quality sampling results.
Coordinate with DOH	Water system manager coordinates with DOH on system condition and water quality results.
Notify customers	Water system manager meets with water system operator and communications lead to write notice to customers. Water system manager directs communications lead to distribute public notice.

Section 14.
Training and Rehearsals

Training

Emergency response training is essential. Training educates system personnel about emergency situations and resulting effects on water systems and also provides an opportunity to practice responses. Any training should have a purpose, appropriately selected personnel, and qualified instruction and supporting materials.

Training can be conducted in a variety of ways, including attending training classes or bringing in experienced trainers for on-site training and exercises. On-site exercises with experienced trainers are very useful, as they involve activities that are specific to the water system. Personnel can practice emergency communications, isolating parts of the system, inspecting system components, and learning what to look for in case of a security breach. It is also important to train staff on risk communications or how to communicate with the media and customers during an emergency.

When planning training, consider the system's size, the type and complexity of its components, staff needs, and operational needs. Periodic training reinforces previous efforts, as people often forget things that they don't use very often. It also provides an opportunity to train new staff and learn about new problems, new techniques, and changes in equipment. Be aware of current and upcoming training topics, especially hot topics that tend to come around as a result of a specific event.

Training

Identify staff position training needs and expectations.

Position	Training needs and expectations
Water System Manager	Emergency response communications, emergency response planning, issuing health advisories
Water System Operator	Emergency response communications, emergency response planning, suspicious activity training
Field support	Emergency response communications, suspicious activity training
Administrative Support	Emergency response communications, emergency response planning,

Emergency rehearsals

Emergency rehearsals, sometimes referred to as "table-top exercises" are valuable tools to make sure employees are always prepared to respond. Ideally, rehearsals are set up by the water system manager and are unannounced to employees. During these rehearsals, employees are required to conduct actual responses. They make phone or radio calls, perform

inspections, respond to inquires, and do other tasks. Get assistance from partners such as local health jurisdictions and local emergency response people.

Practicing for an emergency is the only real way to thoroughly evaluate the emergency response plan and the system's ability to implement it. The final step of a rehearsal is to evaluate and discuss the results. Conduct a staff meeting to go over the results and get input from those involved in the rehearsal. Then make modifications or set up training to be better prepared.

Example: Emergency rehearsals

Schedule for drills, tabletop exercises, and other ways to practice emergency response:

Event	Description	People and organizations involved
Rehearsal	Conduct actual emergency drill	Water system staff
On-site training drills	Conduct specific drills, i.e, communications, water line breaks, sampling with a professional trainer	Water system staff and professional trainer

Section 15.
Plan Approval

Representatives of the water system who are ultimately responsible, such as water system manager, owner, board members, commissioners and council members, should review, approve, and sign the emergency response plan. This demonstrates support for the plan, acknowledges the effort put into its preparation, and puts it officially into effect.

Be sure to secure and protect the emergency response plan as it may contain sensitive information about facilities and response activities that you may not want others to know in order to safeguard the water system.

Plan approval

This plan is officially in effect when reviewed, approved, and signed by the following people:

Name/Title	Signature	Date
Mayor		
Public Works Director		

6.

Water Shortage Response Plan

Tenino

Prepared By:

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

June 2023

Gibbs & Olson Project No. 0751.5021

Tenino Water Shortage Response Plan

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Water Shortage Response Plan
for
Tenino

Introduction

Introduction

DOH guidance document *Water Shortage Response Plans* (DOH PUB 331-316) was used to prepare this Water Shortage Response Plan (WSRP) for Tenino. The goal of the WSRP is to maintain essential public health and safety services and minimize adverse impacts affecting the lifestyles of Tenino's water customers. The WSRP outlines Tenino's short-term water shortage response activities to minimize the impacts of events that can be weather-related water shortages, natural or human-caused disasters, or other water system operating emergencies. The objective of the WSRP is to establish procedures for managing water supply and demand in times of shortage. The WSRP identifies the range of demand reduction actions that are available and defines the mechanism(s) by which decisions will be made during a shortage event. Since each situation has unique characteristics, the WSRP cannot address all of the possible scenarios, or all of the supply and demand management actions that are appropriate to a given situation. For this reason, the WSRP is intended as a framework of actions that will be tailored to meet the specific needs of a shortage situation.

Background

Tenino's water supplies are solely from groundwater sources. There are two wells in close proximity to one another near the Middle School. Both are just less than 100' deep in a prolific aquifer.

Water from both wells are treated with chlorine for disinfection and calcium for pH adjustment.

Combined well production is 700 gpm and maximum day demand (MDD) is 371 gpm. Due to Tenino's water supply solely deriving from groundwater, the water system is not highly vulnerable to short-term drought conditions. Summer drought conditions are a normal part of our annual weather cycle, and measures to meet annual summer demand are addressed in the City's Water System Plan.

This WSRP establishes procedures intended for use during unexpected periods of water shortage. There are several scenarios that could result in such a shortage and impair the ability of the City's water supplies to meet demand.

Drought conditions resulting in less than average fall/winter precipitation may decrease recharge to local aquifers. Impacts from this scenario may not be immediately evident due to lag times between drought conditions, recharge and groundwater withdrawal. Impacts may become evident in shallow aquifers 6 months to 1 year following below-average rainfall, and would likely be evident following a 1-2 year period of below-average precipitation.

Unusually warm and dry weather sustained over the summer months also holds the potential to impact water supplies if our usual period of peak demand extends in duration. Effects of from this scenario would be immediate.

Events such as natural disasters including earthquakes, flooding, snow and windstorms that result in power failures can result in water shortage situations lasting a longer period of time than a routine water main break. The same is true for human caused emergencies such as hazardous material spill, chlorine solution leak or an act of vandalism. Such emergencies can result in a critical water component to be out of service for an extended period of time resulting in a curtailment of water production.

Problem Assessment

There are no known issues that would affect Tenino's ability to meet system demands.

Demand Analysis

The MDD is 371 gpm or 534,031 gpd.

Supply Analysis

Tenino has two wells that produce 700 gpm or 1,008,000 gpd.

Demand and Supply Comparison Summary

During the peak demand period, the system now is able to produce 1,008,000 gpd which is almost twice the MDD of 534,031 gpd. The supply is therefore adequate. There is also 550,000 gallons of storage available.

Options for Dealing with a Water Shortage

Water Resource Policies

Tenino is governed by many federal, state and local laws, regulations, policies and plans that form the

legal context within which the public water system operates. Those dealing with water resource policies include, at a minimum: water rights (chapter 173-152 WAC), water code (chapter 90.03 RCW), groundwater (chapter 90.44 RCW), Group A water systems (chapter 246-290 WAC), water use efficiency (RCW 90.03.386(3), watershed planning (chapter 90.82 RCW), Tenino's ordinances and policies for service.

Water Shortage Response Team

When a **potential** water shortage is identified, the public water system would assemble a Water Shortage Response (WSR) Team to consider whether the WSRP should be implemented. The team would be comprised of the following staff though additional staff would be brought in, as needed:

- Public Works Director
- Mayor
- City Council

The WSR Team would consider the following **water supply** factors:

- Total supply availability.
- Groundwater rights status for that particular year.
- Operational condition of all sources, storage tanks, and other facilities.
- The rate of decline in groundwater levels compared with the normal operating levels.
- Amount of time required to implement a supply-enhancement measure.
- Weather conditions as derived from short- and long-term weather forecasts and modeling by the National Weather Service.

The WSR Team would then consider the following water demand factors:

- Current trends and seasonal forecasts for the system's daily water demands.
- The estimated margin of safety provided by the demand reduction compared with the level of risk assumed if no action is taken.
- Amount of time required to implement a water use reduction measure.
- Magnitude of expected savings provided by a water use reduction measure.

Other factors the WSR Team would consider include:

- The value of lost water sales revenue compared with the increased margin of supply reliability.
- Consultation with Council members, state resource agencies, the County, and interested organizations.
- Required time lags to institute measures.
- Ultimate cost to Tenino customers, both residential and commercial.
- Equity in demand reduction between customer classes.
- Current events.
- Actions taken by neighboring jurisdictions (i.e. City of Rainier), which influence or directly affect Tenino customers.
- Environmental benefits.

Stages of a Water Shortage

The four stages of phased responses are implemented in an effort to manage water demand when supplies become limited. Stages will be implemented progressively, if conditions allow or as needed depending on the situation. Each stage includes a variety of communications, internal operations, supply side actions and demand management strategies, as appropriate. Below is a summary of those stages.

Stage 1. Advisory
In this stage, customers would be informed as early as meaningful data is available, that water supply and demand conditions may result in a less than normal supply of water. If the supply and demand situation foreseen at the Advisory Stage develops, then the Utility would move to the Voluntary Stage.

Stage 2. Voluntary Reductions
This is the first step in reducing water consumption during a potential or actual water shortage. At this stage, voluntary cooperation and support of customers is requested to meet water use reduction goals.

Stage 3. Mandatory Restrictions
If voluntary measures do not provide the necessary reduction in water use, then mandatory activities would be implemented.

Stage 4. Emergency Curtailment
This stage would only be used when extraordinary levels of reduction are required to ensure demand does not exceed supply and public health and safety are not compromised.

Demand Reduction Options

Table 1, on the next page, provides a brief description of possible demand reduction options the Utility could possibly use based on the water shortage stage and an estimate (percentage) of water savings associated with it.

Table 1. Demand Reduction Options

Action	Stage and Consumption Reduction Goal Percentage				Comments
	Advisory	**Voluntary**	**Mandatory**	**Emergency**	
Communications	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
Media coordination.	X	X	X	X	
Develop and implement public outreach and education plan.	X	X	X	X	
Coordination with resource agencies and local jurisdictions.	X	X	X	X	
Coordination with largest water users.	X	X	X	X	
Notify irrigation customers of potential shut down procedures.			X	X	
Tenino	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
WSR Team coordination and planning.	X	X	X	X	
Reduce all maintenance and operations water uses to essential levels.		X	X	X	
Assess water main flushing activities.	X	X	X	X	
Increase water quality monitoring actions as necessary.					
Finalize water use restrictions, exemptions, and enforcement procedures and penalties.			X	X	Subject to Council approval.
Apply surcharges and penalties.			X	X	
Initiate “Water watcher” patrols.			X	X	
Declare water emergency.				X	Subject to Council approval.
Customers	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
Initiate residential indoor water use recommendations	X	X	X	X	
Initiate residential outdoor water use recommendations/tip (non-landscape)	X	X	X	X	

Initiate residential landscape water use recommendations/tips.	X	X	X	X	
Initiate commercial water use recommendations/tips.	X	X	X	X	
Initiate commercial landscape water use recommendations/tips.	X	X	X	X	
Contact water waste customers to cease waste.			X	X	
Initiate time of day watering restrictions (i.e., prohibited from 6 a.m. to 10 p.m.).			X	X	
Initiate day(s) of week lawn watering restrictions.			X	X	
Prohibit all lawn/turf watering, including new installations.			X	X	Possible exemptions for ballfields / playfields for safety purposes. All lawn watering banned prior to moving to Emergency Stage.
Prohibit all garden/ornamental landscape watering				X	
Initiate ornamental fountain operation restrictions		X	X	X	Prohibited at Mandatory and Emergency Stages.
Initiate car washing restrictions.		X	X	X	Request at Voluntary Stage, restrictions as necessary.
Initiate construction site water use restrictions				X	Water use prohibited. Exemptions as necessary to meet air quality regulations.
Restrict outdoor use by customers with special medical needs				X	Special medical needs like home dialysis are exempt from any emergency surcharge or re-strictions, provided they notify Tenino of

					such a need.
Initiate sidewalk, deck and driveway washing restrictions.			X	X	Except as necessary for public health or safety.
Initiate building pressure washing restrictions.			X	X	Limited at Mandatory Stage, prohibited at Emergency Stage.
Restrict filling of swimming pools			X	X	Prohibited at Emergency Stage for both private and public pools.
Penalties	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
None	X	X			
Issue warnings, make site visit, collect shut off and reconnection fee			X		
Institute rate changes to further encourage conservation			X	X	Requires Council approval.
Impose surcharges			X	X	Requires Council approval.

Triggering Criteria

Individual triggers for implementing the WSRP include both environmental (i.e., temperature, rainfall, instream flow, snowpack, climatologic data, etc.) or infrastructure. **Tables 2 –5** provide details each stage as it relates to the objectives, triggers, actions, and communications.

Advisory Stage

There are a variety of conditions that may cause concern about water availability and signal a potential water shortage. Responses to triggering an Advisory Stage are shown in **Table 2**. A public message that might be drafted could be: "*The potential exists for lower than normal water supply. Customers may be asked to reduce consumption unless conditions return to normal. Please use water wisely. We will keep you informed."* The Advisory Stage may be discontinued when water supply conditions return to a normal situation.

Voluntary Stage

As information further confirms the need to step up the surveillance of conditions contributing to both environmental and or infrastructure concerns about meeting water needs, **Table 3** provides responses that could occur during the Voluntary Stage. A public message that might be drafted would be: "We are

relying on the support and cooperation of **all** water users to reduce consumption and stretch the available water supply. Water use needs to be reduced by ten percent, approximately 25 gallons per household per day.

Customers are responsible for determining how they will meet that goal. Water waste is not allowed. If everyone cooperates, more stringent restrictions may be avoided. In addition to meeting essential water needs of customers, the needs of fish habitat and other environmental concerns is a priority." **Appendix B** lists water use reductions actions customers can do.

Mandatory Stage

At this point if voluntary actions do not result in needed demand reductions, Tenino will implement more aggressive actions and will limit or prohibit certain uses of water by customers. **Table 4** provides response that could occur during the Mandatory Stage. A public message that might be drafted would be: "We are imposing mandatory restrictions to reduce demand because the voluntary approach is not resulting in necessary water use reductions. We are continuing to rely on the support and cooperation of our customers to reduce water use.

However, we need the certainty and predictability of restricting certain water uses. This way, we can ensure that an adequate supply of water is available for public health and safety throughout this shortage."

Emergency Stage

At this stage, Tenino would recognize that a critical water situation exists. Without additional significant curtailment actions, a shortage of water for public health and safety would be imminent.

This stage is characterized by two basic approaches. First, increasingly stringent water use restrictions would be established and enforced. Secondly, significant rate surcharges would be used to encourage customer compliance. While a rate surcharge may be implemented in either the Voluntary or Mandatory stages, a surcharge is a key component to the success of this stage, and any previous surcharge may be increased if appropriate. A public message that might be drafted would be: "A water supply emergency exists. Severe restrictions on water use are necessary to maintain adequate water supplies essential for basic public health and safety. The public's continued cooperation is requested. Restrictions will be strenuously enforced."

TABLE 2. ADVISORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Prepare Tenino staff, relevant agencies, and water users for a potential water shortage, thereby allowing all parties adequate time for planning and coordination. 2. Undertake supply management actions that forestall or minimize the need for more stringent demand or supply management actions later on.	1. River and stream levels that are historically low in August/September (when levels are at their annual lowest). Staff would begin monitoring precipitation and analyzing all available data. If stream levels do not come up to historical levels, we would declare an Advisory Stage in June. 2. River and stream levels that are significantly below historical normals for the current time of year and data indicates that expected demands may not be met if this trend worsens or continues. 3. Lower than normal winter precipitation or snow pack.	1. Convene Tenino's Water Shortage Response Team to evaluate conditions, determine actions, and assign tasks. 2. Intensify communication with all Tenino staff so they can communicate our message clearly to concerned customers. 3. Intensify data collection actions for well pumping records, tank level records, monitoring river and stream levels and weather conditions. 4. Assess water quality in the distribution system to target areas that may experience degradation with reduced consumption. 5. Develop a list of critical water uses and users. 6. Initiate planning and preparation for Voluntary Stage actions, including an assessment of potential staffing impacts, training needs, and communications strategies.	1. Brief Council members. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes. Specific entities include City of Rainier, Thurston County, State Departments of Health and Enterprise Services, interested environmental and community organizations, and large commercial customers. 3. Develop a status report for customers/businesses with special interests. 4. Develop and distribute public outreach and education materials explaining the drought response stages and expected ranges of actions through a variety of communication channels (i.e., print and radio media, TCTV, Tenino website, direct mail, etc.). Post updated status reports on Tenino's website and through other communication channels. Prepare information for customers, including developers, who may be planning new landscaping.

TABLE 3. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Inform Tenino water customers of a water shortage and the need to reduce water use and eliminate water waste. 2. Reduce water use to meet consumption goals through voluntary customer actions. 3. Forestall or minimize the need for more stringent demand or supply management actions. 4. Minimize the disruption to customers while meeting consumption goals. 5. Maintain the highest water quality standards throughout the shortage.	1. River and stream levels continue to be low. 2. Rainfall and snowpack is significantly less than normal by April 1. 3. The summer is predicted to be hot and dry. 4. Water use demand projections indicate a systematic response to reducing demand is required.	1. Continue Advisory Stage actions. 2. WSR Team to prepare weekly reports for distribution to staff and local media on supply conditions and consumption levels. 3. WSR Team will consider the current and projected supply conditions and seasonal demand and set consumption goals that may be revised as necessary. 4. Reduce all operating system water uses to essential levels. 5. Increase water quality monitoring actions as necessary. 6. WSR Team will evaluate whether target consumption levels and supply conditions warrant a rate surcharge to reinforce voluntary actions and/or to recover revenue losses. The WSR Team would make recommendations to the Mayor for recommendation to the full Council. 7. Implement staffing reassignments as needed and plan staffing changes that may be needed for the Mandatory Stage, including staff to enforce mandatory restrictions. **8.** Contact the Tenino Fire Department to inform them of the situation and request implementation of action listed in **Appendix D.**	1. WSR Team would establish systematic communications with the City Council, including the suggested nature and scope of the voluntary measures and strategies. 2. **Appendix A** contains a list of public agencies, large customers and business groups who should be provided status reports on the situation. Specific entities include City of Rainier, Thurston County, State Departments of Health, State and Enterprise Services, interested environmental and community organizations, and large commercial customers. Post updated status reports on the Tenino website. 3. Develop and implement a comprehensive public awareness and education campaign with the goal of keeping customers informed about supply and demand conditions. This campaign will recommend customer actions to significantly reduce demand, reinforce desired customer actions, and remind customers that if goals are not achieved, mandatory restrictions may be necessary.

TABLE 3. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUE

Objectives	Triggers	Actions	Communications
			4. Promote consumption goals for typical households and a percentage reduction goal for commercial customers. 5. Prepare a current list of commercial car washes in Tumwater and Centralia that recycle water. 6. Contact Tenino largest water users and request a percentage reduction. Contact public agencies to inform them of conditions and request their cooperation. 7. Identify customers with large irrigation accounts and promote the use of daily weather information, such as rainfall and reduced evapotranspiration (ET) rates to minimize irrigation use. Provide current ET rates on Tenino's website. 8. Provide water quality information in public information so that if flushing is necessary, the public understands that it is essential for water quality maintenance. 9. Initiate remaining planning and preparation for the Mandatory Stage. 10. Establish regular communication with staff that has regular contact with the public, such as Utility Billing representatives, meter readers, and Water Operations staff. Keep them up to date on conditions, goals, and City Council's actions so they can provide accurate information to our customers.

TABLE 4. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Achieve targeted consumption reduction goals by restricting defined water uses. 2. Ensure that an adequate water supply will be available during the duration of the water shortage to protect public health and safety and to provide sufficient in-stream flows for fish habitat. 3. Minimize the disruption to customers' lives and businesses while meeting target consumption goals. 4. Promote equity among customers by establishing clear restrictions that affect all customers.	1. The current water supply would not be able to meet demand projections. 2. Measures implemented in the Voluntary Stage are not adequately reducing demand. 3. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary compliance. 4. It is evident the level of water use reduction required would not be achieved through voluntary compliance.	1. Continue actions from Advisory and Voluntary Stages, as appropriate. 2. The WSR Team would develop a list of recommended water use restrictions and exemptions from restrictions. 3. The WSR Team would finalize and implement a process for receiving, recording, and responding to reported violations of restrictions. 4. The WSR Team would make recommendations to move to the Mandatory Stage and adopt mandatory restrictions, emergency surcharges, and fees to the City Council for adoption. The WSR Team would recommend the nature, scope, and timing of restrictions. 5. **Appendix C** provides an enforcement checklist the WSR Team would finalize and implement procedures and assess fines where mandatory restrictions are not followed. The WSR Team would review and process all requests for exemptions from mandatory requirements. 6. Initiate planning and preparation for the Emergency Stage.	1. WSR Team will provide periodic reports to the City Council, including the suggested nature and scope of the mandatory restrictions, implementation strategies, and customer response data. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes (**Appendix A** includes a list of appropriate contacts). Specific entities include the City of Rainier, the Tenino School District, Thurston County, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, interested environmental and community organizations, and large commercial customers. Post updated status reports on the Tenino website. 3. Through a media campaign and direct mail communicate: • Scope and nature of mandatory restrictions. • Reasons for imposing the restrictions. • Consumption goals and ways in which to achieve those goals.

TABLE 4. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
			• Additional restrictions that may be imposed if water use reduction goals are not achieved. • Enforcement mechanisms and fines. • Rate surcharges. • Projections for how long restrictions will be in place. 4. In communicating mandatory restrictions to the public, a clear distinction will be made between lawn/turf watering and watering gardens and ornamental plantings. The type and amount of watering will be clearly defined. 5. Any exemptions from water use restrictions will be clearly identified. 6. Contact irrigation customers and inform them that Tenino may shut down their irrigation meters in the event of an immediate water shortage situation. 7. Provide area landscape management and property management companies with water use restriction information. 8. Restrict hydrant usage to essential purposes, including recall of hydrant meters previously issued. This should include contacting each registered hydrant user. Require the use of best management practices (BMPs) to reduce water use, meet operational needs, and provide for dust control.

Objectives	Triggers	Actions	Communications
			9. Post updated status reports on the Tenino website. 10. Continue and enhance communication actions from the Advisory and Voluntary Stages 11. **No exemptions will be allowed for watering new lawn installations**. 12. Evaluate resources and plans for moving into the Emergency Stage. As appropriate, begin preparatory measures.

TABLE 5. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Ensure throughout the water shortage, an adequate water supply exists to protect public health and safety. 2. Sharply reduce water demand. 3. Restrict certain defined water uses in order to meet consumption goals.	1. Measures to reduce water use implemented in the Voluntary and Mandatory Stages have not adequately reduced demand. 2. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary or mandatory compliance.	1. The WSR Team would define the water shortage as an emergency and, through the Mayor, would implement procedures for the full Council to formally declare a Water Shortage Emergency. 2. The WSR Team would develop a list of water use restrictions, prohibitions, exemptions, and surcharge rates for recommendation to the Council for consideration through the Mayor. 3. The WSR Team would increase the frequency of reports to the Mayor and the full Council. Reports would provide detail on the implementation of the Emergency Stage and customer response data. 4. The WSR Team would establish water use reduction goals. Consumption goals may be set in a variety of ways. Determining factors include equity among customers and the utility billing software in use. Single-family residential goals may be set as a standard per house allotment or as a percentage reduction from the previous year's consumption. Consumption goals may be below customers' average winter month use. Commercial, institutional, and multifamily residential customers may be asked to reduce water use by a set percentage of their average consumption during the previous year.	1. Define the problem to the public as an emergency, and institute formal procedures to declare a water emergency. 2. Inform customers of the rate surcharge and how it will affect them. Provide information on an appeal process. 3. Define and communicate exemptions for medical facilities and other public health situations. 4. Consult with and provide status reports to state resource agencies, interest groups and Native American Tribes. Specific entities include the City of Rainier, the Tenino School District, Thurston County, Washington Departments of Health, Enterprise Services, Fish and Wildlife, and Natural Resources; interested environmental and community organizations and large commercial customers. Post updated status reports on Tenino's website.

TABLE 5. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
		5. Adjust or modify utility billing systems to implement any approved surcharges and penalties. 6. Increase enforcement actions in accordance with the applicable ordinances approved by the full Council. 7. Provide training for personnel and deploy additional "Water Watcher" patrols. 8. Water Shortage Response Team to increase meeting frequency to daily status briefings to review the current situation and determine which actions are working and those that need to be improved. Focus on messages that are easy to communicate, implement, and have the potential to sharply reduce demand.	5. Through a media campaign and direct mail communicate to Tenino customers the: • Scope and nature of rationing and curtailments, • Reasons for imposing the curtailments, • Water use reduction goals, • Enforcement mechanisms and fines, • Projections for how long curtailments will be in place, and • Rate surcharges. 6. Clearly identify any exemptions from the water use curtailment. 7. Inform customers about possible pressure reductions and problems this may cause. 8. Provide area landscape firms with water use curtailment information. 9. Post updated status reports on the Tenino website. 10. Continue and enhance communication actions from the Advisory, Voluntary, and Mandatory Stages.

Supply Augmentation Options

There are no other water systems with an intertie to Tenino. The City of Rainier system is five miles away.

In the event of a severe water shortage, the only other source of water would be for Tenino to buy water from the City of Rainier and truck it to Tenino.

Plan Implementation

In order to properly implement this Plan, the City Council must adopt the key policies within it and inform the customers of new requirements including possible rate structure changes and tiered rate increases along with financial penalties for not complying with mandatory water use restrictions.

Appendix F contains health advisory templates to be used in the event of a water outage or severe shortage.

Emergency Declaration

In the event that this Plan must be implemented due to a water shortage, that action constitutes an "Emergency" as defined by the departments of Health and Ecology.

Appendix A

Water Shortage Response Contact List

WATER SHORTAGE RESPONSE CONTACT LIST

A working list of contacts for easy reference should be developed and regularly updated by staff. In the event of a water shortage caused by a drought, the following will be contacted directly. They will be apprised of the situation, and their support and cooperation in reducing demand will be requested.

Other Public Agencies

- City of Rainier
- Thurston County
- Tenino School District
- State Department of General Administration
- State Department of Ecology
- State Department of Health

Large Customers

Staff will develop a contact list based on previous two year's water consumption

Landscape Interests

- WSU/Lewis County Cooperative Extension
- Local nurseries
- Local landscape contractors
- The Irrigation Association
- Washington Association of Landscape Professionals
- Washington State Nursery and Landscape Association

Business Groups

- Thurston County Chamber of Commerce
- Master Builders Association
- Rotary Clubs of Thurston County

Appendix B

Voluntary Customer Water Use Reductions

VOLUNTARY CUSTOMER WATER USE REDUCTIONS

Residential Indoor

- Flush the toilet less often. Each flush uses 1.6 to 7 gallons of water, depending upon the age of the toilet.
- Dishwashers should be run only when there are full loads of dishes. Each load uses 8 to 13 gallons of water, less than by hand washing.
- Wash only full loads of laundry. Each load uses 15 to 40 gallons of water. High-Efficiency washing machines use approximately 30 percent less water than standard models.
- Keep a pitcher of cold drinking water in the refrigerator rather than running the faucet until the water gets cold.
- Take shorter showers. Each minute of showering time uses 2.0 to 5 gallons of water. Try to limit showering time to five minutes.
- Avoid letting the faucet run while shaving, brushing teeth, or washing vegetables.
- While waiting for hot water, use a container to catch wasted tap water for use on plants.

Residential Outdoors

- Wash cars less often. Instead of using a hose, consider a commercial car wash that recycles water.
- Always use a shutoff nozzle when using a hose. Be sure there are no leaks in any hose fittings.

Commercial and Residential Landscape

- Water lawns and gardens only early in the morning or late in the evening to reduce water loss from evaporation.
- Consider letting established lawns go dormant until the shortage is over. Homes that normally water lawns will save from 25 to 50 percent by not watering them.
- Do not water lawns when it is raining. If you have an automatic irrigation system, learn how to change the program that controls your system in order to cut back on irrigation time. Turn off automated irrigation system clocks during rainy spells. Install a rain sensor on automatic irrigation systems that will override the system during rainfall.
- Eliminate outdoor water play, such as running through a sprinkler, plastic water slides, and wading/swimming pools that requires frequent refilling.
- Eliminate all hosing of sidewalks, driveways, and decks. Use a broom instead.
- Water established plants only when necessary, testing the soil moisture levels in the root zone with your fingers. Two to four inches of mulch in your planting beds will help retain moisture.
- Create tree wells around trees to minimize runoff when watering.

Commercial

- Set goals for reduced water use and inform managers and employees. Give businesses ideas for limiting water use and ask them for their ideas.
- Repair all leaks and dripping faucets. Ensure that constantly running toilets are repaired. Urge employees to report leaks.
- Reduce or eliminate routine vehicle cleaning during the shortage. Use a local commercial car wash facility that recycles water.
- Ensure that all hoses are fitted with shutoff nozzles.
- Eliminate all hosing of walkways, parking lots, and loading docks. If washing paved areas is

necessary for public health and safety, pressure washers use substantially less water.

- Postpone routine building washing until after the shortage.
- Post signs informing customers of the nature of the water shortage and ask for cooperation in reducing water use.
- Turn off all non-recirculating fountains. On windy days, when there is significant water loss, turn off all fountains.
- Ask restaurants to deliver water only on request.
- Accelerate restroom upgrades by replacing older toilets with low-flow (1.6-gallon-per-flush) or high-efficiency (1.0 to 1.3 gallon per flush) models.

Appendix C

Mandatory Restrictions

Enforcement Procedural Checklist

_____ Determine fines and/or surcharges to be imposed for mandatory restriction infractions, including whether or not there will be "one fine for all infractions" or whether certain selected water use reduction actions would command a higher fine than others.

_____ Determine the number of warnings before fines or surcharges apply.

_____ Establish a database for tracking violations.

_____ Print self-duplicating "Notice of Violation" forms: one copy for location where violation occurred and one to record violation with billing. Print violations and fines on the Notice of Violation.

_____ Assign and train staff with customer service and communication experience to "Water Watch".

_____ Establish a procedure for "Water Watchers" to record warnings and penalties on customer accounts.

_____ Establish a "hotline" for customers to report violations. To help avoid frivolous complaints, recorded message should note that only complains with name and address of complainant will be pursued.

_____ Provide all field and customer service staff members with fact sheets and question and answer sheets. Provide briefings on restrictions and enforcement procedures. Train field staff to tag obvious violations.

Appendix D

Tenino Fire Department Shortage Response

Tenino Fire Department Shortage Response

The Fire Department uses water in a variety of ways. These uses include:

- Fire flow pressure testing
- Vehicle washing
- Washing of drill pad
- Training (evolution/wet training)
- Irrigation

The following explains how these water uses might be affected during the four stages of drought response.

Advisory Stage

At this stage, we would be communicating a possible water supply shortage to our customers. It may make sense to schedule any line flushing or wet training for earlier in the season in case restrictions are in place.

Voluntary Stage

In this stage, we would be asking our water customers to reduce their water use by a certain amount (generally about 5-10 percent). The Fire Department may change their water use at this stage in the following ways:

- Vehicle washing: Currently, several of the vehicles are washed or at least rinsed daily. Washing is more frequent during the wet season when vehicles are muddy. During this stage, vehicles would only be washed if they have mud on them but could continue to be rinsed each evening.
- Drill pad washing: The pad is now washed twice during the summer. If the voluntary stage occurs during summer months, a sweeper from the Public Works Department would be brought in to sweep the pad instead of washing it.
- Fire flow testing: Testing could still occur at this stage.
- Training: Scheduled training could still occur at this stage. However, the need for training should be weighed carefully against water use.
- Irrigation: Irrigation of landscape should be slightly reduced at this stage.

Mandatory Stage

At this stage, we would acknowledge a serious water supply shortage. Water use restriction would be enforced with fines. The Fire Department may alter their water use in the following way at this stage:

- Vehicle washing: As in the Voluntary Stage, vehicles would only be washed or rinsed if there is mud on them.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Fire flow testing: Testing should be postponed during this stage.
- Training: Scheduled training should not occur at this stage. If this stage continues for more than

one month, limited training exercises would resume.

- Irrigation: Irrigation of landscape should be reduced at this stage.

Emergency Stage

At this stage, the utility would be faced with a critical water supply shortage. The goal would be to provide enough water to provide for our customers' health and safety during the duration of the emergency. No outdoor irrigation would be allowed for any of our customers. At this stage, the Fire Department would need to change their water uses in the following ways:

- Vehicle washing: Vehicles would only be washed if there is mud on them. No rinsing could occur. Vehicles that can fit in commercial washes must be washed only at facilities that recycle water.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Fire flow testing: Testing may not occur during this stage.
- Training: Scheduled training may not occur at this stage.
- Irrigation: Irrigation of landscape may not occur at this stage.

Appendix E

Tenino Parks Department Alternative Irrigation Plan

Tenino Parks Department Alternative Irrigation Plan

This plan will provide for reductions in irrigation water usage that meet thresholds provided for each of the stages of the Water Shortage Response Plan. The plan reduces water use at City owned parks, streetscapes and other facilities by shifting irrigation schedules and prioritizing City facilities based on the age of landscaping, watering needs and public use.

In Stage 2, the Voluntary Stage, water use consumed through non-exempt meters will be reduced by 5 to 10%. Stage 3, the Mandatory Stage, provides for water use reduction of 10 to 20%. In Stage 4, the Emergency Stage provides for water use reduction of 20 to 30%, which may also be required for ballfields/playfields.

Appendix F

Health Advisory Templates

APPENDIX F – Health Advisory Templates

DRINKING WATER WARNING

The Tenino Water System, ID#09-0501, located in Thurston County may be contaminated because of a water outage and loss of pressure in the water system.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a rolling boil for one minute, and let it cool before using. Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until *further notice*. Boiling kills bacteria and other organisms in the water.

When a loss of pressure occurs, it is possible that contamination from the environment or from human or animal waste may be drawn into the water system. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. <u>These symptoms are not only caused by organisms in drinking water</u>. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care provider.

What happened?

The following is being done to correct the problem:

We have consulted with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water. We anticipate resolving the problem by _____.

For more information, please contact _____ at ( )_____-_____ or at
(owner or operator) (phone number)
_____ (address).

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

This notice is sent to you by _____ Water System on ___/___/____

::

Drinking Water Warning:
BOIL WATER – RESTRICT WATER USE

The Tenino Water System, ID#09-0501, located in Thurston County is having difficulty maintaining water pressure within the distribution system because of the reason(s) checked below:

- ❑ The well and/or booster pumps have failed.
- ❑ There is a major leak or break in the distribution system.
- ❑ The source is failing (i.e. declining water table/low stream flow).
- ❑ The system was without power for a significant period of time and our tank water levels are low.
- ❑ Hot weather has created a demand greater than the system facilities can satisfy.
- ❑ Other:

The situation is being addressed and we will notify you when it is resolved. In the meantime, please follow all of the steps indicated below:

- ❑ Conserve Water by:
  - Water outside before 10 AM or after 7 PM, and avoid doing laundry or taking showers between 5 PM and 7 PM.
- ❑ Limit outside watering to every other day and no watering on Mondays.
- ❑ Curtail all use of water outside except spot watering of plants in critical need.
- ❑ Bring water to a rolling boil for one minute. Boiled water should be used for drinking, making ice, food preparation, washing dishes, and brushing teeth.
- ❑ Other:

The state Drinking Water Regulations require that the water system be designed and operated to maintain 30 pounds of water pressure throughout the distribution system under normal circumstances. When a loss of pressure occurs, it is possible for contamination from the environment, such as human or animal waste, to be drawn into the water system. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms of illness. This may pose a special health risk for infants, young children, the elderly, and people with severely compromised immune systems. Please note that these symptoms may also be the result of events totally unrelated to drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about disease causing organisms in drinking water from their health care provider.

What happened?

The following is being done to correct the problem:

We will be keeping you informed of our progress and it may be necessary to conduct a community meeting to discuss whether additional facilities will be required to correct the problem. For more information, please contact _____ at ( )_____-_____.
(owner or operator) (phone number)

Please share this notice with all the other people who use this water system, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

Water Outages

Water outages may allow contaminants to enter the pipes.
The water, when it returns, may be temporarily unsafe to drink.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.

Knowing the following information can help.

Before a water outage

- Store one gallon of water per person per day.
- Store at least a three-day supply of water per person.
- Collect the water from a safe supply.
- Thoroughly washed plastic containers such as soft drink bottles are best. You can also purchase food-grade plastic buckets or drums.
- If you are storing water in buckets or drums, put a couple of drops of chlorine bleach (unscented) into each bucket or drum.
- Seal water containers tightly, label with date, and store in a cool, dark place.
- Replace water every six months.
- Never reuse a container that contained toxic materials such as pesticides, solvents, chemicals, oil or antifreeze.

During a water outage

- Remove any garden hoses from taps or spigots.
- Listen to your hot water heater for gurgling or boiling noises. If it is making noise, turn it off until water service is restored.
- If water service is out, but you still have water in your pipes: Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes and food preparation until further notice.
- Conserve water and try to prevent your taps from running dry.

After a water outage

- Until you hear from your water provider that they have sampled the water and it is safe to drink:
- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.**
- Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes and food preparation until further notice.
- Let water boil for one minute and allow it to cool before using it.
- If you are experiencing illness symptoms, it is recommended that you see your health care provider.

In the event of a water outage, call [Phone#], even if the power is out. After hours, follow the voice mail instructions and someone will be paged. We will make every effort to keep you informed, however, in the event of a region-wide event, we may not be able to return all calls.

[Contact Info]

Appendix H

Financial Program

2019 BUDGET POSITION

ty Of Tenino

Time: 14:25:16 Date: 02/16/2023
Page: 1

401 Water Fund — 01/01/2019 To: 12/31/2019

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 80 00 06	Beginning Balance	1,047,415.00	1,047,414.79	0.21	0.0%
308 Beginning Balances		1,047,415.00	1,047,414.79	0.21	0.0%
340 Charges For Services					
343 40 00 00	Water Services	231,971.00	244,443.92	(12,472.92)	0.0%
343 40 00 02	Water Account Activation Fee	3,403.00	3,080.00	323.00	9.5%
343 40 03 00	Excise Tax	11,527.00	12,218.04	(691.04)	0.0%
343 40 04 00	Hydrant Permits	103.00	235.00	(132.00)	0.0%
359 00 00 04	Late Charge Penalty - Water	15,000.00	18,170.46	(3,170.46)	0.0%
340 Charges For Services		262,004.00	278,147.42	(16,143.42)	0.0%
360 Misc Revenues					
361 11 45 24	Interest	2,006.00	4,603.72	(2,597.72)	0.0%
360 Misc Revenues		2,006.00	4,603.72	(2,597.72)	0.0%
Fund Revenues:		**1,311,425.00**	**1,330,165.93**	**(18,740.93)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	1,284.00	3,347.53	(2,063.53)	0.0%
534 80 10 00	Salaries & Wages	91,803.00	94,615.42	(2,812.42)	0.0%
534 80 20 00	Benefits - Taxes	13,770.00	13,639.76	130.24	0.9%
534 80 21 00	Benefits - Health Care	11,016.00	12,765.38	(1,749.38)	0.0%
534 80 22 00	Benefits - Retirement	2,754.00	9,908.47	(7,154.47)	0.0%
534 80 23 00	Safety Clothing	1,200.00	896.96	303.04	25.3%
534 80 31 00	Supplies	7,000.00	5,621.77	1,378.23	19.7%
534 80 31 01	Corrosion Control Supplies	3,000.00	1,735.03	1,264.97	42.2%
534 80 33 00	Small Tools & Equipment	1,500.00	1,548.06	(48.06)	0.0%
534 80 35 00	Fuel, Unspecified	500.00	876.12	(376.12)	0.0%
534 80 35 01	Fuel, Backhoe	100.00	595.64	(495.64)	0.0%
534 80 35 03	Fuel, Chevy 3/4t	2,600.00	3,199.83	(599.83)	0.0%
534 80 35 04	Fuel, Dump Truck	100.00	155.46	(55.46)	0.0%
534 80 35 13	Fuel, Kumatsu	100.00	141.09	(41.09)	0.0%
534 80 35 15	Fuel, Vactor Truck	100.00	521.30	(421.30)	0.0%
534 80 40 01	State Water Excise Tax	13,000.00	13,578.18	(578.18)	0.0%
534 80 42 00	Telephone (Land Line)	2,000.00	2,384.42	(384.42)	0.0%
534 80 42 01	Internet Connectivity	900.00	1,149.80	(249.80)	0.0%
534 80 42 03	IT Service Provider	391.00	702.08	(311.08)	0.0%
534 80 42 05	PRA Compliance Software	249.00	249.00	0.00	0.0%
534 80 42 06	City Web Site	109.00	0.00	109.00	100.0%
534 80 42 07	Web Bill Pay Service Provider	420.00	17.50	402.50	95.8%
534 80 42 08	Postage	2,750.00	3,478.95	(728.95)	0.0%
534 80 42 09	Telephone (Cellular)	1,500.00	1,869.21	(369.21)	0.0%
534 80 42 10	Office Productivity Software	216.00	419.17	(203.17)	0.0%
534 80 45 03	Professional Testing Service	2,000.00	3,273.40	(1,273.40)	0.0%
534 80 45 04	Repair & Maintenance	15,000.00	26,894.61	(11,894.61)	0.0%
534 80 45 05	Computer Software Maintenance	15,000.00	1,612.06	13,387.94	89.3%
534 80 46 00	Insurance	21,250.00	21,250.00	0.00	0
534 80 47 00	Utilities	13,750.00	12,053.04	1,696.96	12

2019 BUDGET POSITION

401 Water Fund 01/01/2019 To: 12/31/2019

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 48 01	Education / Training	1,000.00	484.00	516.00	51.6%
534 80 48 02	Meals/Lodging/Travel	1,500.00	400.80	1,099.20	73.3%
534 80 49 00	Misc Dues, Subs & Tuition	2,000.00	1,727.60	272.40	13.6%
534 80 50 00	Lien Fees	170.00	0.00	170.00	100.0%
534 Water Utilities		230,032.00	241,111.64	(11,079.64)	0.0%
597 Interfund Transfers					
597 00 00 04	Transfer To Wat Cap Imp Fund (#402)	0.00	586,585.00	(586,585.00)	0.0%
597 Interfund Transfers		0.00	586,585.00	(586,585.00)	0.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**230,032.00**	**827,696.64**	**(597,664.64)**	**0.0%**
Fund Excess/(Deficit):		**1,081,393.00**	**502,469.29**		

2019 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2019 To: 12/31/2019

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 80 00 07	Beginning Balance	638,625.00	638,625.68	(0.68)	0.0%
308 Beginning Balances		638,625.00	638,625.68	(0.68)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/cap. Improve	60,733.00	38,632.63	22,100.37	36.4%
343 40 02 00	Tapping Fees	78,750.00	2,500.00	76,250.00	96.8%
343 40 06 00	Meter Installation	500.00	0.00	500.00	100.0%
340 Charges For Services		139,983.00	41,132.63	98,850.37	70.6%
360 Misc Revenues					
361 11 45 25	Investment Interest	523.00	2,794.31	(2,271.31)	0.0%
360 Misc Revenues		523.00	2,794.31	(2,271.31)	0.0%
397 Interfund Transfers					
397 00 00 04	Transfer From #401	0.00	586,585.00	(586,585.00)	0.0%
397 Interfund Transfers		0.00	586,585.00	(586,585.00)	0.0%
Fund Revenues:		**779,131.00**	**1,269,137.62**	**(490,006.62)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,546.00	6,534.10	11.90	0.2%
591 Debt Repayment		6,546.00	6,534.10	11.90	0.2%
594 Capital Expenditures					
534 20 41 00	Water Comp Plan Update	7,000.00	1,553.00	5,447.00	77.8%
594 34 61 00	Water Rights	40,000.00	0.00	40,000.00	100.0%
594 34 61 01	Third Well	30,000.00	0.00	30,000.00	100.0%
594 34 63 01	Well #1	10,000.00	5,911.20	4,088.80	40.9%
594 34 63 02	Fire Hydrants	2,500.00	0.00	2,500.00	100.0%
594 34 63 09	Water Main Replacement	10,000.00	0.00	10,000.00	100.0%
594 34 64 00	Computer Purchase	750.00	0.00	750.00	100.0%
594 34 64 05	Radio Read Meter Reading	2,000.00	3,540.37	(1,540.37)	0.0%
594 34 65 00	Water System Repairs	7,500.00	1,677.80	5,822.20	77.6%
594 34 66 01	Water Valve Exercise Tool	5,000.00	3,941.47	1,058.53	21.2%
594 34 66 02	Mower Head	6,500.00	7,159.17	(659.17)	0.0%
595 50 60 02	PW Shop Extension	15,000.00	5,042.24	9,957.76	66.4%
594 Capital Expenditures		136,250.00	28,825.25	107,424.75	78.8%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%

2019 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2019 To: 12/31/2019

Expenditures	Amt Budgeted	Expenditures	Remaining	
Fund Expenditures:	**142,796.00**	**35,359.35**	**107,436.65**	**75.2%**
Fund Excess/(Deficit):	**636,335.00**	**1,233,778.27**		

2019 BUDGET POSITION TOTALS

Fund	Revenue Budgeted	Received		Expense Budgeted	Spent	
401 Water Fund	1,311,425.00	1,330,165.93	0.0%	230,032.00	827,696.64	0%
402 Water Capital Imp Fund	779,131.00	1,269,137.62	0.0%	142,796.00	35,359.35	75%
	2,090,556.00	2,599,303.55	0.0%	372,828.00	863,055.99	0.0%

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2020 BUDGET POSITION

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401 Water Fund — 01/01/2020 To: 12/31/2020

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 07	Beginning Balance	500,000.00	502,469.29	(2,469.29)	0.0%
308 Beginning Balances		500,000.00	502,469.29	(2,469.29)	0.0%
340 Charges For Services					
343 40 00 00	Water Services	255,141.00	244,733.17	10,407.83	4.1%
343 40 00 02	Water Account Activation Fee	2,047.00	3,240.00	(1,193.00)	0.0%
343 40 03 00	Excise Tax	12,028.00	12,136.71	(108.71)	0.0%
343 40 04 00	Hydrant Permits	100.00	885.61	(785.61)	0.0%
359 00 00 04	Late Charge Penalty - Water	19,785.00	4,249.64	15,535.36	78.5%
340 Charges For Services		289,101.00	265,245.13	23,855.87	8.3%
360 Misc Revenues					
361 11 45 24	Interest	2,716.00	2,257.86	458.14	16.9%
360 Misc Revenues		2,716.00	2,257.86	458.14	16.9%
Fund Revenues:		**791,817.00**	**769,972.28**	**21,844.72**	**2.8%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	0.00	0.00	0.00	100.0%
534 80 10 00	Salaries & Wages	64,783.00	106,037.53	(41,254.53)	0.0%
534 80 20 00	Benefits - Taxes	12,471.00	12,377.17	93.83	0.8%
534 80 21 00	Benefits - Health Care	11,453.00	16,898.17	(5,445.17)	0.0%
534 80 22 00	Benefits - Retirement	2,267.00	14,888.92	(12,621.92)	0.0%
534 80 23 00	Safety Clothing	1,200.00	547.48	652.52	54.4%
534 80 31 00	Supplies	7,000.00	6,844.07	155.93	2.2%
534 80 31 01	Corrosion Control Supplies	3,000.00	2,225.86	774.14	25.8%
534 80 33 00	Small Tools & Equipment	1,500.00	1,012.94	487.06	32.5%
534 80 35 00	Fuel, Unspecified	907.00	976.83	(69.83)	0.0%
534 80 35 01	Fuel, Backhoe	25.00	70.45	(45.45)	0.0%
534 80 35 03	Fuel, Chevy 3/4t	650.00	1,355.39	(705.39)	0.0%
534 80 35 04	Fuel, Dump Truck	25.00	43.42	(18.42)	0.0%
534 80 35 13	Fuel, Kumatsu	25.00	74.39	(49.39)	0.0%
534 80 35 15	Fuel, Vactor Truck	25.00	550.90	(525.90)	0.0%
534 80 42 00	Telephone (Land Line)	1,250.00	2,876.23	(1,626.23)	0.0%
534 80 42 03	MNS Service Provider	754.00	1,393.29	(639.29)	0.0%
534 80 42 05	PRA Compliance Software	290.00	249.00	41.00	14.1%
534 80 42 06	City Web Site	136.00	115.38	20.62	15.2%
534 80 42 08	Postage	2,905.00	4,621.72	(1,716.72)	0.0%
534 80 42 09	Telephone (Cellular)	1,585.00	1,604.74	(19.74)	0.0%
534 80 42 10	Office Productivity Software	215.00	926.87	(711.87)	0.0%
534 80 42 13	BIAS Financial Software	863.00	500.00	363.00	42.1%
534 80 45 03	Professional Testing Service	2,083.00	1,900.00	183.00	8.8%
534 80 45 04	Repair & Maintenance	15,000.00	5,963.06	9,036.94	60.2%
534 80 45 05	Computer Software Maintenance	3,750.00	1,500.00	2,250.00	60.0%
534 80 45 17	Maintenance - Vactor Truck	0.00	5,597.34	(5,597.34)	0.0%
534 80 46 00	Insurance	13,529.00	13,529.00	0.00	0.0%
534 80 47 00	Utilities	1,200.00	13,020.22	(11,820.22)	0
534 80 48 01	Education / Training	1,000.00	872.00	128.00	12

2020 BUDGET POSITION

401 Water Fund 01/01/2020 To: 12/31/2020

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 48 02	Meals/Lodging/Travel	1,500.00	0.00	1,500.00	100.0%
534 80 49 00	Misc Dues, Subs & Tuition	2,242.00	580.20	1,661.80	74.1%
534 80 53 00	State Water Excise Tax	13,000.00	16,051.77	(3,051.77)	0.0%
534 Water Utilities		166,633.00	235,204.34	(68,571.34)	0.0%
597 Interfund Transfers					
597 00 00 15	Transfer To #402	287,447.43	287,447.43	0.00	0.0%
597 Interfund Transfers		287,447.43	287,447.43	0.00	0.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**454,080.43**	**522,651.77**	**(68,571.34)**	**0.0%**
Fund Excess/(Deficit):		**337,736.57**	**247,320.51**		

2020 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2020 To: 12/31/2020

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 08	Beginning Balance	608,000.00	1,233,778.27	(625,778.27)	0.0%
308 Beginning Balances		608,000.00	1,233,778.27	(625,778.27)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/cap. Improve	38,188.00	39,863.35	(1,675.35)	0.0%
343 40 02 00	Tapping Fees	7,500.00	70,000.00	(62,500.00)	0.0%
343 40 06 00	Meter Installation	0.00	0.00	0.00	100.0%
340 Charges For Services		45,688.00	109,863.35	(64,175.35)	0.0%
360 Misc Revenues					
361 11 45 25	Investment Interest	1,251.00	1,460.37	(209.37)	0.0%
360 Misc Revenues		1,251.00	1,460.37	(209.37)	0.0%
397 Interfund Transfers					
397 00 00 15	Transfer From #401	287,447.43	287,447.43	0.00	0.0%
397 Interfund Transfers		287,447.43	287,447.43	0.00	0.0%
Fund Revenues:		**942,386.43**	**1,632,549.42**	**(690,162.99)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,545.00	6,686.39	(141.39)	0.0%
591 Debt Repayment		6,545.00	6,686.39	(141.39)	0.0%
594 Capital Expenditures					
594 34 43 00	Water Comp Plan Update	6,425.00	0.00	6,425.00	100.0%
594 34 45 03	Resevoir Cleaning	7,000.00	0.00	7,000.00	100.0%
594 34 61 00	Water Rights	10,000.00	0.00	10,000.00	100.0%
594 34 61 01	Third Well	7,500.00	0.00	7,500.00	100.0%
594 34 62 01	Emergency Response Vehicle	20,000.00	84,684.88	(64,684.88)	0.0%
594 34 63 01	Well #1	2,500.00	7,270.81	(4,770.81)	0.0%
594 34 63 02	Fire Hydrants	706.00	0.00	706.00	100.0%
594 34 63 09	Water Main Replacement	2,500.00	0.00	2,500.00	100.0%
594 34 64 05	Radio Read Meter Reading	2,770.00	103,620.59	(100,850.59)	0.0%
594 34 65 00	Water System Repairs	7,500.00	5,575.59	1,924.41	25.7%
595 50 60 02	PW Shop Extension	0.00	5,419.74	(5,419.74)	0.0%
594 Capital Expenditures		66,901.00	206,571.61	(139,670.61)	0.0%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**73,446.00**	**213,258.00**	**(139,812.00)**	**0**

2020 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2020 To: 12/31/2020

Fund Excess/(Deficit):	**868,940.43**	**1,419,291.42**

2020 BUDGET POSITION TOTALS

Fund	Revenue Budgeted	Received		Expense Budgeted	Spent	
401 Water Fund	791,817.00	769,972.28	2.8%	454,080.43	522,651.77	0%
402 Water Capital Imp Fund	942,386.43	1,632,549.42	0.0%	73,446.00	213,258.00	0%
	1,734,203.43	2,402,521.70	0.0%	527,526.43	735,909.77	0.0%

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2021 BUDGET POSITION

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401 Water Fund — 01/01/2021 To: 12/31/2021

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 07	Beginning Balance	0.00	247,320.51	(247,320.51)	0.0%
308 91 00 07	Beginning Balance	250,000.00	0.00	250,000.00	100.0%
308 Beginning Balances		250,000.00	247,320.51	2,679.49	1.1%
340 Charges For Services					
343 40 00 00	Water Services	235,579.00	236,191.82	(612.82)	0.0%
343 40 00 02	Water Account Activation Fee	2,362.00	3,480.00	(1,118.00)	0.0%
343 40 03 00	Excise Tax	11,724.00	12,097.51	(373.51)	0.0%
343 40 04 00	Hydrant Permits	231.00	152.49	78.51	34.0%
359 00 00 04	Late Charge Penalty - Water	27,163.00	602.52	26,560.48	97.8%
340 Charges For Services		277,059.00	252,524.34	24,534.66	8.9%
360 Misc Revenues					
361 11 45 24	Interest	2,500.00	351.73	2,148.27	85.9%
360 Misc Revenues		2,500.00	351.73	2,148.27	85.9%
Fund Revenues:		**529,559.00**	**500,196.58**	**29,362.42**	**5.5%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	0.00	0.00	0.00	100.0%
534 80 10 00	Salaries & Wages	63,353.00	66,689.46	(3,336.46)	0.0%
534 80 20 00	Benefits - Taxes	6,643.00	5,827.10	815.90	12.3%
534 80 21 00	Benefits - Health Care	12,894.00	2,775.48	10,118.52	78.5%
534 80 22 00	Benefits - Retirement	7,978.00	4,947.28	3,030.72	38.0%
534 80 23 00	Safety Clothing	1,124.00	1,887.46	(763.46)	0.0%
534 80 31 00	Supplies	5,424.00	3,133.17	2,290.83	42.2%
534 80 31 01	Corrosion Control Supplies	2,439.00	1,440.35	998.65	40.9%
534 80 33 00	Small Tools & Equipment	610.00	1,947.59	(1,337.59)	0.0%
534 80 35 00	Fuel, Unspecified	1,150.00	1,454.79	(304.79)	0.0%
534 80 35 01	Fuel, Backhoe	124.00	415.20	(291.20)	0.0%
534 80 35 03	Fuel, Chevy 3/4t	1,000.00	1,542.25	(542.25)	0.0%
534 80 35 04	Fuel, Dump Truck	90.00	0.00	90.00	100.0%
534 80 35 13	Fuel, Kumatsu	83.00	62.26	20.74	25.0%
534 80 35 15	Fuel, Vactor Truck	273.00	471.01	(198.01)	0.0%
534 80 42 00	Telephone (Land Line)	4,306.00	2,836.18	1,469.82	34.1%
534 80 42 03	MNS Service Provider	1,779.00	1,433.80	345.20	19.4%
534 80 42 05	PRA Compliance Software	249.00	249.00	0.00	0.0%
534 80 42 06	City Web Site	125.00	121.23	3.77	3.0%
534 80 42 08	Postage	3,648.00	1,855.29	1,792.71	49.1%
534 80 42 09	Telephone (Cellular)	1,688.00	1,390.90	297.10	17.6%
534 80 42 10	Office Productivity Software	0.00	187.41	(187.41)	0.0%
534 80 42 13	BIAS Financial Software	1,988.48	1,813.48	175.00	8.8%
534 80 45 03	Professional Testing Service	2,435.00	1,839.00	596.00	24.5%
534 80 45 04	Repair & Maintenance	15,000.00	13,963.02	1,036.98	6.9%
534 80 45 05	Computer Software Maintenance	1,500.00	0.00	1,500.00	100.0%
534 80 45 17	Maintenance - Vactor Truck	0.00	0.00	0.00	100.0%
534 80 46 00	Insurance	5,828.00	6,036.62	(208.62)	0
534 80 47 00	Utilities	13,079.00	13,322.17	(243.17)	0

2021 BUDGET POSITION

401 Water Fund 01/01/2021 To: 12/31/2021

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 48 01	Education / Training	1,000.00	820.00	180.00	18.0%
534 80 48 02	Meals/Lodging/Travel	500.00	0.00	500.00	100.0%
534 80 49 00	Misc Dues, Subs & Tuition	2,228.00	2,147.20	80.80	3.6%
534 80 53 00	State Water Excise Tax	13,168.00	17,200.84	(4,032.84)	0.0%
534 Water Utilities		171,706.48	157,809.54	13,896.94	8.1%
597 Interfund Transfers					
597 00 00 15	Transfer To #402	0.00	0.00	0.00	100.0%
597 00 00 49	Transfer To Water Capital Improvement	100,000.00	0.00	100,000.00	100.0%
597 Interfund Transfers		100,000.00	0.00	100,000.00	100.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
508 91 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**271,706.48**	**157,809.54**	**113,896.94**	**41.9%**
Fund Excess/(Deficit):		**257,852.52**	**342,387.04**		

2021 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2021 To: 12/31/2021

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 08	Beginning Balance	0.00	1,419,291.42	(1,419,291.42)	0.0%
308 91 00 08	Beginning Balance	886,392.00	0.00	886,392.00	100.0%
308 Beginning Balances		886,392.00	1,419,291.42	(532,899.42)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/cap. Improve	38,542.00	39,681.24	(1,139.24)	0.0%
343 40 02 00	Tapping Fees	8,333.00	15,000.00	(6,667.00)	0.0%
343 40 06 00	Meter Installation	0.00	0.00	0.00	100.0%
340 Charges For Services		46,875.00	54,681.24	(7,806.24)	0.0%
360 Misc Revenues					
361 11 45 25	Investment Interest	1,301.00	214.72	1,086.28	83.5%
360 Misc Revenues		1,301.00	214.72	1,086.28	83.5%
397 Interfund Transfers					
397 00 00 15	Transfer From #401	0.00	0.00	0.00	100.0%
397 00 00 49	Transfer From Water Fund	100,000.00	0.00	100,000.00	100.0%
397 Interfund Transfers		100,000.00	0.00	100,000.00	100.0%
Fund Revenues:		**1,034,568.00**	**1,474,187.38**	**(439,619.38)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,545.00	6,519.23	25.77	0.4%
591 Debt Repayment		6,545.00	6,519.23	25.77	0.4%
594 Capital Expenditures					
594 34 43 00	Water Comp Plan Update	6,425.00	6,346.50	78.50	1.2%
594 34 45 03	Resevoir Cleaning	7,000.00	0.00	7,000.00	100.0%
594 34 61 00	Water Rights	10,000.00	0.00	10,000.00	100.0%
594 34 61 01	Third Well	7,500.00	0.00	7,500.00	100.0%
594 34 62 01	Emergency Response Vehicle	40,000.00	(88.25)	40,088.25	100.2%
594 34 63 01	Well #1	2,500.00	2,500.00	0.00	0.0%
594 34 63 02	Fire Hydrants	516.00	0.00	516.00	100.0%
594 34 63 09	Water Main Replacement	15,000.00	4,223.73	10,776.27	71.8%
594 34 64 05	Radio Read Meter Reading	2,770.00	1,847.40	922.60	33.3%
594 34 64 06	Meter Read Tower	163,000.00	0.00	163,000.00	100.0%
594 34 65 00	Water System Repairs	6,157.00	6,818.00	(661.00)	0.0%
595 50 60 02	PW Shop Extension	0.00	0.00	0.00	100.0%
594 Capital Expenditures		260,868.00	21,647.38	239,220.62	91.7%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100
508 91 00 06	Ending Balance	0.00	0.00	0.00	100

2021 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2021 To: 12/31/2021

Expenditures	Amt Budgeted	Expenditures	Remaining	
999 Ending Balance				
999 Ending Balance	0.00	0.00	0.00	100.0%
Fund Expenditures:	**267,413.00**	**28,166.61**	**239,246.39**	**89.5%**
Fund Excess/(Deficit):	**767,155.00**	**1,446,020.77**		

2021 BUDGET POSITION TOTALS

Fund	Revenue Budgeted	Received		Expense Budgeted	Spent	
401 Water Fund	529,559.00	500,196.58	5.5%	271,706.48	157,809.54	42%
402 Water Capital Imp Fund	1,034,568.00	1,474,187.38	0.0%	267,413.00	28,166.61	89%
	1,564,127.00	1,974,383.96	0.0%	539,119.48	185,976.15	65.5%

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2022 BUDGET POSITION

401 Water Fund 01/01/2022 To: 12/31/2022

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 07	Beginning Balance	0.00	0.00	0.00	100.0%
308 91 00 07	Beginning Balance	0.00	342,387.04	(342,387.04)	0.0%
308 Beginning Balances		0.00	342,387.04	(342,387.04)	0.0%
340 Charges For Services					
343 40 00 00	Water Services	242,647.00	250,687.57	(8,040.57)	0.0%
343 40 00 02	Water Account Activation Fee	3,000.00	3,120.00	(120.00)	0.0%
343 40 03 00	Excise Tax	11,724.00	12,605.68	(881.68)	0.0%
343 40 04 00	Hydrant Permits	231.00	93.22	137.78	59.6%
359 00 00 04	Late Charge Penalty - Water	27,163.00	11,918.97	15,244.03	56.1%
340 Charges For Services		284,765.00	278,425.44	6,339.56	2.2%
360 Misc Revenues					
361 11 45 24	Interest	2,500.00	0.00	2,500.00	100.0%
360 Misc Revenues		2,500.00	0.00	2,500.00	100.0%
Fund Revenues:		**287,265.00**	**620,812.48**	**(333,547.48)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	4,963.00	0.00	4,963.00	100.0%
534 80 10 00	Salaries & Wages	79,953.00	77,434.09	2,518.91	3.2%
534 80 20 00	Benefits - Taxes	7,042.00	7,439.89	(397.89)	0.0%
534 80 21 00	Benefits - Health Care	14,655.00	13,680.98	974.02	6.6%
534 80 22 00	Benefits - Retirement	8,196.00	7,838.99	357.01	4.4%
534 80 22 01	Benefits - Retirement (DCP)	476.00	0.00	476.00	100.0%
534 80 23 00	Safety Clothing	1,200.00	1,242.45	(42.45)	0.0%
534 80 31 00	Supplies	5,500.00	5,609.47	(109.47)	0.0%
534 80 31 01	Corrosion Control Supplies	2,500.00	2,910.13	(410.13)	0.0%
534 80 33 00	Small Tools & Equipment	1,500.00	1,122.67	377.33	25.2%
534 80 35 00	Fuel	3,000.00	4,830.51	(1,830.51)	0.0%
534 80 35 01	Fuel - Diesel	2,000.00	2,004.64	(4.64)	0.0%
534 80 41 03	Water Utilities - Professional Services	30,265.00	22,146.25	8,118.75	26.8%
534 80 42 00	Telephone (Land Line)	4,500.00	3,018.33	1,481.67	32.9%
534 80 42 03	MNS Service Provider	1,779.00	3,059.51	(1,280.51)	0.0%
534 80 42 05	PRA Compliance Software	249.00	273.90	(24.90)	0.0%
534 80 42 06	City Web Site	125.00	121.23	3.77	3.0%
534 80 42 08	Postage	3,648.00	2,451.67	1,196.33	32.8%
534 80 42 09	Telephone (Cellular)	1,688.00	1,394.32	293.68	17.4%
534 80 42 10	Office Productivity Software	190.00	109.70	80.30	42.3%
534 80 42 13	BIAS Financial Software	2,200.00	2,001.22	198.78	9.0%
534 80 45 03	Professional Testing Service	2,500.00	3,052.96	(552.96)	0.0%
534 80 45 04	Repair & Maintenance	15,000.00	7,899.26	7,100.74	47.3%
534 80 45 05	Computer Software Maintenance	1,500.00	0.00	1,500.00	100.0%
534 80 45 17	Maintenance - Vactor Truck	0.00	338.30	(338.30)	0.0%
534 80 46 00	Insurance	6,370.00	5,856.00	514.00	8.1%
534 80 47 00	Utilities	13,079.00	17,234.89	(4,155.89)	0.0%
534 80 48 01	Education / Training	1,000.00	260.00	740.00	74
534 80 48 02	Meals/Lodging/Travel	500.00	0.00	500.00	100

2022 BUDGET POSITION

401 Water Fund 01/01/2022 To: 12/31/2022

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 49 00	Misc Dues, Subs & Tuition	2,500.00	1,555.20	944.80	37.8%
534 80 53 00	State Water Excise Tax	13,300.00	14,884.89	(1,584.89)	0.0%
534 Water Utilities		231,378.00	209,771.45	21,606.55	9.3%
597 Interfund Transfers					
597 00 00 15	Transfer To #402	0.00	0.00	0.00	100.0%
597 00 00 49	Transfer To Water Capital Improvement	0.00	0.00	0.00	100.0%
597 Interfund Transfers		0.00	0.00	0.00	100.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
508 91 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**231,378.00**	**209,771.45**	**21,606.55**	**9.3%**
Fund Excess/(Deficit):		**55,887.00**	**411,041.03**		

2022 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2022 To: 12/31/2022

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 08	Beginning Balance	1,227,227.98	1,446,020.77	(218,792.79)	0.0%
308 91 00 08	Beginning Balance	0.00	0.00	0.00	100.0%
308 Beginning Balances		1,227,227.98	1,446,020.77	(218,792.79)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/Cap. Improve	38,542.00	56,960.07	(18,418.07)	0.0%
343 40 02 00	Tapping Fees	10,000.00	20,000.00	(10,000.00)	0.0%
343 40 06 00	Meter Installation	0.00	0.00	0.00	100.0%
340 Charges For Services		48,542.00	76,960.07	(28,418.07)	0.0%
360 Misc Revenues					
361 11 45 25	Investment Interest	1,301.00	0.00	1,301.00	100.0%
360 Misc Revenues		1,301.00	0.00	1,301.00	100.0%
397 Interfund Transfers					
397 00 00 15	Transfer From #401	0.00	0.00	0.00	100.0%
397 00 00 49	Transfer From Water Fund	0.00	0.00	0.00	100.0%
397 Interfund Transfers		0.00	0.00	0.00	100.0%
Fund Revenues:		**1,277,070.98**	**1,522,980.84**	**(245,909.86)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,545.00	6,519.23	25.77	0.4%
591 Debt Repayment		6,545.00	6,519.23	25.77	0.4%
594 Capital Expenditures					
594 34 43 00	Water Comp Plan Update	6,425.00	5,257.50	1,167.50	18.2%
594 34 45 03	Reservoir Cleaning	7,000.00	5,967.00	1,033.00	14.8%
594 34 61 00	Water Rights	10,000.00	0.00	10,000.00	100.0%
594 34 61 01	Third Well	7,500.00	0.00	7,500.00	100.0%
594 34 62 01	Emergency Response Vehicle	40,000.00	38,164.33	1,835.67	4.6%
594 34 63 01	Well #1	2,500.00	2,105.00	395.00	15.8%
594 34 63 02	Fire Hydrants	516.00	339.21	176.79	34.3%
594 34 63 09	Water Main Replacement	219,292.79	375,591.62	(156,298.83)	0.0%
594 34 64 05	Radio Read Meter Reading	10,000.00	728.35	9,271.65	92.7%
594 34 64 06	Meter Read Tower	0.00	0.00	0.00	100.0%
594 34 65 00	Water System Repairs	10,000.00	55,471.66	(45,471.66)	0.0%
594 50 60 02	PW Shop Maintenance	2,500.00	1,305.61	1,194.39	47.8%
595 50 60 02	PW Shop Extension	0.00	0.00	0.00	100.0%
594 Capital Expenditures		315,733.79	484,930.28	(169,196.49)	0.0%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100

2022 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2022 To: 12/31/2022

Expenditures	Amt Budgeted	Expenditures	Remaining	
999 Ending Balance				
508 91 00 06 Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance	0.00	0.00	0.00	100.0%
Fund Expenditures:	**322,278.79**	**491,449.51**	**(169,170.72)**	**0.0%**
Fund Excess/(Deficit):	**954,792.19**	**1,031,531.33**		

6.

RESOLUTION 2019-02

A RESOLUTION OF THE CITY OF TENINO, WASHINGTON AMENDING THE 2019 CONSOLIDATED FEE SCHEDULE

WHEREAS, Ordinance 870, establishing the City of Tenino Consolidated Fee Schedule was duly adopted the City Council on January 24, 2017; and

WHEREAS, Resolution 2018-11, adopted on December 11, 2018, established the Consolidated Fee Schedule for the Fiscal Year ending December 31, 2019; and

WHEREAS, Ordinance 900 requires a fee to attend the Tenino-Toledo Reserve Academy and the Chief of Police has set the amount for tuition; and

WHEREAS, The City Council has authorized a new "No Child Left Inside" Quarry Pool Pass program and established a fee therefore.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TENINO, WASHINGTON, that the City of Tenino 2019 Consolidated Fee Schedule is amended as shown below:

Section 1. Use of all City facilities or permits shall be granted only through the application process established for the type of use being requested. All applications shall be submitted to the City Clerk's Office for processing.

Section 2. Application forms shall be available at City Hall, or online on the City's Web Page, which can be accessed at: www.CityOfTenino.us. Downloaded applications forms must still be submitted to the City Clerk's Office for processing. The Clerk shall accept the forms in person, via the U.S. Mail, or via e-mail.

Section 3. The amended 2019 General Schedule of Fees and Charges is set forth below:

	FEES	DEPOSIT
ANIMAL LICENSES		
New License	$ 15.00	
New License – senior citizen	$ 12.00	
Renewal – Spayed or Neutered	$ 8.00	
Renewal – Non-altered	$12.00	
Renewal – Senior Citizen	$ 5.00	
Replacement Tag	$ 5.00	
Documented Rescued Animal	1st License free	
BALLFIELD FEES		

Tournaments (Deposit non-refundable if Canceled less than 72 hours prior to event)	$ 25.00 per field, per day	$ 50.00 per field
Tournament Maintenance	$ 15.00 per game	
League Practices (Adults Only – Maximum 2 Practices per week, 10 weeks)	$ 50.00 per league	
Other than Leagues (All Day)	$ 60.00 per day	$ 50.00
Other than Leagues (Half Day)	$ 30.00 per ½ day	$ 50.00
Youth Sports	$ 5.00 per player, per season	
Field Maintenance/Capital Improvement	$250.00 per league per season	
BUSINESS LICENSES		
New Business	$ 55.00	
Renewal	$ 45.00	
Late Renewal Penalty	$ 75.00	
CONCESSION STAND RENTAL		
All Day	$100.00	$100.00
Half Day (4 Hours)	$50.00	$100.00
Youth Seasonal Activities	$50.00/month	
Commercial Vehicle (Food Vendor – Business License Required)	$50.00/month	
Concession at Pool (Business License Required_		
Non-profit	10% of gross sales $25/day cap	
For Profit	10% of gross sales $50/day cap	
COUNCIL CHAMBERS RENTAL		
2 Hour Minimum (No alcoholic beverages)	$ 25.00 per hour	$ 50.00
MISCELLANEOUS		
Photocopies	$ 0.15 each	
Copy onto CD or disc (includes cost of CD or disc)	$ 5.00	
Notary Service (1st signature)	$ 10.00	
Each additional signature	$ 1.50	
Credit Card Convenience Fee	2% of transaction amount	
NSF Check Fee	$ 40.00	
Copy of Police Reports	$ 7.50 per report	
PARKING		
Designated Parking Stalls		
Hourly (First 15 minutes free)	$ 2.00	
Permit (Daily)	$ 12.00	
Permit (Weekly)	$ 48.00	
Permit (Monthly)	$ 150.00	
Permit (Yearly)	$1600.00	

PARK FEES		
Premium Numbered Sites	$ 15.00/night	
1 unit per site (1-8 people)		
Unit = tent/RV/camping structure		
Open Camp Sites	$ 10.00/unit/night	
Camping Fees (Single entity / unit / night)	$ 8.00	
Groups		
Areas 1, 2, 4, 5		
1-50 people	$ 50.00	$ 75.00
51-75 people	$100.00	$ 75.00
76-125 people	$150.00	$ 75.00
Area 3 (Concession Stand Not Included)		
1-50 people	$ 50.00	$ 75.00
51-75 people	$100.00	$ 75.00
76-125 people	$150.00	$ 75.00
Area 6 (Concession Stand Not Included)		
1-50 people	$ 50.00	$ 75.00
51-75 people	$100.00	$ 75.00
76-125 people	$150.00	$ 75.00
Designated Rentable Spaces & Shelters		
Shelters 2 & 3, Quarry House Back Porch		
All Day (8:00 a.m. to dusk)	$ 60.00	$ 75.00
½ Day (8 a.m. – 2 p.m. or 2:30 p.m. to dusk)	$ 35.00	$ 75.00
PARADES & SPECIAL EVENTS		
Permit Fee	$100.00	$500.00
Plus cost for any necessary police, public works, or other City personnel or services required.	Per FY Salary Schedule	
QUARRY HOUSE RENTAL		
All Day (8:00 a.m. – 2:00 p.m. the next day)	$130.00	$ 100.00
½ Day (8:00 am – 4:00 pm or 5:00 pm – 1:00 pm the next day	$100.00	$ 100.00
Meetings (2-hour minimum)	$ 25.00/hour	$ 75.00
Non-Profit Organizations	$ 30.00 utility fee	
Senior Lunch Program	$115.00/month	
QUARRY POOL FEES	**Inside TSD**	**Outside TSD**
Per Person / Per Day	$ 3.00	$ 5.00
Per Season / Per Family (2 adults and 3 children)	$125.00	$200.00
Early Bird (purchased prior to June 1st)	$100.00	$175.00
No Child Left Inside Program Pass	$ 75.00	$150.00
Day Pass Punch Card (pay for nine, get one free)	$ 27.00	$ 45.00
Corporate Sponsor Day Use Fee	$1000.00	$1000.00
Non-Profit Sponsor Day Use Fee	$800.00	$800.00
SCOTCH BROOM PULLER RENTAL	$ 15.00/day	$ 75.00
STREET USE PERMITS		

Surface Improvements	$120.00	
Underground Improvements in Roadway	$180.00	
Underground Improvements Outside Roadway	$ 75.00	
Miscellaneous	$ 50.00	
Street Cleaning Deposit		$200.00
Street Closure Deposit		$200.00
Bond Required	125% of improvements	
TENINO-TOLEDO RESERVE ACADEMY		
Tuition	$750.00	
UTILITIES		
Establishment of Service		
New Account Application Fee	$ 40.00	
Service		
Connection/Disconnection		
Turn water service on or off	$ 40.00	
Tapping Fee	$2,500.00 plus cost of materials	
Water Service per month (up to 500 cf)		
¾" meter (up to 500 cf)	$ 12.65	
1" meter (up to 500 cf)	$ 17.63	
1-1/2" meter (up to 500 cf)	$ 29.58	
2" meter (up to 500 cf)	$ 44.84	
3" meter (up to 500 cf)	$ 93.04	
4" meter (up to 500 cf)	$138.38	
Senior Citizen (in city only, up to 300 cf)	$ 7.59	
Outside City Limits (up to 300 cf)	$ 18.95	
Quarry Pool Rate	$ 9.11	
Vacancy Rate	$ 3.16	
Overage		
Within city per additional 100 cf	$ 3.22	
Outside city per additional 100 cf	$ 4.56	
Senior (in city only) per add 100 cf	$ 0.81	
Hydrant		
Permit Fee	$ 75.00	$250.00
Use and rent of meter	$ 35.00	
First 300 cubic feet	$ 18.22	
Each additional 100 cubic feet	$ 3.10	
Municipal Rate		
Base Rate (first 500 cubic feet)	$ 8.93	
Each additional 100 cubic feet	$ 0.77	
Sewer Service		
Per ERU	$125.66	
Per ERU w/Grinder Credit	$122.38	
Per ERU w/Grinder Charge	$128.95	
Vacancy Rate	$ 71.03	
Connection/Disconnection		

Facility Charge	$7,000.00 plus cost of materials	
Remove or Install Grinder Pump	$300.00	
Late Fee	$ 25.00	
Interest	2% of outstanding balance	
Lien Recordation	$ 36.00	
Lien Removal	$ 36.00	

COMMUNITY DEVELOPMENT – PLANNING & BUILDING

Application, Permit, or Request Type*†	Fee	Initial Engineering Deposit§
Physical Development Permits		
Building Permit	$40 + Building Fee**	$0
Design Standards Review	$264	$0
Sign Permit	$33	$0
Site Development Permit	$198	$450
Shoreline Substantial Development Permit	$660	$450
Use Permits		
Administrative Use Permit	$396	$450
Home Occupation	$198	$300
Conditional Use Permit – including shoreline conditional use permits	$1,320	$450
Public Facilities Use Permit	$1,320	$450
Development Option/Subdivision Permits		
Binding Site Plan – Preliminary	$1,980	$1,800
Binding Site Plan – Final	$990	$1,500
Boundary Line Adjustment	$396	$450
Lot Combination/Segregation	$132	$0
Density Transfer Program	$1,320	$900
Short Plat – Preliminary	$1,320	$900
Short Plat – Final	$330	$1,500
Subdivision – Preliminary	$1,980	$1,800
Subdivision – Final	$990	$1,500
Environmental Review‡		
Critical Area Report Review	$528	$450
SEPA Threshold Determination	$528	$450
Waiver - Critical Area Report or Shoreline Substantial Development Permit	$198	$450
Environmental Impact Statement Review	Staff/ Consultant Costs	Staff/ Consultant Costs
Mitigation Plan Review	$528	$450
Amendments to the LDRs/Comprehensive Plan		
Rezone	$1,980	$0
Text Amendment		
Initial Application Fee	$0	$0
Accepted on City Council Docket	$1,980	$1,800
Master Planned Development	$1,980	$1,800
Comprehensive Plan Amendment		

COMMUNITY DEVELOPMENT – PLANNING & BUILDING		
Application, Permit, or Request Type*†	**Fee**	**Initial Engineering Deposit§**
Initial Application Fee	$0	$0
Accepted on City Council Docket	$1,980	$1,800
Relief from the LDRs		
Administrative Variance	$660	$450
Appeal of Administrative or Planning Commission Decision§§	$660	$0
Extension Request	$198	$0
Reasonable Use Determination	$1,320	$450
Variance – including shoreline variances	$1,320	$450
Interpretations of the LDRs		
Administrative Interpretation	$660	$450
Zoning Decision	Hourly Rate	$0
Other Requests		
Annexation	$1,320	$900
Notification Posting	$33	$0
Pre-Application Conference	$264	$450
Right-of-Way Vacation	$990	$1,500
City Council Reconsideration	$264	$0

*A review deposit may apply in addition to the application fee.

†**County Reviews.** Applications may also be required to be reviewed by Thurston County. Please check with the individual County department for possible review/application fees.

§**Engineering Deposit.** For applications requiring an initial engineering deposit, projects may be evaluated on a case-by-case basis to determine if the deposit is necessary. All Engineering review fees are required to be paid, including fees in excess of the initial deposit. Any of the deposit remaining after completion of the review will be returned to the applicant.

Building Permits. Building fees are based on current Thurston County Building Fee Guide and fee tables. See http://www.co.thurston.wa.us/permitting/fees/fees-building-explain.html for more information.

‡**Wetland/Stream Reviews.** Applications requiring a review of wetlands and/or streams may require an additional $990 review deposit.

§§**Appeals.** The application fee for appealing an Administrative or Planning Commission decision shall be refunded if appellant prevails.

PASSED at a regular meeting of the Tenino City Council this 9th day of April, 2019.

Wayne Fournier, Mayor

ATTEST:

John C. Millard, City Clerk-Treasurer

APPROVED AS TO FORM:

Richard L. Hughes, City Attorney

6.

City of Tenino Water System Plan
Planning Level Opinion of Probable Cost
Storage Improvement
200,000 Gallon Reinforced Concrete Water Reservoir

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$89,000	$89,000
2	Erosion Control	1	LS	$9,000	$9,000
3	Clearing and Grubbing	1	LS	$8,500	$8,500
4	Shoring	1	LS	$8,000	$8,000
5	Earthwork	1	LS	$110,000	$110,000
6	Crushed Surfacing Base Course (CSBC)	300	TN	$40	$12,000
7	Crushed Surfacing Top Course (CSTC)	150	TN	$40	$6,000
8	Import Foundation Material	300	TN	$40	$12,000
9	Riprap	40	TN	$85	$3,400
10	Chain Link Fencing	400	LF	$40	$16,000
11	Topsoil and Hydroseed	1,000	SY	$30	$30,000
12	Retaining Walls	800	SF	$100	$80,000
13	200,000 Gallon Reinforced Concrete Water Reservoir (Including Foundation)	1	LS	$450,000	$450,000
14	Storm Drainage Structures, Piping, Fittings, and Accessories	1	LS	$20,000	$20,000
15	Potable Water Piping, Fittings, Valves, and Accessories	1	LS	$45,000	$45,000
16	Electrical and Control	1	LS	$85,000	$85,000
				Subtotal	$984,000
				Sales Tax @ 8.1%	$80,000
				Subtotal	$1,064,000
				Contingency @ 20%	$213,000
				Subtotal	$1,277,000
				Engineering, Permitting, and Administrative Costs @ 30%	$383,000
				Total Estimated Project Cost	$1,660,000

Notes and Assumptions
- April 2023 - ENR Seattle Construction Cost Index - 15,031.28
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000

6.

6.

Amortization Schedule for Contract Num: 99-65199-046

Contractor Name: Tenino City of

Project Name: Water System Corrosion Control Program

Loan Information: Loan# 1

Loan Amount: $199,410.00
Interest Rate/Type: 0.0000 % (None)
Amortized Loan Fee: 0.0000 %
Payment Frequency: Annual - 360 Days
Periods Principal Deferred: 2
Draw Based Loan: Yes

Loan Type: Amortizing Loan
Loan Term: 31 Years
Amortization Term: 30 Years
Paid Off:
Loan Source: DWSRF
Terminated Date:

Loan Start Date: 10/1/1999
Accrual Start Date:
First Payment Date: 10/1/2000
Last Payment Date: 10/1/2030
Distressed Community: N/A
Subordination Allowed: N/A

Amortization Schedule

Pmt #	Pmt Due Date	Principal	Accrued Interest	Interest	Payment Due	Loan Balance	Invoice Date	Inv#	Paid Date	Paid Amt	Extra Principal Paid Date	Extra Principal Paid Amt
1	10/1/2000	$0.00	$0.00	$0.00	$0.00	$0.00	10/01/2000	65794				
2	10/1/2001	$0.00	$0.00	$0.00	$0.00	$170,497.80	10/01/2001	65795				
3	10/1/2002	$6,547.79	$0.00	$0.00	$6,547.79	$183,260.04	05/30/2002	65796	09/27/2002	$6,547.79		
4	10/1/2003	$6,545.10	$0.00	$0.00	$6,545.10	$176,714.94	05/30/2003	65797	09/12/2003	$6,545.10		
5	10/1/2004	$6,545.10	$0.00	$0.00	$6,545.10	$170,169.84	05/30/2004	65798	10/28/2004	$6,545.10		
6	10/1/2005	$6,545.10	$0.00	$0.00	$6,545.10	$163,624.74	05/30/2005	65799	10/06/2005	$6,545.10		
7	10/1/2006	$6,545.10	$0.00	$0.00	$6,545.10	$157,079.64	05/30/2006	65800	09/20/2006	$6,545.10		
8	10/1/2007	$6,542.40	$0.00	$0.00	$6,542.40	$150,537.24	10/01/2007	65801	10/01/2007	$6,542.40		
9	10/1/2008	$6,545.09	$0.00	$0.00	$6,545.09	$143,992.15	10/01/2008	65802	10/02/2008	$6,545.09		
10	10/1/2009	$6,545.10	$0.00	$0.00	$6,545.10	$137,447.05	10/01/2009	65803	10/01/2009	$6,545.10		
11	10/1/2010	$6,545.10	$0.00	$0.00	$6,545.10	$130,901.95	10/01/2010	65804	10/01/2010	$6,545.10		
12	10/1/2011	$6,545.10	$0.00	$0.00	$6,545.10	$124,356.85	08/31/2011	65825	09/29/2011	$6,545.10		
13	10/1/2012	$6,545.10	$0.00	$0.00	$6,545.10	$117,811.75	09/04/2012	65826	09/13/2012	$6,545.10		
14	10/1/2013	$6,545.10	$0.00	$0.00	$6,545.10	$111,266.65	08/28/2013	65827	10/01/2013	$6,545.10		
15	10/1/2014	$6,545.10	$0.00	$0.00	$6,545.10	$104,721.55	08/28/2014	65828	10/21/2014	$6,545.10		
16	10/1/2015	$6,545.10	$0.00	$0.00	$6,545.10	$98,176.45	08/31/2015	65829	09/25/2015	$6,545.10		
17	10/1/2016	$6,545.10	$0.00	$0.00	$6,545.10	$91,631.35	09/01/2016	65830	10/05/2016	$6,545.10		
18	10/1/2017	$6,545.10	$0.00	$0.00	$6,545.10	$85,086.25	09/01/2017	65831	09/15/2017	$6,545.10		
19	10/1/2018	$6,545.10	$0.00	$0.00	$6,545.10	$78,541.15	11/01/2018	65199	11/13/2018	$6,673.43		
20	10/1/2019	$6,545.10	$0.00	$0.00	$6,545.10	$71,996.05	09/01/2019	1093	09/10/2019	$6,534.10		
21	10/1/2020	$6,545.10	$0.00	$0.00	$6,545.10	$65,450.95	09/01/2020	1702	09/08/2020	$6,686.39		
22	10/1/2021	$6,545.09	$0.00	$0.00	$6,545.09	$58,905.86	09/01/2021	2337	09/21/2021	$6,519.23		

Pmt	Pmt Due Date	Principal	Accrued Interest	Interest	Payment Due	Loan Balance	Invoice Date	Inv#	Paid Date	Paid Amt	Extra Principal Paid Date	Extra Principal Paid Amt
23	10/1/2022	$6,545.10	$0.00	$0.00	$6,545.10	$52,360.76	09/01/2022	2815	09/13/2022	$6,519.23		
24	10/1/2023	$6,545.10	$0.00	$0.00	$6,545.10	$45,815.66	09/01/2023	28680	09/12/2023	$6,519.23		
25	10/1/2024	$6,545.09	$0.00	$0.00	$6,545.09	$39,270.57						
26	10/1/2025	$6,545.10	$0.00	$0.00	$6,545.10	$32,725.47						
27	10/1/2026	$6,545.09	$0.00	$0.00	$6,545.09	$26,180.38						
28	10/1/2027	$6,545.10	$0.00	$0.00	$6,545.10	$19,635.28						
29	10/1/2028	$6,545.09	$0.00	$0.00	$6,545.09	$13,090.19						
30	10/1/2029	$6,545.10	$0.00	$0.00	$6,545.10	$6,545.09						
31	10/1/2030	$6,545.09	$0.00	$0.00	$6,545.09	$0.00						
	Totals:	**$189,807.83**	**$0.00**	**$0.00**	**$189,807.83**					$144173.19		

File Attachments for Item:

7. Water Use Efficiency Goals

To present and adopt Water Use Efficiency Goals

Recommended Action: Move to adopt the Water Use Efficiency Goals.

Water System Plan Update

City of Tenino
Water System

Thurston County, Washington



Prepared By:

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

December 2023

Gibbs & Olson Project No. 0751.5021

Water System Plan Update

City of Tenino
Water System

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PRELIMINARY

December 2023

Gibbs & Olson Project No. 0751.5021

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Chapter 1

DESCRIPTION OF WATER SYSTEM

CHAPTER 1

DESCRIPTION OF WATER SYSTEM

INTRODUCTION

Gibbs & Olson has been authorized by the City of Tenino to prepare this Water System Plan (WSP) Update for the purpose of identifying capital improvements, operational programs and financial guidelines for the next ten-year planning period. The WSP is intended to be a comprehensive planning tool and meet the regulatory requirements of Chapter 246-290 of the Washington Administrative Code (WAC), specifically WAC 246-290-100.

OWNERSHIP AND MANAGEMENT

The water system (Washington State Department of Health (DOH) ID #87400) is owned and operated by the City and serves the City and surrounding areas. Tenino is a Code City operated under a Mayor-Council form of government in accordance with RCW 35A.12. The Mayor has the responsibility of appointing the Public Works Director, who is responsible for utility operation and maintenance. The City Council is responsible for enacting policies that govern the operations of the City. The Tenino Planning Commission is a volunteer board comprised of five citizens who review and make recommendations to the city council on development proposals, subdivisions, rezones, and long-range planning projects, such as changes to the Land Development Regulations and Comprehensive Plan. Responsible parties involved with the water system are as follows:

Mayor	**City Council**	**Planning Commission Members**
Wayne Fournier	Linda Gotovac	Dave Watterson
	Elaine Klamn	William Rutherford
Clerk-Treasurer	John O'Callahan	Darnella Stenzel
Jen Scharber	Rachel Davidson	Alex Murray
	Jason Lawton	
Public Works	**Building Department**	**City Planner**
Troy Cannon	Rene Durand	Dan Penrose

Mailing address: City of Tenino, Public Works Department
P.O. Box 4019
149 S. Hodgden Street
Tenino, WA 98589
Phone (360) 264-2368 / Fax (360) 264-5772

SYSTEM BACKGROUND

The City is located in Thurston County approximately 12 miles south of the City of Olympia. A vicinity map is shown in Figure I-1. Based on information from the Tenino Comprehensive Plan (TCP), the City is located on the historic Oregon Trail. In 1872 a railroad line from the Columbia River to Tenino's Hodgden Street was completed. This was the closest mainline rail transportation to Olympia, which was not served by rail at that time. From the Tenino depot, two stagecoaches ran daily to the capitol city. A branch line to Olympia was completed in 1878. Sandstone quarries came after the railroads and were a major industry in the City for several decades. In 1888, Van Tine and Fentons' Tenino Stone Company founded the first quarry, now the site of the City pool. This development was followed by the Eureka Sandstone Company on the east side of the City and later the Hercules Stone Company on the west side of the City.

By 1912, concrete had become a widely used construction material, and the sandstone industry declined. However, the quarries operated until the 1930's. With the hope for another source of prosperity, exploratory oil wells were drilled in and around the City in the 1940's but these failed to produce positive results. Logging and farming later became the major employers in Tenino, and the City is still a regional trading center for south Thurston County. Tenino is also famous for its wooden money. When the Great Depression hit in 1920, Tenino created wooden money to relieve the currency shortage. Tenino's ingenuity became famous in an economically depressed world.

Until 1954, Highway 99, the major route through the City, was the primary north/south route between Portland and Seattle and the major transportation route for the West Coast. During that period, Tenino's economy was oriented to tourism from the highway. With the completion of Interstate 5, the major transportation corridor was moved west of the City.

During the early 1970's, Tenino experienced rapid growth, as did the rest of the County. Since 1980, however, growth has slowed to a fraction of the growth rate of the 1970's. Tenino has become a bedroom community for Tumwater, Olympia and Lacey, many new residents preferring to live in a small community and commute to the larger urban area for employment and services. The city constructed a sewage treatment collection and treatment system in 2009 and will now be able to grow and provide opportunities for commercial/retail and light industrial growth.

The City relies on two wells, Well No. 1 and Well No. 3, with a combined capacity of approximately 700 gpm. Well No. 1 was drilled in 1967 and Well No. 3. was drilled in 1994 to replace Well No. 2, which at that time, was producing sand. In 1994, the City constructed two reservoirs with a total storage capacity of 550,000 gallons. The majority of the distribution system was installed in the 1970's and is comprised of approximately 13 miles of piping, all within one pressure zone. A detailed discussion of water system components and related analysis is presented in Chapter 3.

INVENTORY OF EXISTING FACILITIES

The following Table 1-6 shows the key components of the Tenino water system facilities including approximate date of installation, remaining useful life and schedule for replacement.

TABLE 1-1

Asset Inventory

Item	Year Installed	Condition	Remaining Life	Replacement Cost
Well 1 (1)	1967	Adequate/Good	0 years	$200,000
Well 2 (1)	1994	Adequate/Good	0 years	$200,000
Distribution System (2)	Varies	Varies	Varies	$20,600,000
Reservoir 1 (3)	1994	Good	20+ years	$1,000,000
Reservoir 2 (3)	1994	Good	20+ years	$1,000,000

1. The well submersible pumps are past a typical lifespan of 15 years and are scheduled to be replaced upon failure. A complete description of the wells is given in the Source Capacity Analysis in Chapter 3.
2. Assumes $300 per linear foot of pipe.
3. Reservoir maintenance is discussed in Chapter 6. A complete description of the reservoirs is given in the Storage Analysis in Chapter 3.

PREVIOUS ENGINEERING AND PLANNING DOCUMENTS

Documents utilized in the preparation of this WSP are summarized below:

City of Tenino Water System Plan – February 2010, Gibbs & Olson, Inc.

This document is the latest version of the City's Water System Plan (WSP). The 2010 WSP estimated a future 2016 Maximum Day Demand (MDD) of 0.62 MGD and a Peak Hour Demand (PHD) of 792 gpm. The recommended six-year improvements included continued replacement of older cast iron piping.

Population, Housing, and Employment Data – July 2022, Thurston Regional Planning Council

The Thurston Regional Planning Council (TRPC) provides population forecasts for Thurston County online at www.trpc.org. Table 3 (see Appendix A) from TRPC shows population forecasts for cities and jurisdictions in Thurston County. The population allocation for the City of Tenino for the year 2040 is 2,750 and for the year 2045 is 2,790. The projected populations and annual growth rates from TRPC are used to develop water demand projections as shown in Table 2-10. TRPC staff coordinated with the Washington State Office of Financial Management (OFM) to develop population forecasts.

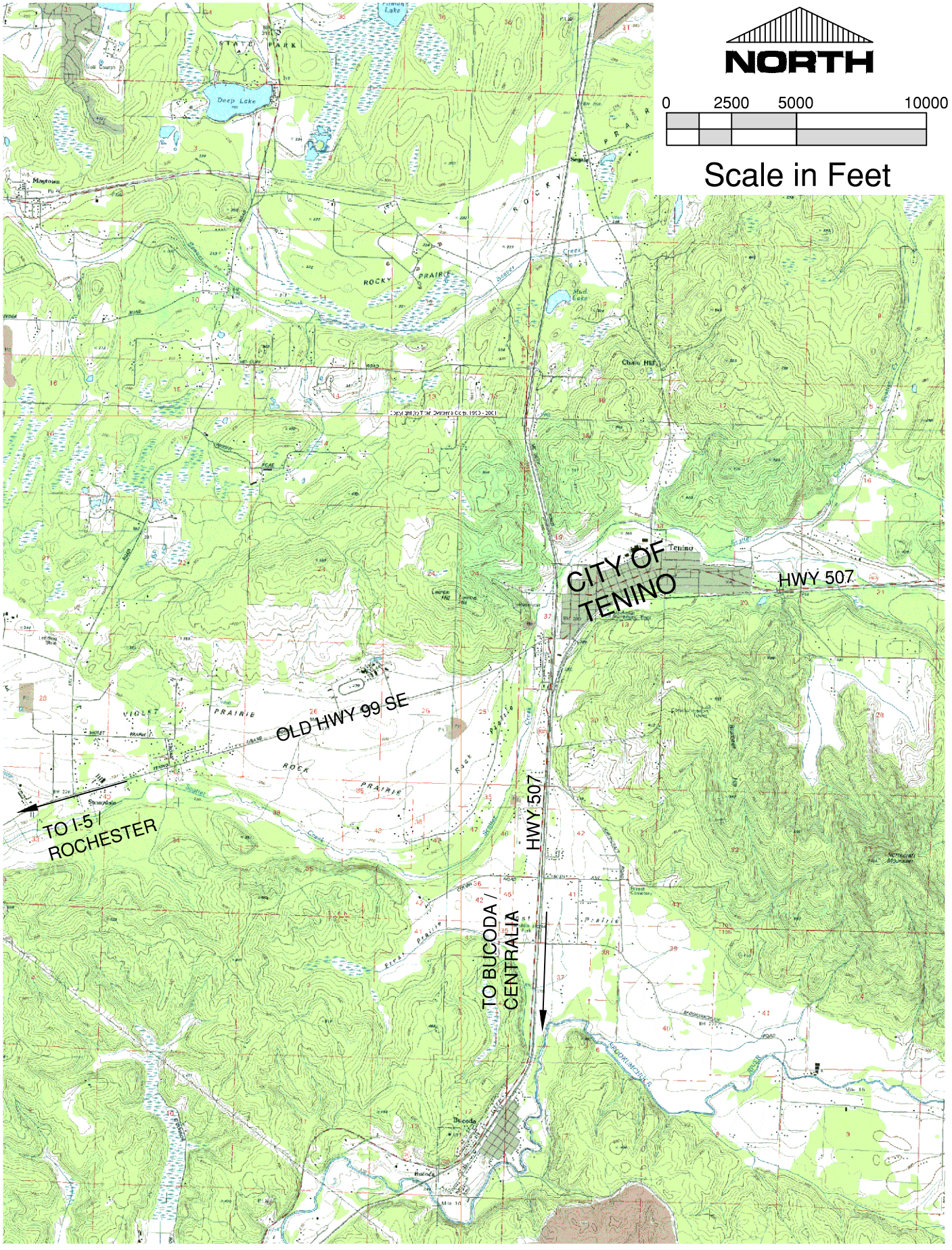
Housing Needs Assessment – December 2022, SCJ Alliance

SCJ Alliance prepared a document for the City of Tenino titled Housing Needs Assessment: Housing Action Plan dated December 2022. This document uses population forecasts from OFM and TRPC and average household size from American Community Survey (ACS) to determine current and future housing needs. The population forecasts, land use, and average household size used in this document were reviewed and are consistent with TRPC data which is used in this Water System Plan. The projected City of Tenino population used by SCJ is also 2,790 in the year 2045.

City of Tenino, Washington – Water and Sewer Rate Study Report – January 11, 2016, FCS Group

This report summarizes FCS Group's methodology, findings, and recommendations for each of the following core study elements: financial policies; revenue requirements; rate equity; and structure analysis and design. The purpose of the study was to provide a rate forecast and financial plan targeting financial stability and rate equity for a ten-year period. The study period was refined to cover only years included in the capital improvement plans (2016 through 2022).

This rate study report was reviewed in conjunction with Chapter 9 – Financial Program of this Water System Plan. Chapter 9 projects the City's financial status beginning in the year 2023 and the planning years of FCS Group's rate study and this Water System Plan do not overlap. For this reason, FCS Group's recommendations and projections were considered; however, new projections were developed for this Water System Plan.



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City of Tenino
Water System Plan
Service Area Vicinity Map
Figure I-1

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MUNICIPAL WATER LAW COMPLIANCE

The Municipal Water Supply Efficiency Requirements Act of 2003 (also referred to as HB 1338) requires water systems to demonstrate compliance with local planning, conservation requirements and water resource allocation laws. A Local Government Consistency Determination Form (DOH Form 331-568) is in Appendix C. The form must be signed by the local planning jurisdiction prior to Water System Plan approval by DOH. In this case, the local planning jurisdictions are the City of Tenino and Thurston County. Draft copies of this Water System Plan will be submitted to the City of Tenino and Thurston County in conjunction with submittal to DOH. Any comments from these agencies will be addressed and signed Local Government Consistency Determination Forms will be submitted with the final copy of this Water System Plan. The Water Use Efficiency (WUE) Rule portion of HB 1338 became effective on January 22, 2007. This new Rule mandates that public water systems develop a WUE program. The WUE program is presented in detail in Chapter 4 of this Water System Plan.

SERVICE AREA CHARACTERISTICS

A map of the service area is presented in Figure I-2. For the City of Tenino, the future water system service area is defined as the Urban Growth Area (UGA) boundary established in the current comprehensive plan. For DOH planning purposes, the City must identify a "Retail Service Area". The DOH definition for the retail service area "means a specific area a public water system plans to provide water service." In this case, the "future" water system service area (i.e., the UGA) defines the "retail" water service area.

For minor UGA adjustments, there is no requirement to update the WSP. However, if future UGA boundary adjustments in the comprehensive plan updates have a significant impact on water supply issues, the City will revise the WSP accordingly at that time. The following are general service area characteristics.

Zoning

Zoning for areas within the City limits is established in the City Comprehensive Plan and regulated through Tenino Municipal Code (TMC) Title 104. City zoning is shown in figures in Appendix A. Zoning for areas within the UGA, but outside City limits is established in the County Comprehensive Plan. A majority of the southwest portion of the UGA was recently annexed into the City. Land use density in the southwest area will likely increase and there will be a moderate to high demand for water and sewer service in that area. The potential for moderate to high service densities in the southwest area is accounted for in the growth projections discussed in Chapter 2 and in the system analysis in Chapter 3 of this WSP Update.

Topography

Tenino is located in a narrow glacial valley bordered by Scatter Creek to the north and west and surrounded by hills on the south and east that are part of the Cascade foothills. The hillsides in Tenino are gentle with slopes that are typically under 5 percent. Elevation within the water service area is within the range of approximately 250-feet to 640-feet above sea level. The majority of the customers served are below 320 feet in elevation. The hydraulic analysis of pressure zone constraints and requirements is included in Chapter 3. Current general mapping of service area (i.e. UGA) features such as soils and wetlands are provided on the City website at http://www.ci.tenino.wa.us/maps.htm.

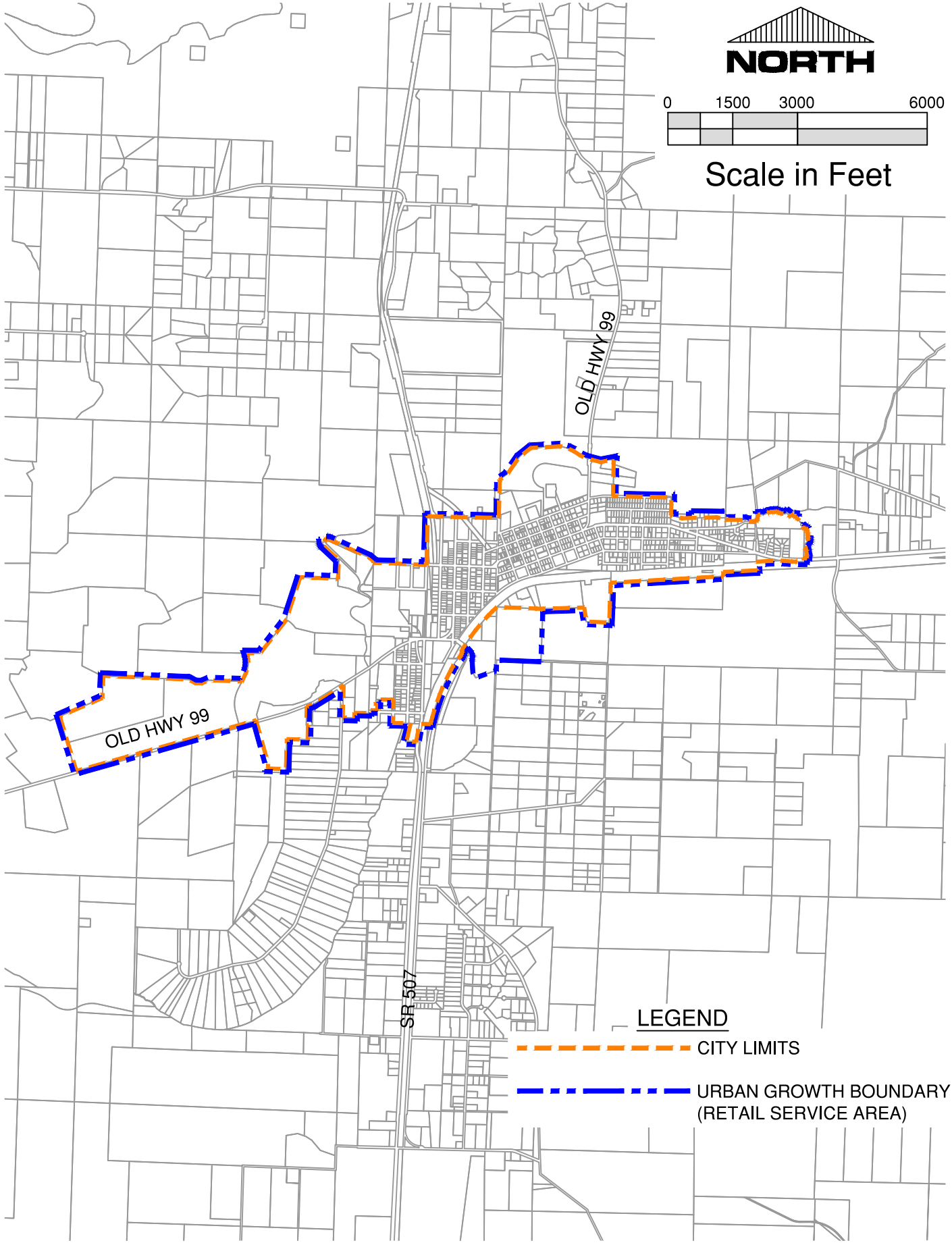
Climate

The climate in the Tenino area is typical of the Pacific Northwest west of the Cascade Mountains. Summers are fairly warm but hot days are rare. Rainfall is extremely light in the summer when several weeks often pass without precipitation. Winters are wet and cloudy, but mild. The average annual air temperature is about 51 degrees Fahrenheit. The lowest temperature on record for the area measured in the City of Olympia is -7 degrees; the highest is 102 degrees in Centralia. In summer, the average temperature is 63 degrees at Centralia and the average daily maximum temperature is about 75 degrees with highs above 90 degrees, and lows dropping below 50 degrees. In winter, the average temperature is 41 degrees at Centralia and the average daily minimum temperature is 35 degrees. Generally, the frost-free season lasts from 150 to 200 days per year.

The total annual precipitation is about 47 inches (Centralia), of which 76% falls between October and March. Rainfall extremes have fluctuated from an annual low of 28 inches to a high of about 60 inches. November, December, and January are the months of highest rainfall. Snowfall is light. The average seasonal snowfall is about 9 inches at nearby Centralia.

Adjacent Public Water Systems

There are numerous small water systems in the immediate vicinity of Tenino. However, there are currently no known Group A public water systems within the City UGA. The more significant water systems in the area are Loma Vista (Thurston County PUD) approximately 1.3 miles to the south, Bucoda approximately 4-1/2 miles to the south and Rainier, approximately 7 miles to the east. There are currently no interties with other water systems in the area. The potential for a future intertie with the Loma Vista system is discussed in other Chapter 3 of this Water System Plan.



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City of Tenino
Water System Plan Update
Service Area
Figure I-2

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SERVICE AREA POLICIES AND CONDITIONS OF SERVICE

Policies and conditions of service allow the City Council to deal with customers on a fair and consistent basis and are developed in the form of codes, resolutions, ordinances, standards or comprehensive plans adopted by the City Council. Where not specifically addressed in these other documents, standard operating procedures are outlined in this WSP Update. Typical policies and conditions of service for water system operations, which must be addressed in accordance with DOH planning requirements, are summarized below. Applicable sections of codes and ordinances are provided in Appendix B. Construction standards are addressed in Chapter 7 of this WSP Update.

Policies

- Annexation Policy: New water customers outside City limits are not required to commit to annexation prior to service.

- Cross-Connection Control Program: A Cross-connection Control Program is required by regulation (WAC 246-290-490) to reduce the potential for system contamination through backflow from potential contaminant sources. The Cross-Connection Control Program is addressed in Chapter 6 of this WSP Update.

- Direct Connection Policy: New development requires direct connection to the water system through individual service connections.

- Private or Public Wells: No new water systems or private wells will be allowed within the City limits unless approved by the City Council. Approval would need to be based on extreme circumstances since the existing water distribution system is readily available to most properties within the City limits. Customers with existing wells (used for irrigation or other purposes) shall have an approved backflow prevention device at the meter consistent with the City's Cross-Connection Control Program.

- Design and Performance Standards Policy: Water system planning and subsequent design and construction activities within the water system service area will follow the DOH Water System Design Manual (WSDM). Distribution improvements are to be designed in accordance with the policies and standards identified in Chapter 7.

- Formation of Local Improvement District: The City will allow an applicant to propose formation of an LID to pay for system upgrades. LID formation must be in accordance with state statutes. The initial costs for an LID feasibility study is borne by the applicant or rolled into LID costs but in no case is the cost the responsibility of the City. The City will provide an initial construction cost estimate for the proposed project and other technical assistance as needed. Once LID formation is shown to be feasible, the City will take the lead role to ensure proper formation and implementation of an LID.

- Late-comer Agreements: The City will allow the use of Late-Comer Agreements to help recover up to 50 percent of the water main extension which directly fronts other properties. All costs for the latecomer agreement and construction across the subject property shall be borne by applicant/property owner. All agreements will be case specific and subject to City Attorney review and approval. Late-comer agreement requests may be denied per City Council discretion. Latecomer agreements shall also comply with the requirements identified in the development standards.

- Individual Booster Pumps: Individual booster pumps will be allowed where hydraulic modeling indicates that pressure under 20-year PHD design conditions along the property frontage is in excess of 30-psi. The property owner shall be responsible for all costs of the booster pump system and shall be required to install a backflow prevention device on the private property side of the service meter. The backflow device must then be tested on an annual basis in accordance with the City's Cross Connection Control Program. Where service pressure is less than 30 psi, the City must manage and control any booster pumps in accordance with 246-290-230(8).

- Oversizing: The City may require a developer or property owner to increase the size of water main extensions in order to meet future planning goals for an area. The developer or property owner is required to fund the entire cost of design and construction of extensions to meet minimum water main size and/or the water main size established in the Capital Improvement Program for a specific pipe corridor (if applicable). If the City requires oversizing within a pipe corridor that does not have a main size identified in the CIP, the City will pay for the additional water main and appurtenant material costs that are in excess of the costs for the minimum required water main and appurtenant materials.

- Remote System Policy: The City will own and operate a separate water system that will serve the new WWTP in the southwest portion of the UGA. The WWTP water system will be abandoned when service from the City's primary water system is available in that area. Decisions regarding other remote water systems within or adjacent to the service area will be made on a case-by-case basis by staff and City Council. If the City decides to own and operate other remote systems, the system will need to be designed and constructed to meet both DOH and City standards. Construction costs specific to the system will be the responsibility of the developer or property owner. Operation and maintenance costs will be based on the actual costs incurred, but in no case will rates for remote systems be less than those for other City customers.

- Surcharge for Outside Customers: The City's current connection fees and rate structures includes a higher water rate for customers outside the corporate limits of the City (Ordinance 709). The surcharge is based on the additional costs associated with service to outside areas.

- Undersized Main Replacement Policy: If a City-owned water main is identified as deficient (through modeling or flow tests), the City assumes responsibility for upsizing the main to the minimum size in accordance with City standards. The prioritization of undersized main replacement projects are set in the WSP Capital Improvement Program (CIP) and shall be based upon overall benefit to City customers as well as level of inadequacy of the flow condition. Basic regulatory compliance for pressure at Peak Hour Demand (PHD) shall be a higher priority than meeting minimum fire flow goals. Should the City not be able to replace an undersized main in a time frame to meet service conditions for proposed development, the development applicant can upgrade the main, but at no cost to the City. In no case shall new connections be added to undersized water mains, unless the adequacy of service is established through review of field data and/or engineering analysis and subsequent approval by the Public Works Director.

- Water Availability: City approval of water availability forms issued by the County simply indicates that the City has adequate water system capacity to serve the proposed use. The approval of a water availability form in no way implies that the City has adequate facilities that are ready to serve the property. The applicant will be required to comply with conditions of service and implement any and all improvements consistent with applicable development or as otherwise identified by the City.

- Water Wheeling: Water wheeling is the practice of selling or buying water to or from a water system by using the piping network of a third water system. There is limited potential for water wheeling at this time due to lack of nearby systems.

- Wholesaling of Water: Routine wholesale to other water systems is not anticipated. In addition, wholesaling to new development would be in conflict with the City's direct connection policy and UGA service policy.

Conditions of Service

Conditions of service are established in the City's design and construction standards, see Chapter 7 and Chapter 13.04 of the TMC. The City will provide water of sufficient quantity and quality as required by the DOH and Environmental Protection Agency (EPA). Other obligations to DOH, as required of water purveyors, are the responsibilities of the City. Ownership, operation and maintenance of facilities upstream of service meters shall be the City's responsibility with reimbursement for such services through customer rates. All rates paid for water service shall be placed into the Water/Sewer Account and shall be used solely for the Water/Sewer Utility. Billing and connection fees are in accordance with the most current rate resolution as addressed in more detail in Chapter 9 of this WSP Update.

Customers shall comply with standards, codes, resolutions and ordinances as adopted by the City Council. Property owners requesting water service shall follow the City water service application process. The City's responsibility does not include main extensions or pump stations to serve new customers unless incidental to capital improvement projects required for provision of service to existing customers. Planning criteria for future improvements shall be a minimum "design" pressure of 30 psi and a minimum "operating" pressure of 20 psi under peak hour demands in accordance with applicable regulations.

Water Main Extensions: Conditions for design and construction of main extensions and related improvements for development are addressed in the City standards described in Chapter 7. Extensions to the water system are the responsibility of the developer. Properties requesting service which do not currently have complete water line frontage will be required to extend existing mains across the entire frontage of property. Frontage shall be at the discretion of the Public Works Department and will be selected to encourage looping and/or access for future extensions. All extensions shall become property of the City following construction approval by the City and shall include associated easements and rights-of-way. Exceptions will be granted only if the property lies within minimum distance for fire protection and in the opinion of the Public Works Department; there is a low probability for the water main to be extended to provide future service beyond the applicant's property.

For most platted properties with existing water main frontage, main extension or other system upgrades are typically not required prior to obtaining water service. However, if the main is less than the minimum water main size, operating pressure is less than 30 psi or if the service line will exceed 150 feet, an analysis will have to be conducted to determine specific service requirements

for that property. Specific requirements for these properties will be based on compliance with minimum design criteria with regard to the specific circumstances for the property.

The current version of City codes or development standards at the time when a development application is made shall supersede the provisions of this Water System Plan.

Chapter 2

BASIC PLANNING DATA

CHAPTER 2

BASIC PLANNING DATA

OBJECTIVE

The objective of this chapter is to present basic planning data and water demand forecasts needed to assess the current and future capabilities of the water system to provide service. This chapter will provide existing and projected population, service connections, and water use data, and will develop the water demand associated with the planning element known as an equivalent residential unit (ERU). This chapter also includes projected land use and water demands for 10- and 20-year planning periods.

The water use data and water demand forecasts found in this chapter comprise two of the three elements required for the development of a conservation program. The third required element is implementation of the conservation program and its component parts, which is addressed in Chapter 4.

CURRENT SYSTEM DEMANDS

In this section current system demands are examined in terms of total production and sales per connection by customer class for the City of Tenino. This information is later used to project future water system demands and evaluate water use efficiency.

CURRENT CITY POPULATION

The analysis of local population and demographic trends is important for a broad understanding of the community and to anticipate future needs.

The total population within the city limits of Tenino was estimated to be 2,030 by the 2022 Postcensal Estimate. Postcensal population data from 1968 to 2022 is available in the Office of Financial Management (OFM), *Postcensal Estimates of April 1 Population, 1960 to Present.*

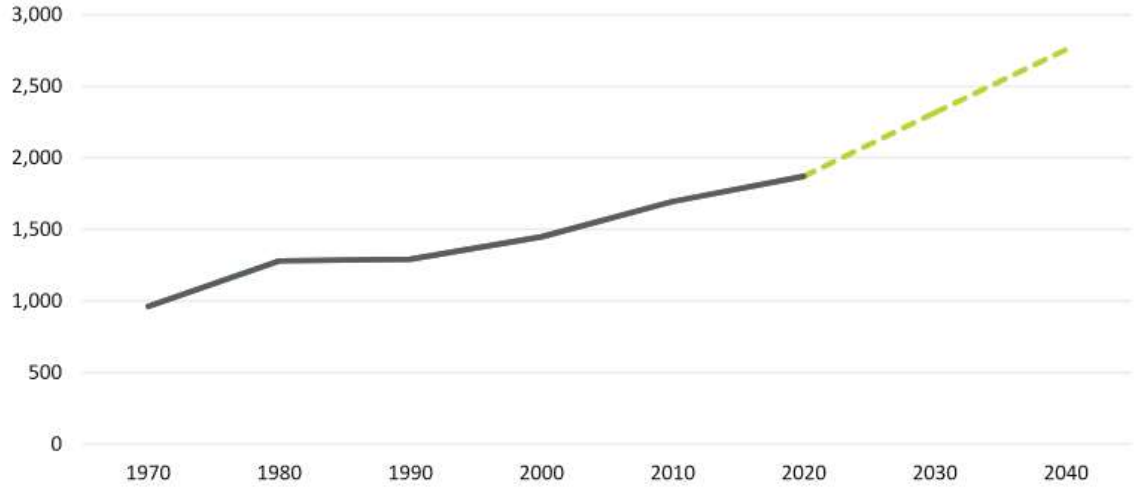
Figure 2-1 is copied from a report titled Housing Needs Assessment Housing Action Plan prepared by SCJ Alliance dated December 2022, see Chapter 1 Previous Engineering and Planning Documents. Figure 2-1 shows the historic and projected population since 1970. When Tenino incorporated in 1906, it was a bustling community powered by the railroad and the sandstone quarries. In 1910, there were 1,038 people living in the community, comprising 5.9% of Thurston County's population. As these formative industries declined, so did the job market and the population. By 1920, Tenino's population had decreased to 850.

Between 1920 and 1950, the population of the community grew at a relatively slow rate but never reached the population levels of 1910. The population decreased in the 1950s once Interstate 5 opened. This reduced automobile travel through Tenino and eliminated jobs serving passing motorists and freight trucks.

The City's population began to increase in the 1960s and has continued to do so since. Between 1970 and 1980, Tenino grew by 2.9% annually, its fastest growth rate over the last 100 years. Population growth slowed significantly in the 1980s, but steady population growth occurred over the last two census periods.

FIGURE 2-1

Historic and Forecasted Population within the City of Tenino Limits



Source: Washington Office of Financial Management (OFM), TRPC 2021 Statistical Profile

TOTAL SERVICE CONNECTIONS

The City of Tenino water system has four customer classes (residential, commercial, public facility, and school). Year-end water connections and estimated year-end population from OFM are shown in Table 2-1.

TABLE 2-1

End of Year Residential and Commercial Units Served and Estimated Population

Year	Total Meters Served	Residential Connections	Commercial Connections	Public Facility Connections	School Units Served	Estimated Service Area Residential Population
2019	785	667	96	15	7	1,858
2020	795	678	95	15	7	1,870
2021	821	705	94	15	7	2,010
2022	833	716	95	15	7	2,030

WATER PRODUCTION

Water production history is examined in the following sections. Source production data is obtained from source meters at each well which are typically read on a daily basis. Annual water production since 2019 is presented in Table 2-2, and monthly water production since 2020 is presented in Figure 2-2.

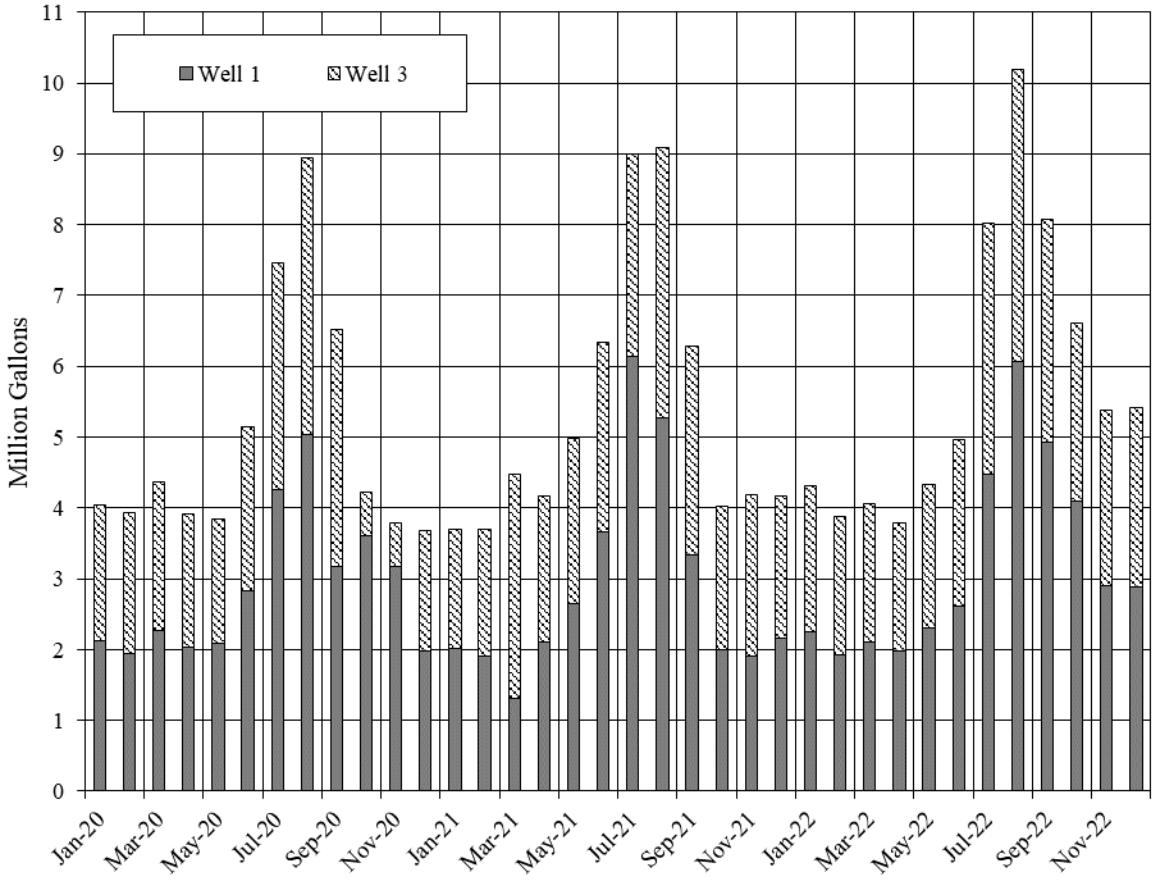
TABLE 2-2

Annual Water Production Records

Year	Production, Well 1		Production, Well 3		Total Production	
	MG	ac-ft	MG	ac-ft	MG	ac-ft
2019	35.9	110.2	26.1	80.1	62.0	190.3
2020	34.5	105.9	25.3	77.6	59.8	183.5
2021	34.5	105.9	29.7	91.1	64.2	197.0
2022	38.5	118.2	30.5	93.6	69.0	211.8
Average	35.9	110.0	27.9	85.6	63.8	195.7

FIGURE 2-2

Monthly Water Production Records



WATER CONSUMPTION

Water Consumption by Customer Class

Water sales data was obtained for the period January 2019 through December 2022, a period of 4 years. The City reads water meters and bills customers monthly. Water sales are divided into residential, commercial, school, and city facility customer classes. The number of residential accounts has slightly increased throughout the time period. Water usage metered or estimated by the city, but not sold will be addressed in the next section.

Average annual water sales by customer class are shown in Tables 2-3 through 2-5. All billing categories are taken inside and outside City limits. Table 2-5 shows average annual water sales per unit for all customer classes in gallons per day (gpd). Monthly City water sales for each customer class are shown in Figure 2-3.

TABLE 2-3

Annual Water Sales by Customer Class

Year	Residential (gpd)	Commercial (gpd)	School (gpd)	City Facility (gpd)	Total Sales (gpd) (1)
2019	96,920	18,590	17,760	9,012	142,282
2020	111,964	18,598	12,536	5,702	148,800
2021	114,585	18,281	7,093	4,051	144,010
2022	123,772	19,865	10,946	3,538	158,121
Average	111,810	18,834	12,084	5,576	148,303

(1) Does not include authorized unbilled water.

TABLE 2-4

Annual Percent Water Sales by Customer Class

Year	Percent Residential	Percent Commercial	Percent School	Percent City Facility
2019	68.1%	13.1%	12.5%	6.3%
2020	75.2%	12.5%	8.4%	3.8%
2021	79.6%	12.7%	4.9%	2.8%
2022	78.3%	12.6%	6.9%	2.2%
Average	75.3%	12.7%	8.2%	3.8%

TABLE 2-5

Average Annual Water Sales per Unit

Year	Residential Units	Residential Sales per Unit (gpd)	Commercial Units	Commercial Sales per Unit (gpd)	School Units	School Sales per Unit (gpd)	City Facility Units	City Facility per Unit (gpd)
2019	667	145	96	194	7	2,537	15	601
2020	678	165	95	195	7	1,791	15	380
2021	705	163	94	194	7	1,013	15	270
2022	716	173	95	210	7	1,564	15	236
Average	692	162	95	198	7	1,726	15	372

FIGURE 2-3

Monthly Water Sales by Customer Class

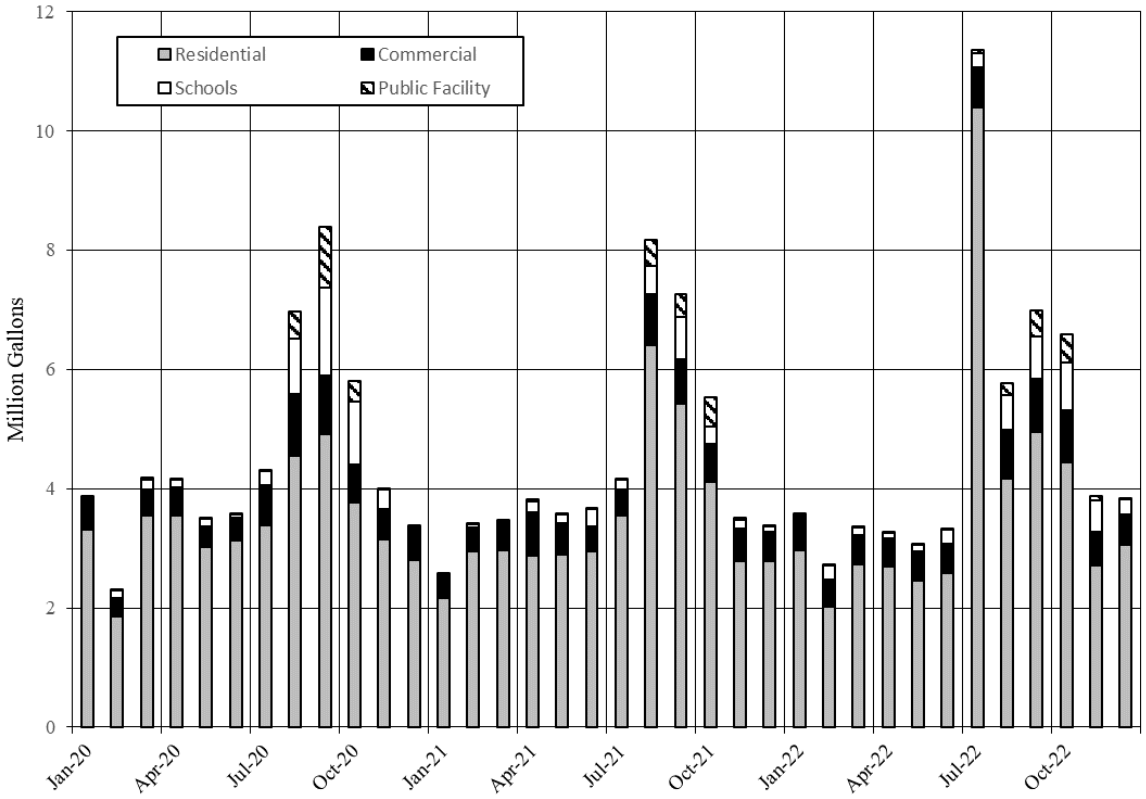
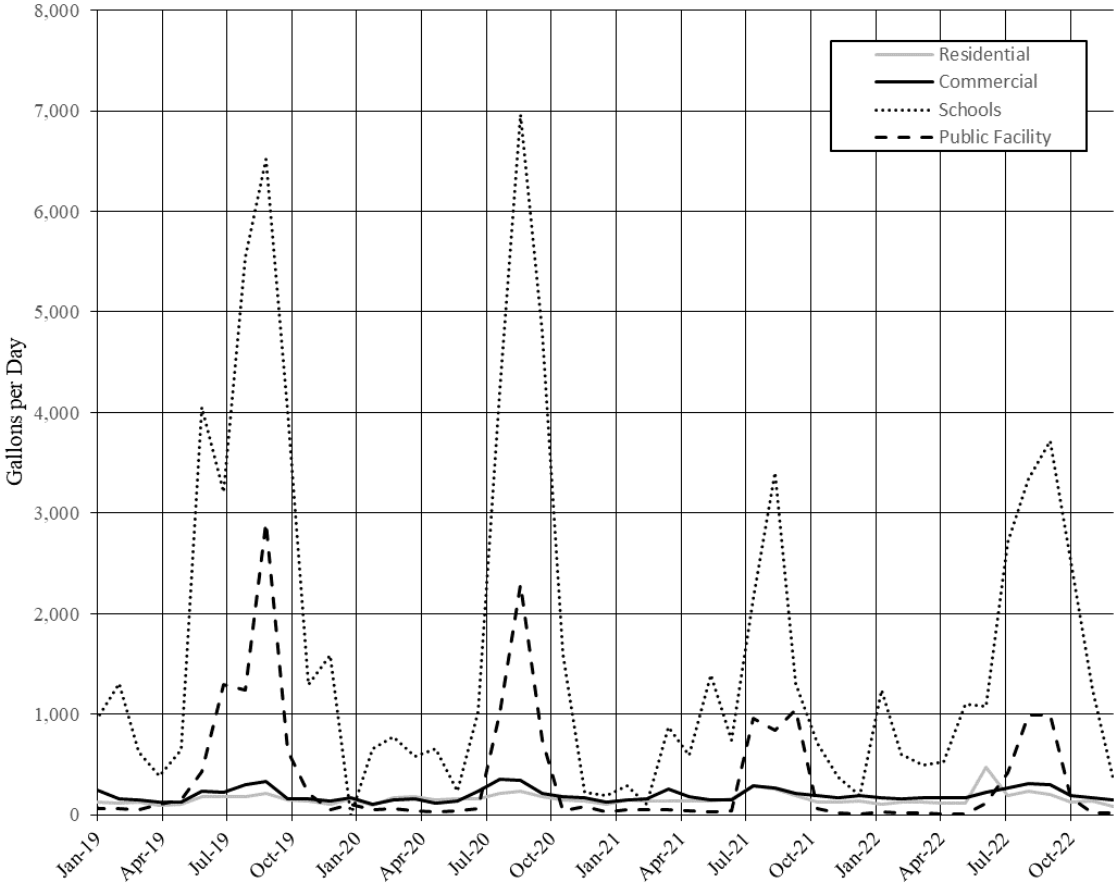


Figure 2-4 shows water use rates by customer class in gpd per connection. The figure shows commercial customers have a slightly larger usage rate than residential customers and both customer classes have seasonally higher usage rates in the late summer and early fall. The lowest month residential usage rate was 94 gpd per connection in April of 2020, the highest month residential usage rate was 476 gpd per connection in July of 2022, and the average residential usage rate is 162 gpd per connection.

In comparison, the lowest month commercial usage rate was 107 gpd per connection in February of 2020, the highest month commercial usage rate was 354 gpd per connection in August of 2020, and the average commercial usage rate is 198 gpd per connection. The schools and public facility customer classes also have seasonally higher usage rates in the late summer and early fall with the public facility having exceptionally high seasonal spikes due to the use of the Tenino Quarry Pool recreational swimming facility. The schools and public facility water usage significantly decreased in 2021 and 2022, presumably due to school and public facility closures in response to Covid.

FIGURE 2-4

Water Use Rates by Customer Class



Average Day Demand

The Water System Design Manual defines Average Day Demand (ADD) as the average day usage per connection of the residential connections on the subject water system. Use of Equivalent Residential Units (ERUs) is a way to express water use by non-residential customers as an equivalent number of residential customers. The value of an ERU is system specific and is calculated by dividing the volume of water utilized in the residential customer classes by the number of residential units served. This number defines the average day residential water use, or one ERU.

When water sales data is available, actual system data should be used for planning purposes. DOH's Water System Design Manual uses the following equations where no metered data is available:

Equation 2-1 Hyperbolic Function

ADD = (8,000/AAR) + 200

ADD = average day demand (gpd/ERU)

AAR = average annual rainfall (in/yr.)

Equation 2-2 Power Function

$ADD = 2{,}500/(AAR)^{1/2}$

Equation 2-3 Modified Power Function

$ADD = [1{,}350/(AAR)^{1/2}] + 200$

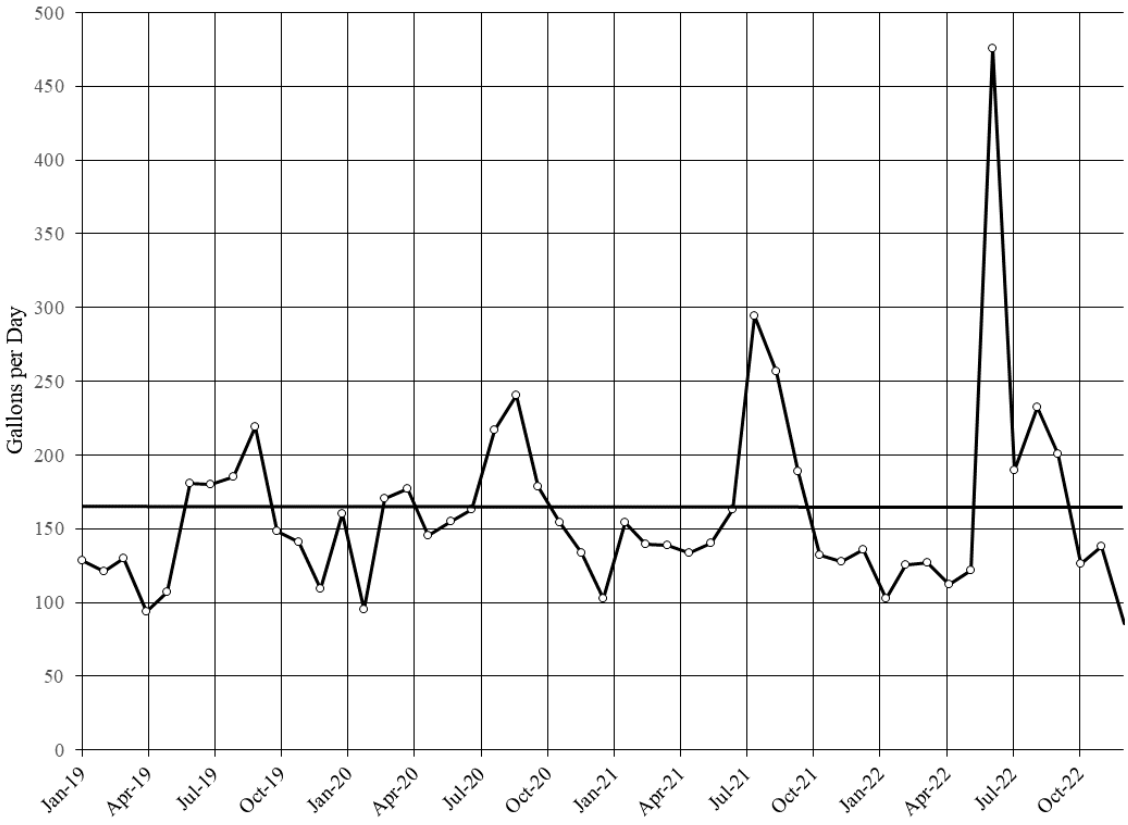
With an average annual precipitation of 49 in/yr. for the City of Tenino, Equations 2-1, 2-2, and 2-3 calculate ADD as 363 gpd/ERU, 357 gpd/ERU, and 393 gpd/ERU respectively. As will be shown based on actual system data, the actual ADD is significantly lower than DOH's guideline which could be due to several factors including households having a moderate population density and demographics such as median age and income.

The City of Tenino's ADD is based on actual system data. Taking each month's total residential water sales in gallons and dividing it by the total number of residential connections for that month and the total number of days for that month yields the monthly residential water use rate per ERU as shown in Figure 2-5, below.

Table 2-5 shows the 2019 to 2022 average calculated ADD to be 162 gallons per day (gpd). For the purposes of planning future water demands, **an ADD of 173 gpd per ERU will be used** because this ADD occurred in the most recent year. For comparison, the 2010 Water System Plan estimated an ERU was equivalent to 203 gpd for the years 2005 through 2007. Note that this per connection water demand does not necessarily represent the actual water use by each connection but represents overall system production divided by the estimated number of individual connections.

FIGURE 2-5

Monthly Single-Family Residential ADD



Maximum Day Demand

Maximum Day Demand (MDD) is defined in the DOH Water System Design Manual as the maximum day demand of the average residential water system connection, or ERU. Since daily residential water service meter data is generally not available, MDD is often estimated based on maximum day production data. Daily production records were reviewed for 2019 through 2022 and maximum day water production is summarized in Table 2-6.

TABLE 2-6

Maximum Day to Average Day Factor

Date	Maximum Day Production (gal)	Annual Average Day Production (gpd)	Factor
July 2, 2019	355,020	169,754	2.1
August 5, 2020	685,010	163,587	4.2
August 16, 2021	422,331	175,685	2.4
July 29, 2022	349,408	189,087	1.8
Average			2.6

The maximum days were determined by visual examination of the monthly data sheets. Average day production data for 2019 through 2022 is the total production from Table 2-2 divided by days in the year. The maximum day to average day factor was determined by dividing the maximum day by the annual average day. DOH suggests an average day to maximum day ratio of 2.0; however, Tenino's water system primarily serves residential customers and is therefore subject to higher demand fluctuations. The more conservative four-year maximum day demand (MDD) to ADD ratio will be used.

A MDD to ADD peaking factor of 2.6 will be used to estimate MDD. The estimated MDD is 450 gpd (173 gpd x 2.6). For comparison, the previous 2010 Water System Plan used a MDD to ADD peaking factor of 2.8 for the years 2005 through 2007 which would result in an MDD of 568 gpd.

Peak Hour Demand

Peak Hour Demand (PHD) is a value that applies to the system as a whole, not to any individual service, and is estimated using Equation 3-1 from the 2019 Water System Design Manual:

Equation 2-4 Peak Hour Demand

$$PHD = (MDD/1,440)\ [(C)(N) + F] + 18$$

Where

PHD = Peak Hour Demand, gallons per minute
C = Coefficient from Water System Design Manual Table 3-1
N = Number of ERUs served
F = Factor from Water System Design Manual Table 3-1
MDD = Maximum Day Demand per connection, gallons per day

For a system with more than 500 service connections, C and F are: 1.6 and 225, respectively. As derived above, MDD for the City water system is 450 gpd. Inserting these numbers into Equation 2-4 yields the following:

$$PHD = (450/1,440)\ [(1.6)\ (N)+225] + 18$$

This equation simplifies to the following:

$$PHD = 0.50N + 88$$

Using 914 currently metered ERUs from Table 2-9 below, the estimated peak hour demand for metered sales in 2022 is 545 gpm. The estimated peak hour demand for the 1,093 metered ERUs plus ERUs from Authorized Consumption and Distribution System Leakage (DSL) is 635 gpm. For comparison, the previous 2010 Water System Plan used a PHD of 647 gpm for the years 2005 through 2007. The above formula will be used to estimate projected peak hour demands.

It can be assumed that overall use will remain approximately proportional to population and ADD and MDD are useful predictors of future water needs. Table 2-7 summarizes water demand statistics.

TABLE 2-7

Summary of Per Capita Water Demand Statistics

Demand Factor	Value
Average Day Demand (gpd)	173
Maximum Day Demand (gpd)	450
Maximum Day to Average Day Demand Factor	2.6
Peak Hour Demand (gpm)	0.50N + 88

Distribution System Leakage

Distribution System Leakage (DSL) consists of the difference between water produced and water sold or otherwise accounted-for. DSL generally consists of a total of several things, including leakage, unauthorized consumption, water main flushing, firefighting, street sweeping, construction, water main breaks, under-reading service meters, and sales to water haulers not metered, estimated, or otherwise accounted-for in the water sales records.

For systems that collect water sales data monthly for all customers, the month-to-month DSL tends to be quite variable. This variability may be due to filling and drawing of reservoirs, timing of the reading of water service meter relative to water source meters, as well as actual monthly variability of water losses and unaccounted for water uses.

Amendments to the Drinking Water Regulations collectively known as the “Water Use Efficiency Rule,” effective January 22, 2007, establishes a 3-year average DSL water goal of 10 percent or less. The water use efficiency (WUE) rule is discussed in greater detail in Chapter 4 of this Plan.

Due to monthly data variability, annual DSL is considered a better evaluation of overall WUE. Annual water production, water sales, and DSL for the years 2019 to 2022 are shown in Table 2-8. The data shows annual DSL averaged 7.8 percent. For comparison, the 2010 Water System Plan noted that DSL has been under 10 percent since 2004. The current 3-year average rate of 6.9 percent DSL is maintained below the WUE rule of 10 percent. The WUE Rule requires specific actions of water utilities that have a 3-year average DSL greater than 10 percent. Chapter 4 further describes the requirements of the WUE Rule and the City’s plans to maintain DSL below 10 percent.

TABLE 2-8

Annual Water Production, Sales, and DSL

Year	Water Production (MG)	Water Sales (MG)	Authorized Consumption, (MG) [1]	Total Accounted-for (MG)	DSL (MG)	Percent DSL
2019	61.96	51.88	3.61	55.49	6.48	10.5%
2020	59.87	54.52	3.27	57.79	2.08	3.5%
2021	64.13	52.56	5.50	58.06	6.06	9.5%
2022	69.02	57.71	6.00	63.71	5.33	7.7%
3-Year Average						6.9%

(1) The City keeps detailed sheets tracking Fire Department use, fire hydrant testing, leaks, losses due to water meters, line flushing, construction use, reservoir cleaning, and other water losses.

Equivalent Residential Units

The volume of water used by non-residential commercial customer classes can be divided by the average single-family residential water use to determine the number of equivalent residential units (ERUs) utilized by the other customer classes. It should be noted that the number of ERUs represented by non-residential users will change from year to year because commercial users do not use the same amount of water every year. It should also be noted that the definition of an ERU will change from year to year because residential users also do not use the same amount of water every year. Since the definition of an ERU is the average residential water use over a data period, the total residential water use in any given year will not necessarily match the total number of residential connections multiplied by the water use per ERU. Therefore, the ERU estimates should not be used as exact predictors of water use in any given year, but rather as an estimate of the capacity of the water system to support additional water users. ERUs for residential, commercial, school, city facility, non-sales water use, and DSL are shown in Table 2-9.

TABLE 2-9

Equivalent Residential Units for 2022

Customer Class	Water Use (gpd)	Meters	ERUs
Residential [1]	123,772	716	716
Commercial [2]	19,865	95	115
School [2]	10,946	7	63
City Facility [2]	3,538	15	20
Authorized Consumption [2]	16,438	-	95
Subtotals	174,559	833	1,009
DSL [2]	14,528	-	84
Totals	189,087	833	1,093

(1) All residential meters are 1 ERU each regardless of usage for any given year.
(2) Commercial, School, City Facility, and DSL ERUs are determined by dividing the average day water sales by 173 gpd per ERU.

PROJECTED SYSTEM DEMANDS

To project future City water demands it will be assumed that water use will be proportional to population. The historic water use factors developed above will be applied to projected populations to estimate future water demands.

PROJECTED LAND USE

The majority of the service area is reserved for residential use with the largest classification being single family residential. Smaller areas are zoned multi-family residential, commercial, and industrial. There are no known plans for large scale changes in land use.

PROJECTED POPULATION

From Figure 2-1 the population within City limits has grown steadily over the last 50 years. Projected population from TRPC Population, Housing, and Employment Data as discussed in Chapter 1, Previous Engineering and Planning Documents is used to project water system demands.

TRPC data was updated most recently in December 2022 and is shown Figure 2-1 above and Table 2-10 below. This forecast projects that the population of Tenino will increase by 760 people between 2022 and 2045.

TABLE 2-10

Projected City Service Area Population

Year	Population (1)	Average Annual Rate of Change (2)
2010	1,695	--
2020	1,870	0.99%
2021	2,010	7.49%
2022	2,030	1.00%
2025	2,050	0.33%
2030	2,310	2.42%
2035	2,565	2.12%
2040	2,750	1.40%
2045	2,790	0.29%

(1) From TRPC – Population, Housing, and Employment Data,
(2) Average Annual Rate of Change was calculated from population data.

PROJECTED NON-RESIDENTIAL WATER NEEDS

By using historic per capita water production, historic non-residential water demand and DSL are accounted for. Since there are no known plans for large-scale changes in land use, it is estimated that non-residential water use will increase proportionately to population. If residential use, non-residential use, or DSL are reduced in the future, then

use of historic per-capita water demand may overpredict future water demands. However, it is preferable to overpredict than to underpredict future water demands so that adequate resources can be assured. Therefore, future water use will be estimated based on projected growth rates and historic water production records.

FUTURE DEVELOPMENT

Since there are no large-scale developments planned at this time, it is estimated that future development will progress in a manner similar to development in the recent past. The West Tenino annexation area (see the Zoning Map in Appendix A) has been federally identified as critical habitat for endangered species and has little to no development potential as verified by SCJ Alliance's Housing Needs Assessment: Housing Action Plan discussed in Chapter 1 of this Water System Plan.

PROJECTED EQUIVALENT RESIDENTIAL UNITS

It is anticipated that the value of an ERU will change as the system grows. With promotion of water conservation, the water usage represented by an ERU may go down. Due to anticipated growth being primarily residential, this Water System Plan projects future ERUs with the same growth rate as city population. DOH requires demand estimates with WUE program projections. The City of Tenino has set a WUE efficiency goal of reducing public water use by 10%.

PROJECTED NON-REVENUE WATER DEMANDS

Non-revenue water consists of all the City's municipal water uses, authorized consumption, and DSL. Non-revenue water demands are listed in Tables 2-3 to 2-5 and 2-8. This data will be used to project (or estimate) future non-revenue water demands. It will be assumed that future non-revenue water demands will remain approximately the same as current non-revenue water demands and will increase proportionately to population.

WATER RATES AND RATE IMPACTS ON WATER DEMAND

If the City's water rate structure is adjusted in the future, that adjustment may have an impact on water usage. The most likely impact of future rate adjustments would be to promote water conservation. If water customers use water in a more conservative manner than historic water use, the water usage rate represented by an ERU would decline and the number of ERUs represented by a given water usage rate would increase. Water usage should be re-evaluated periodically to adjust the value of an ERU.

PROJECTED WATER DEMAND FOR 10- AND 20-YEAR HORIZONS

Projected Average Day, Maximum Day, Peak Hour, and Annual Demands

Based on historic water use rates and projected population growth rates, estimated future City water demands are shown in Table 2-11. PHD in Table 2-11 is estimated based on the PHD formula developed previously and applied to the projected total ERUs for the water system. Annual water demands are calculated directly from the ADD in Table 2-11 and expressed in acre-feet per year (ac-ft/yr) for easy comparison to water right limitations.

Table 2-12 shows the same demands as Table 2-11 with the WUE goal of reducing public water usage by ten percent as further discussed in Chapter 4. Table 2-12 shows 10 percent public water use reduction beginning in 2023 and therefore demands are shown to decrease from 2022 to 2023. It is important to note that 10 percent public water use reduction is a goal and will not likely be achieved in the first year as shown in Table 2-12.

Annual incremental projections are made for the 10-year horizon to the year 2037 to allow time for Water System Plan review and approval. One final projection for the 20-year horizon in the year 2042 is also included.

TABLE 2-11

Projected Water Demands

Year	Population (1)	Service Connections (2)	ERUs (3)	ADD gpd (4)	MDD gpd (5)	PHD gpm (6)	Annual Demand ac-ft/yr (7)
2022 (8)	2,030	833	1,093	189,087	349,408	635	211.8
2023	2,037	836	1,097	189,708	493,460	636	212.5
2024	2,043	838	1,100	190,329	495,075	638	213.8
2025	2,050	841	1,104	190,952	496,696	640	213.9
2026	2,100	862	1,130	195,567	508,700	653	219.1
2027	2,150	882	1,158	200,294	520,995	667	224.4
2028	2,202	904	1,186	205,135	533,587	681	230.4
2029	2,255	926	1,214	210,093	546,483	695	235.3
2030	2,310	948	1,244	215,170	559,691	710	241.0
2031	2,359	968	1,270	219,724	571,536	723	246.1
2032	2,409	988	1,297	224,374	583,632	736	252.0
2033	2,460	1,009	1,324	229,122	595,983	750	256.6
2034	2,512	1,031	1,352	233,971	608,596	764	262.1
2035	2,565	1,053	1,381	238,923	621,475	779	267.6
2036	2,601	1,067	1,400	242,274	630,192	788	272.1
2037	2,637	1,082	1,420	245,672	639,031	798	275.2
2042	2,766	1,135	1,489	257,639	670,159	833	288.6

(1) Population starts at 2,030 in 2022 and increases at the annual rate of change shown in Table 2-10.
(2) Service connections start at 833 in 2022 and increase at the annual rate of change shown in Table 2-10.
(3) Projected ERUs are the year 2022 total ERUs from Table 2-9 (including DSL) projected forward at the annual rate of change in Table 2-10.
(4) ADD is the projected number of ERUs multiplied by 173 gpd/ERU from Table 2-7.
(5) MDD is the projected number of ERUs multiplied by 450 gpd/ERU from Table 2-7.
(6) PHD is based on the formula in Table 2-7 and the projected number of ERUs shown in this table.
(7) 2022 is based on actual data and may not correlate with forecast factors because forecast factors are derived using prior 4-year averages.
(8) One acre-foot (ac-ft) of water is the amount of water required to cover 1 acre to a depth of 1 foot which is approximately 325,851 gallons.

TABLE 2-12

Projected Water Demands with Water Use Efficiency

Year	Population [1]	Service Connections [2]	ERUs [3]	ADD gpd [4][9]	MDD gpd [5][9]	PHD gpm [6][9]	Annual Demand ac-ft/yr [7][9]
2022 [8]	2,030	833	1,093	189,087	444,114	635	211.8
2023	2,037	836	1,097	170,737	445,568	573	191.2
2024	2,043	838	1,100	171,296	447,026	574	192.4
2025	2,050	841	1,104	171,857	457,830	576	192.5
2026	2,100	862	1,130	176,010	468,896	588	197.2
2027	2,150	882	1,158	180,264	480,228	600	201.9
2028	2,202	904	1,186	184,621	491,835	613	207.4
2029	2,255	926	1,214	189,083	503,722	626	211.8
2030	2,310	948	1,244	193,653	514,383	639	216.9
2031	2,359	968	1,270	197,752	525,268	651	221.5
2032	2,409	988	1,297	201,937	536,385	663	226.8
2033	2,460	1,009	1,324	206,210	547,736	675	231.0
2034	2,512	1,031	1,352	210,574	559,328	688	235.9
2035	2,565	1,053	1,381	215,031	567,173	701	240.9
2036	2,601	1,067	1,400	218,047	575,128	709	244.9
2037	2,637	1,082	1,420	221,105	444,114	718	247.7
2042	2,766	1,135	1,489	231,875	603,143	749	259.7

(1) Population starts at 2,030 in 2022 and increases at the annual rate of change shown in Table 2-10.
(2) Service connections start at 833 in 2022 and increase at the annual rate of change shown in Table 2-10.
(3) Projected ERUs are the year 2022 total ERUs from Table 2-9 (including DSL) projected forward at the annual rate of change in Table 2-10.
(4) ADD is the projected number of ERUs multiplied by 173 gpd/ERU from Table 2-7.
(5) MDD is the projected number of ERUs multiplied by 450 gpd/ERU from Table 2-7.
(6) PHD is based on the formula in Table 2-7 and the projected number of ERUs shown in this table.
(7) 2022 is based on actual data and may not correlate with forecast factors because forecast factors are derived using prior 4-year averages.
(8) One acre-foot (ac-ft) of water is the amount of water required to cover 1 acre to a depth of 1 foot which is approximately 325,851 gallons.
(9) Although projected ERUs do not change with or without the WUE goal, ADD, MDD, and PHD were calculated using 10% less ERUs for projecting water demands with WUE.

Chapter 3

SYSTEM ANALYSIS

CHAPTER 3

SYSTEM ANALYSIS

OBJECTIVE

The objective of this chapter is to evaluate if the water system facilities can supply sufficient quality and quantity of water to meet existing and projected demands. Facility performance and design criteria are established as the basis for evaluating existing facilities and proposed improvements. The majority of the standards identified below are based on regulatory requirements and DOH guidance. System specific standards that deviate from DOH guidance are referenced where applicable. Water System Standards are addressed in further detail in Chapter 7

DESIGN STANDARDS AND CRITERIA

The following is a summary of applicable capacity requirements and minimum design standards for water service as defined in Chapter 246-290 WAC and the DOH Water System Design Manual (WSDM).

SOURCE AND PUMPING CAPACITY

In general, overall source requirements are dependent upon the capacity and reliability of the source facilities. Specifically, source capacity and pumping stations must equal or exceed Maximum Day Demand (MDD) in accordance with WAC 246-290-222. Source pumping should not exceed instantaneous withdrawal rights allowed by the Department of Ecology (Ecology).

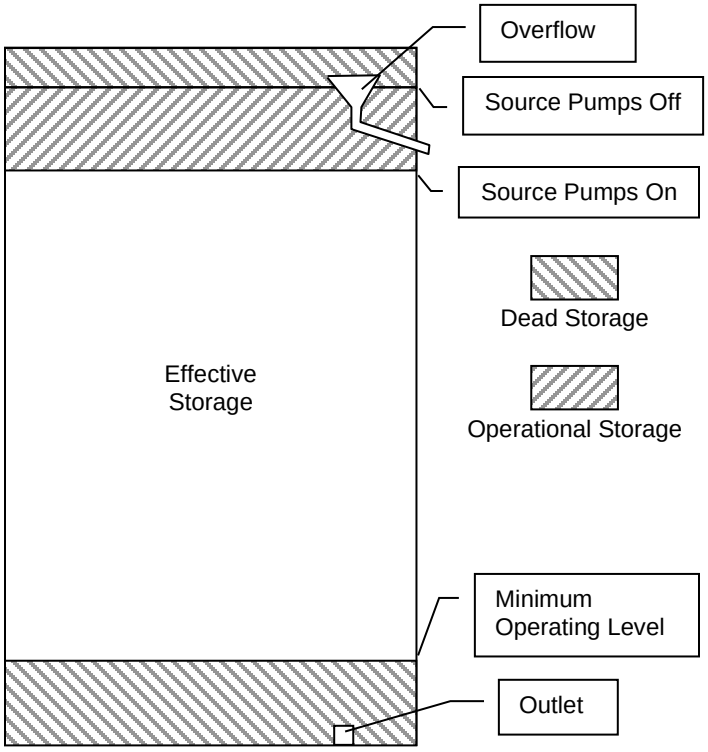
DISTRIBUTION AND TRANSMISSION PERFORMANCE

Minimum design pressures must be maintained under Peak Hour Demand (PHD) and MDD plus fire flow conditions (WAC 246-290-222). DOH rules differentiate between “design” and “operating” conditions. Water systems must be designed to provide a minimum pressure of 30 psi measured at the meter or property line under PHD conditions (WAC 246-290-230). This design pressure must be met at the condition where equalizing storage is depleted. During routine operating conditions, approved design pressures must be maintained, but in no case shall service pressure be less than 20 psi (WAC 246-290-420). When fire flow is required, 20-psi design pressure must be maintained at the operating hydrant and in all other areas of the distribution system. Positive pressures must be maintained at all points in the distribution system under actual fire flow operating conditions.

Storage Capacity

According to the DOH Water System Design Manual, water system storage volume is comprised of five components:

Figure 3-1 Water System Storage Components



- Operational storage (OS)
- Equalizing storage (ES)
- Standby Storage (SS)
- Fire suppression storage (FSS)
- Dead storage (DS)

These required volume components are illustrated in Figure 3-1. Table 3-1 replicates Table 7-1 of the 2019 Water System Design Manual which provides equations or methods to calculate or determine each volume component. A reservoir's effective storage volume is the nominal or total volume less operational storage and dead storage. This volume must be large enough to accommodate the requirements for equalizing storage, standby storage, and fire suppression storage.

Storage must be sufficient for the 10-year planning period and storage improvements should be designed to meet the requirements for at least the next 20-year planning period. Critical components are operational, equalizing, standby, fire suppression, and dead storage as discussed in the following.

- Operational Storage: Operational storage is the amount of water that flows in and out of a reservoir during normal system control cycling. Reservoirs typically operate with a maximum water level at which all source pumps are turned off, and a minimum level at which all source pumps are turned on and are set by City operations staff. The amount of water that flows into and out of the reservoir between these two levels depends on the operational control levels and the dimensions of the system reservoirs. Operational storage should be sufficient to avoid source of supply pump cycling (starts/stops per hour) in excess of the pump motor manufacturer's recommendation.
- Equalizing Storage: Equalizing storage is the amount of water needed to meet peak system demand for the period of time that system demand exceeds the system source capacity. The DOH Water System Design Manual recommends that this volume be estimated as PHD minus source capacity for 150 minutes, but not less than zero. The equalizing volume of a storage tank must be located at an elevation that provides a minimum service pressure of 30 pounds per square inch (psi) to all customers served by the reservoir.
- Standby Storage: Standby Storage is water held in reserve for emergency situations, such as temporary loss of a water source. A key concept is that establishing standby volume involves planning for reasonable system outages – those that can be expected to occur under normal operating conditions, such as a pipeline failure, power outage or valve failure. Major system emergencies, such as those created by an earthquake, are intended to be covered by emergency system operations planning, because construction of sufficient reserve volume to accommodate sustained system demands under emergency

conditions is not economically feasible. The DOH Water System Design Manual recommends that this volume be based on one day of maximum day demand for the pressure zone and adjusted based on source vulnerability and/or redundancy, but not less than 200 gallons per ERU.

- Fire Suppression Storage: Fire flow storage must be equal to the greatest required fire flow within the service area multiplied by the required duration. Fire flow storage may be nested within standby storage if allowed by the local fire protection authority. Applicable fire flow, duration and local standards are provided in the discussion of fire flow criteria below.
- Dead Storage: Dead storage is the volume at the bottom of the reservoir that cannot be used because it is either physically too low to provide sufficient service pressure at one or more connection in the distribution system or cannot be withdrawn from the reservoir at the required rates while maintaining the minimum required system pressure or other required operating parameter. The amount of dead storage existing in a system depends on storage system dimensions, elevations, pumping systems, outlet design, and possibly other requirements such as disinfectant contact time. Since fire flow storage is the first component above dead storage, the dead storage volume typically must be at an elevation such that a minimum of 20 psi (approximately 46 feet) distribution system pressure is maintained at the highest connection in the zone supplied by the reservoir when the water level in the reservoir reaches the bottom of the fire flow storage.

TABLE 3-1

Reservoir Storage Component Cross-Section Diagram

	High Level Alarm. Overflow above **pump off** elevation
Pump(s) Off	**Operational Storage (OS) Component** Not part of ES Not applicable for continuous pumping systems. Minimum OS volume for pump protection can be conservatively calculated as the pump supply capacity (in gpm) times 2.5 minutes. OS = Operational storage component (gallons).
Pump(s) On	
	Equalizing Storage (ES) Component For call-on-demand: **ES = (PHD - Q_S)(150 min.),** but in no case less than zero. ES = Equalizing storage component (gallons). PHD = Peak hourly demand (gpm). Q_S = Total of all permanent and seasonal sources (gpm).
Maintain 30 psi (required)	See WSDM Section 7.1.1.2 for sizing criteria for continuous pumping operations.
Low Level Alarm	**Fire Suppression Storage (FSS) Component** For Single Sources: **FSS = (FF)(t_m)** FSS = Fire suppression storage component (gallons). FF = Needed fire flow rate, expressed in gpm as specified by fire authority or the Coordination Act, whichever is greater.
Maintain 20 psi (required)	t_m = Duration of FF rate, expressed in minutes as specified by fire authority.
	Standby Storage (SB) Component SB = (N)(SB_i)(T_d) SB = Total standby storage component, or its equivalent, in gallons. N = Number of ERUs based on the ERU_{MDD} value SB_i = Locally adopted unit SB volume in gallons per day per ERU (number of ERUs based on the ERU_{MDD} value) T_d = Number of days selected to meet water system-determined standard of reliability
Maintain 20 psi (recommended)	We recommend a minimum SB volume of at least 200 gal per ERU.
	Dead Storage (DS)
	Portion of a gravity reservoir that does not provide required minimum pressure.

FIRE FLOW CRITERIA

The Washington Survey and Rating Bureau (WSRB) classifies municipalities according to firefighting capabilities and establishes guidelines for rating overall fire protection. The insurance rating of a local fire authority is based upon a variety of criteria distributed among three key

components. Ten percent (10%) of the rating is based upon the “911” center’s ability to answer and dispatch calls, forty percent (40%) is based upon the fire department itself, and fifty percent (50%) is based upon the reliability of the water system and its ability to provide required fire flows.

The WSRB rating influences fire insurance premiums. The Fire District has a WSRB rating of 6 in and around the City, on a scale of 1, high to 10, low. Ratings are typically conditional upon proximity of hydrants. If a residential property is more than 1,000 feet, or a commercial property is more than 300 feet from a fire hydrant, the rating may be reduced for insurance purposes. A municipality should request a new rating evaluation when significant upgrades to fire protection capabilities are completed.

Fire flow performance requirements for the water system can be based on statutes or can be established by the City Council in the form of performance standards. At a minimum, the water system must comply with WAC 246-293, which sets specific fire flow performance requirements for public water systems with greater than 1,000 service connections. For reference and comparison, these performance requirements are summarized in Table III-2.

TABLE 3-2

Minimum Fire Flow per WAC 246-293-640

Development Classification	Minimum Fire Flow Requirement [1]
Rural [3]	None
Residential [4]	500 gpm for 30 minutes
Commercial [5]	750 gpm for 60 minutes [2]
Multi-Family [5]	750 gpm for 60 minutes [2]
Industrial	1,000 gpm for 60 minutes [2]

1. Minimum fire flow requirements are in addition to maximum day demands.
2. Commercial and industrial buildings may be subject to higher flow requirements when evaluated on an individual basis by the fire protection authority.
3. Rural development - lot sizes greater than one acre (including parks, open space, agricultural lands, etc.)
4. Residential development - lot sizes one acre or less, (including all single family and multifamily structures less than 4,000 square feet, and mobile home and recreational vehicle parks)
5. Commercial and multifamily with a floor area 4,000 square feet or greater

The City’s design and construction guidelines (see Appendix B) identify the minimum fire flow goals listed in Table III-2. There is no mandated fire flow standard since the water system serves less than 1,000 connections. The City goal for 1,000 gpm for 60 minutes will be used to evaluate fire storage capacity. Since there is no specific mandate for the City to provide fire flow, the City has the option to nest the fire flow storage component within the standby storage component. The City will continue to exercise this option to achieve greater flexibility with regard to storage sizing, which is a typical operating procedure for most small cities.

Fire flow requirements are specific to both the water system performance and to specific building projects. Site specific fire flow requirements in addition to the minimum standards may be required by the local fire protection authority (i.e. City or County) through the building permit process. It is common for codes and ordinances to specify building requirements in excess of the water system fire flow standards. It is important to note that the building related codes and ordinances do not require the water system to provide the fire flow. In the case where site specific fire flow requirements are greater than the water system fire flow requirements or available fire flow, it is the responsibility of the property owner and/or developer to provide the improvements

that are required for the specific building or development proposal. Typically, the property owner or developer must make up the shortfall with site-specific mitigation such as fire sprinklers, fire resistant construction, or reduction in building size. In extreme cases, such as large industrial or commercial buildings, the building owner may need to install storage, pumping and/or piping to provide the necessary fire flow. In summary, the water system is required to meet the minimum fire flow performance standard based on the designated land use. If the City can provide fire flow in excess of the minimum standards with reasonable and affordable improvements, there may be advantages to customers in the form of lower insurance premiums and less on-site fire flow mitigation for future commercial and industrial projects.

DISINFECTION CONTACT TIME

The City is not currently required to maintain a minimum disinfection contact time. Typically, DOH only requires contact time for groundwater sources that have had multiple positive coliform sample results at the source of supply or if a source is vulnerable to microbiological contamination.

WATER QUALITY ANALYSIS

The City's water quality must comply with the provisions of the federal Safe Drinking Water Act (SDWA). DOH water quality provisions contained in Chapter 246-290 WAC generally incorporate the SDWA requirements. However, due to resource and legal process constraints, the DOH rules tend to lag behind SDWA implementation. Compliance with the current state rules does not guarantee compliance with all current federal rules. Therefore, some of the analysis in this section may evaluate proposed federal rules as well as current state statutes.

The City is required to test various water quality parameters ranging from monthly coliform samples to sampling inorganic chemicals. The following section discusses the various water quality parameters and most recent results. Table III-3 provides a summary of water quality monitoring requirements and results. The Cities water quality monitoring schedule is provided in Appendix D.

TABLE 3-3

Water Quality Monitoring Summary

Parameter	Monitoring Requirements	Results
Coliform	Monthly coliform samples have been consistently collected in accordance with the regulations. (1)	The City has had one positive total coliform sample in March 2022 over the previous ten-year period. The repeat samples taken as a result showed an absence of total coliform.
Inorganic Chemicals (IOC)	DOH has granted the City a 9-year waiver. The next sample is due in September of 2027.	The last sample was taken on September 6, 2018. Results show no contaminants were above the Maximum Contaminant Levels (MCLs). Most analytes were not detected (or less than the State Reporting Limit). Sodium, hardness, conductivity, turbidity, total dissolved solids, and total nitrate/nitrite were detected which is typical for most groundwater sources.
Nitrates	Nitrate samples are required annually.	Previous nitrate sample results are in the range of 0.5 mg/l to 1.0 mg/l, which is typical for groundwater in the area and far below the MCL of 10.0 mg/l. The most recent sample was taken in April 2023 with a result of 0.71 mg/l.
Volatile Organic Chemicals (VOC)	The most recent sample was taken March 2022 and the next sample due date is currently being determined.	The last sample was taken March 2022. Results are below the current MCLs.
Synthetic Organic Chemicals (SOC)	SOC monitoring requirements are based on DOH rating of the source susceptibility. DOH has granted the City a 9-year waiver for herbicides and the next sample is due June 2024.	The water system has purchased waivers to reduce SOC monitoring requirements since the waiver program was instituted in 1995. The last herbicide and pesticide samples were taken July 8, 2016 and all results were below the current MCLs.
Per and polyfluroalkyl substances (PFAS)	Beginning Jan 2023 through Dec 2025, DOH requires Group A community and non-transient non-community water systems to monitor for PFAS.	The City has collected a sample in March 2023 and the results are currently being determined.
Radionuclides	Radionuclide samples are required every six years. The last samples were taken May 13, 2015 and the compliance period ends Dec 2025.	The last samples were taken May 13, 2015, and results are below the current MCLs.
Asbestos	DOH policy requires asbestos sampling every nine years if more than 10% of the distribution system consists of AC pipe.	Sample results from October of 2018 were less than the state reporting limit. The next sample due date is in October 2027.
Disinfection By-Products (DBPs)	The City has been granted reduced monitoring (annually in Oct) for TTHMs and HAA5.	Sample results from September of 2023 were well below the maximum contaminant level.
Lead and Copper	The City is required to take 10 Lead and Copper samples at the standard 3 year frequency. The last samples were taken Sep of 2023 and the next samples are due Sep of 2026.	Sample results from September of 2023 were less than action levels.

1. See Coliform Monitoring Plan in Appendix D

EPA passed the Stage 2 Disinfection Byproducts (DBP) Rule in January 2006. The Stage 2 DBP rule builds on earlier rules that addressed DBPs. The DBP rules are intended to reduce potential cancer and reproductive and developmental health risks. The DBPs form in drinking water when disinfectants are used to control microbial pathogens. This Stage 2 DBP Rule enhances compliance monitoring requirements for two groups of DBPs, trihalomethanes (TTHM) and haloacetic acids (HAA5).

Because previous monitoring results have been low, the City received a 40/30 Certification from EPA. The 40/30 Certification allows for reduction of some DPB monitoring requirements including reduction of the monitoring frequency from quarterly to annually.

SYSTEM DESCRIPTION AND ANALYSIS

This section provides a description of the general condition and physical capacity of each water system component. The existing capacity is compared to the existing and projected water demands identified in Chapter 2. This analysis identifies the extent and timing of facility deficiencies. Each identified deficiency is summarized at the end of this section. Other deficiencies are identified in the Operations and Maintenance Program in Chapter 6. Recommendations are discussed in more detail in the Capital Improvement Program in Chapter 8. See Figure 3-2 for a schematic map of the water system facilities.

Source Capacity Analysis

The City currently owns and operates two wells located along the north central part of the service area. The wells are referred to Well No. 1 and Well No. 3. Well No. 2 is located in the vicinity of Well No. 1 and Well No. 3 but is no longer utilized due to excessive sand production. Well No. 1 and Well No. 3 are currently designated as a well field by DOH, which reduces overall water quality monitoring requirements. Table 3-4 presents a summary of general parameters for each well.

TABLE 3-4

Well Characteristics

Parameter	Well No. 1	Well No. 3
Installation Date	May 1967	May 1994
Casing Size	12-inch	12-inch
Depth below ground surface	94 feet	93 feet
Screened interval	89 to 94 feet	58 to 93 feet
Well Tag	AAA-948	ABE-103
Confining Layer	13.5 to 23 feet	5 to 59 feet
Static Water Level	16.5 feet	11 feet
Pump Test Capacity	459 gpm	359 gpm
Installed Pump Capacity	300 gpm	400 gpm

Total source capacity must equal or exceed the estimated Maximum Day Demand (MDD) as required in WAC 246-290-222. The current available pumping capacity is 700 gpm which is also the City's existing instantaneous water rights as discussed in the Water Rights Analysis section below. Table 3-5 shows the existing source capacity compared against projected MDD developed in Chapter 2 and the projected surplus or deficit in annual increments through the year 2037 and one final projection in the year 2042. As shown in Table 3-5, the City's current source capacity is

projected to support MDD through the year 2037; however, there is a projected 41 gpm deficit in the year 2042.

Table 3-6 shows the same information as Table 3-5; however, uses Average Day Demand (ADD) and MDD developed in Chapter 2 assuming the water use efficiency (WUE) goal of reducing public water use by ten percent (further discussed in Chapter 4) is achieved. As shown in Table 3-6, if the City achieves the WUE goal, existing source capacity is projected to support MDD through the 20-year scenario. This analysis should be reviewed again during the next Water System Plan, anticipated to occur between 2032 and 2037, to determine if water use efficiency efforts reduce or eliminate the projected 20-year source capacity deficit.

Peak Hour Demand (PHD) can either be met through the provision of source capacity or equalizing storage. Beginning in the year 2028, the City is projected to not have adequate source capacity to meet PHD and therefore must provide equalizing storage within the system. Storage capacity is discussed later in this section.

Well No. 1 and Well No. 3 pump operation is automatically controlled by storage tank levels. After each well pump cycle, the status of each well alternates as the lead or the lag pump. A pump control valve, located in Well No. 3 building, is utilized to minimize surge when the pump operates.

Water Rights Analysis

This section recognizes that water rights have a legal bearing on water system capacity. ADD is compared against the City's existing annual rate of withdrawal and MDD is compared against the City's existing instantaneous rate of withdrawal. Table 3-5 shows a summary of current water rights. Water right documentation and the Water Rights Self-Assessment (DOH Form 331-372-F) are included in Appendix C. There are no extraordinary conditions associated with the existing water rights.

TABLE 3-5

Water Rights Summary

Water Right Number	Priority Date	Instantaneous Water Right (gpm)	Annual Water Right (acre-feet/year)	Notes
6869-A	June 5, 1967	300	196(P)	Certificate for Well No. 1 POW: NW NE T16N R01W S19
G2-20933 C	April 19, 1973	400	74(P) 196(S)	Certificate for Well No. 2 and Well No. 3 POW: T16N R01W S19
	Total	**700**	**270(P)**	

(P) - Primary, (S) Supplemental

The City's existing instantaneous rate of withdrawal water right matches current source capacity and therefore, the analysis is the same for both a legal analysis and physical capacity analysis, see the Source Capacity Analysis section. As shown in Tables 3-6 and 3-7, the City is projected to have an annual water right deficit in the year 2036 unless water use efficiency goals are achieved. This projected deficiency and further recommendations to resolve it are further discussed below.

TABLE 3-6

Water Rights Analysis

Year	Annual (ac-ft/yr)			Instantaneous (gpm)		
	Water Rights [1]	ADD [2]	Surplus / (Deficit) [3]	Source Capacity / Water Rights [1][4]	MDD [2]	Surplus / (Deficit) [5]
2022	270.0	211.8	58.2	700	243	457
2023	270.0	212.5	57.5	700	343	357
2024	270.0	213.8	56.2	700	344	356
2025	270.0	213.9	56.1	700	345	355
2026	270.0	219.1	50.9	700	353	347
2027	270.0	224.4	45.6	700	362	338
2028	270.0	230.4	39.6	700	371	329
2029	270.0	235.3	34.7	700	380	320
2030	270.0	241.0	29.0	700	389	311
2031	270.0	246.1	23.9	700	397	303
2032	270.0	252.0	18.0	700	405	295
2033	270.0	256.6	13.4	700	414	286
2034	270.0	262.1	7.9	700	423	277
2035	270.0	267.6	2.4	700	432	268
2036	270.0	272.1	(2.1)	700	438	262
2037	270.0	275.2	(5.2)	700	444	256
2042	270.0	288.6	(18.6)	700	465	235

(1) Water Rights and the Water Right Self-Assessment (DOH Form 331-372-F) are provided in Appendix C.
(2) Average and maximum day demands are from Table 2-11.
(3) Annual surplus/(deficit) is the difference between annual water rights and average day demand.
(4) Source capacity for each well matches the instantaneous water rights, see Table 3-4.
(5) Instantaneous surplus/(deficit) is the difference between instantaneous water rights and maximum day demand.

TABLE 3-7

Water Rights Analysis with Water Use Efficiency

Year	Annual (ac-ft/yr)			Instantaneous (gpm)		
	Water Rights [1]	ADD [2]	Surplus / (Deficit) [3]	Source Capacity / Water Rights [1][4]	MDD [2]	Surplus / (Deficit) [5]
2022	270.0	211.8	58.2	700	243	457
2023	270.0	191.2	78.8	700	308	392
2024	270.0	192.4	77.6	700	309	391
2025	270.0	192.5	77.5	700	310	390
2026	270.0	197.2	72.8	700	318	382
2027	270.0	201.9	68.1	700	326	374
2028	270.0	207.4	62.6	700	333	367
2029	270.0	211.8	58.2	700	342	358
2030	270.0	216.9	53.1	700	350	350
2031	270.0	221.5	48.5	700	357	343
2032	270.0	226.8	43.2	700	365	335
2033	270.0	231.0	39.0	700	372	328
2034	270.0	235.9	34.1	700	380	320
2035	270.0	240.9	29.1	700	388	312
2036	270.0	244.9	25.1	700	394	306
2037	270.0	247.7	22.3	700	399	301
2042	270.0	259.7	10.3	700	419	281

(1) Water Rights and the Water Right Self-Assessment (DOH Form 331-372-F) are provided in Appendix C.
(2) Average and maximum day demands are from Table 2-12.
(3) Annual surplus/(deficit) is the difference between annual water rights and average day demand.
(4) Source capacity for each well matches the instantaneous water rights, see Table 3-4.
(5) Instantaneous surplus/(deficit) is the difference between instantaneous water rights and maximum day demand.

Treatment Analysis

The City provides disinfection at both wells as a proactive measure to protect the distribution system from contamination. The residual goal at entry to the system is 0.3 mg/l. The hypochlorite solution is maintained at a ratio of 1 gallon of 12.5% sodium hypochlorite to 15 gallons of water.

The City also utilizes calcite contactors to raise pH prior to entry into the distribution system. One contactor vessel is provided for each 100 gpm of well capacity. Therefore, four contactors are dedicated to Well No. 3 and three contactors are dedicated to Well No. 1. The contactors have adequately adjusted pH to optimize corrosion control in the distribution system. Installation of new media into the contactors is somewhat difficult but is not a significant concern since media replacement is relatively infrequent.

Storage Capacity Analysis

The City has two existing glass-lined steel tanks located in the west area of the City referred to as Lemon Hill. The tanks were built in 1994 and are both 50 foot in diameter with a base elevation of approximately 467 feet, an overflow elevation of approximately 486 feet, and an overflow height of approximately 19-feet. The combined storage volume is approximately 550,000 gallons. The tank site is fenced and the City has recently installed security cameras and motion activated lights to deter vandalism. Results of bi-annual cleaning and inspection by City staff indicate that valves function properly, screens are intact, and the interior coatings are in good condition.

Table 3-6 provides a summary of the storage capacity requirements with the current total source capacity of 700 gpm. The largest storage volume requirement for this zone is standby storage. Storage capacity requirements are calculated in accordance with the 2019 DOH WSDM formulas. The Water System Design Manual requires that 30 psi be provided at the highest customer's water meter minus operating and equalizing storage. Due to the reservoir's base elevation (approximate elevation 476 feet) which is higher than the highest customer's water meter (approximate elevation 310 feet), the City maintains 30 psi at the highest customer's elevation minus the year 2042 projected equalizing storage. The limiting factor is therefore required storage greater than 20 psi minus operating, equalizing, standby, and fire suppression storage. Table 3-6 shows the storage surplus/deficit for maintaining 20 psi at the highest customer's water meter without operational, equalizing, standby, and fire suppression storage.

DOH requires that water systems evaluate the capacity as well as the physical condition of each storage facility. The analysis must address constraints within the ten- and twenty-year planning periods. As discussed previously in this Chapter, specific storage capacity requirements are dependent upon capacity and reliability of the source of supply.

The previous Water System Plan indicated storage capacity to be adequate for most of the 20-year planning period; however, additional storage would be needed by 2027. Based upon the revised WSDM storage calculations, the storage capacity is not adequate for either the 10- or 20-year planning periods with a current storage surplus of only 28,774 gallons and a projected deficiency beginning in the year 2027. This deficiency and recommendations to address it are further discussed below.

TABLE 3-8

Storage Capacity Analysis for Main Zone

Year	Required Storage (gallons)					Existing Effective Storage (gallons) (6)	Storage Surplus/ (Deficit) (gallons) (7)
	Operating (1)	Equalizing (2)	Standby (3)	FSS (4)	Total (5)		
2022	29,376	0	491,850	60,000	521,226	550,000	28,774
2023	29,376	0	493,460	60,000	522,836	550,000	27,164
2024	29,376	0	495,075	60,000	524,451	550,000	25,549
2025	29,376	0	496,696	60,000	526,072	550,000	23,928
2026	29,376	0	508,700	60,000	538,076	550,000	11,924
2027	29,376	0	520,995	60,000	550,371	550,000	(371)
2028	29,376	0	533,587	60,000	562,963	550,000	(12,963)
2029	29,376	0	546,483	60,000	575,859	550,000	(25,859)
2030	29,376	1,482	559,691	60,000	590,549	550,000	(40,549)
2031	29,376	3,456	571,536	60,000	604,368	550,000	(54,368)
2032	29,376	5,472	583,632	60,000	618,479	550,000	(68,479)
2033	29,376	7,530	595,983	60,000	632,889	550,000	(82,889)
2034	29,376	9,633	608,596	60,000	647,604	550,000	(97,604)
2035	29,376	11,779	621,475	60,000	662,631	550,000	(112,631)
2036	29,376	13,232	630,192	60,000	672,800	550,000	(122,800)
2037	29,376	14,705	639,031	60,000	683,112	550,000	(133,112)
2042	29,376	19,893	670,159	60,000	719,428	550,000	(169,428)

(1) Operating storage is based on current operating levels of 2 feet of water in both tanks.
(2) Equalizing storage is calculated as shown in Table 3-1. Peak hour demands are shown in Table 2-11. Total source assumes source pumps are on for 24 hours a day at the maximum production rate, see the Source Capacity section above.
(3) Standby storage is calculated as shown in Table 3-1. The number of ERU's are shown in Table 2-11 and the ERU_{MDD} value is 450 gpd/ERU as developed in Chapter 2. The number of days selected to meet the standard of reliability is 1 as recommended by the Water System Design Manual.
(4) Fire suppression storage is 1,000 gpm x 60 minutes.
(5) Total required storage is equal to the total of operating, equalizing, and the greater of standby or fire flow storage. This assumes standby and fire flow storage are nested as allowed by the local fire authority. This total required storage must be above 20 psi.
(6) The existing effective storage volume available in Reservoirs 1 and 2, as described above, is based on the elevation of the highest customer's water meter (~310 feet).
(7) Storage surplus/(deficit) is the difference between the existing effective storage and the total required storage.

Distribution System

Figure 3-2 shows a schematic map of the water distribution system. The City currently tracks pipe installation and replacement through as-built drawings. As-built drawings are maintained in a file at the Public Works Department. The overall water system map is updated through WSP Updates. Minor repairs and modifications by City staff are documented through notes and revisions to existing maps. The overall distribution map generally shows the location of piping and valves with regard to right of way and other general features. As-built drawings are typically referenced when investigating problems or making improvements to the system.

Table 3-7 contains an inventory of distribution pipe. Approximately 70% of the distribution system is asbestos cement (AC) pipe. The life expectancy of AC pipe is significantly reduced in areas with hydric soils and/or where groundwater is present within the pipe zone for extended periods. Typically, the coarse subsurface material in Tenino is well drained and past inspection of the AC pipe during service installations has indicated little evidence of AC pipe deterioration. The condition of AC distribution materials must be carefully examined and documented during any future repairs or new service installations. There is no need for system wide AC pipe replacement at this time. However, the City will begin to look at ways to implement systematic replacement of a majority of the AC distribution materials over the long term.

TABLE 3-9

Distribution System Characteristics

	Pipe Material (feet)				
Pipe Size	**PVC and HDPE**	**Asbestos Cement**	**Ductile / Cast Iron**	**Galvanized Iron**	**Total**
14-inch	-	-	280	-	280
12-inch	-	-	1,964	-	1,964
10-Inch	-	-	-	-	-
8-inch	7,856	20,775	774	-	29,405
6-inch	6,259	24,550	4,239	-	35,048
4-inch	274	12,204	114	-	12,592
< 4-inch	3,201	123	70	3,580	6,974
Total	17,590	57,652	7,441	3,580	86,263

Leak detection was performed on the entire distribution system in 2004, which is discussed in more detail in Chapter 4. Leak detection identified some specific leaks but did not indicate system leakage of distribution system piping.

The City no longer uses small diameter cast iron pipe and the amount of small diameter cast iron pipe in the system is not significant. However, the small diameter cast iron pipe is typically subject to scale, corrosion, and leakage. Because of these factors, the City will systematically replace cast and galvanized pipe over the next six to ten years.

Hydraulic Analysis

Water systems are required to complete a hydraulic analysis to evaluate existing system performance, identify deficiencies, aid in identifying needed system improvements, and document any special operational needs. WAC 246-290-230 requires that the minimum size for transmission or distribution mains is six inches unless smaller mains can be justified by a hydraulic analysis (systems designed to provide fireflow shall have a minimum distribution main size of six inches).

Sizing mains using a hydraulic analysis must, at a minimum, consider the two demand scenarios specified in WAC 246-290-230 (i.e. PHD, MDD + Fire Flow). DOH also recommends that the design of distribution mains not exceed a maximum velocity of eight feet per second under PHD conditions. Maximum velocities of greater than eight feet per second may occur under fire flow conditions, for short sections of mains, or for piping within pump and valve station facilities.

Hydraulic Model

The model used for hydraulic analysis is KYPipe 2022. Pipes and nodes were imported from the City's water system base map. Elevations for nodes were obtained using Google Earth data and static pressures were reviewed to verify elevations. System demands presented in Chapter 2 are distributed evenly throughout the system nodes. As built drawings were reviewed and used to add segments of waterline that were constructed after the City's water system base map was developed.

DOH indicates that the model should be calibrated such that the system pressures predicted for certain conditions are in general agreement with field measurements. Table 6-1 of the DOH WSDM presents general criteria for calibrating a hydraulic network model. The general calibration criteria established by Walski et al. for long range planning is to predict the hydraulic grade line to within 5 to 10 feet (2.2 to 4.3 psi) at model calibration points during peak demands such as fireflows. Hydrant flow tests were conducted in February of 2022 to calibrate the model. Results of the model calibration are presented in Table 3-8. The water levels within Reservoirs 1 and 2 and the production flow rate of Wells 1 and 3 were recorded at the time of hydrant flow tests. The water level elevations within Reservoirs 1 and 2 were approximately elevation 484 feet, Well 1 was producing 270 gpm, and Well 3 was off at the time of the hydrant flow tests.

Model calibration was performed by setting the boundary conditions (reservoir levels and well production rates) and applying system demand. Model output for static pressures was generated by running the model at a steady state scenario. Model output for residual pressures was generated at each hydrant test location by placing an added demand equal to the measured hydrant flow rate at points (nodes) in the model equivalent to the locations of the tested hydrants.

System pressures and flow within the pipes are dependent on the friction loss characteristics within pipes, fittings, and valves. These friction losses are modeled using Hazen-Williams Coefficients applied to lengths of pipe. Hazen-Williams Coefficients are adjusted through the calibration process until the hydraulic model best estimates field measured values. For the City of Tenino water system, Hazen-Williams Coefficients were adjusted by pipe material and calibration results yielded coefficients between 110 and 140. These friction factors are typical values for most pipe materials and are generally conservative. The friction factors for the pipe also compensate for system losses through valves and pipe fittings.

The model output was produced for both static pressures and residual pressures. Comparing field measured static pressures with hydraulically modeled static pressures indicates the overall accuracy of the model node elevations and reservoir elevations under normal demand conditions. As shown in Table 3-8, the simulated model pressures were within 4.3 psi of the measured field pressures, which indicates a reasonable match between modeled and measured conditions.

Comparing field measured residual pressures (under a fireflow demand) with hydraulically modeled residual pressures aids in determining whether the model piping is connected correctly, and appropriate friction factors have been used. As shown in Table 3-8, the field measured versus hydraulically modeled difference in static and residual pressure (pressure drop) were within 3.2

psi. Hydrant flow tests were selected to provide adequate coverage over the water system and to maximize the friction losses across the system by placing the test locations as far from Reservoirs 1 and 2 as possible. This method of testing provides a high level of accuracy in the hydraulic model. For the purpose of comprehensive planning, the City's hydraulic water model is considered well calibrated.

TABLE 3-10

Hydraulic Model Calibration

Hydrant Location	Flow (gpm)	Field Test Pressures (psi)			Modeled Pressures (psi)			Difference (psi)	
		Static	Residual	Drop	Static	Residual	Drop	Static	Drop
5th Ave & Wichman St	1,100	90.0	88.0	2.0	87.8	83	4.8	2.2	-2.8
Garfield St & Ragless St	1,126	90.0	75.0	15.0	90.6	77.3	13.3	-0.6	1.7
Tenino Middle School	1,126	90.0	72.0	18.0	88.5	73.7	14.8	1.5	3.2
9th Ave & Houston St	1,186	95.0	70.0	25.0	97.4	73.2	24.2	-2.4	0.8
Park Ave & Frost St	1,061	80.0	72.0	8.0	76.7	69.5	7.2	3.3	0.8
4404 WA-507	836	80.0	65.0	15.0	77.3	62.5	14.8	2.7	0.2
Tenino Ag Park	1,007	80.0	40.0	40.0	84.6	47.8	36.8	-4.6	3.2

PHD Model Results:

The model is run under peak hour demands to ensure that the PHD can be provided at the minimum required pressure of 30 psi for design conditions and at least 20 psi for current operating conditions in all parts of the system. During PHD scenarios, all wells are off (i.e. steady state) and the reservoirs are depleted of operational and equalizing storage to simulate the worst case. The reservoir elevations are set at 480 feet (13 feet in the reservoir, 4 feet below the overflow elevation) for the 20-year scenario. The 20-year PHD developed in Chapter 2 is applied to the entire system. The model results indicate that the system can easily meet the 30 psi design criteria for current and future demand scenarios. The minimum system pressure for the 20-year PHD scenario is 65-psi. The maximum pipe velocity for the 20-year PHD scenario is 6.0 feet per second. The 20-year PHD model results are included in Appendix E.

MDD + Fire Flow Model Results:

The model is run under maximum day demands to ensure the required fireflow can be provided such that a residual "design" pressure of 20 psi is maintained throughout the distribution system. For "operating" conditions, 20 psi must be maintained at the operating hydrant and at least positive pressure must be maintained throughout the system (WAC 246-290-420(3)). For the MDD plus fire flow analysis, all wells are off and the reservoirs are depleted of operational, equalizing, and fire suppression storage. The reservoir elevations are set at 478-feet (11 feet in reservoir, 6 feet below the overflow elevation) for the 20-year scenario. The 20-year MDD developed in Chapter 2 is applied to the entire system. The model indicates that the existing system is capable of meeting minimum fire flow goals under design conditions in all areas of the distribution system. Under the design conditions fire flow available throughout the system ranges from approximately

1,000 gpm to 4,000 gpm; however, pipe velocity may be a more limiting factor under actual operation for the higher modeled design flows. The hydrants controlling the fire flow performance are located at the far east and west ends of the system. The 20-year MDD plus fireflow model results are included in Appendix E.

RELIABILITY

The water system is very reliable based on the presence of redundant wells, treatment, multiple storage tanks and standby power that is available to operate Well No. 3.

OVERALL CAPACITY

DOH requires that water systems provide an analysis of the system to determine overall physical service capacity in terms of ERUs. Table 3-9 presents the capacities of the water system components based on WSDM formulas and guidance.

TABLE 3-11

Current Water System Capacity Limits

System Component	Current System Capacity (ERUs)	Existing Demand (ERUs)	Available Surplus (ERUs)	Projected Year of Deficiency
Source	2,240	1,093	1,147	- (1)
Instantaneous Water Rights	2,240	1,093	1,147	- (1)
Annual Water Rights	1,236	1,093	143	2036
Storage	1,157	1,093	64	2027

1. No deficiency projected in the 20-year planning period.

The limiting system component is currently storage capacity (specifically standby storage) because of DOH's revised storage capacity calculations. The next most limiting system component is the City's existing annual water rights. The current 1,236 ERU capacity is adequate to meet demand projections through 2036 without WUE.

SUMMARY OF SYSTEM DEFICIENCIES AND RECOMMENDATIONS

The following section provides a summary of the system deficiencies from the analysis provided above and recommended improvements or courses of action. Priorities for implementation, project descriptions and planning level cost estimates are discussed in the Capital Improvement Program in Chapter 8 and the Financial Program in Chapter 9.

Source Capacity Summary and Recommendations

There are no current or projected deficiencies associated with source capacity.

Water Rights Summary and Recommendations

Water rights is a significant concern because Ecology is not processing applications for new water rights within the upper Chehalis basin. Therefore, the most feasible alternatives to address the projected water rights deficiency are WUE, acquisition of existing water rights, or purchase of wholesale water from another entity. The primary WUE program to address water right issues, as further discussed in Chapter 4, is the reduction of ADD. Because of existing efficiency in DSL programs and the relatively low ADD per customer, WUE program implementation may be difficult

to achieve and the progress towards the WUE goal should be reviewed in the next Water System Plan. Due to the significant amount of time it takes to process existing water rights sales or change applications, the City is recommended to begin pursuing additional water right acquisition. As shown in Table 3-5, the City is projected to have a 20-year annual water right deficiency of 18.6 acre-feet per year.

Another option would be to purchase wholesale water from another entity such as Loma Vista (Thurston County Public Utilities District). The Loma Vista system is approximately 1.3 miles south of Tenino. Purchase of wholesale water from Loma Vista would require the construction of an intertie.

Water Quality and Treatment Summary and Recommendations

There are no deficiencies associated with water quality or treatment. Chapter 6 discusses treatment projects which would improve the maintenance of treatment equipment and provide additional operational flexibility.

Storage Capacity Summary and Recommendations

As discussed in the Storage Capacity Analysis section above, additional standby storage is projected to be deficient in the year 2027 with a 10-year deficiency of 68,479 gallons and a 20-year deficiency of 169,428 gallons. Additional storage capacity on the order of 200,000 gallons is recommended which will conservatively provide for adequate 20-year demand projections.

Distribution System Summary and Recommendations

There are no projected deficiencies associated with the existing distribution system. The City intends to systematically replace older, small diameter, cast iron, galvanized iron, or asbestos cement piping which will maintain a distribution system leakage under 10 percent.

7.



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City of Tenino
Figure 3-2
Water Distribution Map

Chapter 4

WATER USE EFFICIENCY PROGRAM

CHAPTER 4

WATER USE EFFICIENCY PROGRAM

INTRODUCTION

The objective of the Water Use Efficiency (WUE) program is to promote maximum efficiency in utilization of water resources. The WUE regulatory provisions were incorporated into Chapter 246-290 of the Washington Administrative Code (WAC), effective January 22, 2007. The WUE program elements are similar to the conservation program that has been implemented by Washington State Department of Health (DOH) since the early 1990's.

The general requirements of a WUE program are data collection, demand forecasting, leakage evaluation, rate structure evaluation, and implementation of WUE measures. All municipal water systems must meet a statewide distribution system leakage (DSL) standard. Water systems with 1,000 or more connections must also evaluate water reclamation opportunities. WUE program goals must be set through a public process (re-established every 6 years) and performance must be reported annually to customers. At present, the Tenino water system has less than 1,000 connections.

DATA COLLECTION AND ANALYSIS

Water systems are required to collect specific types of water use data in order to evaluate the water usage and the effectiveness of the WUE program. The minimum level of data collection for water systems with less than 1,000 connections based on DOH planning requirements (WAC 246-246-100(4)) is monthly and annual production totals from each source and annual totals for each customer class.

The City currently exceeds the minimum data collection requirements by metering daily water production and monthly water use. In addition to these data collection requirements for planning, WAC 246-290-820 identifies how water systems must quantify Authorized Consumption (AC) and DSL. The definition of AC is *the volume of metered and un-metered water used for municipal water supply purposes by consumers, the purveyor, and others authorized to do so by the purveyor, including, but not limited to, firefighting and training, flushing of mains and sewers, street cleaning, and watering of parks and landscapes. These volumes may be billed or unbilled.* The percentage and volume of DSL must be reported on an annual basis. The percentage of DSL must be calculated using the following equation:

Equation 4-1 Percent Distribution System Leakage

$$DSL = [(TP - AC)/TP] \times 100$$

Where:

DSL = Percent of Distribution System Leakage (%)
TP = Total Water Produced and Purchased
AC = Authorized Consumption

Per WAC 146-290-496, total water produced and purchased must be measured using source and supply meters. Elements of authorized consumption that cannot be metered must be estimated. A system is in compliance if DSL is less than or equal to 10 percent for the previous three-year DSL average. Systems with greater than 10% DSL must develop and implement a Water Loss Control Action Plan (WLCAP).

Demand projections in Chapter 2 identify a DSL of 6.9% for the past three years. A full leak detection survey was conducted in 2004, which confirmed that leaks are primarily associated with connections to corporation stops on older service line connections. It is likely that DSL is also related to older residential service meters and small diameter galvanized steel distribution and service piping.

The City will continue to implement programs to reduce or maintain DSL such as replacing older meter connections and galvanized pipe. The City will also work to reduce the amount of AC by replacing additional non-functioning meters each year and metering all park irrigation where practical. It is expected that these programs will maintain DSL at below 10 percent.

The City's goal is to maintain DSL below 8.5%. This is below the maximum allowed DSL of 10%. The 10% DSL level can be difficult to meet for older and smaller water systems and the City has done an outstanding job at keeping DSL below the standard for the last several years.

Demand Forecasting

Demand forecasting requires an evaluation of the current water use with projections for future water use over the next 10-year and 20-year planning periods. The required demand forecasting has been completed in Chapter 2 of this Water System Plan.

Previous WUE Goal

The previous Water System Plan dated February 2010 identified a 6-year goal of reducing Average Day Demand (ADD) by 10% by providing an economic incentive to reduce peak summer use. This 6-year goal projected a reduction in ADD from 235,886 gpd to 212,297 gpd in the 6-year planning period (2016). The measured ADD in 2016 was 198,203 gpm; therefore, this previous 6-year goal was achieved.

Another goal identified by the 2010 Water System Plan was to maintain DSL at about 8.5%. As shown in Table 2-8, this goal has also been achieved.

Current WUE Goals

Water systems are required to set WUE goals in a public forum that provides the opportunity for consumers and the public to participate in and comment on WUE goals. A public forum should be held and the WUE goal re-established every 6 years. WUE goals should be recorded in planning documents and performance reports. When setting WUE goals, the water system must:

- Include a measurable outcome in terms of water production or consumption.
- Address water supply and forecasted demand characteristics.
- Include an implementation schedule for meeting the goals.

The most recent WUE goal was set in a public forum in 2009 and the goal has not been changed since then. A public forum should be held to re-establish the WUE goal. DOH has published a

guidance document to aid in setting WUE goals through public forums titled *Setting Goals to Use Water Efficiently* (DOH 331-402) included in Appendix C.

The projected water demands with WUE in Chapter 2, Table 2-12 have been developed with a goal of reducing ADD by 10%. This goal can be reasonably achieved with continued WUE measures based on the most recent demand data. The majority of the savings will be met through consumer education, leak detection, and using reclaimed water for irrigation in the City Park. The City also plans to form a new utility committee to establish new goals.

WUE Measures

Municipal water suppliers need to evaluate or implement a specified number of WUE measures based on water system size (WAC 246-290-810). Currently, the water system is in the "500 to 999 service connections" range. In this case, at least four WUE measures must be evaluated or implemented. As shown in Table 2-11, the water system is projected to be within the "1,000 to 2,499 service connections" range by the year 2027. If the system exceeds 1,000 connections, at least five WUE measures must be evaluated or implemented. A detailed evaluation is not required for any measure the water system will implement. DOH guidance material identifies three categories of WUE measures:

- **Internal (supply side) –** Internal efficiency measures are activities undertaken by a water system, such as source metering, customer meter installation, meter calibration, distribution system leak detection and repair, implementation of rate structures that encourage the efficient use of water by the customer, and bills showing consumption history.
- **External (demand side) –** External measures are developed by the water system to motivate customers to reduce water use. Such measures include distribution and installation of water-saving devices and fixtures, residential and commercial water audits, and reuse of reclaimed water.
- **Customer information –** WUE program promotion and customer education with pertinent and timely information delivery is an essential component of internal and external efforts and can in itself lead to customer water use reductions.

The DOH guidelines indicate that metering is the most important part of a WUE program. Source and service meters provide the data necessary for water demand management and planning. A successful and measurable WUE program is not as effective without service meters. Service metering, when combined with a consumption-oriented rate structure and, if possible, a bill that shows current and previous year consumption information, is the most effective way to change customers' water use patterns. Generally, customers are more likely to modify water use behaviors if they know they will pay more for greater consumption.

In addition to source meter and service meter implementation, which are considered to be supply side WUE measures, the following external demand side WUE measures will continue to be implemented by the water system over the next 10-year planning period:

1. WUE oriented rate structure for single-family residential customers.
2. WUE oriented rate structure for outside residential customers.
3. WUE oriented rate structure for commercial customers.
4. WUE oriented rate structure for outside commercial customers.
5. Automated meter reading with system to alert customers about demand side losses such as leaky toilets**.**

As the system grows and there are more resources available, the city will attach consumption history to billings and provide WUE promotional materials to educate customers about WUE on a regular basis. The basic public education program is most often accomplished by distribution of DOH/DOE WUE guidelines. Pamphlets and other WUE educational materials are available online at:

https://www.doh.wa.gov/communityandenvironment/drinkingwater/watersystemdesignandplanning/wateruseefficiency/wuepublicationsandresources

WUE Based Rate Structures

DOH strongly advocates consideration of WUE oriented rate structures. The general premise of a WUE oriented rate structure is that the customer should be conscious of a financial incentive to use less water. In the mid 1990's, DOH's conservation guidance documents indicated that constant block (uniform) rate structures encourage WUE. In recent years, DOH advocates inverted (or increasing) block rates. Inverted block rates have at least two rate tiers, are generally effective, and have been more difficult to implement for small systems that do not have sophisticated billing software or processes. Billing software technology has become available which has made it easier for small systems to implement inverted block rate structures. Inverted block rates can be difficult for customers to understand.

In general, consumers should understand that the use of more water results in a higher water bill. For example, if a customer knows that each additional 100 cubic feet of water will cost more, WUE will occur at the same relative level if the similar commodity charges are presented in one single tier or in the second tier of an inverted rate structure. In summary, communication of WUE based pricing can be very effective with constant block rate structures that are implemented with a WUE based commodity (overage) charge.

The City will continue to implement a constant block rate structure with an overage rate that encourages WUE. This rate structure has proven to be effective at encouraging WUE for the City of Tenino as evident in the decreasing value of one Equivalent Residential Unit (ERU), see Chapter 2. Inverted block rates may be implemented in the future if practical. Inverted block rates would likely have to be implemented along with more education in the form of either expanded billing sheets, additional rate information or online access to usage information. Specific information regarding water rate development and implementation is provided in the financial discussion in Chapter 9.

Bills Reflecting Consumption History

Bills showing consumption history provide information to the customer and to the purveyor regarding water use trends. The customer can observe the difference in water consumption during the same period for both the current and previous year.

Level of Implementation

The City will consider purchasing water billing software that shows customer water use history when the City next upgrades their water billing software. Considerations should include the rapidly changing costs of software, including the cost of paper and printing, the revenue generated by actual water use, and the current progress towards the WUE goal. If ADD trends towards projected ADD with the WUE goal as shown in Table 2-12, purchasing new water billing software is not recommended. If ADD trends towards projected ADD without WUE, new water billing software is recommended to be considered.

Service Meters

All water conservation programs shall consider the benefits and cost of installing individual service meters. The metering program shall include periodic tests and repairs.

Level of Implementation
The City is fully metered and charges customers based on metered water usage. The City has pursued a water meter testing and replacement program and will continue this program to assure meter accuracy. The City is also pursuing an automatic read metering system. Beginning in 2020, the City began replacing all existing water meters with radio read meters beginning with difficult to read services and installing radio read meters for new services. The long-term goal is to have the entire water system on automated meter reading. This replacement program is currently pending completion.

Water Conservation Kits

Water conservation kits containing easily installed water-saving devices can be distributed to customers. These kits can include such items as shower flow restrictors, toilet-tank-water displacement devices, leak detection tablets, informational brochures, and other materials.

Level of Implementation
The City will consider obtaining and distributing water conservation kits in the future in consideration of the status of actual water use compared to WUE goals.

Landscape Management

Water use management of large irrigation operations for agriculture, nurseries, and landscaping can increase the irrigation efficiency of these operations. Moisture sensors, flow timers, low volume sprinklers, drip irrigation, weather monitoring, low water demand landscaping, and other practices can be encouraged by the water utility.

Level of Implementation
The City will promote the use of water efficient irrigation systems by large irrigators by distributing Water Conservation Guideline 7: Irrigation and Landscaping (DOH Pub. #331-120-7). A copy of Guideline 7 is included in Appendix C.

WUE Reporting and Evaluation

The effectiveness of the WUE program will be evaluated each year by comparing the current year ADD to the demand projections in Tables 2-11 and 2-12 in Chapter 2. Table 2-11 presents demand projections without WUE and Table 2-12 presents demand projections with WUE. These projections can be used to measure if the WUE program is effective. Water systems must report annually (by July 1) on their WUE performance to customers and DOH and make this information available to the public in accordance with WAC 246-290-840. DOH indicates that water systems may fulfill this requirement by including performance information in their Consumer Confidence Report (CCR). The annual report must include the following information:

- Total annual production
- DSL totals in percent and annual volume
- WUE goals
- Implementation schedule for WUE measures
- Description of progress on WUE goals
- Status of DSL reduction programs (if applicable)

The City reports on annual WUE to DOH by submitting Annual Performance Reports. A copy of the most recent Annual Performance Reports is included in Appendix C.

WUE Program Implementation and Cost

The WUE program will be implemented through the operation program identified in Chapter 6 and the Capital Improvement and Financial Programs in Chapters 8 and 9.

- Source metering costs will be included in proposed well implementation projects.
- Service meter installation will be required for all new services and costs will be paid for by new customers.
- Service connection repairs, service meter replacement and data collection will be addressed through the operations budget.
- Galvanized pipe replacement will be implemented through Capital Improvement budgets.
- Programs such as providing consumption history and additional public education on billing cards will be implemented through the operations budget.

The goal of reducing the ADD by 10% should be attainable based on an understanding of typical demands for residential customers in small western Washington communities. If the ADD goal is not met at the end of the 10-year period, the City will evaluate the use of other programs such as additional consumption history and/or rate information on billings and additional WUE pricing incentives. The galvanized pipe replacements may also be implemented earlier if resources allow or if results from the initial projects are not successful in maintaining the identified DSL goal.

Reclaimed Water

The wastewater treatment plant built in 2009 produces Class A reclaimed water that is available for sale and use. The plant uses groundwater recharge as the primary effluent disposal method. Approximately 90,000 gpd of Class A reclaimed water is available and until recently, there have been no customers because the plant is ½ mile from town where the bulk of the demand would be. Based on review of the planning data, it is unlikely that City-wide reuse would be a cost-effective option to off-set existing water demands at this time due to the high cost of the conveyance systems to existing areas. A recent development near the wastewater treatment plant titled Tenino Agriculture Park was constructed with reclaimed water conveyance piping which plans to use reclaimed water for landscape irrigation.

SOURCE OF SUPPLY ANALYSIS

The purpose of this section is to summarize efforts being undertaken to ensure an adequate quantity of water can be provided at all times. When water shortages or interruptions in service occur, public health can be threatened because system pressure may be reduced such that basic public health needs are not met or other backflow related problems occur. In addition, the City is required to prepare an emergency response plan and water shortage response plan to address contingencies for water system component failures. Emergency response and water shortage response planning is presented in Chapter 6.

Source Reliability

The water system has two wells and standby power for Well No. 3. Demands can be met from gravity standby storage. The reliability of the source of supply is above average. However, both wells are located at the same site and can both be affected by a single contamination event.

Overall reliability could be greatly enhanced by implementing an additional well or wells in a location that is independent of the current well site. To address this concern, an additional well site is recommended to be considered in conjunction with potential projects to address water rights deficiencies identified in Chapter 3 of this Water System Plan.

Chapter 5

WELLHEAD PROTECTION PROGRAM

CHAPTER 5

WELLHEAD PROTECTION PROGRAM

Source water protection for groundwater-based systems is provided through a Wellhead Protection Program (WHPP) in accordance with WAC 246-290-135. A WHPP is vital for meeting the overall goal to provide safe and reliable drinking water. The WHPP provides awareness of the conditions and activities that may affect source water quality. The following program has been developed in accordance with Washington State Department of Health (DOH) planning and wellhead protection guidance.

AQUIFER DESCRIPTION AND CHARACTERISTICS

The aquifer in the City of Tenino area is generally unconfined. The ground water is recharged by precipitation and surface waters through infiltration and percolation. Most of the land area in Tenino and some of the land area in the City's Urban Growth Area (UGA) is classified by Thurston County as extremely critical aquifer recharge areas (444 acres in the City limits, and 51 acres in the UGA). These are areas "which provide very rapid recharge with little protection, contain coarse soil textures and soil materials, and are derived from glacial outwash materials (Thurston County Critical Areas Ordinance, February 1994)." Water from rain and other sources move very rapidly into the water bearing soil layers which are as shallow as 3 feet and as deep as 83 feet below ground surface.

The number of contaminated wells in the south Thurston County region has risen rapidly during the last few years, likely due to increasing urbanization, agricultural use, and failing septic systems. The Critical Aquifer Recharge Area (CARA) of greatest concern to Tenino is in the southwest portion of the City. The City has passed a Critical Areas protection ordinance which includes CARAs to limit the intensity and type of use on this land. The ordinance is included in Appendix B.

Data provided by well logs and geologic maps of the area show that Rock Prairie and the upper Scatter Creek valley are predominately covered by glacial outwash sediments. Well log data suggests the thickness of the glacial outwash is generally 15 to 30 feet. Water levels in the area are typically five feet below ground surface in the winter months and 20 to 50 feet below ground surface during the summer months (depending on location and the effects of seasonal changes in recharge).

Direct measurements of aquifer characteristics are relatively limited through this area, but the available data is sufficient to identify reasonable ranges of water volumes and velocities. Based on the published data and information from Robinson & Noble, the amounts of water moving through the shallow aquifer system were calculated between 62,500 gallons per day per square foot of aquifer (gpd/ft^2) in the upper reaches of the Scatter Creek east of Tenino and over 2 million gpd/ft^2 in Rock Prairie. Based on this information, the average flow velocity of water within the aquifer may be in the range of 10 to 100 feet per day.

Scatter Creek flows east to west along the northern and western borders of Tenino, limiting development along its banks due to fish habitat and other species of concern that have been identified in the area. A wetland buffer of 200 feet and a high ground water table requiring a 300-foot buffer are common for properties along the Creek. According to Thurston Regional

Planning Council (TRPC), there are approximately 9.0 acres of wetlands within the City limits and another 35.2 acres within the UGA.

TIME OF TRAVEL ZONES

The wellhead protection area is made up of five zones based upon the time of travel of a contaminant reaching the well. The zones are:

1) The Sanitary Control Area (SCA)
2) 6-Month Time of Travel (TOT) Zone
3) 1-Year TOT Zone
4) 5-Year TOT Zone
5) 10-Year TOT Zone.

The Calculated Fixed Radius (CFR) method is the least complex method to determine the TOT zones for small water systems and relatively undefined areas. The CFR method is conservative in most cases and is recommended for use by DOH for small water systems with low to moderately susceptible sources of supply. Table 5-1 presents the TOT for Well No. 1 and Well No. 3 site as determined by using the CFR method. The calculation is based on a combined pumping rate of 700 gpm and a screen length of 35'. Assumed aquifer porosity is 0.22.

TABLE 5-1

Wellhead Protection Areas by Calculated Fixed Radius (CFR)

Time of Travel	Radius of Contribution (feet)
6-month	1,009
1-year	1,426
5-year	3,189
10-year	4,510

Contaminants within the TOT zones can conceivably reach the well within the time specified based upon the assumed groundwater hydrology. The City will utilize the CFR method for determining TOT boundaries. Groundwater modeling can also be conducted to better refine TOT boundaries. There is no specific need to model the aquifer at this time since sanitary sewers have been implemented. Figure 5-1 shows the TOT boundaries based on the CFR method.

The following is a brief description of the conditions in the protection zones:

Sanitary Control Area

The SCA should be 100 feet for wells per WAC 240-290-135 unless engineering justification allows for mitigation of the SCA based on hydrogeologic factors. The City owns the 100-foot SCA for each well. There are no potential contamination sources with the current SCAs.

TOT Land Use

The current land uses within TOT zones are predominantly low and medium density residential. Other current uses include light commercial and schools. The likelihood of additional development or higher development density is minimal due to zoning and the majority of the nearby properties

have been platted in a way that would preclude higher densities without substantial re-development.

INVENTORY OF POTENTIAL CONTAMINANT SOURCES

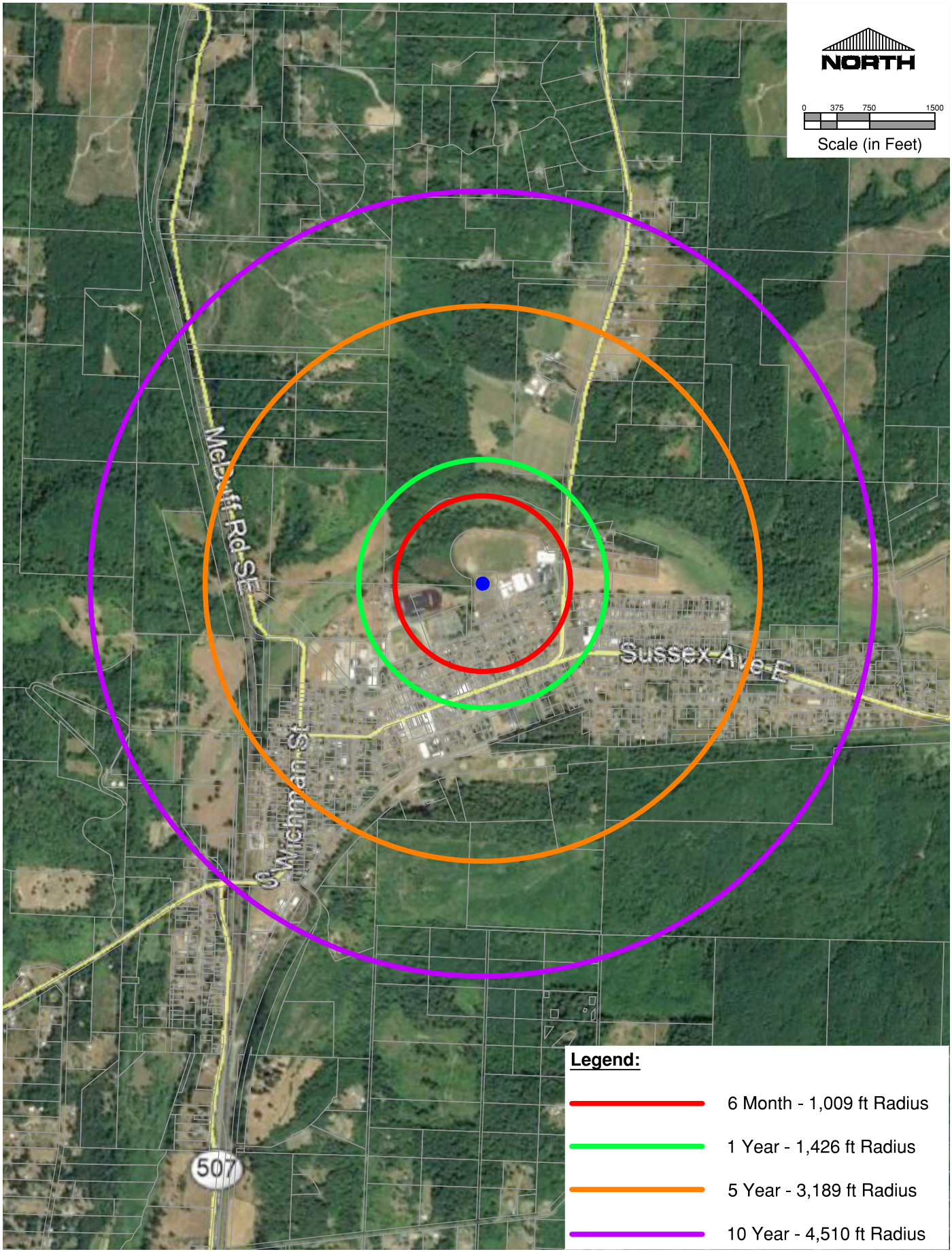
During the development of this Water System Plan, an inventory of potential contaminant sources was developed using Washington State Department of Ecology's (DOE's) Facility/Site Identification Database and Thurston County Online Maps. These databases list any operation that is a potential or active source of pollution. This includes gas stations, automotive stores, dry cleaners, gravel pits, waste management sites, and industrial facilities. Table 5-2 summarizes the review of the database and identifies all sites that are located within the 10-year TOT zone. Sites that have a listed end date, indicating that the potential contaminant source has been removed, are excluded. Figure 5-2 is printed from DOE's Facility/Site Identification Map and Figure 5-3 is printed from Thurston County Online Maps.

TABLE 5-2

Inventory of Potential Contaminant Sources

DOE Facility ID	Facility Name	Interaction (Contaminant Type)	Address (Tenino, WA)
87263176	Tenino Grader Storage Area	UST	McClellan St S & Hwy 507
74873833	Tenino Corner Grocery	UST / LUST / State Cleanup Site	319 Wichman St S
70971197	Tenino Service Center	UST / LUST	Garfield Ave E & Hodgden St N
70416466	Lycan Fuel Service	UST	Sussex Ave E & Ragless St N
55924127	Jackpot Food Mart 375	UST	397 Sussex Ave W
45564645	Laidlaw Transit Tenino	Industrial SW GP / Emergency Hazardous Chemical Report, Tier 2	500 W 2nd St
25436916	Tenino Telephone Company Inc	Emergency Hazardous Chemical Report, Tier 2	225 Central Ave W
16999364	American Tower Tenino	Emergency Hazardous Chemical Report, Tier 2	2 Mi SE
6413759	PSE Blumaer Substation	State Cleanup Site / Emergency Hazardous Chemical Report, Tier 2	Hodgden St N & Garfield Ave E
79806	Tenino City	Underground Injection Control	N Custer St
50269	Tenino Market Fresh	UST	500 Sussex Ave E
14941	Bakers Towing	Revisited Site Visit Program	508 Wichman St S

(1) UST = Underground Storage Tank
(2) LUST = Leaking Underground Storage Tank
(3) SW GP = Stormwater General Permit
(4) State cleanup sites are sites that are being cleaned up under state regulations which include Model Toxics Control Act or its predecessors.
(5) Emergency Hazardous Chemical Report Tier 2 refers to businesses that store 10,000 lbs or more of a hazardous chemical or 500 lbs or less, depending on the chemical, of an extremely hazardous chemical on site at any one time and must report annually.
(6) Underground Injection Control is a well or structure used to put fluids into the ground. The structure's depth is greater than the largest land surface dimension or it contains perforated pipe, i.e. drywell or infiltration trench with perforated pipe.
(7) Revisited Site Visit Program refers to engagement from Hazardous Waste and Toxics Reduction Program such as field work, site visits, or other contact with the site.



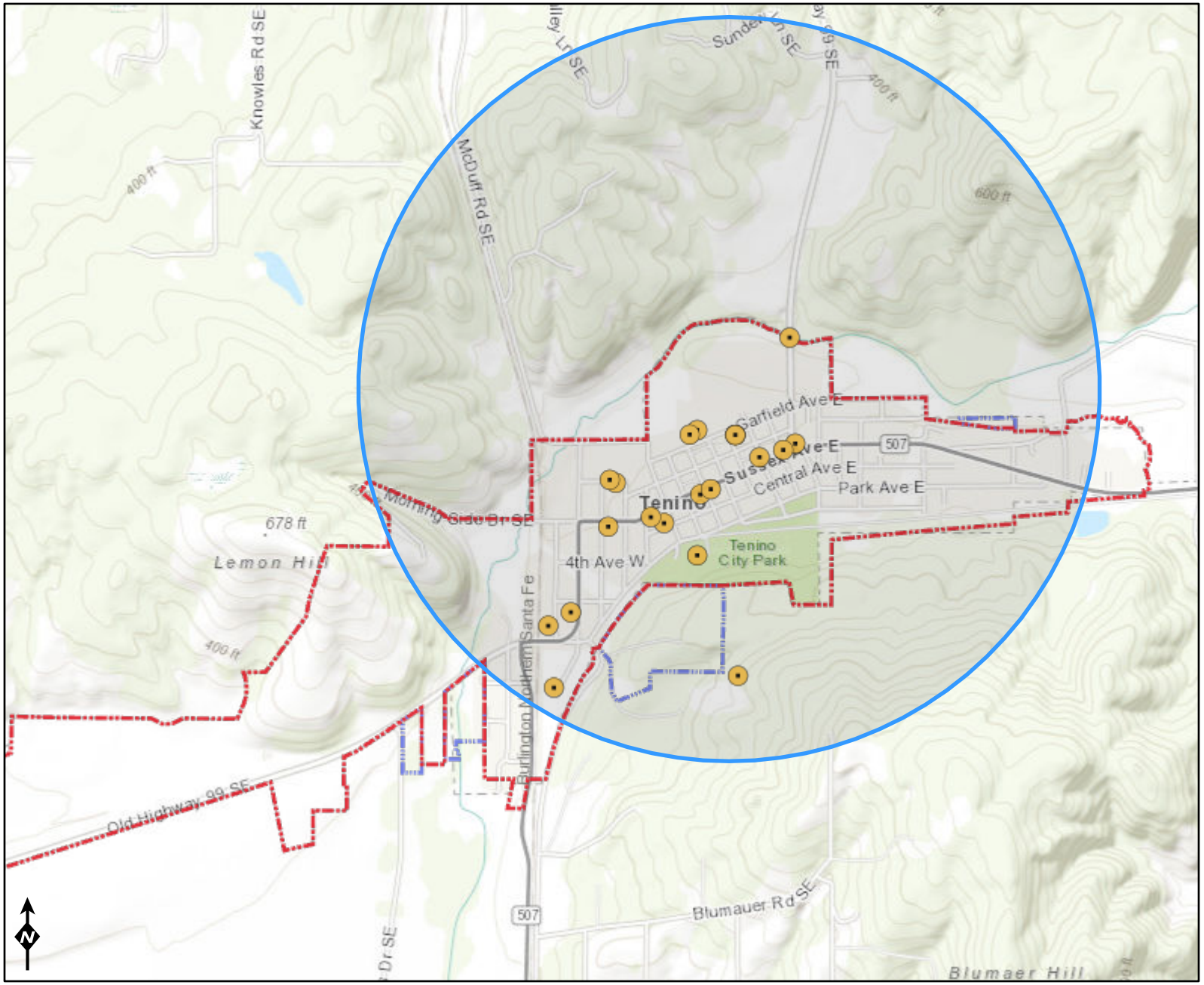
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City of Tenino
Water System Plan
Time Of Travel
Figure 5-1

DRAWING: T:\PROJECTS\0751 TENINO\5021 WATER SYSTEM UPDATE\FIGURES AND EXHIBITS\TIME OF TRAVEL FIGURE.DWG, LAYOUT TAB: FIGURE 5-1, PLOT DATE: 4/20/2023 12:49:01 PM, DRAWING SAVE DATE: 10/3/2019 9:52:48 AM, PLOTTED BY: GMICKELSEN
PLOT DEVICE: GIBBS & OLSON - DWG TO PDF.PC3, PLOT STYLE TABLE: GIBBS-OLSON STANDARD COLOR.CTB, PAPER SIZE: GIBBS & OLSON - FIGURE A SIZE (PORTRAIT - 8.50 X 11.00 INCHES)

7.

Figure 5-2 Potential Contaminant Sources Map



Selected facility/site locations
Selected facility/site

Cities
City limits

Urban growth areas
UGA boundary

Miles
0 0.23 0.45 0.9

Esri, NASA, NGA, USGS, FEMA
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

DEPARTMENT OF ECOLOGY
State of Washington

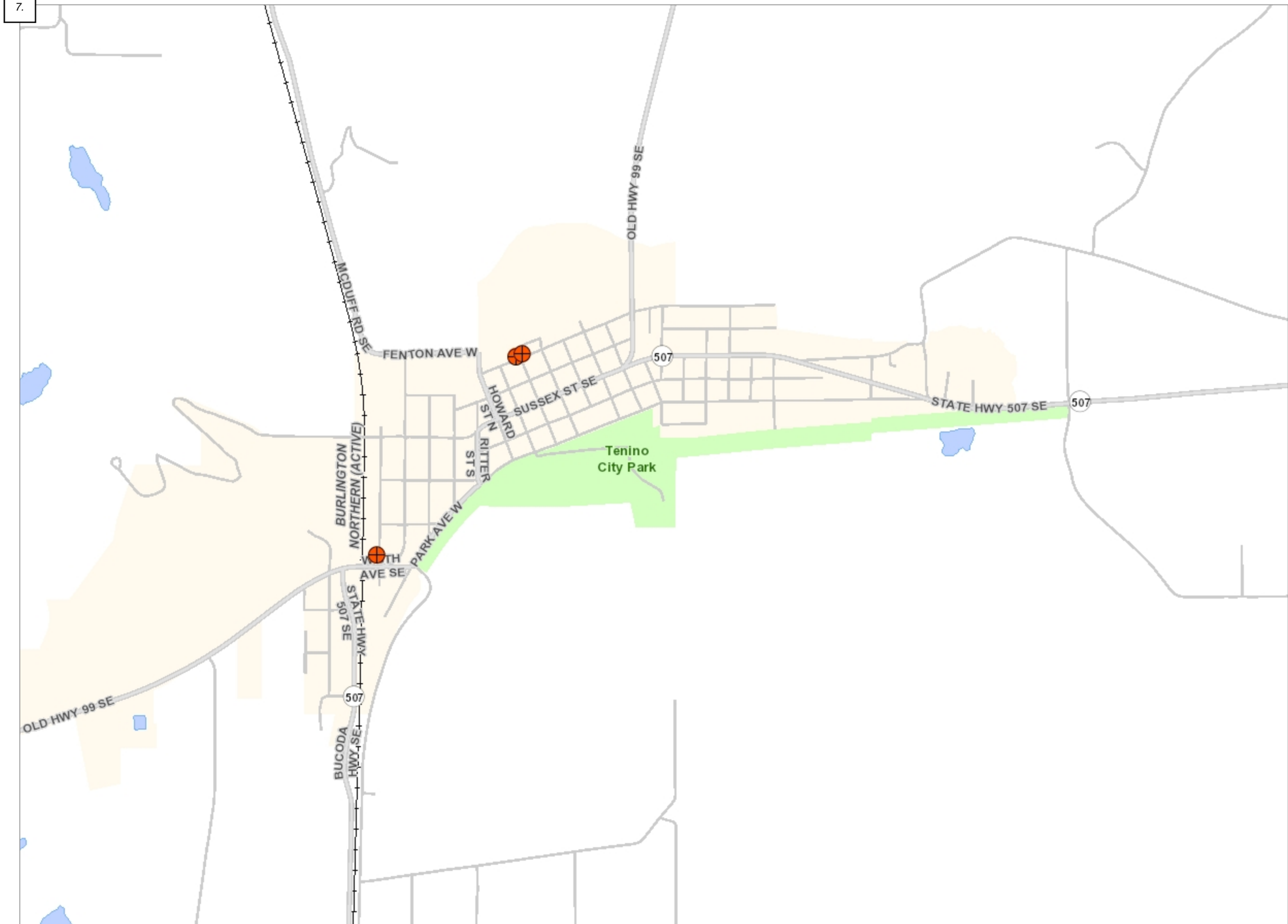


Fig 5-3 Potential Contaminant Sources Map

Legend

- Contaminated Sites
- Roads - Major (Large Scale)
  - <all other values>
  - I 5 ACCESS; US 101 ACCESS; US 101 SB OFF RAMP
  - I 5; US 101
- Roads (Large Scale)
- Railroads
- County Border
- Olympia Municipal Airport
- Water Bodies (River - Small Scale)
- Water Bodies (Other)
- Parks
- Cities
- Capital Forest
- County Background
- Roads - Major
  - <all other values>
  - I 5 ACCESS; US 101 ACCESS; US 101 SB OFF RAMP
  - I 5; US 101
- Roads
- Railroads
- County Border
- Olympia Municipal Airport
- Water Bodies (River - Small Scale)
- Water Bodies (Other)
- Parks
- Cities
- Capital Forest
- County Background
- Roads - Major
  - Major Roads
  - Ramp
  - I 5; US 101
- Roads (Large Scale)
- Railroads

Scale 1: 23,047

0 1000 2000

Feet

Map Created Using GeoData Public Website

Published: 4/20/2023

Note:

Thurston County GeoData Center

THURSTON COUNTY WASHINGTON SINCE 1852

The information included on this map has been compiled by Thurston County staff from a variety of sources and is subject to change without notice. Additional elements may be present in reality that are not represented on the map. Ortho-photos and other data may not align. The boundaries depicted by these datasets are approximate. This document is not intended for use as a survey product. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. Thurston County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. In no event shall Thurston County be liable for direct, indirect, incidental, consequential, special, or tort damages of any kind, including, but not limited to, lost revenues or lost profits, real or anticipated, resulting from the use, misuse or reliance of the information contained on this map. If any portion of this map or disclaimer is missing or altered, Thurston County removes itself from all responsibility from the map and the data contained within. The burden for determining fitness for use lies entirely with the user and the user is solely responsible for understanding the accuracy limitation of the information contained in this map. Authorized for 3rd Party reproduction for personal use only.

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SUSCEPTIBILITY ASSESSMENT

Susceptibility assessments for all of the wells are on file with DOH. The wells are rated as "moderately" susceptible. The susceptibility rating affects the level of water quality monitoring requirements for organic contaminants and wellhead protection planning. The rating may also influence future decisions regarding groundwater disinfection requirements.

WELLHEAD PROTECTION PROGRAM

Public water systems are required to implement a management plan to accomplish wellhead protection. The required elements of the management plan are public notification, contingency planning, and emergency spill response. The following is a discussion of those elements.

Notification

Landowners that have been identified as a potential contamination source must be notified with regard to the location of the public water system well. In addition, the City is required to notify Thurston County Emergency Management and Ecology Spill Response with regard to location and relative vulnerability of the well. Sample notification letters are included in Appendix F.

Future Development

Based on current zoning, significant development is not a concern with regard to the upgradient areas with the TOT boundaries at this time. However, the City will require higher density developments in the TOT boundaries to provide an analysis of aquifer impacts and appropriate mitigation such as sewers, storm drainage plans and landscape management plans.

Contingency Planning

The water system has limited contingencies for wellhead contamination events. Severe water use restrictions would likely be in place considering the tanker supply volumes relative to system demand. Depending on the type of contamination, water use from the wells may be continued with specific restrictions and instructions for customers. If contamination areas can be well defined, there is also the possibility to implement temporary emergency wells or replacement wells in areas that are not contaminated. The City's Water Shortage Response Plan included in Appendix G contains provisions for a water supply shortage. In any event, the City will contact the DOH Regional Engineer to develop a course of action and public notice procedures.

Emergency Spill Response

Upon notification of a spill event, the system will consult with DOH and Ecology on a proper monitoring program to ensure that contamination of the well will be detected in a timely manner. Actual procedures for spill response and clean-up will be developed by the applicable state and local emergency service entities.

Water Quality

Discussion and analysis of water quality is provided in Chapter 3.

Chapter 6

OPERATION AND MAINTENANCE PROGRAM

CHAPTER 6

OPERATION AND MANTENANCE PROGRAM

DEPARTMENT ORGANIZATION, ROLES, AND CERTIFICATIONS

The Public Works Director is Troy Cannon. The Public Works Department is responsible for the water system, storm drainage, sewage collection, streets, parks, cemeteries, and all other City facilities deemed Public Works. The lead person for the water system is also Troy Cannon. The City ensures that at least one person is available at all times for emergencies.

DOH requires operator certification for all group A public water systems. The level of certification required is dependent upon the system size and complexity. Requirements for the City are a Group 2 Water Distribution Manager (WDM2) and a Cross-Connection Control Specialist (CCS). Mr. Cannon is certified as a WDM2 and CCS. Brent Gibbs is also certified as a WDM2 and CCS. The City is in compliance, but will encourage other staff to take training and become certified as licensed operators.

RECORD KEEPING AND REPORTING

Records must be maintained for water quality, treatment, water use data, complaints, and maintenance activities. DOH requires that water systems document where the records are filed and specifies how long records are to be kept. Files are maintained by clerical and public works staff. WAC 246-290-480 provides requirements and details for record keeping and reporting. Table 6-1 summarizes the basic record keeping requirements.

TABLE 6-1

Record Keeping Requirements

Record Type	Retention Period	Official File Location
Bacteria Sample Results	5 years	City Hall
Chemical Sample Results	Life of the Facility	City Hall
Public Notification	3 years	City Hall
Treatment Related Reports	3 years	City Hall
Complaints	3 years	City Hall
Sanitary Surveys (by DOH or others)	10 years	City Hall
Reports and Construction Documents	Life of the Facility	City Hall
Water Use Data	10 years	City Hall

The basic reporting requirements applicable to the water system are in regard to water quality violations and Water Facility Inventory forms (WFIs). Acute coliform violations must be reported to DOH within 24 hours of the sample results. Other water quality violations must be reported within 48 hours. Any changes to the system's WFI must be reported within 30 days of the change. In general, it is good practice to keep DOH informed of water quality related events as soon as they become evident.

ROUTINE AND PREVENTATIVE OPERATION AND MAINTENANCE

Routine Operational and Maintenance (O&M) tasks include inspection of treatment systems and storage facilities, meter replacement, valve exercising, hydrant flushing, water quality sampling and repairs. A list of routine and preventative O&M duties are listed in Table 6-2 along with the frequency that the tasks are typically performed.

TABLE 6-2

Routine Maintenance Schedule

Frequency	Item
Daily	Daily Planning and Coordination
	Well site - Readings, Check Pumps, Check Treatment System Levels
	Chlorine Residual
Weekly	Customer Service/Requests/Complaints
	Tank Site Inspection
	Meter Activation/Inactivate
	Locates
	Distribution/Service Repair
	Customer Complaints
Monthly	Coliform Sampling per Coliform Monitoring Plan
	Customer Meter Reading
	Chlorination Reports
	Service Meter Replacement
	Building/Facility Maintenance
Yearly	Certification Requirements
	Flushing
	Service Meter Replacement
	Cross Connection Control Program Updates
Other	Meter Calibration
	Exercise Distribution Valves (every 5 years)
	Check Tank Hatch and Vents for Openings (quarterly)
	Tank Draining and Cleaning (every other year)
	Chemical Water Quality Monitoring (per DOH monitoring schedule)

In general, current water system staffing and routine O&M coverage is adequate for the expected level of service. Adjustments to the overall O&M program are addressed at the end of this Chapter.

WATER QUALITY MONITORING

The lead water system person conducts water quality monitoring and is responsible for scheduling and collecting samples in accordance with WAC 246-290. Bacteriological samples (coliform) are currently collected in accordance with the Coliform Monitoring Plan, see Appendix D. Sample results are sent directly to DOH. The City maintains a copy of the results in the Water Quality file at City Hall.

For most chemical testing (when needed), the City typically uses a private laboratory. Bottles for testing are usually requested by the City in advance and are delivered by mail to the City. Samples are delivered, if required by specific handling procedures, or shipped via UPS to the lab. The lead person maintains records of all samples sent to the labs by retaining the chain of custody report and filing it in the appropriate water quality-testing file. Once results are obtained, the chain of custody tally is discarded and replaced with test results.

EMERGENCY RESPONSE PLAN

The City is required to have an Emergency Response Plan that addresses general procedures for routine or major emergencies within the water system. The major components of this plan are general procedures for Emergency Notification to the Public, General Communication with the Public, an Emergency Roster, and a Basic Contingency Plan for anticipated emergencies. These basic items are provided on an Emergency Response Plan template, as recommended by DOH, included in Appendix G.

The minimum emergency reserve amount required to replace critical pumping or piping components is approximately $25,000 (approximate cost of a replacement well pump) and will be included in the minimum level of emergency reserve funding in the Financial Program in Chapter 9.

WATER SHORTAGE RESPONSE PLAN

The City water supply has not been subject to any supply limitations associated with drought or overall aquifer storage or supply limitations. The City periodically records static water level from the wells. The well level data from 2001 to present indicates that there is no trend that would suggest any long-term impacts to the aquifer from City water use. The City is required to develop a Water Shortage Response Plan (WSRP) that identifies actions to be taken during various levels of water shortage. Water shortage response planning for the City will focus on relatively short-term events resulting from facility failure or down time.

SAFETY PROCEDURES

Water system personnel currently follow all applicable Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Administration (WISHA) procedures. Training is provided on an ongoing basis in response to City insurance programs. Potential workplace hazards and special safety procedures, such as chemicals, heavy equipment, and asbestos-cement pipe are addressed during specific training. Material Safety Data Sheets (MSDS) for each chemical utilized are kept on-site and in a file at the Well No. 1 and Well No. 3 water treatment building. First aid equipment is provided in each public works vehicle.

The current method to replace media in the calcite contactors involves using the front loader side of the backhoe to elevate maintenance staff and media up to the filling port of the contactor vessels. A project is planned (see below summary) to correct this unsafe practice.

CROSS-CONNECTION CONTROL

The focus of the Cross-Connection Control Program (CCP) is to prevent backflow of contaminated water into the system during low-pressure occurrences or other water system abnormalities. The backbone of the program is a City Code/Ordinance which allows the City to eliminate cross-connections or require installation of an approved backflow prevention assembly to protect the public potable water system. The following is a summary of the City's compliance status based

on minimum program elements, as identified in WAC 246-290-490 (3):

Element 1. Implementing Ordinance

The current CCP ordinance is codified in Chapter 12.10 of the City Code provided in Appendix B.

Element 2. Notification of Existing and New Connections

The current ordinance requires all new service connections to be installed with a backflow prevention assembly. Double check valves have been installed on all new residential services since June 2004. The type of backflow preventers installed on new commercial installations is determined on a case-by-case basis by the CCS. Required devices must be installed prior to activation of a new service meter. The City's Water Standard Details included in Appendix B show approved residential and commercial backflow prevention.

The City has conducted a cross-connection survey of existing customers. City staff are typically aware of areas where potential cross connections may exist and have addressed those areas over the years. The City now needs to formally document the survey results. Identified sites with potential for cross-connections will be inspected and the results documented. If a potential cross-connection is confirmed, the customer will be notified of cross-connection risks, provided with a recommended action and given a date to complete the recommended action, which will likely be installation of a backflow prevention assembly.

Element 3. Schedules

Overall schedules are addressed in discussion of the individual elements and summarized below.

Elements 4, 5, 6 and 7. CCS Training

The City provides training and certification support to staff on a regular basis. The AWWA Pacific Northwest Section's "Cross-Connection Control Manual" and DOH guidance will be utilized as a basis for all CCP activities. A copy of the manual and DOH guidance will be maintained at City Hall for staff as well as public review and use.

Elements 8 and 9. Information and Record Keeping

The CCP requires ongoing monitoring and testing on an annual basis. The City currently hires a Backflow Assembly Tester (BAT) to test the City's backflow devices. The City is planning to maintain a Backflow Assembly Tester (BAT) on staff to test all devices and make corrections as needed. The BAT keeps information and records for the City of Tenino in accordance with the guidance provided in the AWWA Manual and DOH guidance.

The City will provide additional public education as needed through the Consumer Confidence Report or billing inserts.

COMPLAINT RESPONSE PROCEDURES

The City is required to document customer complaints and respond in a timely manner. The City currently receives complaints through City Hall, through customer contact with staff in the field, or through an online tool. Most complaints are minor and are addressed immediately. The City has implemented a complaint form to document the complaint and the response to the complaint (provided in Appendix F). City staff maintain complaint forms on-hand so that field complaints can be documented properly. If the complaint is initiated at City Hall, the form is given to the appropriate staff for resolution. In either case, the form is returned to City Hall for filing. The City also has an online tool titled Citizen's Action Request through which citizens can file a complaint provided at the following link:
https://cityoftenino.us/community/webform/citizens-action-request

OPERATION AND MAINTENANCE SUMMARY

The following is a summary of the Operation and Maintenance Program improvements identified in this Chapter and other Chapters of this Water System Plan. The operational improvements are shown in relative order of priority. Each improvement is identified as either a Capital Improvement Project which will be further described in Chapter 8 Capital Improvement Program and budgeted for in Chapter 9 Financial Program or will be included in normal O&M costs.

1. Cross-Connection Program Implementation: The City currently hires a Backflow Assembly Tester who complies with the Cross-Connection Program. The CCP is considered normal O&M and will be paid for using the O&M budget.

2. Service Connection Leak Repair: Previous leak detection efforts have documented older service lines as the most common water leak issue. The City has been working to eliminate the issue in recent years and will continue to address the problem. Service connection leak repair is considered normal O&M and will be paid for using the O&M budget.

3. Meter Replacement Program: Service meter accuracy can have a significant impact on revenue and unaccounted for water. Calibration of smaller meters is typically not cost effective and therefore older meters are typically replaced. The manufacturers recommended useful life of service meters is typically 10 to 15 years. As mentioned in Chapter 4, the City has begun a meter replacement program in 2020 which plans to replace all existing water meters with radio read meters beginning with difficult to read meters. All new water services are installed with radio read meters. The long-term goal is to have the entire water system on Automated Meter Reading (AMR) to save overall operational costs. This replacement program is currently projected to be completed in 2023. The advantages of meter replacement include more water is accounted for and water use is typically decreased due to increased customer costs when actual water use is billed. The City will utilize AMR type meters in all future installations to decrease long term operational costs associated with reading meters. The meter replacement program is considered a Capital Improvement and an annual proposed funding amount of $30,000 is planned for in Chapter 9.

4. Calcite Contactor Loading Platform: Obtain a portable access ladder and platform that can be moved to each calcite contactor unit for loading media. The front loader bucket of the backhoe would still be utilized to raise the media up to the platform level, but maintenance staff would not have to be situated in the bucket during loading. This project is considered normal O&M and will be paid for using the O&M budget.

5. Piping Calcite Contactor Flexibility: Install piping to allow use of either set of calcite contactors with either Well No.1 or Well No. 3 which would provide operational flexibility. This project is considered normal O&M and will be paid for using the O&M budget.

6. Water System Plan: Update the Water System Plan, required every 10 years from the date of approval. This project is identified in Chapter 8 Capital Improvement Program and is proposed to be funded with Capital Improvement funds.

Chapter 7

DESIGN & CONSTRUCTION STANDARDS

CHAPTER 7

DESIGN AND CONSTRUCTION STANDARDS

Standard construction specifications for distribution mains are identified in the City policy document *Water System Standards* in Appendix B (referred to herein as the City Standards). In general, the City Standards provide sizing criteria, detailed material specifications and criteria for installation of water mains and appurtenances. Current general administrative procedures for main extensions and recently completed standard detail drawings for uniform installation of service meters, valves, thrust blocks, and appurtenances are included in the City Standards.

Washington State Department of Health (DOH) will review the City Standards concurrently with this Water System Plan. Upon approval of the City Standards by DOH, the City may replace piping and extend distribution mains without further review by DOH if the replacement or extension is consistent with the City Standards and the Water System Plan. As a condition of the approval, the City must keep accurate records of distribution extensions and replacement projects. Record keeping must include record drawings and engineering certifications. Typically, most distribution extensions should be designed by a professional engineer and in all cases approved by the Public Works Supervisor prior to construction.

It should be noted that the City Standards only provide detailed guidelines for distribution mains and related appurtenances. Proposed improvements such as a new pump station or storage tank must be reviewed and approved by DOH prior to construction.

Chapter 8

CAPITAL IMPROVEMENT PROGRAM

CHAPTER 8

CAPITAL IMPROVEMENT PROGRAM

This Capital Improvement Program (CIP) has been developed in a manner consistent with the City's water system needs as well as State and federal regulations regarding planning, water quality, treatment, distribution, and storage. Updates to the Water System Plan are typically required every 10 years from the date of approval. Therefore, a schedule of improvements must extend at least 10 years into the future to correspond with the next 10-year Water System Plan. This CIP will extend 15 years into the future to allow for longer review and approval timelines; however, specific schedules for improvements outside of the 10-year planning period are not required.

SUMMARY OF CAPITAL IMPROVEMENTS

The following is a summary of the capital improvements to address deficiencies or needs that are identified in the various preceding chapters of this Water System Plan. Summaries of operational improvements are provided in Chapter 6. Specific project cost estimates are included in Appendix H. Unless otherwise stated, the opinions of cost in this report are based on implementation of the improvements through a public bid process. Unit costs are based on similar projects which have been recently constructed in southwest Washington. Total project costs for the improvements are estimated using an applicable construction contingency, sales tax, mobilization, and adjusted unit prices where construction conditions may be difficult or where materials are expected to be marked up due to relatively limited quantity on the job site. Administrative, legal, engineering, environmental, permitting and construction management costs are added to the subtotal of construction costs and contingencies. The planning level estimates are intended to be conservative to ensure that adequate funding is appropriated for each project. Industry standards for planning level estimates should be accurate within a range of minus 20% to plus 50%.

The system analysis in Chapter 3 identifies the basic premise for improvements and identifies a general strategy to address deficiencies. The specific improvements that are required to address the deficiencies are discussed in more detail below. The project summaries below are intended to layout the general nature of the improvement for determining the planning level cost estimates and more detailed pre-design work will be needed to provide additional information to implement the project.

Small Diameter Pipe Replacement

The primary intent of the small diameter main replacement is to replace older, small diameter, cast iron, galvanized iron, or asbestos-cement piping that is prone to leaking and high maintenance and repair costs. The typical small cast iron pipe run is in the range of 200 feet to 400 feet. Priorities for small diameter pipe replacement areas will be determined through field observations by City staff. The initial priority areas include South McArthur Street (4-inch A.C. lack of depth.) and South Wichman Street (old 2-inch cast iron). There are also multiple areas with 2-inch cast iron pipe that is over 50-years old. The most critical component of this program is to establish a budget item so that priorities can be addressed when they are identified. Since City staff time is fairly limited with regard to this type of work, the recommended annual budget planned for in Chapter 9 Financial Program is $50,000 annually to allow for replacement of the typical pipe run through a small works type contract. Pipe replacement budget could also be carried over multiple years to address larger projects.

Water Right Acquisition

As presented in Chapter 3, the City is projected to use all allowable water rights in the year 2036 unless the Water Use Efficiency (WUE) goal is achieved. The City is recommended to begin pursuing the acquisition of additional water rights because it can take a significant amount of time to process water rights sales or change applications. Water rights acquisitions should prioritize annual water rights. Instantaneous water rights are likely to be attached to annual water rights. As shown in Table 3-6, the City is projected to have a 20-year annual water right deficiency of 18.6 acre-feet per year. In addition, large expansions of the existing water system are not recommended until additional water rights are acquired. Table 3-11 shows a current Annual Water Right surplus of 143 ERUs. The City has budgeted $10,000 annually to pursue water rights.

Source Improvements

The 2010 Water System Plan identified several projects to develop the Southwest Urban Growth Area (UGA) known as Lemon Hill. Projects included 200 gpm of well capacity, storage tank, distribution system piping, and a booster station. These projects were dependent on development and were planned to be developer funded. Due to several challenges with developing the Lemon Hill area including steep grades and federally identified critical habitat for endangered species, plans to develop the Lemon Hill area have been discontinued.

The 2010 Water System Plan identified a well site (location to be determined by development), well house, and two well pumps, each with a minimum 100 gpm capacity (200 gpm total capacity which includes redundancy) based off a projected 20-year 55 gpm deficiency. As shown in Chapter 3, this Water System Plan no longer projects a source deficiency based on 2022 data projections; therefore, this source improvement project will be removed for this CIP; however, a new well site would improve source reliability and should be considered in conjunction with the Water Rights Acquisition CIP.

Storage Improvements

The 2010 Water System Plan identified a new water storage tank to be located on the southwestern side of Lemon Hill with a minimum recommended storage capacity of 200,000 gallons. The storage tank site was planned to be designed to accommodate a second tank. This CIP will include a new reinforced concrete water storage reservoir with the same minimum recommended capacity of 200,000 gallons to conservatively meet the projected 20-year storage deficiency of 169,428 gallons. This project is planned to be developer driven and funded and the location will depend on the location of future development.

The base construction cost was developed using unit costs from recent and similar reservoir projects in Southwest Washington. Sales tax was calculated as 8.1% (2023 local tax rate) of the base construction cost. 20% contingency was added to the base construction cost and sales tax to account for uncertainties associated with estimating project costs at this planning level. 30% was added to the base construction cost, sales tax, and contingency for City and consultant design, permitting, and construction administration costs. The total estimated project cost as shown in Appendix H is $1,660,000.

Maintenance and Operations

Chapter 6 identifies six operations and maintenance projects ordered in order of priority. Of these six projects, the Meter Replacement Program and the next Water System Plan are identified as Capital Improvements. The recommended annual budget is $30,000 annually for the Meter

Replacement Program which is expected to be completed in 2023. The next Water System Plan is estimated to cost $100,000.

CAPITAL IMPROVEMENT PROGRAM SCHEDULE

Project schedules are based on priorities established by the City Council and are adjusted based on financial considerations and effects of project scheduling on other City projects. The City has identified safe and reliable service, low costs, financial viability, and regulatory compliance as the highest priorities for the water system. Recommended improvements must be prioritized with regard to implementation in either the 10-year or 20-year planning period. A recommendation that is included for implementation in the 10-year period signifies a high priority and the improvement should be implemented prior to the next Water System Plan. A 20-year recommendation signifies that the improvement is not a significant (low) priority and can be re-evaluated after the next Water System Plan. The primary factors considered for prioritization of each of the operation program improvements and capital improvements are identified in Table 8-1.

TABLE 8-1

Capital Improvement Program

#	Project	Priority
1	Storage Improvement – New Reservoir	High – Due to revisions in DOH's storage calculations, a projected storage deficiency in the year 2024 has been identified. This project is planned to occur in conjunction with new development assumed to occur once additional water rights are acquired.
2	Small Diameter Pipe Replacement	Moderate/Ongoing – This project is planned to be funded with an annual amount to replace leaking pipes or pipes that are prone to leak to prevent potential future problems associated with emergency repairs and localized contamination from cast iron or steel pipe.
3	Meter Replacement Program	Moderate/Ongoing – This project will result in more accounted for water potentially reducing DSL and reduced operational costs.
4	Water Right Acquisition	Low – Due to the long timelines for processing water rights sales or changes, the City is recommended to begin pursuing additional water rights.
5	Water System Plan	Low – The next Water System Plan is planned to be updated 10 years after the date of approval of this Water System Plan anticipated to be between 2033 and 2037.

The CIP Schedule is shown in Table 8-2. Recommended implementation dates for the projects are based on the above priorities and integrated with the financial program analysis and recommendations in Chapter 9. The CIP and related basis of the recommendations in other chapters of this Water System Plan are based on the best information available and represent a significant investment of resources by the City to reach a comprehensive understanding of water system issues. CIP financing can be affected by many factors that may change the timing and scope for implementation. Since rate adjustments are dependent upon City Council support and can be controversial, there is no certainty that rate adjustments will be implemented within the scope and timing anticipated in the financial program. In addition, there may be competing priorities for reserve funds that are also contingent upon City Council approval prior to use. Financing methods such as low interest loans have specific timelines and requirements

associated with appropriations and implementation. These factors are built into the estimated schedules but can be highly variable based on the actual method utilized. In summary, the CIP schedule should be evaluated on an annual basis and modified as needed during the City's annual budgeting process.

TABLE 8-2

10-Year Capital Improvement Program Schedule

No.	Project Title	Purpose of Project	Cost Estimate	Financing Source	Year
Source Improvements					
1	Water Rights Acquisition	20-Yr. Deficiency	$10,000	City	Annual
Distribution System Improvements					
2	Small Diameter Pipe Replacement	Operation & Maintenance	$50,000	City	Annual
Storage Improvements					
3	200,000 Gallon Reinforced Concrete Water Reservoir	10-yr. Deficiency	$1,660,000	Developer	- (1)
Maintenance and Operations					
4	Meter Replacement Program	Operation & Maintenance	$30,000	City	Annual
5	Water System Plan	Operation & Maintenance	$100,000	City	2033 (2)

1. The planning year for developer funded projects depends on new development and is unknown.
2. The next Water System Plan will be scheduled 10 years from the date of approval of this Water System Plan. 2033 is the earliest this could occur.

Chapter 9

FINANCIAL PROGRAM

CHAPTER 9

FINANCIAL PROGRAM

OBJECTIVE

The objective of the financial program is to identify the total cost of providing water service, assure that the utility improvement schedule will be implemented, and assist in establishing adequate fees for service. The emphasis of the financial program for systems with less than 1,000 connections is financial viability. In order for a system to be "financially viable," it must have the capacity to obtain sufficient funds to develop, construct, operate, maintain and manage a public water system on a continuing basis in full compliance with federal, state and local requirements. In addition, a complete financial program can assist the purveyor in establishing water rates and other charges that reflect the actual cost of providing service.

Funds are compared to the following financial viability tests in accordance with DOH policies:

- Test 1 – Operating revenue must be greater than operating expenditure.
- Tests 2 & 3 - The operating cash reserve must be at least 1/8 of annual operating expenses and the emergency reserve must be sufficient to address expected emergency expenses for items such as equipment replacement.
- Test 4 – Annual water rates should be less than 1.5% of the Median Household Income (MHI) for the area.

FUND MANAGEMENT

The City of Tenino owns and operates two funds for the water system: the water (operating) fund and the water capital improvement fund. For financial forecasting purposes, operating fund expenditures and revenues tend to be ongoing and predictable, while capital costs are highly variable and may include large, one-time projects. The main funding source for utility operating expenditures is utility ongoing rate revenue. Capital funding sources consist of loans or grants, developer funding, or transfers from operating fund. The City uses the capital improvement fund to repay existing loans.

EXPENDITURES

Typical operating expenses include salaries, wages, benefits, operating supplies and services, and taxes. Typical capital expenses include debt repayment and projects designated as capital improvement projects. The previous four years of capital and operating expenditures are summarized in Table 9-3 and a comprehensive list provided in Appendix H.

REVENUE

The primary revenue sources for the water utility are water rates, connections fees and investment interest. The following sections contain a summary of the revenue sources available to the City. The previous four years of capital and operating revenues are summarized in Table 9-3 and a comprehensive list is provided in Appendix H.

Rate Revenue

The City collected approximately $275,000 in rate revenue in 2022 including taxes and late fees. Current basic rates for water service are shown in Table 9-1 as defined in Resolution No. 2019-02 provided in Appendix H.

TABLE 9-1

Water Rates

Customer Class	Base Rate (monthly)
3/4” Meter (up to 500 cf)	$12.65
1” Meter (up to 500 cf)	$17.63
1-1/2” Meter (up to 500 cf)	$29.58
2” Meter (up to 500 cf)	$44.84
3” Meter (up to 500 cf)	$93.04
4” Meter (up to 500 cf)	$138.38
Senior Citizen (in city only, up to 300 cf)	$7.59
Outside City Limits (up to 300 cf)	$18.95
Quarry Pool Rate	$9.11
Vacancy Rate	$3.16
Municipal Rate (up to 500 cf)	$8.93
Overage	
Within City per additional 100 cf	$3.22
Outside City per additional 100 cf	$4.56
Senior (in City only)	$0.81
Municipal per additional 100 cf	$0.77

The current resolution became effective in April 2019. The City has not increased water rates since that time. Current rates result in average monthly residential rates of $21.20 and $41.29 for inside City and outside City customers respectively (at 700 c.f. average monthly residential water use – see Chapter 2 including 6% Utility Tax and 5.029% State Excise Tax). Comparing this with the 2020 MHI of $79,769 for Thurston County (as listed on the Washington State Median Household Income Estimates by County published by the Office of Financial Management), rates inside the City and outside the City are approximately 0.03% and 0.05% of the MHI, respectively. Therefore, the City is in compliance with Test 4 that annual water rates should be less than 1.5% of the MHI for the area.

For general reference, Table 9-2 provides monthly residential water rates for similar size municipal water utilities in the area as calculated using 700 cubic feet and current rates per ordinance. Service connections are taken from The Department of Health Office of Drinking Water Sentry Internet containing information on public water systems.

TABLE 9-2

Residential Water Rates

Municipality	Service Connections	Inside City (Monthly Rate for 700 cf)	Outside City (Monthly Rate for 700 cf)
Castle Rock	1,151	$80.08	$120.12
McCleary	905	$89.56	$132.20
Mossyrock	532	$47.91	$73.10
Napavine	858	$49.00	$64.00
Tenino	833	$19.09	$37.19

(1) This table is for comparison purposes and excludes additional taxes.

The average water rates for Cities in the area is approximately $70 per month for inside City limits and $100 per month for outside City limits. The City of Tenino currently has low water rates compared to similar sized municipalities in the area.

Connection Fees

Current residential connection fees for the City are $2,500 plus materials for inside connections and $3,750 plus materials for outside service connections. The significant difference in the inside and outside fees recognizes the fact that the cost of service is higher for outside City customers. Connection fees are deposited into the water Capital Improvement account to meet the intent of RCW 35.92.025. State statutes require justification of connection fees and capacity charges with regard to prior and anticipated capital improvement costs. Therefore, it is also recommended to establish a basis for connection fees but is not a significant priority due to the unlikely event that the fees will be challenged. Connection fee revenue is projected to be $10,000 annually.

Loan Funding

There are currently no anticipated projects that would warrant loan funding at this time. If needed, the primary loan programs that will be considered are the DOH Drinking Water State Revolving Fund (DWSRF) and the Public Works Trust Fund (PWTF) infrastructure loan program. These programs have similar low interest rates and funding timelines.

Grant Funding

Grants funding is typically reserved for communities with very low average incomes and relatively high-water rates and is not a realistic source of water utility funding for the City of Tenino; however, availability and conditions on government grants can vary from year to year. The most probable sources of grant funding is the Community Development Block Grant (CDBG) program and General Purpose Grants (GPG). As mentioned above, the City does not currently anticipate significant projects that would warrant grant funding consideration.

Operating Reserves

An operating reserve is designed to provide a liquidity cushion protecting the utility from the risk of short-term variation in the timing of revenue collection or payment of expenses. An operating reserve also smooths rate increases over a multi-year period. The City's existing reserve policy states "The City's enterprise funds will maintain reserves equal to at least 10 percent of their adopted operating expenditures." This calculates to approximately $23,500 in the year 2022; however, the fund has historically been maintained above $200,000. Table 9-3 shows the city's year beginning operating fund balance, year ending operating fund balance, and the amount

transferred from the operating fund to the capital improvement fund for the past four years (2019-2022).

Capital Reserves

Capital reserves are utilized for funding smaller projects when the size of the project fits in with available reserve amounts or the project is too small to be viable for outside funding. Capital reserves are also utilized as a last resort for time sensitive projects or significant emergencies. Capital reserves are only used for capital improvement related expenses as a local match to other funding resources or when other funding resources are not available. Capital reserves are primarily funded through connections fees and transfer of operating reserves after operating reserve goals are met. The City's current policy does not specify a capital reserve; however, a study titled Water and Sewer Rate Study by FCS Group written for the City of Tenino in January 2016 developed a recommended minimum capital reserve balance roughly equal to average annual capital program spending. This Water System Plan will adopt this policy in developing the Financial Program. The average annual capital program spending over the previous 4-year period (2019 – 2022) was approximately $200,000.

Other Revenue

The City generates other revenue through various fees and short-term investment of operating and capital reserve funds. This other revenue was approximately $7,500 in 2019 and has decreased to $0 in 2022. For this Financial Program, other revenue is projected to generate $2,500 annually in the Operating Fund and $1,500 annually in the Capital Fund.

SUMMARY OF FINANCIAL HISTORY

Table 9-3 contains a summary of operating and capital revenues and expenditures and beginning of the year and end of year cash balances for both funds from the previous four years. Appendix H contains a comprehensive list of operating and capital revenues and expenditures for the previous four years. The City completes budget estimates in the fall for implementation in the next calendar year.

As shown in Table 9-3, operating revenue has been greater than operating expenses excluding transfer to the Capital Fund for the previous four years; therefore, the City has been in compliance with Test 1 as discussed in the Objective section above. Both Operating and Capital Fund reserves have been maintained above $200,000 for the previous four years; therefore, the City is in compliance with Tests 2 and 3 as discussed in the Objective section above.

TABLE 9-3

Summary of Financial History

Year	2019	2020	2021	2022
Operating Fund				
Water Services [1]	$278,147	$265,245	$252,524	$278,425
Interest	$4,604	$2,258	$352	$0
Total Revenue	**$282,751**	**$267,503**	**$252,876**	**$278,425**
Operations & Maintenance	$241,112	$235,204	$157,810	$209,771
Transfer to Capital Improvement Fund	$586,585	$287,447	$0	$0
Total Expenditures	**$827,697**	**$522,651**	**$157,810**	**$209,771**
Year Beginning Cash, January 1	**$1,047,415**	**$502,469**	**$247,321**	**$342,387**
Year Ending Cash, December 31	**$502,469**	**$247,321**	**$342,387**	**$411,041**
Capital Fund				
Water Services [1]	$41,133	$109,863	$54,681	$76,960
Interest	$2,794	$1,460	$215	$0
Transfers from Operating Fund	$586,585	$287,447	$0	$0
Total Revenue	**$630,512**	**$398,770**	**$54,896**	**$76,960**
Debt Repayment	$6,543	$6,686	$6,519	$6,519
Water System Plan	$1,553	$0	$6,437	$5,258
Meter Replacement Program	$3,540	$103,621	$1,847	$728
Small Diameter Pipe Replacement	$0	$0	$4,224	$375,592
Other CIPs	$23,732	$102,951	$9,139	$103,352
Total Expenditures	**$35,359**	**$213,258**	**$28,166**	**$491,449**
Year Beginning Cash, January 1	**$638,626**	**$1,233,778**	**$1,419,291**	**$1,446,021**
Year Ending Cash, December 31	**$1,233,778**	**$1,419,291**	**$1,446,021**	**$1,031,531**

1. Water services in the operating fund include revenue from water rates include account activation fees, taxes, and late charges. Water services in the capital fund include revenue from water surcharge tax for capital improvements, and connection fees.

BUDGET PROJECTIONS

DOH requires that the Water System Plan identify a balanced annual budget. Water systems should also identify budget framework for the 10-year planning period to evaluate general cash flow and potential rate impacts. The following assumptions are utilized as a basis for identifying budget constraints and future revenue requirements.

- Base O&M costs in the first year (2023) of budget estimates are determined using previous operating expense data and adjusted for inflation.
- The inflation rate for O&M costs is estimated at 2.5% annually.
- The inflation rate for CIP costs is estimated at 4.0% annually based on the Seattle

Construction Cost Index as published in the Engineering News Record, assuming that the year 2022 was an anomaly.

- Water rate revenue and connection fees shown in Table 9-4 are projected to increase proportionally to Equivalent Residential Units (ERU's) at the annual growth rates presented in Table 2-10 plus the proposed rate increase shown in Table 9-4.

A 10- to 15-year budget projection is provided in Table 9-4. The majority of capital expenditures will be funded by water reserves and transfers from the Operating Fund. The 200,000-gallon reservoir is planned to be funded by developer contributions. An annual 4.0% inflationary rate adjustment beginning in 2024 is projected to be necessary to maintain a financially viable program such that operating revenues are greater than expenses and the operating reserve is maintained above $200,000. Otherwise, the City may begin to draw down operating reserves. The 4.0% annual rate adjustment will allow revenue to keep pace with inflation and avoid more severe one-time increases in the future. If the inflationary costs do not materialize, the City could build up reserves and use them to complete future upgrades without taking on additional debt.

Annual transfers from the water operating fund to the water capital improvement fund on the order of $100,000 to $250,000 depending on the end of the year Operating Fund cash balance is projected to fund proposed capital improvement projects and maintain a capital reserve above $200,000. This financial program does not plan for funding through loans or grants; however, a higher cost small diameter pipe replacement project could be funded by loans, grants or building up capital reserves (instead of spending $50,000 annually as shown).

FINANCIAL VIABILITY

The balanced 10 to 15-year budget identifies compliance with financial viability requirements for operating revenue, operating reserves, and emergency reserves as follows:

- Test 1 - Revenue is greater than expenses in all periods.
- Tests 2 & 3 - The current operating cash reserve of approximately $400,000 decreases to between $200,000 and $260,000. The operating reserves are adequate to provide a liquidity cushion. The current capital cash reserve of approximately $1,000,000 decreases to approximately $260,000. The capital reserves are adequate to fund emergency response.
- Test 4 – The projected average rate for customer classes inside the City is 0.03%, which is less than 1.5% of the Median Household index for the area. Projected rate increases match projected inflation; therefore, this percentage is anticipated to be maintained.

Table 9-4 10 Year Budget

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Revenue - Operating Fund															
Water Services (with rate increase) [1]	$ 257,000	$ 267,000	$ 284,500	$ 303,000	$ 323,000	$ 344,000	$ 366,000	$ 389,000	$ 413,000	$ 438,500	$ 466,000	$ 494,500	$ 521,500	$ 550,000	$ 580,000
Proposed Rate Increase	0.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Interest	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500
Total Operating Revenues	**$ 259,500**	**$269,500**	**$ 287,000**	**$ 305,500**	**$ 325,500**	**$ 346,500**	**$ 368,500**	**$ 391,500**	**$ 415,500**	**$ 441,000**	**$ 468,500**	**$ 497,000**	**$ 524,000**	**$ 552,500**	**$ 582,500**
Expenditures - Operating Fund															
Operations & Maintenance [2]	$ 249,000	$ 255,000	$ 261,500	$ 268,000	$ 275,000	$ 281,500	$ 288,500	$ 296,000	$ 303,500	$ 311,000	$ 318,500	$ 326,500	$ 335,000	$ 343,000	$ 352,000
Total Operating Expenditures	**$ 249,000**	**$ 255,000**	**$ 261,500**	**$ 268,000**	**$ 275,000**	**$ 281,500**	**$ 288,500**	**$ 296,000**	**$ 303,500**	**$ 311,000**	**$ 318,500**	**$ 326,500**	**$ 335,000**	**$ 343,000**	**$ 352,000**
Cash Balance - Operating Fund															
Year Beginning Cash, Jan 1	$ 411,000	$ 422,000	$ 336,500	$ 261,500	$ 199,000	$ 249,500	$ 214,500	$ 194,500	$ 190,000	$ 202,000	$ 232,000	$ 282,000	$ 252,500	$ 242,000	$ 251,500
Proposed Transfer to Capital Fund	$ -	100,000	$ 100,000	$ 100,000	$ -	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 200,000	$ 200,000	$ 200,000	$ 200,000
Year Ending Cash, Dec 31	**$ 422,000**	**$ 336,500**	**$ 261,500**	**$ 199,000**	**$ 249,500**	**$ 214,500**	**$ 194,500**	**$ 190,000**	**$ 202,000**	**$ 232,000**	**$ 282,000**	**$ 252,500**	**$ 242,000**	**$ 251,500**	**$ 282,500**
Test 1: Operating Revenue - Operating Expenses	$ 10,500	14,500	$ 25,500	$ 37,500	$ 50,500	$ 65,000	$ 80,000	$ 95,500	$ 112,000	$ 130,000	$ 150,000	$ 170,500	$ 189,000	$ 209,500	$ 230,500
Operating Revenue > Operating Expenses?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Test 2: Operating Reserve Requirement (1/8 expenses)	$ 31,125	$ 31,875	$ 32,688	$ 33,500	$ 34,375	$ 35,188	$ 36,063	$ 37,000	$ 37,938	$ 38,875	$ 39,813	$ 40,813	$ 41,875	$ 42,875	$ 44,000
Operating Reserve > 1/8 Expenditures ?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Revenue - Capital Fund															
Water Services [1]	$ 48,500	$ 48,500	$ 49,000	$ 49,000	$ 49,000	$ 49,000	$ 49,500	$ 49,500	$ 49,500	$ 49,500	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,500
Interest	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
Total Capital Revenues	**$ 50,000**	**$ 50,000**	**$ 50,500**	**$ 50,500**	**$ 50,500**	**$ 50,500**	**$ 51,000**	**$ 51,000**	**$ 51,000**	**$ 51,000**	**$ 51,500**	**$ 51,500**	**$ 51,500**	**$ 51,500**	**$ 52,000**
Expenditures - Capital Fund															
Debt Repayment	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Improvement Projects															
200,000 Gallon Reservoir	Developer Financed														
Small Diameter Pipe Replacement	$ 50,000	$ 52,000	$ 54,000	$ 56,000	$ 58,500	$ 61,000	$ 63,500	$ 66,000	$ 68,500	$ 71,000	$ 74,000	$ 77,000	$ 80,000	$ 83,500	$ 86,500
Meter Replacement Program	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Right Acquisition	$ 10,000	$ 10,500	$ 11,000	$ 11,000	$ 11,500	$ 12,000	$ 12,500	$ 13,000	$ 13,500	$ 14,000	$ 15,000	$ 15,500	$ 16,000	$ 16,500	$ 17,500
Water System Plan	$ 6,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 154,000	$ -	$ -	$ -
Other	$ 101,000	$ 103,500	$ 106,000	$ 109,000	$ 111,500	$ 114,500	$ 117,000	$ 120,000	$ 123,000	$ 126,000	$ 129,500	$ 132,500	$ 136,000	$ 139,000	$ 142,500
Total Capital Expenditures	**$ 204,000**	**$ 172,500**	**$ 177,500**	**$ 182,500**	**$ 188,000**	**$ 194,000**	**$ 199,500**	**$ 205,500**	**$ 205,000**	**$ 211,000**	**$ 218,500**	**$ 379,000**	**$ 232,000**	**$ 239,000**	**$ 246,500**
Cash Balance - Capital Fund															
Year Beginning Cash, Jan 1	$ 1,031,500	$ 897,500	$ 875,000	$ 847,500	$ 815,000	$ 677,000	$ 633,500	$ 584,500	$ 530,000	$ 475,500	$ 415,000	$ 348,000	$ 220,500	$ 240,000	$ 252,500
Proposed Transfer from Operating Fund	$ -	$ 100,000	$ 100,000	$ 100,000	$ -	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 200,000	$ 200,000	$ 200,000	$ 200,000
Year Ending Cash, Dec 31	**$ 897,500**	**$ 875,000**	**$ 847,500**	**$ 815,000**	**$ 677,000**	**$ 633,500**	**$ 584,500**	**$ 530,000**	**$ 475,500**	**$ 415,000**	**$ 348,000**	**$ 220,500**	**$ 240,000**	**$ 252,500**	**$ 257,500**

1. Operating fund water service revenues are projected to increase at the growth rates in Table 2-11 plus the proposed rate increase.
2. Operations & Maintenance revenue is projected to increase at an annual inflation rate of 2.5%.
3. Capital Improvement Projects are projected from their 2023 cost at an annual inflation rate of 4.0% to the proposed year of implementation.
4. All costs are rounded to the nearest $500.

Appendix A

Tenino Plans and Maps

7.

Tenino Future Land Use Map

- Residential
- Multi-Family Residential
- Master Planned Community
- Mixed Use
- Commercial
- Public / Semi-Public
- Industrial
- Historic Preservation
- City Limits
- Urban Growth Boundary

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N W E S

0 500 1,000 2,000 Feet

DISCLAIMER:
This map is for general planning purposes only. Thurston Regional Planning Council makes no representations as to accuracy or fitness of the information for a particular purpose.

Path: P:\SmallTowns\Tenino\2015_CompPlan\Maps_Images\FutureLandUse.mxd

City of Tenino, Thurston County, WA
Official Zoning Map

- Single Family ES
- Single Family
- Single Family Duplex
- West Tenino
- Multi-Family Residential
- Mixed Use
- Commercial - 1
- Commercial - 2
- Commercial - 3
- Industrial
- Public / Semi-Public
- Professional Office Overlay
- Historic Character
- Historic Preservation
- City Limits
- Urban Growth Boundary

Adopted Ordinance 823

N W E S

0 0.25 0.5 Miles

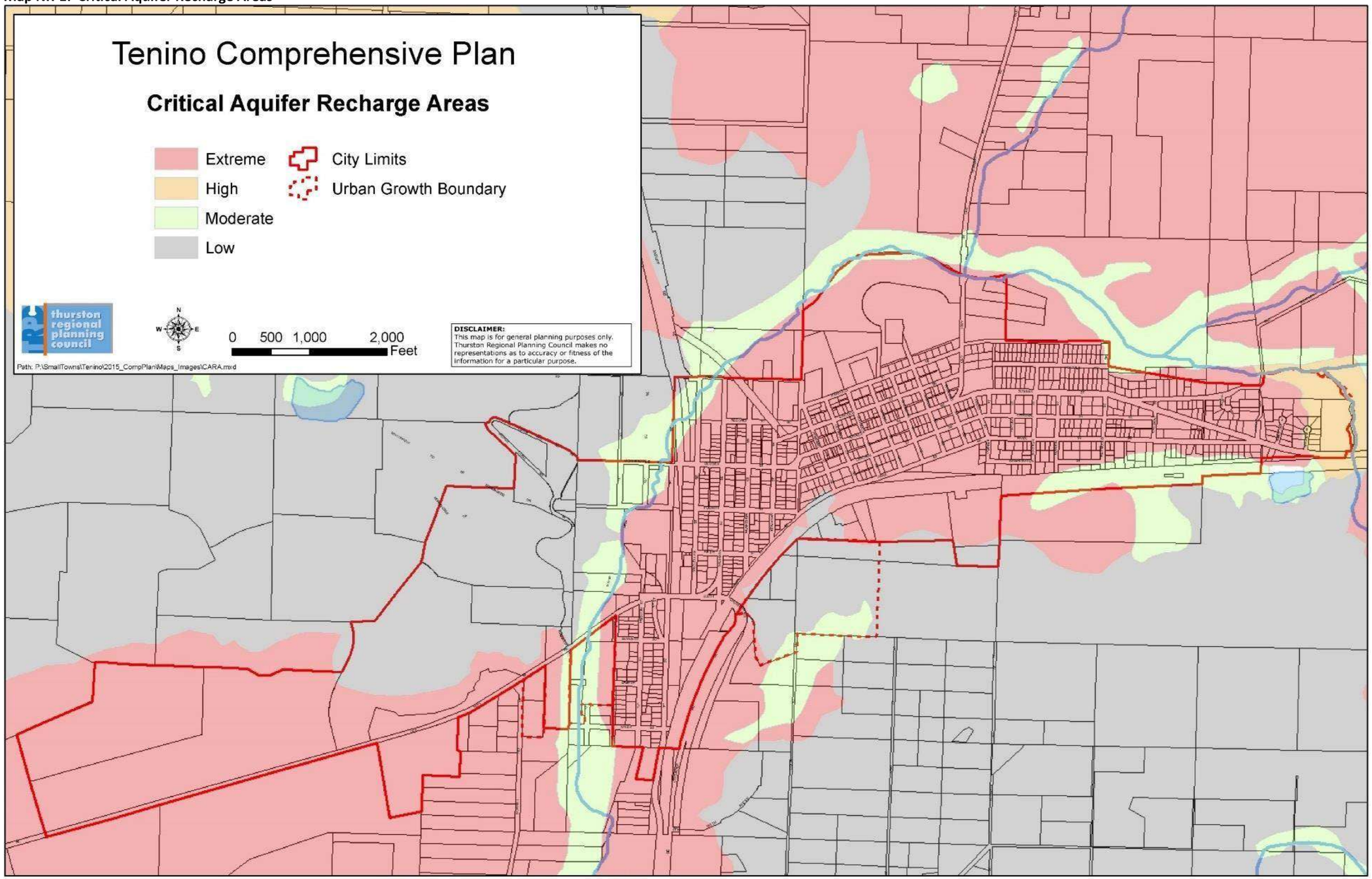
Date: Tuesday, December 18, 2012
Path: P:\SmallTowns\Tenino\WestTeninoVisioning\Maps_Images\Zoning2012.mxd

NATURE LN SE
MCDUFF RD SE
OLD MILITARY RD SE
GARFIELD AVE E
LINCOLN AVE E
CUSTER ST N
SUSSEX AVE E
OLD MILITARY RD E
REYNOLDS ST S
SR507 HWY
BOGNOR ST S
FENTON AVE W
STAGE ST N
WICHMAN ST N
LINCOLN AVE W
MORNINGSIDE DR SE
SUSSEX AVE W
CENTRAL AVE W
OLD DUMP RD S
KEITHAHN ST S
MCARTHUR ST S
MCCLELLAN ST S
WICHMAN ST S
PARK AVE W
OLD 99 HWY S
7TH AVE W
NELSON LN S
HUSTON ST S
CROWDER RD SE
OLD 99 HWY SE
MIMA ACRES DR SE
BUCODA HWY SE
168TH AVE SE
BLUMAUER RD SE
DYSON RD SE
COOK ST SE
KENT ST SE
CRANE ST SE

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DISCLAIMER:
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Map NR-1: Critical Aquifer Recharge Areas



POPULATION ESTIMATES AND FORECAST
THURSTON COUNTY CITIES, URBAN GROWTH AREAS, AND RESERVATIONS
2010-2045

		Census Calibrated		TRPC		TRPC Forecast Most Recent Jurisdiction Boundaries				
Jurisdiction		**2010**	**2020**	**2021**	**2022**	**2025**	**2030**	**2035**	**2040**	**2045**
Bucoda	Total	562	600	595	610	625	685	720	765	800
Lacey	City	42,393	53,526	54,850	58,180	56,550	57,820	58,970	59,890	60,670
	UGA	33,170	37,733	37,330	34,750	41,480	44,550	47,050	49,850	52,770
	Total	75,560	91,259	92,180	92,930	98,030	102,370	106,020	109,740	113,440
Olympia	City	46,478	55,605	55,960	56,370	58,840	62,980	66,960	69,760	72,040
	UGA	11,840	12,480	12,510	12,590	13,270	13,390	13,730	14,610	15,610
	Total	58,320	68,085	68,470	68,960	72,110	76,370	80,690	84,370	87,650
Rainier	City	1,794	2,369	2,440	2,510	2,350	2,570	2,725	3,075	3,165
	UGA	110	133	125	125	115	120	130	135	160
	Total	1,905	2,502	2,565	2,635	2,465	2,690	2,855	3,210	3,325
Tenino	City	1,695	1,870	2,010	2,030	2,050	2,310	2,565	2,750	2,790
	UGA	15	26	15	15	15	15	15	15	45
	Total	1,710	1,896	2,025	2,045	2,065	2,325	2,580	2,765	2,835
Tumwater	City	17,371	25,350	26,050	26,360	29,120	31,670	34,090	35,920	36,900
	UGA	6,350	3,357	3,290	3,380	5,410	7,030	8,240	9,020	9,170
	Total	23,720	28,707	29,340	29,740	34,530	38,700	42,330	44,940	46,070
Yelm	City	6,848	10,617	10,640	10,680	13,540	17,390	20,910	23,910	25,890
	UGA	1,355	1,514	1,445	1,585	1,380	1,380	1,390	1,420	1,670
	Total	8,205	12,131	12,085	12,265	14,920	18,770	22,300	25,330	27,560
Grand Mound UGA	Total	1,345	1,358	1,220	1,260	1,870	2,270	2,505	2,665	2,745
Chehalis Reservation	Total	64	58	50	50	65	65	65	65	65
Nisqually Reservation	Total	575	715	610	610	855	870	885	905	930
Total Cities		117,141	149,937	152,545	156,740	163,070	175,430	186,950	196,080	202,240
Total UGAs (1)		54,180	56,601	55,940	53,700	63,550	68,760	73,070	77,710	82,170
Total Reservations (2)		639	773	660	660	920	930	950	970	990
Rural Unincorporated County (3)		80,300	87,482	88,650	89,400	88,960	90,880	93,430	95,940	98,090
Thurston County Total		**252,264**	**294,793**	**297,800**	**300,500**	**316,500**	**336,000**	**354,400**	**370,700**	**383,500**

SOURCE Thurston Regional Planning Council
Small Area Population Estimates and Population and Employment Forecast (2018 Update)

NOTES Estimates are for April 1 and reflect city limits on that date. Numbers may not add due to rounding.
A decrease in UGA population may be due to annexation. TRPC's most recent forecast was completed before 2020 Census data were released and in some cases underestimated growth.
1) Urban Growth Area (UGA): Unincorporated area designated to be annexed into city limits over 20 years time to accommodate urban growth.
2) Reservations: Estimate is for Thurston County portion of reservation only.
3) Rural Unincorporated County is the portion of the unincorporated county that lies outside UGA and Reservation boundaries.

UPDATED 12/6/2022

Appendix B

Tenino Water Distribution Standards and Municipal Code

Footnotes:
*--- (**1**) ---*
***State Law reference—** Given certain prerequisites, municipal water supplier has duty to provide retail water service within its retail service area, RCW 43.20.260; general health and safety requirements for public water systems, RCW 70.119A.060; beneficial uses of municipal water supply, RCW 90.03.550.*

12.04.010. - Findings; operation.

This chapter is declared necessary and essential for the health and welfare of the public as related to the operation of a water system for use by the residents of the city and any other users. The water department shall be operated under the requirements of the rules and regulations of the state board of health regarding public water systems and any other applicable state and/or county regulations to ensure the safety of the water supply system. The city shall be the only purveyor of water within the city limits. The city shall establish and maintain such rates as will provide sufficient revenues to meet the needs and obligations of the water department.

(Code 1988, § 13.04.010; Ord. No. 408, § 1, 1985)

12.04.020. - Definitions.

When used in this chapter, the following words and phrases have the meaning ascribed to them in this section, unless the context indicates a different meaning:

Clerk means the clerk-treasurer as employed by the city.

Independent user, for the purpose of assessing the surcharge established in TMC 12.04.250C, is defined as a separate residence or business entity which receives, or is able to receive, water through a meter through which another separate residence or business entity also receives, or is able to receive, its water.

Property means real property.

Superintendent means the public works superintendent as employed by the city, or any employee as designated by the superintendent.

Water department means the city water department.

(Code 1988, § 13.04.020; Ord. No. 475, § 1, 1990; Ord. No. 631, § 1, 1994; Ord. No. 774, § 1, 8-24-2010)

12.04.030. - Water department.

The city shall organize and maintain a water department under the regulations set out in this chapter.

(Code 1988, § 13.04.030; Ord. No. 408, § 2, 1985)

12.04.040. - Water service application.

7.

(a) Any person desiring to obtain water from the water supply system of the city shall make application in the c office during regularly scheduled business hours. Every application shall be made or co-signed by the owner property subject to the application or by his authorized agent. The applicant shall state fully and truly all the purposes for which the water is required including the number of independent users plumbed into the prop subject to the application. The applicant must agree to conform to all applicable rules and regulations. The applicant must further agree that the city shall have the right to shut off the water for emergency repairs wi notice and that the city shall not be responsible for any damages caused by emergency shutoff.

(b) Upon receipt of a completed water service application, a nonrefundable fee shall be paid by the applicant for water account activation. The amount of the fee shall be as established by the city council, from time to time.

(Code 1988, § 13.04.040; Ord. No. 475, § 2, 1990; Ord. No. 631, § 2, 1994)

12.04.050. - Connection by city.

When an application has been completed for the installation of water and the property abuts upon a street where there is a city water main, the superintendent shall connect the new service to the city's water system. Included in the installation will be a meter stop which shall thereafter be maintained by and kept within the exclusive control of the city.

(Code 1988, § 13.04.050; Ord. No. 408, § 5, 1985)

12.04.060. - Main extension or renewal.

The council, at its discretion, may order the extension or renewal of mains by a local improvement plan, as provided by law, and the water department may pay for the improvement, or whatever part is deemed equitable, as determined by the council.

(Code 1988, § 13.04.060; Ord. No. 408, § 6, 1985)

12.04.070. - Pipelaying; service maintenance.

A. All persons connecting to the city system, or laying their own private pipes, shall be required to use only American Water Works Association approved methods and materials. The superintendent will maintain private service from the main in streets which are being graded or regarded, and will have such access on private property as is necessary to maintain such pipes during the work. As soon as is reasonable and practical upon the completion of the work, the pipes shall be relaid.

B. Except for the cause described in subsection A of this section, owners shall maintain their private pipes from the end of the city service into their property. Should the superintendent find it necessary to maintain a private service, due to owner disregard, the owner shall relinquish all rights to the pipes. When necessary, the superintendent may slope service in on property to conform to the slope occasioned by the grading of the street and charge the expense to the owner.

(Code 1988, § 13.04.070; Ord. No. 408, § 7, 1985)

7. 4.080. - Service installation cost; service deposit.

A. Services shall be installed at the expense of the property owner, the services to be installed by the city and actual cost charged therefor. All services shall be constructed by the city through meter coupling on the customer's side.

B. Within the legal city limits, the applicant, in applying for water services, shall be charged and pay a connection fee plus installation costs. Outside the legal city limits, a 50 percent surcharge will be assessed. The amount of the fee shall be as established by the city council, from time to time. All revenues received for connection fees shall be deposited to the Water Capital Improvement Fund No. 420.

C. The fixed fee service charges shall be paid to the clerk prior to the installation of the service. Upon completion of the installation, the superintendent shall prepare and submit to the applicant the plus cost section of the connection fee. Upon payment of the plus cost, the water shall be turned on to the premises.

D. The provisions of subsections A and B of this section also apply where exchanges in the size of the service are made at the property owner's request. This charge shall include the actual cost of installation ("plus cost" amount) only and not the fixed rate. In case of replacements, no service smaller than five-eighths by three-fourths inch shall be installed.

(Code 1988, § 13.04.080; Ord. No. 408, § 8, 1985; Ord. No. 629, § 1, 1994)

12.04.090. - Separate services; connection assembly.

Before the water shall be turned on to the premises connected to the city system, the service pipes must conform to the following:

A. The service pipes must be so located that the supply for each separate house or premises is controlled by separate valves of standard make with an access box, be properly protected from frost, and placed within the premises so that all fixtures may be shut off.

B. The connection between the city's pipes and the service pipes must be made with a coupling so that the supply to each separate house or premises may be controlled by a separate stop valve.

(Code 1988, § 13.04.090; Ord. No. 408, § 9, 1985)

12.04.100. - Activation; reactivation.

A. New service owners shall notify the superintendent of the desire to have the system inspected and the water turned on.

B. Requests to discontinue service must be filed in the clerk's office during regularly scheduled business hours. Service will then be discontinued within two business days. No remission of rates will be made for a period of less than one calendar month, nor without the notice prescribed in this section. Reactivation

7. of service will be made within one business day of the account being paid in full, including payment in full of all arrearages on the account.

(Code 1988, § 13.04.100; Ord. No. 408, § 10, 1985; Ord. No. 653, § 1, 1997)

12.04.110. - Expanded use.

A. The use of city water beyond the purposes identified in an application filed pursuant to TCM 12.04.040 is unlawful. If a person desires to expand the purpose for which water is required beyond that identified in the current water service application, the person must file a new water service application pursuant to TCM 12.04.040.

B. After being put on notice by the city of the existence of an unlawful expanded use of city water, the property subject to the expanded use shall be assessed a charge per day until the expanded use is stopped or properly authorized pursuant to TCM 12.04.040. Further, the city reserves the right to disconnect water service to a property that is the subject of an unlawful expanded use. The amount of the per day charge shall be as established by the city council, from time to time.

(Code 1988, § 13.04.110; Ord. No. 653, § 2, 1997)

12.04.120. - Removal of connection.

A. The superintendent may remove the service connection in the following circumstances:
   1. Change of service location;
   2. New service on existing service site;
   3. Abandoned service;
   4. Enlargement of existing service.

B. Following removal, a new service connection shall follow the application procedure set forth in this chapter.

C. When the service connection of any premises does not come from a main in front of the premises, the superintendent shall, when a main is laid in front of the premises, transfer the service connection to the new main without charge and remove the old service connection. The superintendent shall notify the property owner of any such action prior to making the transfer.

(Code 1988, § 13.04.120; Ord. No. 408, § 12, 1985)

12.04.130. - Fire hydrants.

No person, except firemen, the superintendent, or a designee in charge of their duties shall open or in any way tamper with any fire hydrant or valve connected with the main of the city's water supply system. No person shall place upon or about any hydrant, meter or water gate connected to the city's system any building material or other substance so as to prevent free access at any and all times.

(Code 1988, § 13.04.130; Ord. No. 408, § 13, 1985)

7. 4.140. - Charges—Responsibility.

All water rates, service connections and assessments will be charged against the property to which they are furnished and shall become a lien against the property. If any sums owing therefor become delinquent, the water shall be shut off and in no case shall be reactivated on the same property until all delinquencies have been paid in full. No owner or occupant or other persons may reactivate the service until all arrearages, including assessments authorized by this chapter, are satisfied.

(Code 1988, § 13.04.140; Ord. No. 408, § 14, 1985; Ord. No. 653, § 3, 1997)

12.04.150. - Charges; unauthorized turnon.

Any unauthorized activation, reactivation or expansion of the city's water service is unlawful and a prohibited act that will subject the occupant of the property to an action by the city pursuant to TCM 12.04.280. A charge shall be assessed against the property each time the water is shut off by the city following an unlawful reactivation. After the third such assessment, a charge of $100.00 shall be assessed against the property each time the water is shut off following an unlawful reactivation. The amount of the charge shall be as established by the city council, from time to time.

(Code 1988, § 13.04.150; Ord. No. 408, § 15, 1985; Ord. No. 653, § 4, 1997)

12.04.160. - Authorization required to connect, tamper with or disconnect.

No plumber or other person will be allowed to make connection with the city mains or make connection with any conduit, pipe or any fixture connected therewith, or to connect pipes that have been disconnected, or to turn water on or off the premises, without permission of the superintendent, excluding emergency repairs.

(Code 1988, § 13.04.160; Ord. No. 408, § 16, 1985)

12.04.170. - Prohibited acts.

The following acts are prohibited:

A. To open, close, turn or interfere with, or attempt to interfere with, any fire hydrant or stop valve belonging to the water department without prior permission of the superintendent. This rule shall not apply to members of the fire department while acting in that capacity;
B. To disturb or damage any pipe, machinery or other property of the water department;
C. To throw refuse or any substance into any city reservoir or to throw any deleterious matter in or upon any part of the city's water buildings or water supply system;
D. To deface or injure any building or other structure or improvement of the water department;
E. To place anything foreign upon the grounds or any area under the control of the water department;
F. To disturb or injure any landscape improvement or ornamental item belonging to or under the control of the water department;

7.

G. To activate, reactivate, or expand water system service without permission of the superintendent and cc with all requirements of this chapter.

(Code 1988, § 13.04.170; Ord. No. 408, § 17, 1985; Ord. No. 653, § 5, 1997)

12.04.180. - Regulation of water use.

The council, whenever the public safety, health or equitable distribution of water so demands, may direct the superintendent to establish regulations required to ensure a continuing and adequate supply of water.

(Code 1988, § 13.04.180; Ord. No. 408, § 18, 1985)

12.04.190. - Sprinklers wetting passersby.

No nozzle or other sprinkling device shall be so placed as to intentionally throw water on any person passing by on the street or sidewalk.

(Code 1988, § 13.04.190; Ord. No. 408, § 19, 1985)

12.04.200. - Meters—Ownership and regulation.

The city reserves the right to place a meter on any or all service. All meters shall remain the property of the city, and may be installed or removed by the superintendent in conformity to rules and regulations provided in this chapter.

(Code 1988, § 13.04.200; Ord. No. 408, § 20, 1985)

12.04.210. - Same—Reading.

Reading of meters shall be by radio read or handheld device. All readings shall record the actual meter reading. When it is not possible to read the meter, estimates will be made and adjusted to actual at the next reading.

(Code 1988, § 13.04.210; Ord. No. 408, § 23, 1985; Ord. No. 774, § 2, 8-24-2010)

12.04.220. - Same—Rereading after complaint.

When any consumer whose water service is metered makes a complaint that the bill for any past time has been incorrect, the water department shall, upon written request, have such meter reread and the service inspected for leaks.

(Code 1988, § 13.04.220; Ord. No. 408, § 21, 1985; Ord. No. 653, § 6, 1997)

12.04.230. - Same—Replacement.

7. In all cases where meters are lost, injured or broken by carelessness or negligence of owners or occupants of the premises, they shall be replaced or repaired by or under the direction of the superintendent. The cost of such repair or replacement will be charged against the owner. In the event of nonpayment the water shall be shut off and will not be reactivated until the charge and the charge for turning the water off are paid.

(Code 1988, § 13.04.230; Ord. No. 408, § 25, 1985)

12.04.240. - Reserved.

Editor's note— Ord. No. 869, § 2, adopted January 24, 2017, repealed § 12.04.240, which pertained to billing. See Code Comparative Table for complete derivation.

12.04.245. - Adjustment of utility bills.

A. The city administrator, or his designee, is empowered to resolve billing disputes upon receipt of request to do so from a city utility customer. Upon receipt of such notice from the customer, the city administrator, or his designee, shall review the bill with the customer to see if the amount is justly owed. The customer shall have the right to have a meeting to bring forth reasons and evidence why such bill should not be due and owing.

B. When any customer in any given billing period has used, according to the water meter, a quantity of water which is more than double the average amount of water used on such premises in similar billing periods in prior years, and the water consumption is solely caused by a broken water pipe on the user's premises, the customer may make an application to the treasurer in writing for a reduction of the billing.

   1. If the application states a broken pipe on the customer's premises caused a large consumption of water, the existence of a broken pipe shall be verified by inspection by the public works employees. If it is established by presenting acceptable documentation demonstrating to the city that such broken pipe has been repaired, a reduction of the water bill to an amount that is the average of the prior four months plus one-half of the difference between the average and the existing disputed bill.
   2. The reduction provided for in this section shall not be allowed if such excess water consumption is due to a customer's neglect or failure to repair the broken pipe. A reduction in billing shall not be permitted if such excess consumption is due simply to leaky faucets or other plumbing fixtures.

C. Any water customer of the city may receive a maximum of one utility bill adjustment per year.

D. Utility bill adjustments shall not be granted if the customer, after notification by the city, refuses to make repairs within three business days or isolate the leak to prevent continued water loss from the city's water system.

E. Irrigation systems are specifically excluded from any adjustments due to leakage.

F. In newly developed property which does not have a prior service record, the appropriate water service charge will be based upon the charges for a similar type of water service and occupancy for the preceding year.

G. The application by the customer shall be on the forms provided by the city.

7. rd. No. 838, § 1, 3-11-2014)

12.04.250. - Rates.

A. The minimum monthly rate for service and the water used shall be assessed per independent user and based upon meter size as listed in subsection B of this section. The council shall have the power to adjust rates to ensure adequate revenues are available for the maintenance and upgrading of the water system.

B. The minimum monthly rate and overage rate shall be assessed as follows:

1. *Building classification.*

a. Residential, duplex, triplex and fourplex: $25.30 per unit plus surcharge per unit (one-inch meter or less).

b. Apartment (multifamily): One meter charge plus surcharge per unit.

c. Commercial/industrial: One meter charge plus surcharge per unit.

d. Mixed use A (commercial and residential): $25.30 per unit plus surcharge/unit and one meter charge plus surcharge.

e. Mixed use B (commercial and apartment): Two meter charges plus surcharge per unit.

f. Residential (outside city limits): $45.60 plus surcharge.

g. Senior citizen (in city only): $19.30 plus surcharge.

h. Developed property (other): One surcharge.

2. *Meter rates.*

a. Up to three-fourth-inch meter: $25.30.

b. One-inch meter: $29.36.

c. 1½- to two-inch meter: $41.54.

d. Over two-inch meter: $52.50.

3. *Overage.*

a. Within city boundaries after 500 cubic feet: $1.25 per 100 cubic feet.

b. Outside city boundaries after 300 cubic feet: $2.00per 100 cubic feet.

c. Senior rate (in city only) after 300 cubic feet: $1.00per 100 cubic feet.

C. Effective June 1, 2008, in addition to the applicable minimum rate and overage charge, a surcharge of $18.30 per month will be charged to each meter. If a meter has independent users, that meter will be charged $18.30 per each independent user. The $18.30 per month surcharge per independent user will be charged to the meter regardless of the current occupancy of independent units within/with on the property. Each such unit capable of receiving water shall be considered to be receiving water for the purpose of this surcharge. Revenues generated by this surcharge shall be deposited in the city's water capital improvement fund to be used by the combined water/sewer utility. Upon connection to the sewer utility, the combined utilities surcharge for that independent user of $18.30 per month will be reduced to $3.80 per month.

7.

D. Should a meter become out of order and fail to register accurately, the charge shall be according to the aver quantity of water used for a period of three months, as shown by the meter when in order. The superintend shall ensure an accurate meter is installed.

E. Rates for the sale of bulk water out of fire hydrants or other distribution points shall be as follows:

Base charge, use of hydrant and rental of hydrant meter	$31.90
First 300 cubic feet	17.55
Each additional 100 cubic feet	1.05

Sale of bulk water must be approved and supervised by the public works director for the city or its appointee.

F. Water rates for active water services which are located outside of the city boundaries as of January 1, 1995, for which annexation petitions are received, shall be calculated based upon meter size for the same rate as meters within city boundaries.

(Code 1988, § 13.04.250; Ord. No. 485, § 1, 1991; Ord. No. 631, § 4, 1994; Ord. No. 635, § 1, 1995; Ord. No. 688, § 1, 2002; Ord. No. 709, §§ 1, 3, 2005; Ord. No. 743, § 1, 5-27-2008; Ord. No. 767, §§ 1, 2, 12-8-2009; Ord. No. 774, §§ 5, 6, 8-24-2010; Ord. No. 856, § 2, 10-27-2015)

12.04.255. - Reuse water rates and charges.

A. *Reuse water rates and charges (no free service).* The city will not furnish any service of the system to any customer whatsoever free of charge.

B. *Classifications.*

1. Residential.
2. Commercial.
3. Industrial. Sand and gravel pits.
4. The reclaimed water service base charge for industrial, sand and gravel pits shall be monthly as follows:

Meter Size (inches)	Amount
¾	$ 7.59
1	8.81

7.

1½	12.46
2	15.75
3	22.68
4 plus	32.66

5. The reuse water service consumption charge for each service per month shall be as follows:

From	To	Rate/c.f.
Zero	5,000	$0.0040
5,001	20,000	0.0033
20,000	50,000	0.0027
50,001 and above		0.0020

C. *Normal billing period.* The normal billing period for customers shall be a two-month cycle and shall be that period falling between two consecutive water meter read dates; provided, however, the city may elect to change to a monthly utility billing cycle for accounts when feasible. During change of ownership, utility charges for periods of less than two months shall be prorated.

D. *COLA increases.* All rates are subject to annual COLA increases.

(Code 1988, § 13.04.255; Ord. No. 732, § 1, 2007)

12.04.260. - Amendment of provisions.

On or about September 1 of each year, the city clerk-treasurer shall cause the city council to review the then-existing water rates to consider whether such water rates are sufficient to meet the long-term needs of the city water system.

(Code 1988, § 13.04.260; Ord. No. 485, § 2, 1991)

12.04.270. - Policies and procedures document.

7. The council shall prepare, or cause to be prepared, a document entitled policies and procedures. The document is to be reviewed regularly and amended or modified as deemed appropriate by council.

(Code 1988, § 13.04.270; Ord. No. 408, § 28, 1985)

12.04.280. - Violation; penalty.

Each and every violation or infraction of any of the rules and regulations established by this chapter, in addition to any specific penalties attached thereto, constitutes a separate offense. Any person found guilty of such violation or infraction shall, upon conviction, be fined in accordance with TMC chapter 1.16.

(Code 1988, § 13.04.280; Ord. No. 408, § 27, 1985)

12.04.290. - Sewer rates and charges.

A. Sewer rates and charges will be $94.00/equivalent residential unit as determined by Ordinance No. 758.
    1. Shared grinder pumps per TMC 13.08.110 shall reflect a credit of $3.00/ERU on the monthly rate for the independent user providing the electricity to operate the grinder pump.
    2. Shared grinder pumps per TMC 12.08.110 shall reflect an additional charge of $3.00/ERU on the monthly rate for the independent user not providing the electricity to the grinder pump.
B. Normal billing period. The normal billing period for customers shall be a monthly cycle.
C. Billings for services are after the fact and not prorated, services provided prior to the 15th of any month will be billed for that full month.
D. All rates are subject to periodic review by city council.

(Ord. No. 767, § 1, 12-8-2009)

CHAPTER 12.10. - CROSS CONNECTIONS

12.10.010. - Definitions.

Except where specifically designated herein, all words used in this document and the city's guidance manual shall carry their customary meanings. Any definition not found in this section will take its meaning from WAC titles 246 through 290, or as amended, or in the most recent the manual as determined by the state department of health.

Approved backflow prevention assembly , *backflow assembly* or *assembly* means an assembly to counteract backpressures or prevent backsiphonage. This assembly must appear on the list of approved assemblies issued by the state department of health. The assembly must be purchased and installed as a complete unit including two shutoff valves and test cocks.

Auxiliary supply means any water source or system other than City of Tenino's water.

7. *Backflow* means the flow of water or other liquids, gases or solids from any source back into the distribution system. The flow of water in the opposite direction of its intended flow.

Backflow assembly tester means a person holding a valid BAT certificate issued in accordance with WAC 246-290-490 and chapters 18.27, 18.106 and 70.119 RCW.

Backpressure means backflow due to water pressure on the downstream side of the meter which exceeds the operating pressure of the public potable water supply.

Backsiphonage means backflow due to a negative or reduced pressure within the public potable water supply.

Contamination means the entry into or presence in a public water supply system of any substance which may be harmful to health and/or quality of the water.

Cross connection means any physical arrangement where a public water system is connected, directly or indirectly (actual or potential), with any other nondrinkable water system or auxiliary system, wells, sewer, drain conduit, swimming pool, storage reservoir, plumbing fixture, swamp coolers, or any other device which contains, or may contain, contaminated or polluted water, sewage, used water, or other liquid of unknown or unsafe quality which may be capable of imparting contamination or pollution to the public water system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross connections.

Cross connection specialist or *specialist* means a person holding a valid cross connection specialist certificate issued in accordance with the Washington Administrative Code and that is employed by or under contract with the city.

Degree of hazard means the low or high hazard classification that shall be attached to all actual or potential cross connections.

Director means the public works director.

DOH means the Washington Department of Health.

Guidance manual means the most recent edition of the guidance manual written specifically for the city.

High health hazard means the classification assigned to an actual or potential cross connection that could allow a substance of a physical, toxic, or biological nature to backflow into the potable water supply. This substance could cause illness or death.

In-premises protection means a method of protecting the health of consumers served by the customer's plumbing system (i.e., located within the property lines of the customer's premises) by the installation of an approved air gap, backflow prevention assembly or device at the point of hazard.

Local administrative authority means the local official, board, department or agency authorized to administer and enforce the provisions of the uniform plumbing code and all other plumbing codes recognized by the state.

7. *Plumbing hazard* means an internal or plumbing-type cross connection in a consumer's potable water system that may be either a pollutional or a contamination-type hazard. The term "plumbing hazard" includes, but is not limited to, cross connections to toilets, sinks, lavatories, wash trays, domestic washing machines and lawn sprinkling systems. Plumbing-type cross connections can be located in all types of structures including, but not limited to, homes, manufactured homes, apartment houses, hotels and commercial or industrial establishments.

Pollutional hazard means an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

Potable water supply means any system of water supply intended or used for human consumption or other domestic use and meets all requirements established by the Safe Drinking Water Act and the DOH regulations.

Premises means any piece of property to which water is provided including, but not limited to, all improvements, mobile structures and structures located on it.

Premises isolation means a method of protecting a public water system by installation of an approved double check valve assembly or a reduced pressure backflow assembly at the point of service (where the city loses control of the water supply) to separate the customer's plumbing system from the purveyor's distribution system.

Reduced pressure principle backflow prevention assembly, reduced pressure principle assembly or *RP assembly* means an assembly containing two independently acting approved check valves together with a hydraulically operated, mechanically independent pressure differential relief valve located between the check valves. The assembly shall include properly located test cocks and tightly closing shutoff valves at each end of the assembly.

Thermal expansion means the pressure created by the expansion of heated water.

Used water means any water supplied by the city to a customer's property after it has passed through the service connection and is no longer under the control of the city.

(Code 1988, § 13.10.010; Ord. No. 696, § 1:01, 2004)

12.10.020. - Purpose.

The purpose of this chapter is to protect the water system of the city from contamination or pollution due to any existing or potential cross connections as defined in WAC 246-290-010, or as amended, and this chapter.

(Code 1988, § 13.10.020; Ord. No. 696, § 1:02, 2004)

12.10.030. - Cross connections regulated.

A. No cross connections shall be created, installed, used or maintained within the area served by the city, except in accordance with this chapter.

B. The specialist for the city shall carry out or cause inspections to be carried out to determine if any actual

7.

or potential cross connections exist. An assembly commensurate with the degree of hazard, if found necessary, will be required to be installed at the service connection.

C. The owner, occupant or person in control of the property is responsible for all cross connection control within the premises.

D. All high health hazard premises which are defined in table 9 of WAC 246-290-490, or as amended, are required to have premises isolation by installing a reduced pressure principle assembly in accordance with this chapter.

(Code 1988, § 13.10.030; Ord. No. 696, § 1:03, 2004)

12.10.040. - Application and responsibilities.

This chapter applies throughout the city and to every premises and property served by the city. It applies to any premises, public or private, regardless of date of connection to the city water. Every owner, occupant and/or person in control of any concerned premises is responsible for compliance with the terms and provisions contained herein.

(Code 1988, § 13.10.040; Ord. No. 696, § 1:04, 2004)

12.10.050. - Backflow prevention assembly requirements.

(a) A specialist employed by or under contract with the city shall determine the type of backflow assembly to be installed within the area served by the city. All assemblies shall be installed at the service connection unless it is determined by the specialist to install the assembly at an alternate location.

(b) The cross connection shall be eliminated or an assembly shall be required to be installed in each of the following circumstances, but the specialist is in no way limited to the following circumstances:

A. The nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the potable water supply;

B. Premises having any one or more cross connections or potential cross connections as that term is defined in TMC 12.10.010 and the WAC;

C. When a cross connection survey report form is required by the city and has not been received;

D. Internal cross connections are present that are not correctable;

E. Intricate plumbing arrangements exist or plumbing subject to frequent changes are present that make it impractical to ascertain whether or not cross connections exist;

F. There is a repeated history of cross connections being established or re-established;

G. There is unduly restricted entry so that inspections for cross connections cannot be made with sufficient frequency to ensure that cross connections do not exist;

H. Materials, chemicals or any substance or apparatus is being used that if backflow occurred contamination would result;

I. Installation of an approved backflow prevention assembly is deemed to be necessary in the judgment of the specialist to accomplish the purpose of this chapter;

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J. Any premises having an auxiliary water supply;

K. In the event an in-premises assembly has not been tested or repaired as required by WAC 246-290-490, or as amended, and this chapter;

L. If it is determined that additions or rearrangements have been made to the plumbing system without obtaining proper permits as required by the city's code enforcement division;

M. When a garden hose attachment is connected to the premises' plumbing, including but not limited to fertilizer applicators, pesticide applicators and radiator flush kits;

N. Wherever the actual or potential of backpressure exists;

O. Wherever the conditions for back-siphonage exist.

(Code 1988, § 13.10.050; Ord. No. 696, § 1:05, 2004)

12.10.060. - Irrigation systems.

All irrigation systems shall be protected in accordance with the plumbing code regulations. In the event any system is equipped with an injector system, or has submerged heads, a reduced pressure principle assembly will be required. If the irrigation system comes directly off the main with a designated line, a minimum of a double check assembly is required. If there is irrigation water supplied by a separate system and that system can be connected to the potable system, an assembly will be installed as required by the WAC.

(Code 1988, § 13.10.060; Ord. No. 696, § 1:06, 2004)

12.10.070. - Fire systems.

An approved double check backflow prevention assembly shall be the minimum protection on all new fire sprinkler systems using piping material that is not approved for potable water use, and/or that does not provide for periodic flow-through. A reduced pressure principle backflow prevention assembly must be installed, if any solution other than the potable water can be introduced into the sprinkler system. Retrofitting on fire sprinkler systems will be required in each of the following circumstances:

A. Where improper maintenance has occurred;

B. On all high hazard systems;

C. Wherever a specialist deems necessary; and

D. Wherever required by the WAC.

(Code 1988, § 13.10.070; Ord. No. 696, § 1:07, 2004)

12.10.080. - Temporary meters and hydrant valves.

Backflow protection will be required on all temporary meters and hydrant valves before any use. The type of assembly will be commensurate with the degree of hazard and will be determined on a case-by-case basis by the city's specialist.

7. ode 1988, § 13.10.080; Ord. No. 696, § 1:08, 2004)

12.10.090. - Mobile units.

Any mobile unit or apparatus, as defined in TMC 12.10.010, which uses the water from any premises within the city's water system shall first obtain a permit from the city and be inspected to ensure appropriate backflow prevention is installed in accordance with the most recent edition of the city's guidance manual. The city reserves the right to revoke the business license of the owner of the apparatus or mobile unit if the owner fails to comply with these procedures.

(Code 1988, § 13.10.090; Ord. No. 696, § 1:09, 2004)

12.10.100. - Right-of-way encroachment.

A. No person shall install or maintain a backflow prevention assembly upon or within any city right-of-way except as provided in this section.
B. The city reserves the right to have an assembly installed in the right-of-way.
C. A backflow prevention assembly required by the city may be installed upon or within any city right-of-way only if the owner proves to the city that there is no other feasible location for installing the assembly, and installing it in the right-of-way will not interfere with traffic or utilities. The city retains the right to approve the location, height, depth, enclosure, and other requisites of the assembly prior to its installation.
D. All permits required by the city code to perform work in the right-of-way shall be obtained.
E. A property owner shall, at the request of the city and at the owner's expense, relocate a backflow prevention assembly which encroaches upon any city right-of-way, when such relocation is necessary for street or utility construction or repairs for purposes of public safety.

(Code 1988, § 13.10.100; Ord. No. 696, § 1:10, 2004)

12.10.110. - Plumbing code.

As a condition of water service, customers shall install, maintain, and operate their piping and plumbing systems in accordance with all state plumbing codes and the 2009 Uniform Plumbing Code, or as amended, and TMC chapters 12.04 and 12.06.

(Code 1988, § 13.10.110; Ord. No. 696, § 1:11, 2004; Ord. No. 744, 7-22-2008)

12.10.120. - Testing and repairs.

(a) Backflow prevention assemblies shall be tested and repaired in accordance with the requirements set out in the WAC, the RCW, and this chapter.
(b) All presently installed backflow prevention assemblies that do not meet the requirements of this chapter, but were approved assemblies for the purpose described herein at the time of installation, are commensurate with the degree of hazard and that have been properly maintained, shall, except for the

7. inspection and maintenance requirements, be excluded from the requirements of these rules so long as the city is ensured that they will satisfactorily protect the utility system. Whenever the existing assembly is moved from the present location, requires more than minimum maintenance, or parts are no longer available, the unit shall be replaced by an approved backflow prevention assembly.

(Code 1988, § 13.10.120; Ord. No. 696, § 1:12, 2004)

12.10.130. - Responsibilities of backflow prevention assembly testers.

(a) All backflow assembly testers operating within the city shall be certified in accordance with all applicable regulations and shall comply with all stipulations in this chapter and the most recent edition of the city's guidance manual. All backflow assembly testers are required to carry a minimum liability insurance policy of $5,000.00.

(b) Testers are required to register with the city in accordance with the most recent edition of the guidance manual.

(Code 1988, § 13.10.130; Ord. No. 696, § 1:13, 2004)

12.10.140. - Maintenance of assemblies.

Backflow prevention assemblies shall be maintained in accordance with the requirements set out in the WAC, or as amended, and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.140; Ord. No. 696, § 1:14, 2004)

12.10.150. - Installation requirements and specifications.

(a) Backflow prevention assemblies shall be installed in accordance with the requirements set out in the WAC and the most recent edition of the city's guidance manual.

(b) In the event the specialist allows a premises isolation assembly to be installed at an alternate location, there shall be no interties or connections between the meter and the premises isolation assembly.

(Code 1988, § 13.10.150; Ord. No. 696, § 1:15, 2004)

12.10.160. - Thermal expansion.

If a closed system has been created by the installation of a backflow prevention assembly, it is the responsibility of the property owner to eliminate the possibility of thermal expansion.

(Code 1988, § 13.10.160; Ord. No. 696, § 1:16, 2004)

12.10.170. - New construction and/or occupancy change.

In all new construction, an approved backflow assembly shall be installed at the service connection. The type of the assembly shall be commensurate with the degree of hazard as determined by a specialist.

(Code 1988, § 13.10.170; Ord. No. 696, § 1:17, 2004)

12.10.180. - Retrofitting.

Retrofitting shall be required at all service connections where an actual or potential cross connection exists, and wherever else the city deems retrofitting necessary to comply with the WAC, this chapter, and the most current edition of the city's guidance manual.

(Code 1988, § 13.10.180; Ord. No. 696, § 1:18, 2004)

12.10.190. - Costs of compliance.

All costs associated with the purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the responsibility of the property owner, their renter, lessee, agent, or personal representative.

(Code 1988, § 13.10.190; Ord. No. 696, § 1:19, 2004)

12.10.200. - Recovery of costs.

(a) Any water customer violating any of the provisions of this chapter and who causes damage to or impairs the city's water system, including, but not limited to, allowing contamination, pollution, any other solution or used water to enter the city's water system, shall be liable to the city for any expense, loss or damage caused by such violation. The city shall collect from the violator for the cost incurred by the city for any cleaning, purifying, repair or replacement work or any other expenses caused by the violation. Refusal to pay the assessed costs shall constitute a violation of this chapter and shall result in the termination of service.

(b) All cost associated with any disconnect fees resulting from the enforcement of this chapter are the sole responsibility of the property owner.

(Code 1988, § 13.10.200; Ord. No. 696, § 1:20, 2004)

12.10.210. - Termination of service.

Failure on the part of any property owner, their renter, lessee, agent or personal representative to discontinue the use of all cross connections, to physically separate cross connections or to abide by all the conditions of this chapter is sufficient cause for the immediate discontinuance of water service by the city to the premises.

(Code 1988, § 13.10.210; Ord. No. 696, § 1:21, 2004)

12.10.220. - Emergency suspension of service.

The director or their designee may, without prior notice, suspend water service to any premises when such suspension is necessary to stop the eminent threat of any actual or potential cross connection as defined in this chapter and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.220; Ord. No. 696, § 1:22, 2004)

12.10.230. - Nonemergency suspension of service.

The director or their designee may suspend, with 24-hour notice, the water supply to any premises where the conditions of this chapter or the most recent edition of the city's guidance manual have been violated.

(Code 1988, § 13.10.230; Ord. No. 696, § 1:23, 2004)

12.10.240. - Falsifying information.

Any person who knowingly makes any false statement, representation, record, report or other document filed or required to be maintained pursuant to this chapter, or who falsifies, tampers with, or knowingly renders inaccurate any backflow assembly, device or method required under this chapter shall (in addition to civil and/or criminal penalties provided by state law) be guilty of a misdemeanor subject to the general penalty clause of City of Tenino's guidance manual.

(Code 1988, § 13.10.240; Ord. No. 696, § 1:24, 2004)

CHAPTER 12.20. - UNIFORM UTILITY BILLING SYSTEM

12.20.001. - Billing generally.

There shall be one uniform billing and collection procedure for all city utility services, including but not limited to water, sewer, and storm sewer.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.005. - Authorized officers designated.

A. The clerk/treasurer, or authorized designee, shall keep an account for water, sewer and storm sewer service used by any person, business, or other entity within the city. Such services shall be paid for by every utility account within the city.

B. The clerk/treasurer, or authorized designee, shall place against these accounts all charges for water, sewer and storm sewer service that are to be paid by every utility account, when these services are used by such person, business or other entity. Any service charges or other charges that are connected with the provision of utility services shall likewise be placed against these accounts. All charges shall be made in accordance with the terms of those ordinances and resolutions of the city establishing the rates and fees for such services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.007. - Creation of accounts; deposits on renter-occupied premises.

7. At the time an account for either residential or commercial renter-occupied premises is requested and before it is authorized, the clerk/treasurer or his/her designee shall require that the person requesting services deposit with the city a sum of money that shall be set by the city council by resolution. This deposit can be reduced to the minimum allowed by ordinance if the property owner agrees in writing to assume financial responsibility for any unpaid balance in excess of the deposit amount and the property owner files such written agreement with the clerk/treasurer or designee prior to the account being established in the tenant's name. This provision does not in any way affect the property owner's liability for charges or the lien rights of the city against the premises to which the services are furnished as provided in TMC 12.20.080. Nothing in this chapter shall prevent the city from requiring additional or new deposits, when the conditions so warrant.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.010. - Bills—Preparation, delivery.

A. The city shall cause a single utility bill, covering all utility services that are furnished by or through the city during the preceding month or accounting period, to be prepared and rendered on a monthly basis to each customer of utility service.

B. Such bill shall be due and payable by the last day of the month from and after the date of mailing.

C. Once prepared, this bill shall be delivered to the customer by depositing it in the United States mail, addressed either to the address shown on the application for utility service or to any change of address that has been submitted by the customer to the city.

D. Deposit in the United States mail pursuant to subsection C. of this section shall be deemed full and complete notice to the customer of the nature and amount of any particular utility billing.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.015. - Budget payment plan.

The clerk/treasurer, or authorized designee, is hereby authorized to create and implement a budget payment plan in accordance with state law. Such a plan shall permit the authorized customer to make payments of utility charges on an annual averaged basis rather than on a monthly basis, with at least one annual adjustment to ensure that the amount paid on an annual basis reflects the actual charges incurred.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.020. - Leak adjustments.

When excessive water meter registration is caused by broken or leaking water service pipes within or abutting upon the premises without the knowledge of the customer, an adjustment may be made upon written application for one month only and for two months in the case of monthly billing during a 12-month period and after repairs have been made. The basis for adjustment shall be the normal consumption for the property in question under similar operating conditions.

7. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.030. - Bills delinquent.

If the bill rendered as provided in TMC 12.20.010 is not paid when due, it shall be considered delinquent ten days after the due date and a late fee that shall be set by the city council by resolution shall be added to the delinquent account. Additionally, in order to reimburse the city for carrying the unpaid balance, the city shall impose interest on the total remaining unpaid balance at a rate that shall be set by the city council by resolution until such time as the bill is paid in full. At no time will the amount of interest actually charged exceed the maximum amount allowable under state law.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.040. - Payment delinquent—Service discontinued.

In the absence of any special arrangement or agreement with the city concerning payment, if a utility bill or any part thereof remains delinquent and unpaid beyond the next subsequent billing cycle, a notice to the effect that if the delinquent utility charges, together with the prior delinquent charges, are not paid in full within seven days from the date of mailing of the notice, the city shall, within 48 hours thereafter, proceed to shut off and discontinue utility services to the premises until all utility charges are paid in full.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.045. - Notice of delinquent account.

A. *Notice.* If an account for utility service remains delinquent beyond seven days, the city shall notify the customer that service will be disconnected without further notice unless the delinquent account and all penalties are immediately paid in full, or special arrangements are made in accordance with TMC 12.20.050. Delivery of the notice shall occur in a way reasonably calculated to apprise the customer of the notice's contents. The notice shall also inform the customer of the date on which service may be disconnected, which shall be not less than 48 hours following delivery of the notice. The notice of delinquent account shall further state that if the consumer has questions or disputes concerning the amount of payment due, he or she may appeal to the clerk/treasurer, or authorized designee, whose address and telephone number shall be stated on the notice of delinquent account.

B. *Disconnection of service.* If no notice is made to the city that the bill is disputed prior to the time indicated in the customer's notice as the date on which service may be disconnected, the city shall proceed by disconnecting water service to the delinquent customer's premises. All reconnections of service shall be subject to the provisions and fees outlined in TMC 12.20.70 or 12.20.075, whichever is applicable.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.050. - Payment delinquency; enforcement actions.

7.

A. The clerk/treasurer, or his designee, is hereby authorized and directed to promulgate administrative policies procedures for the implementation of this chapter.

B. If the customer is unable to pay the full amount of utility charges because of temporary financial difficulties or other hardship, the clerk/treasurer, or his designee, may permit the customer to make deferred payment arrangements upon written application; provided, however, that the city will be under no obligation to enter into any deferred payment agreement with any customer who has not fully and satisfactorily complied with terms of any previous agreement.

C. Failure to abide by the terms of the arrangement shall be cause for shut-off and discontinuance of utility services until the total utility charges that are due are paid in full.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.053. - Deferred payments arrangements—Penalty, assessed.

If arrangements for deferred payments have been made, the clerk/treasurer, or authorized designee, shall assess against such accounts the same penalty fees as set forth in TMC 12.20.030.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.055. - Delinquent account—Refusal of other city services.

If a bill becomes delinquent, no officer, agent, or employee of the city may authorize or permit any further city service or process any application for a permit from the city, when such application has been requested by the person in whose name an account stands delinquent; this requirement shall remain in effect until the delinquent account is paid in full. This section, however, shall not apply to the provision of water, sewer and storm sewer service, but shall apply to connections, inspections, engineering and other like services furnished by the water, sewer and storm sewer utilities.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.057. - Service charge for returned checks.

A service charge, which shall be set by the city council by resolution, shall be imposed upon any customer who, in full or partial payment of a city utility bill, tenders a check, which is thereafter returned to the city as a result of insufficient funds in the customer's checking account.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.060. - Service discontinuance—For other than payment failure.

In addition to nonpayment of a utility bill, the city may shut off and discontinue any or all utility services to a customer for failure to pay connection charges for any utility service furnished to such customer, or for the fraudulent, illegal or unauthorized use or abuse of any utility service, or the failure or refusal of the customer to

7. mply with all rules, regulations or ordinances pertaining to the receipt and use of utility services furnished by the city.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.070. - Disconnection of utility services.

After the discontinuance of service, should a customer continue to fail to pay a delinquent bill pursuant to TMC 12.20.030, the clerk/treasurer, or his/her designee, shall cause services to be physically disconnected (cut off) from the premises. Such services shall be reconnected to the premises only upon full payment of all delinquent utility charges, and correction of any fraudulent, illegal or unauthorized use or abuse of any utility service, applicable to the particular premises, irrespective of who may have incurred the charges or who may have been responsible for the fraudulent, illegal or unauthorized use or abuse of utility services. In addition, one single reconnection fee, which shall be set by the city council by resolution, shall be charged and paid prior to the reconnection of any utility service that was actually cut off and discontinued and that will require such reconnection to be made during regular working hours.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.075. - Reconnection of utility services.

A charge, which shall be set by the city council by resolution, shall be assessed for reconnections made at a customer's request outside of regular working hours. After-hours reconnections shall only be performed after the customer signs a written promissory note indicating that payment of all charges will be made to the city prior to 3:00 p.m. on the following business day. Failure to make payment in accordance with the provisions of the promissory note will result in termination of water services without further notice.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.080. - Liability for charges.

All owners of property shall remain ultimately and legally liable for the payment of any and all utility charges to the premises, regardless of whether such property is used for single-family, multiple dwelling or commercial purposes and regardless of the fact that the billings are made in the name of a tenant or other occupant of the premises. Such billings are for personal convenience only and shall not in any way affect the lien rights of the city against the premises to which the services are furnished.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.090. - Right of lien.

(a) In addition to the right herein provided to shut off and discontinue utility service, the city shall have a lien for delinquent and unpaid utility charges, including any late charges, fees, and interest, against the premises to which such utility service has been furnished or is available. The lien shall be effective for a

7.

total of not to exceed six months' delinquent charges without the necessity of any writing or recording. In order to make such lien effective for more than six months, the clerk/treasurer shall cause to be filed for record in the office of the county auditor of Thurston County a notice in substantially the following form:

Utility Lien Notice

City of Tenino,)
)
v.)

Reputed Owner.)
)

- -

NOTICE IS HEREBY GIVEN that the City of Tenino has and claims a lien for unpaid utility charges against the following described premises situated in Thurston County, Washington, to wit:

(Here insert legal description of premises.)

Said lien is claimed for not exceeding six months charges and interest now delinquent, amounting to $_____, and is also claimed for future utility charges against said premises.

DATED this _____ day of _____, 20___.

CITY OF TENINO
By _____.

(b) The lien notice shall be signed by the clerk/treasurer. The lien notice shall be recorded as prescribed by law. Any costs of such recording shall be added to the delinquent account and will be included in the total amount to be paid prior to removing the lien. Any costs associated with removing such a lien will also be added to the account and must be paid according to the provisions of TMC 12.20.020.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.100. - Out-of-city service—Billing.

With respect to out-of-city utility service furnished by the city, particularly out-of-city sewer service, the clerk/treasurer or authorized designee shall cause monthly bills for such out-of-city utility service to be prepared and mailed to each customer, which bills shall become due and payable the last day of the month from and after the date of mailing. The owner of the premises shall remain at all times responsible for such utility services, irrespective of the actual occupant or user of such services who shall likewise be and remain liable to the city for such utility services. No tenant deposits shall be available on out-of-city utility services.

7. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.110. - Out-of-city service—Charge payment failure—Service discontinuance.

Failure to pay out-of-city utility charges within seven days after mailing of a notice of delinquency substantially in the form provided in TMC 12.20.045, or the failure to comply with any and all other ordinances and/or contract provisions governing out-of-city service, including payment of connection charges and latecomer agreement charges, shall be grounds to immediately disconnect and discontinue all utility services furnished by the city to such premises. Reconnection will be permitted only upon payment of all delinquent charges and compliance with all ordinances and contract provisions, plus payment of all costs expended in the disconnecting and reconnection of such premises to such utility service or services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.120. - Out-of-city service—Right of lien.

Notwithstanding the provisions of TMC 12.20.110, the city reserves the right to any and all liens authorized by law in connection with the collection of unpaid utility charges and to pursue such liens and other available collection or enforcement remedies separately, concurrently or conjunctively.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.130. - Utility lien foreclosure—Authorized when.

The city may foreclose its utility lien in an action in the superior court of Thurston County. All or any of the tracts subject to the lien may be proceeded against in the same action, and all parties appearing of record as owning or claiming to own, having or claiming to have any interest in or lien upon the tracts involved in the action shall be impleaded in the action as parties defendant. An action to foreclose a utility lien pursuant to a lien notice filed as required by this chapter must be commenced within two years from the date of filing thereof. An action to foreclose a six months' lien may be commenced at any time after six months subsequent to the furnishing of the utility service for which payment has not been made. The service of summons and all other proceedings except as provided specifically under this chapter, including appeal, order of sale, sale, redemption and issuance of deed shall be governed by the statutes of the state of Washington now or hereafter in force relating to the foreclosure of mortgages on real property. The terms "judgment debtor" or "successor in interest" in the statutes of the state of Washington governing redemption when applied under this chapter shall include an owner or a vendee. All sales shall be subject to the right of redemption within one year from date of sale. At any time after deed is issued to it pursuant to a foreclosure of a lien, the city may lease or sell or convey the property conveyed thereunder at public or private sale for such price and on such terms as may be determined by the resolution of the city council.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.140. - Utility lien foreclosure—Trial.

7. A utility lien foreclosure action shall be tried before the court without a jury. The court may allow, in addition to the delinquent charges and interest, such attorneys' fees as the court may adjudge reasonable. If the owners and parties interested in any particular account default, the court may enter judgment of foreclosure and sale as to such parties and accounts and the action may proceed as to the remaining defendants and accounts. The judgment shall specify separately the amount of the utility charges, with interest, penalty and costs chargeable to each account. The judgment shall have the effect of a separate judgment as to each account described in the judgment and any appeal should not invalidate or delay the judgment except as to the property concerning which the appeal is taken. The judgment of the court shall order the accounts therein described sold at one general sale, and an order of sale shall issue pursuant thereto for the enforcement of the judgment. Judgment may be entered as to any one or more separate accounts involved in the action and the court shall retain jurisdiction of other properties.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.150. - Utility lien—Enforcement—Alternative method.

As an additional and concurrent method of enforcing the lien authorized under this chapter, the City of Tenino may shut off and discontinue any or all utility services to the premises to which such utility service was furnished after the charges become delinquent and unpaid, and until the charges are paid. The right to enforce the lien by cutting off and refusing utility services shall not be exercised after two years from the date of the recording of the utility lien notice provided under this chapter except to enforce the payment of six months' charges for which no lien notice is required to be recorded.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.160. - Statutes adopted by reference.

A. Chapter 9A.61 of the RCW is adopted in its entirety by reference.

B. RCW 80.28.240 is hereby adopted by reference.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

7.

12.10.010. - Definitions.

Except where specifically designated herein, all words used in this document and the city's guidance manual shall carry their customary meanings. Any definition not found in this section will take its meaning from WAC titles 246 through 290, or as amended, or in the most recent the manual as determined by the state department of health.

Approved backflow prevention assembly , *backflow assembly* or *assembly* means an assembly to counteract backpressures or prevent backsiphonage. This assembly must appear on the list of approved assemblies issued by the state department of health. The assembly must be purchased and installed as a complete unit including two shutoff valves and test cocks.

Auxiliary supply means any water source or system other than City of Tenino's water.

Backflow means the flow of water or other liquids, gases or solids from any source back into the distribution system. The flow of water in the opposite direction of its intended flow.

Backflow assembly tester means a person holding a valid BAT certificate issued in accordance with WAC 246-290-490 and chapters 18.27, 18.106 and 70.119 RCW.

Backpressure means backflow due to water pressure on the downstream side of the meter which exceeds the operating pressure of the public potable water supply.

Backsiphonage means backflow due to a negative or reduced pressure within the public potable water supply.

Contamination means the entry into or presence in a public water supply system of any substance which may be harmful to health and/or quality of the water.

Cross connection means any physical arrangement where a public water system is connected, directly or indirectly (actual or potential), with any other nondrinkable water system or auxiliary system, wells, sewer, drain conduit, swimming pool, storage reservoir, plumbing fixture, swamp coolers, or any other device which contains, or may contain, contaminated or polluted water, sewage, used water, or other liquid of unknown or unsafe quality which may be capable of imparting contamination or pollution to the public water system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross connections.

7. *Cross connection specialist* or *specialist* means a person holding a valid cross connection specialist certificate issued in accordance with the Washington Administrative Code and that is employed by or under contract with the city.

Degree of hazard means the low or high hazard classification that shall be attached to all actual or potential cross connections.

Director means the public works director.

DOH means the Washington Department of Health.

Guidance manual means the most recent edition of the guidance manual written specifically for the city.

High health hazard means the classification assigned to an actual or potential cross connection that could allow a substance of a physical, toxic, or biological nature to backflow into the potable water supply. This substance could cause illness or death.

In-premises protection means a method of protecting the health of consumers served by the customer's plumbing system (i.e., located within the property lines of the customer's premises) by the installation of an approved air gap, backflow prevention assembly or device at the point of hazard.

Local administrative authority means the local official, board, department or agency authorized to administer and enforce the provisions of the uniform plumbing code and all other plumbing codes recognized by the state.

Plumbing hazard means an internal or plumbing-type cross connection in a consumer's potable water system that may be either a pollutional or a contamination-type hazard. The term "plumbing hazard" includes, but is not limited to, cross connections to toilets, sinks, lavatories, wash trays, domestic washing machines and lawn sprinkling systems. Plumbing-type cross connections can be located in all types of structures including, but not limited to, homes, manufactured homes, apartment houses, hotels and commercial or industrial establishments.

Pollutional hazard means an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

Potable water supply means any system of water supply intended or used for human consumption or other domestic use and meets all requirements established by the Safe Drinking Water Act and the DOH regulations.

Premises means any piece of property to which water is provided including, but not limited to, all improvements, mobile structures and structures located on it.

7. *Premises isolation* means a method of protecting a public water system by installation of an approved double check valve assembly or a reduced pressure backflow assembly at the point of service (where the city loses control of the water supply) to separate the customer's plumbing system from the purveyor's distribution system.

Reduced pressure principle backflow prevention assembly, reduced pressure principle assembly or *RP assembly* means an assembly containing two independently acting approved check valves together with a hydraulically operated, mechanically independent pressure differential relief valve located between the check valves. The assembly shall include properly located test cocks and tightly closing shutoff valves at each end of the assembly.

Thermal expansion means the pressure created by the expansion of heated water.

Used water means any water supplied by the city to a customer's property after it has passed through the service connection and is no longer under the control of the city.

(Code 1988, § 13.10.010; Ord. No. 696, § 1:01, 2004)

12.10.020. - Purpose.

The purpose of this chapter is to protect the water system of the city from contamination or pollution due to any existing or potential cross connections as defined in WAC 246-290-010, or as amended, and this chapter.

(Code 1988, § 13.10.020; Ord. No. 696, § 1:02, 2004)

12.10.030. - Cross connections regulated.

A. No cross connections shall be created, installed, used or maintained within the area served by the city, except in accordance with this chapter.
B. The specialist for the city shall carry out or cause inspections to be carried out to determine if any actual or potential cross connections exist. An assembly commensurate with the degree of hazard, if found necessary, will be required to be installed at the service connection.
C. The owner, occupant or person in control of the property is responsible for all cross connection control within the premises.
D. All high health hazard premises which are defined in table 9 of WAC 246-290-490, or as amended, are required to have premises isolation by installing a reduced pressure principle assembly in accordance with this chapter.

(Code 1988, § 13.10.030; Ord. No. 696, § 1:03, 2004)

12.10.040. - Application and responsibilities.

7. This chapter applies throughout the city and to every premises and property served by the city. It applies to any premises, public or private, regardless of date of connection to the city water. Every owner, occupant and/or person in control of any concerned premises is responsible for compliance with the terms and provisions contained herein.

(Code 1988, § 13.10.040; Ord. No. 696, § 1:04, 2004)

12.10.050. - Backflow prevention assembly requirements.

(a) A specialist employed by or under contract with the city shall determine the type of backflow assembly to be installed within the area served by the city. All assemblies shall be installed at the service connection unless it is determined by the specialist to install the assembly at an alternate location.

(b) The cross connection shall be eliminated or an assembly shall be required to be installed in each of the following circumstances, but the specialist is in no way limited to the following circumstances:

A. The nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the potable water supply;

B. Premises having any one or more cross connections or potential cross connections as that term is defined in TMC 12.10.010 and the WAC;

C. When a cross connection survey report form is required by the city and has not been received;

D. Internal cross connections are present that are not correctable;

E. Intricate plumbing arrangements exist or plumbing subject to frequent changes are present that make it impractical to ascertain whether or not cross connections exist;

F. There is a repeated history of cross connections being established or re-established;

G. There is unduly restricted entry so that inspections for cross connections cannot be made with sufficient frequency to ensure that cross connections do not exist;

H. Materials, chemicals or any substance or apparatus is being used that if backflow occurred contamination would result;

I. Installation of an approved backflow prevention assembly is deemed to be necessary in the judgment of the specialist to accomplish the purpose of this chapter;

J. Any premises having an auxiliary water supply;

K. In the event an in-premises assembly has not been tested or repaired as required by WAC 246-290-490, or as amended, and this chapter;

L. If it is determined that additions or rearrangements have been made to the plumbing system without obtaining proper permits as required by the city's code enforcement division;

M. When a garden hose attachment is connected to the premises' plumbing, including but not limited to fertilizer applicators, pesticide applicators and radiator flush kits;

N. Wherever the actual or potential of backpressure exists;

O. Wherever the conditions for back-siphonage exist.

(Code 1988, § 13.10.050; Ord. No. 696, § 1:05, 2004)

12.10.060. - Irrigation systems.

All irrigation systems shall be protected in accordance with the plumbing code regulations. In the event any system is equipped with an injector system, or has submerged heads, a reduced pressure principle assembly will be required. If the irrigation system comes directly off the main with a designated line, a minimum of a double check assembly is required. If there is irrigation water supplied by a separate system and that system can be connected to the potable system, an assembly will be installed as required by the WAC.

(Code 1988, § 13.10.060; Ord. No. 696, § 1:06, 2004)

12.10.070. - Fire systems.

An approved double check backflow prevention assembly shall be the minimum protection on all new fire sprinkler systems using piping material that is not approved for potable water use, and/or that does not provide for periodic flow-through. A reduced pressure principle backflow prevention assembly must be installed, if any solution other than the potable water can be introduced into the sprinkler system. Retrofitting on fire sprinkler systems will be required in each of the following circumstances:

A. Where improper maintenance has occurred;

B. On all high hazard systems;

C. Wherever a specialist deems necessary; and

D. Wherever required by the WAC.

(Code 1988, § 13.10.070; Ord. No. 696, § 1:07, 2004)

12.10.080. - Temporary meters and hydrant valves.

Backflow protection will be required on all temporary meters and hydrant valves before any use. The type of assembly will be commensurate with the degree of hazard and will be determined on a case-by-case basis by the city's specialist.

7. ode 1988, § 13.10.080; Ord. No. 696, § 1:08, 2004)

12.10.090. - Mobile units.

Any mobile unit or apparatus, as defined in TMC 12.10.010, which uses the water from any premises within the city's water system shall first obtain a permit from the city and be inspected to ensure appropriate backflow prevention is installed in accordance with the most recent edition of the city's guidance manual. The city reserves the right to revoke the business license of the owner of the apparatus or mobile unit if the owner fails to comply with these procedures.

(Code 1988, § 13.10.090; Ord. No. 696, § 1:09, 2004)

12.10.100. - Right-of-way encroachment.

A. No person shall install or maintain a backflow prevention assembly upon or within any city right-of-way except as provided in this section.
B. The city reserves the right to have an assembly installed in the right-of-way.
C. A backflow prevention assembly required by the city may be installed upon or within any city right-of-way only if the owner proves to the city that there is no other feasible location for installing the assembly, and installing it in the right-of-way will not interfere with traffic or utilities. The city retains the right to approve the location, height, depth, enclosure, and other requisites of the assembly prior to its installation.
D. All permits required by the city code to perform work in the right-of-way shall be obtained.
E. A property owner shall, at the request of the city and at the owner's expense, relocate a backflow prevention assembly which encroaches upon any city right-of-way, when such relocation is necessary for street or utility construction or repairs for purposes of public safety.

(Code 1988, § 13.10.100; Ord. No. 696, § 1:10, 2004)

12.10.110. - Plumbing code.

As a condition of water service, customers shall install, maintain, and operate their piping and plumbing systems in accordance with all state plumbing codes and the 2009 Uniform Plumbing Code, or as amended, and TMC chapters 12.04 and 12.06.

(Code 1988, § 13.10.110; Ord. No. 696, § 1:11, 2004; Ord. No. 744, 7-22-2008)

12.10.120. - Testing and repairs.

(a) Backflow prevention assemblies shall be tested and repaired in accordance with the requirements set out in the WAC, the RCW, and this chapter.

7.

(b) All presently installed backflow prevention assemblies that do not meet the requirements of this chapter, but were approved assemblies for the purpose described herein at the time of installation, are commensurate with the degree of hazard and that have been properly maintained, shall, except for the inspection and maintenance requirements, be excluded from the requirements of these rules so long as the city is ensured that they will satisfactorily protect the utility system. Whenever the existing assembly is moved from the present location, requires more than minimum maintenance, or parts are no longer available, the unit shall be replaced by an approved backflow prevention assembly.

(Code 1988, § 13.10.120; Ord. No. 696, § 1:12, 2004)

12.10.130. - Responsibilities of backflow prevention assembly testers.

(a) All backflow assembly testers operating within the city shall be certified in accordance with all applicable regulations and shall comply with all stipulations in this chapter and the most recent edition of the city's guidance manual. All backflow assembly testers are required to carry a minimum liability insurance policy of $5,000.00.

(b) Testers are required to register with the city in accordance with the most recent edition of the guidance manual.

(Code 1988, § 13.10.130; Ord. No. 696, § 1:13, 2004)

12.10.140. - Maintenance of assemblies.

Backflow prevention assemblies shall be maintained in accordance with the requirements set out in the WAC, or as amended, and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.140; Ord. No. 696, § 1:14, 2004)

12.10.150. - Installation requirements and specifications.

(a) Backflow prevention assemblies shall be installed in accordance with the requirements set out in the WAC and the most recent edition of the city's guidance manual.

(b) In the event the specialist allows a premises isolation assembly to be installed at an alternate location, there shall be no interties or connections between the meter and the premises isolation assembly.

(Code 1988, § 13.10.150; Ord. No. 696, § 1:15, 2004)

12.10.160. - Thermal expansion.

If a closed system has been created by the installation of a backflow prevention assembly, it is the responsibility of the property owner to eliminate the possibility of thermal expansion.

7. ode 1988, § 13.10.160; Ord. No. 696, § 1:16, 2004)

12.10.170. - New construction and/or occupancy change.

In all new construction, an approved backflow assembly shall be installed at the service connection. The type of the assembly shall be commensurate with the degree of hazard as determined by a specialist.

(Code 1988, § 13.10.170; Ord. No. 696, § 1:17, 2004)

12.10.180. - Retrofitting.

Retrofitting shall be required at all service connections where an actual or potential cross connection exists, and wherever else the city deems retrofitting necessary to comply with the WAC, this chapter, and the most current edition of the city's guidance manual.

(Code 1988, § 13.10.180; Ord. No. 696, § 1:18, 2004)

12.10.190. - Costs of compliance.

All costs associated with the purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the responsibility of the property owner, their renter, lessee, agent, or personal representative.

(Code 1988, § 13.10.190; Ord. No. 696, § 1:19, 2004)

12.10.200. - Recovery of costs.

(a) Any water customer violating any of the provisions of this chapter and who causes damage to or impairs the city's water system, including, but not limited to, allowing contamination, pollution, any other solution or used water to enter the city's water system, shall be liable to the city for any expense, loss or damage caused by such violation. The city shall collect from the violator for the cost incurred by the city for any cleaning, purifying, repair or replacement work or any other expenses caused by the violation. Refusal to pay the assessed costs shall constitute a violation of this chapter and shall result in the termination of service.

(b) All cost associated with any disconnect fees resulting from the enforcement of this chapter are the sole responsibility of the property owner.

(Code 1988, § 13.10.200; Ord. No. 696, § 1:20, 2004)

12.10.210. - Termination of service.

7. Failure on the part of any property owner, their renter, lessee, agent or personal representative to discontinue the use of all cross connections, to physically separate cross connections or to abide by all the conditions of this chapter is sufficient cause for the immediate discontinuance of water service by the city to the premises.

(Code 1988, § 13.10.210; Ord. No. 696, § 1:21, 2004)

12.10.220. - Emergency suspension of service.

The director or their designee may, without prior notice, suspend water service to any premises when such suspension is necessary to stop the eminent threat of any actual or potential cross connection as defined in this chapter and the most recent edition of the city's guidance manual.

(Code 1988, § 13.10.220; Ord. No. 696, § 1:22, 2004)

12.10.230. - Nonemergency suspension of service.

The director or their designee may suspend, with 24-hour notice, the water supply to any premises where the conditions of this chapter or the most recent edition of the city's guidance manual have been violated.

(Code 1988, § 13.10.230; Ord. No. 696, § 1:23, 2004)

12.10.240. - Falsifying information.

Any person who knowingly makes any false statement, representation, record, report or other document filed or required to be maintained pursuant to this chapter, or who falsifies, tampers with, or knowingly renders inaccurate any backflow assembly, device or method required under this chapter shall (in addition to civil and/or criminal penalties provided by state law) be guilty of a misdemeanor subject to the general penalty clause of City of Tenino's guidance manual.

(Code 1988, § 13.10.240; Ord. No. 696, § 1:24, 2004)

CHAPTER 12.20. - UNIFORM UTILITY BILLING SYSTEM

12.20.001. - Billing generally.

There shall be one uniform billing and collection procedure for all city utility services, including but not limited to water, sewer, and storm sewer.

7. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.005. - Authorized officers designated.

A. The clerk/treasurer, or authorized designee, shall keep an account for water, sewer and storm sewer service used by any person, business, or other entity within the city. Such services shall be paid for by every utility account within the city.

B. The clerk/treasurer, or authorized designee, shall place against these accounts all charges for water, sewer and storm sewer service that are to be paid by every utility account, when these services are used by such person, business or other entity. Any service charges or other charges that are connected with the provision of utility services shall likewise be placed against these accounts. All charges shall be made in accordance with the terms of those ordinances and resolutions of the city establishing the rates and fees for such services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.007. - Creation of accounts; deposits on renter-occupied premises.

At the time an account for either residential or commercial renter-occupied premises is requested and before it is authorized, the clerk/treasurer or his/her designee shall require that the person requesting services deposit with the city a sum of money that shall be set by the city council by resolution. This deposit can be reduced to the minimum allowed by ordinance if the property owner agrees in writing to assume financial responsibility for any unpaid balance in excess of the deposit amount and the property owner files such written agreement with the clerk/treasurer or designee prior to the account being established in the tenant's name. This provision does not in any way affect the property owner's liability for charges or the lien rights of the city against the premises to which the services are furnished as provided in TMC 12.20.080. Nothing in this chapter shall prevent the city from requiring additional or new deposits, when the conditions so warrant.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.010. - Bills—Preparation, delivery.

A. The city shall cause a single utility bill, covering all utility services that are furnished by or through the city during the preceding month or accounting period, to be prepared and rendered on a monthly basis to each customer of utility service.

B. Such bill shall be due and payable by the last day of the month from and after the date of mailing.

C. Once prepared, this bill shall be delivered to the customer by depositing it in the United States mail, addressed either to the address shown on the application for utility service or to any change of address that has been submitted by the customer to the city.

7.

D. Deposit in the United States mail pursuant to subsection C. of this section shall be deemed full and complete notice to the customer of the nature and amount of any particular utility billing.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.015. - Budget payment plan.

The clerk/treasurer, or authorized designee, is hereby authorized to create and implement a budget payment plan in accordance with state law. Such a plan shall permit the authorized customer to make payments of utility charges on an annual averaged basis rather than on a monthly basis, with at least one annual adjustment to ensure that the amount paid on an annual basis reflects the actual charges incurred.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.020. - Leak adjustments.

When excessive water meter registration is caused by broken or leaking water service pipes within or abutting upon the premises without the knowledge of the customer, an adjustment may be made upon written application for one month only and for two months in the case of monthly billing during a 12-month period and after repairs have been made. The basis for adjustment shall be the normal consumption for the property in question under similar operating conditions.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.030. - Bills delinquent.

If the bill rendered as provided in TMC 12.20.010 is not paid when due, it shall be considered delinquent ten days after the due date and a late fee that shall be set by the city council by resolution shall be added to the delinquent account. Additionally, in order to reimburse the city for carrying the unpaid balance, the city shall impose interest on the total remaining unpaid balance at a rate that shall be set by the city council by resolution until such time as the bill is paid in full. At no time will the amount of interest actually charged exceed the maximum amount allowable under state law.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.040. - Payment delinquent—Service discontinued.

In the absence of any special arrangement or agreement with the city concerning payment, if a utility bill or any part thereof remains delinquent and unpaid beyond the next subsequent billing cycle, a notice to the effect that if the delinquent utility charges, together with the prior delinquent charges, are not paid in full within seven days from the date of mailing of the notice, the city shall, within 48 hours thereafter, proceed to shut off and discontinue utility services to the premises until all utility charges are paid in full.

7. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.045. - Notice of delinquent account.

A. *Notice.* If an account for utility service remains delinquent beyond seven days, the city shall notify the customer that service will be disconnected without further notice unless the delinquent account and all penalties are immediately paid in full, or special arrangements are made in accordance with TMC 12.20.050. Delivery of the notice shall occur in a way reasonably calculated to apprise the customer of the notice's contents. The notice shall also inform the customer of the date on which service may be disconnected, which shall be not less than 48 hours following delivery of the notice. The notice of delinquent account shall further state that if the consumer has questions or disputes concerning the amount of payment due, he or she may appeal to the clerk/treasurer, or authorized designee, whose address and telephone number shall be stated on the notice of delinquent account.

B. *Disconnection of service.* If no notice is made to the city that the bill is disputed prior to the time indicated in the customer's notice as the date on which service may be disconnected, the city shall proceed by disconnecting water service to the delinquent customer's premises. All reconnections of service shall be subject to the provisions and fees outlined in TMC 12.20.70 or 12.20.075, whichever is applicable.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.050. - Payment delinquency; enforcement actions.

A. The clerk/treasurer, or his designee, is hereby authorized and directed to promulgate administrative policies and procedures for the implementation of this chapter.

B. If the customer is unable to pay the full amount of utility charges because of temporary financial difficulties or other hardship, the clerk/treasurer, or his designee, may permit the customer to make deferred payment arrangements upon written application; provided, however, that the city will be under no obligation to enter into any deferred payment agreement with any customer who has not fully and satisfactorily complied with terms of any previous agreement.

C. Failure to abide by the terms of the arrangement shall be cause for shut-off and discontinuance of utility services until the total utility charges that are due are paid in full.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.053. - Deferred payments arrangements—Penalty, assessed.

If arrangements for deferred payments have been made, the clerk/treasurer, or authorized designee, shall assess against such accounts the same penalty fees as set forth in TMC 12.20.030.

7. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.055. - Delinquent account—Refusal of other city services.

If a bill becomes delinquent, no officer, agent, or employee of the city may authorize or permit any further city service or process any application for a permit from the city, when such application has been requested by the person in whose name an account stands delinquent; this requirement shall remain in effect until the delinquent account is paid in full. This section, however, shall not apply to the provision of water, sewer and storm sewer service, but shall apply to connections, inspections, engineering and other like services furnished by the water, sewer and storm sewer utilities.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.057. - Service charge for returned checks.

A service charge, which shall be set by the city council by resolution, shall be imposed upon any customer who, in full or partial payment of a city utility bill, tenders a check, which is thereafter returned to the city as a result of insufficient funds in the customer's checking account.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.060. - Service discontinuance—For other than payment failure.

In addition to nonpayment of a utility bill, the city may shut off and discontinue any or all utility services to a customer for failure to pay connection charges for any utility service furnished to such customer, or for the fraudulent, illegal or unauthorized use or abuse of any utility service, or the failure or refusal of the customer to comply with all rules, regulations or ordinances pertaining to the receipt and use of utility services furnished by the city.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.070. - Disconnection of utility services.

After the discontinuance of service, should a customer continue to fail to pay a delinquent bill pursuant to TMC 12.20.030, the clerk/treasurer, or his/her designee, shall cause services to be physically disconnected (cut off) from the premises. Such services shall be reconnected to the premises only upon full payment of all delinquent utility charges, and correction of any fraudulent, illegal or unauthorized use or abuse of any utility service, applicable to the particular premises, irrespective of who may have incurred the charges or who may have been responsible for the fraudulent, illegal or unauthorized use or abuse of utility services. In addition, one single reconnection fee, which shall be set by the city council by resolution, shall be charged and paid prior to the reconnection of any utility service that was actually cut off and discontinued and that will require such reconnection to be made during regular working hours.

7. rd. No. 869, § 6(Exh. A), 1-24-2017)

12.20.075. - Reconnection of utility services.

A charge, which shall be set by the city council by resolution, shall be assessed for reconnections made at a customer's request outside of regular working hours. After-hours reconnections shall only be performed after the customer signs a written promissory note indicating that payment of all charges will be made to the city prior to 3:00 p.m. on the following business day. Failure to make payment in accordance with the provisions of the promissory note will result in termination of water services without further notice.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.080. - Liability for charges.

All owners of property shall remain ultimately and legally liable for the payment of any and all utility charges to the premises, regardless of whether such property is used for single-family, multiple dwelling or commercial purposes and regardless of the fact that the billings are made in the name of a tenant or other occupant of the premises. Such billings are for personal convenience only and shall not in any way affect the lien rights of the city against the premises to which the services are furnished.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.090. - Right of lien.

(a) In addition to the right herein provided to shut off and discontinue utility service, the city shall have a lien for delinquent and unpaid utility charges, including any late charges, fees, and interest, against the premises to which such utility service has been furnished or is available. The lien shall be effective for a total of not to exceed six months' delinquent charges without the necessity of any writing or recording. In order to make such lien effective for more than six months, the clerk/treasurer shall cause to be filed for record in the office of the county auditor of Thurston County a notice in substantially the following form:

Utility Lien Notice

City of Tenino,)
)
v.)

Reputed Owner.)
)
- -

7.

NOTICE IS HEREBY GIVEN that the City of Tenino has and claims a lien for unpaid utility charges against the following described premises situated in Thurston County, Washington, to wit:

(Here insert legal description of premises.)

Said lien is claimed for not exceeding six months charges and interest now delinquent, amounting to $_____, and is also claimed for future utility charges against said premises.

DATED this _____ day of _____, 20___.

CITY OF TENINO
By _____.

(b) The lien notice shall be signed by the clerk/treasurer. The lien notice shall be recorded as prescribed by law. Any costs of such recording shall be added to the delinquent account and will be included in the total amount to be paid prior to removing the lien. Any costs associated with removing such a lien will also be added to the account and must be paid according to the provisions of TMC 12.20.020.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.100. - Out-of-city service—Billing.

With respect to out-of-city utility service furnished by the city, particularly out-of-city sewer service, the clerk/treasurer or authorized designee shall cause monthly bills for such out-of-city utility service to be prepared and mailed to each customer, which bills shall become due and payable the last day of the month from and after the date of mailing. The owner of the premises shall remain at all times responsible for such utility services, irrespective of the actual occupant or user of such services who shall likewise be and remain liable to the city for such utility services. No tenant deposits shall be available on out-of-city utility services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.110. - Out-of-city service—Charge payment failure—Service discontinuance.

Failure to pay out-of-city utility charges within seven days after mailing of a notice of delinquency substantially in the form provided in TMC 12.20.045, or the failure to comply with any and all other ordinances and/or contract provisions governing out-of-city service, including payment of connection charges and latecomer agreement charges, shall be grounds to immediately disconnect and discontinue all

7. ility services furnished by the city to such premises. Reconnection will be permitted only upon payment of all delinquent charges and compliance with all ordinances and contract provisions, plus payment of all costs expended in the disconnecting and reconnection of such premises to such utility service or services.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.120. - Out-of-city service—Right of lien.

Notwithstanding the provisions of TMC 12.20.110, the city reserves the right to any and all liens authorized by law in connection with the collection of unpaid utility charges and to pursue such liens and other available collection or enforcement remedies separately, concurrently or conjunctively.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.130. - Utility lien foreclosure—Authorized when.

The city may foreclose its utility lien in an action in the superior court of Thurston County. All or any of the tracts subject to the lien may be proceeded against in the same action, and all parties appearing of record as owning or claiming to own, having or claiming to have any interest in or lien upon the tracts involved in the action shall be impleaded in the action as parties defendant. An action to foreclose a utility lien pursuant to a lien notice filed as required by this chapter must be commenced within two years from the date of filing thereof. An action to foreclose a six months' lien may be commenced at any time after six months subsequent to the furnishing of the utility service for which payment has not been made. The service of summons and all other proceedings except as provided specifically under this chapter, including appeal, order of sale, sale, redemption and issuance of deed shall be governed by the statutes of the state of Washington now or hereafter in force relating to the foreclosure of mortgages on real property. The terms "judgment debtor" or "successor in interest" in the statutes of the state of Washington governing redemption when applied under this chapter shall include an owner or a vendee. All sales shall be subject to the right of redemption within one year from date of sale. At any time after deed is issued to it pursuant to a foreclosure of a lien, the city may lease or sell or convey the property conveyed thereunder at public or private sale for such price and on such terms as may be determined by the resolution of the city council.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.140. - Utility lien foreclosure—Trial.

A utility lien foreclosure action shall be tried before the court without a jury. The court may allow, in addition to the delinquent charges and interest, such attorneys' fees as the court may adjudge reasonable. If the owners and parties interested in any particular account default, the court may enter judgment of foreclosure and sale as to such parties and accounts and the action may proceed as to the remaining defendants and accounts. The judgment shall specify separately the amount of the utility charges, with

7. terest, penalty and costs chargeable to each account. The judgment shall have the effect of a separate judgment as to each account described in the judgment and any appeal should not invalidate or delay the judgment except as to the property concerning which the appeal is taken. The judgment of the court shall order the accounts therein described sold at one general sale, and an order of sale shall issue pursuant thereto for the enforcement of the judgment. Judgment may be entered as to any one or more separate accounts involved in the action and the court shall retain jurisdiction of other properties.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.150. - Utility lien—Enforcement—Alternative method.

As an additional and concurrent method of enforcing the lien authorized under this chapter, the City of Tenino may shut off and discontinue any or all utility services to the premises to which such utility service was furnished after the charges become delinquent and unpaid, and until the charges are paid. The right to enforce the lien by cutting off and refusing utility services shall not be exercised after two years from the date of the recording of the utility lien notice provided under this chapter except to enforce the payment of six months' charges for which no lien notice is required to be recorded.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

12.20.160. - Statutes adopted by reference.

A. Chapter 9A.61 of the RCW is adopted in its entirety by reference.

B. RCW 80.28.240 is hereby adopted by reference.

(Ord. No. 869, § 6(Exh. A), 1-24-2017)

7.

112.20.010. - Purpose and general provisions.

A. *Purpose.* State law (WAC 365-190-080) requires communities to protect critical areas. In order to protect ecologically sensitive and hazardous areas, protect their functions and values, and to allow reasonable use of private property, this chapter establishes protection standards for critical areas and regulates physical development, activity, and use within, adjacent to, or likely to affect critical areas.

B. *Findings.* Critical areas provide valuable biological and physical functions that benefit the city and its residents. Critical areas may also pose a threat to human safety or to public and private property. The beneficial functions and values provided by critical areas include, but are not limited to:

1. Water quality protection and enhancement.
2. Fish and wildlife habitat.
3. Flood water storage.
4. Flood water conveyance and attenuation.
5. Ground water recharge and discharge.
6. Erosion control.
7. Protection from hazards.
8. Recreational opportunities.

C. *Establishment of critical areas.*

1. Critical areas regulated by this chapter include:
    a. Wetlands;
    b. Critical aquifer recharge areas;
    c. Frequently flooded areas;
    d. Geologically hazardous areas; and
    e. Fish and wildlife habitat conservation areas.
2. All areas within the city that meet the definition of at least one critical area, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter.
3. Areas adjacent to critical areas are also subject to the standards of this chapter. Adjacent means any activity located:
    a. On a site bordering a critical area;

Within the critical area's buffer or building setback;

7. Within the critical area's buffer or building setback;

b.

c. Within 300 feet upland from a stream, wetland, or water body;

d. Within the floodplain; or

e. Within 200 feet of a critical aquifer recharge area.

D. *Relationship to other regulations.*

1. These critical areas regulations apply as an overlay in addition to zoning and other regulations adopted by the city.
2. When a property or development is subject to more than one critical area overlay or other regulations apply to a development, the more restrictive applies.
3. Compliance with the provisions of this chapter does not constitute compliance with other federal, state, and local regulations and permit requirements that may be required. The applicant is responsible for complying with these requirements in addition to the process established in this chapter.

E. *Interpretation.* In the interpretation and application of this chapter, the provisions of this chapter are:

1. Considered the minimum requirements necessary;
2. Are liberally construed to serve the purpose of this chapter; and
3. Do not limit or repeal any other provisions under state statute.

F. *Protection of critical areas.*

1. *Equivalent or greater functions.* Any action taken pursuant to this Chapter must result in equivalent or greater functions and values of the critical areas associated with the proposed action, as determined by the best available science.
2. *Mitigation sequencing required.* All actions and developments must be designed and constructed to avoid, minimize, and restore all adverse impacts. Applicants must first demonstrate an inability to avoid or reduce impacts, before restoring and compensating for impacts will be allowed. Activities or uses that result in a net loss of the functions or values of critical areas are prohibited.

G. *Title notification.* Activity in critical areas may require a notice to title, recorded with the Thurston County auditor.

(Ord. No. 880, § 14, 9-12-2017)

112.20.020. - Best available science.

A. *Definition.* Best available science is that scientific information applicable to the critical area prepared by local, state, or federal natural resource agencies, a qualified scientific professional, or team of qualified scientific professionals that is consistent with criteria established in WAC 365-

7. 95-900 through 365-195-925.

B. *Sources.* Sources of the best available science are included in *Citations of Recommended Sources of Best Available Science for Designating and Protecting Critical Areas* , published by the Washington State Department of Community, Trade and Economic Development (now the Washington State Department of Commerce) and as updated, amended or replaced.

C. *Characteristics of a valid scientific process.* In the context of critical areas protection, a valid scientific process is one that produces reliable information useful in understanding the consequences of a local government's regulatory decisions, and in developing critical areas policies and development regulations that will be effective in protecting the functions and values of critical areas. To determine whether information received during the permit review process is reliable scientific information, the community development director must determine whether the source of the information displays the characteristics of a valid scientific process. Such characteristics are as follows:

1. *Peer Review.* The information has been critically reviewed by other persons who are qualified scientific experts in that scientific discipline. The proponents of the information have addressed the criticism of the peer reviewers. Publication in a refereed scientific journal usually indicates that the information has been appropriately peer-reviewed;
2. *Methods.* The methods used to obtain the information are clearly stated and reproducible. The methods are standardized in the pertinent scientific discipline or, if not, the methods have been appropriately peer-reviewed to ensure their reliability and validity;
3. *Logical conclusions and reasonable inferences.* The conclusions presented are based on reasonable assumptions supported by other studies and consistent with the general theory underlying the assumptions. The conclusions are logically and reasonably derived from the assumptions and supported by the data presented. Any gaps in information and inconsistencies with other pertinent scientific information are adequately explained;
4. *Quantitative analysis.* The data have been analyzed using appropriate statistical or quantitative methods;
5. *Context.* The information is placed in proper context. The assumptions, analytical techniques, data, and conclusions are appropriately framed with respect to the prevailing body of pertinent scientific knowledge; and
6. *References.* The assumptions, analytical techniques, and conclusions are well referenced with citations to relevant, credible literature and other pertinent existing information.

D. *Nonscientific information.* Nonscientific information may supplement scientific information, but it is not an adequate substitute for valid and available scientific information. Common sources of nonscientific information include anecdotal information, non-expert opinions, and hearsay.

E.

7. *bsence of valid scientific information.* Where there is an absence of valid scientific information or incomplete scientific information relating to a critical area leading to uncertainty about the risk to critical area function of permitting an alteration of or impact to the critical area, the Community Development Director must:

1. Take a precautionary or no-risk approach that strictly limits development and land use activities until the uncertainty is sufficiently resolved; and
2. Require application of an effective adaptive management program that relies on scientific methods to evaluate how well regulatory and non-regulatory actions protect the critical area. An adaptive management program is a formal and deliberate scientific approach to taking action and obtaining information in the face of uncertainty. An adaptive management program must:
    a. Address funding for the research component of the adaptive management program;
    b. Change course based on the results and interpretation of new information that resolves uncertainties; and
    c. Commit to the appropriate timeframe and scale necessary to reliably evaluate regulatory and non-regulatory actions affecting protection of critical areas and anadromous fisheries.

(Ord. No. 880, § 14, 9-12-2017)

112.20.030. - Applicability, exemptions, and exceptions.

A. *Applicability.*

1. A critical area or buffer must not be altered by any person, company, agency, or applicant except as consistent with the purposes and requirements of this chapter. The provisions of this chapter apply to all:
    a. Lands, uses, and development activity;
    b. Structures and facilities in the city, whether or not a permit or authorization is required; and
    c. Persons, firms, partnerships, corporations, groups, governmental agencies, or other entities that own, lease, or administer land within the City.
2. *Compliance required.* The city must ensure compliance with the requirements of this chapter prior to approving a permit or otherwise issuing authorization to:
    a. Alter the condition of land, water, or vegetation; or
    b. Construct or alter structures or improvements in, over, or on a critical area or associated buffer.

B. *Exemptions.*

1. *Impacts to critical areas.* All exempted activities must use reasonable methods to avoid potential impacts to critical areas. To be exempt from this chapter does not give permission to degrade a critical area or ignore risk from natural hazards. Any incidental damage to, or alteration of, a critical area that is not a necessary outcome of the exempted activity must be restored, rehabilitated, or replaced at the responsible party's expense.
2. *Exempt activities.* The following developments, activities, and associated uses are exempt from the provisions of this chapter, provided they are otherwise consistent with the provisions of other local, state, and federal laws and requirements:
    a. *Emergencies.* Activities necessary to prevent an immediate threat to public health, safety, or welfare, or that pose an immediate risk of damage to private property and require corrective or preventative action in a timeframe too short to allow for compliance with the requirements of this chapter must meet the following standards:
        i. *Minimize impacts.* Emergency actions that create an impact to a critical area or its buffer must use reasonable methods to address the emergency while minimizing possible impacts to the critical area or its buffer.
        ii. *Notification and determination.* The person or agency undertaking emergency action must notify the city within one working day following initiating such action. Within 30 days, the city will determine if the action taken was within the scope of the emergency actions allowed in this subsection. If the city determines that the action taken, or any part of the action taken, was beyond the scope of an allowed emergency action, then enforcement provisions of TMC Section 100.30.130, enforcement, apply.
        iii. *Restoration/mitigation required.*
            a) After the emergency, the person or agency undertaking the action must fully fund and conduct necessary restoration and/or mitigation for any impacts to the critical area and buffers resulting from the emergency action in accordance with an approved critical area report and mitigation plan.
            b) The person or agency undertaking the action must apply for review of the work. The city will review the alteration, critical area report, and mitigation plan in accordance with the review procedures contained herein.
            c) Restoration and/or mitigation activities must be initiated within one year of the date of the emergency, and completed in a timely manner;
    b. *Operation, maintenance, or repair.* Operation, maintenance, or repair of existing structures, infrastructure improvements, utilities, public or private roads, and drainage systems may be exempt provided the activity:
        i. Does not require construction permits;
        ii.

7. oes not further alter or increase the impact to or encroach further within a critical area or buffer; and

iii. Does not increase risks to life or property; and

c. *Passive outdoor activities.* Recreation, education, and scientific research activities that do not degrade the critical area, including fishing, hiking, and bird watching are exempt.

C. *Exceptions.*

1. *Public agencies and utilities.* If the application of this chapter would prohibit a development proposal by a public agency or public utility, the agency or utility may apply for an exception pursuant to TMC Section 112.10.060.

2. *Reasonable use.* If the application of this chapter would deny all reasonable economic use of the subject property, the city must determine if compensation is an appropriate action, or the property owner may apply for an exception pursuant to TMC Section 112.10.060.

(Ord. No. 880, § 14, 9-12-2017)

112.20.040. - Allowed activities.

A. *Critical area report.* Activities allowed under this chapter must be reviewed and approved by the city, but do not require submittal of a separate critical area identification form or critical area report, unless required previously for the underlying permit. The city may apply conditions to the underlying permit or approval to ensure that the allowed activity is consistent with the provisions of this chapter to protect critical areas.

B. *Best management practices required.*

1. All allowed activities must be conducted using the best management practices that result in the least amount of impact to the critical areas. Best management practices must be used for the following:

a. Tree and vegetation protection;

b. Construction management;

c. Erosion and sedimentation control;

d. Water quality protection; and

e. Regulation of chemical applications.

2. The city must observe the use of best management practices to ensure that the activity does not result in degradation to the critical area. Any incidental damage to, or alteration of, a critical area must be restored, rehabilitated, or replaced at the responsible party's expense.

C. *Allowed activities.* The following activities are allowed in critical areas:

1. *Permit requests following critical area review.* Development permits and approvals that involve both discretionary land use approvals and construction approvals if all the following conditions have been met:

a. The provisions of this chapter have been previously addressed as part of another approval;

b. There have been no material changes in the potential impact to the critical area or buffer since the prior review;

c. There is no new information available that is applicable to any critical area review of the site or particular critical area;

d. The permit or approval has not expired or, if no expiration date, no more than five years has elapsed since the issuance of that permit or approval; and

e. Compliance with any standards or conditions placed upon the prior permit or approval has been achieved or secured.

2. *Modifications to existing structures.* Structural modification of, addition to, or replacement of an existing, legally constructed structure that does not further alter or increase the impact to the critical area or buffer, provided:

a. There is no increased risk to life or property as a result of the proposed modification or replacement; and

b. For structures substantially damaged by fire, flood, or act of nature, restoration must be initiated within one year of the date of such damage, as evidenced by the issuance of a valid building permit, and diligently pursued to completion.

3. *Activities within the improved right-of-way.* Except for substations, replacement, modification, installation, or construction of utility facilities, lines, pipes, mains, equipment, or appurtenances may be allowed provided:

a. Such facilities are located within the improved portion of the public right-of-way or a city-authorized private roadway;

b. The activity does not alter a wetland, watercourse, or result in the transport of sediment or increased stormwater;

c. Critical area and/or buffer widths are increased, where possible, equal to the width of the right-of-way improvement, including disturbed areas;

d. Native vegetation is retained or replanted wherever possible along the right-of-way improvement and resulting disturbance; and

e. Invasive species are removed.

4. *Minor utility projects.* Utility projects that have minor or temporary impacts to critical areas, such as the placement of a utility pole, street sign, anchor, vault, or other small component of a utility facility, may be allowed provided:

a. The activity involves disturbance of an area less than 75 square feet;

b. There is no practical alternative to the proposed activity with less impact on critical are

c. The utility project does not significantly impact the function or values of critical areas, is constructed with best management practices, and additional restoration measures are provided; and

d. The activity does not result in sediment transport or increased stormwater runoff.

5. *Public and private pedestrian trails.* Public and private pedestrian trails that are not located in wetlands, fish and wildlife habitat conservation areas, or their buffers, may be allowed subject to the following:

   a. The trail surface meets all other requirements including water quality standards set forth in the locally adopted stormwater management regulations;

   b. Critical area and/or buffer widths are increased, where possible, equal to the width of the trail corridor, including disturbed areas; and

   c. Trails proposed to be located in landslide or erosion hazard areas are constructed in a manner that does not increase the risk of landslide or erosion and in accordance with an approved geotechnical report.

6. *Select vegetation removal activities.* Upon approval from the city, the following vegetation removal activities in a critical area or its buffer may be allowed:

   a. The removal of the following vegetation with hand labor and light equipment:

      i. Invasive and noxious weeds;

      ii. English Ivy (Hedera helix);

      iii. Himalayan blackberry (Rubus discolor, R. procerus);

      iv. Evergreen blackberry (Rubus laciniatus); and

      v. Scotch broom (Cytisus scoparius);

   b. The removal of trees from critical areas and buffers that are hazardous and pose a threat to public safety or an imminent risk of damage to private property, provided that:

      i. The applicant submits a report from a certified arborist, registered landscape architect, or professional forester that documents the hazard and provides a replanting schedule for the replacement trees;

      ii. Tree cutting is limited to pruning and crown thinning, unless otherwise justified by a qualified professional. Where pruning or crown thinning is not sufficient to address the hazard, trees may be removed or converted to wildlife snags;

      iii. All vegetation cut (tree stems, branches, etc.) must be left within the critical area or buffer unless removal is warranted due to the potential for disease or pest transmittal to other healthy vegetation;

      iv.

7. The landowner must replace any trees that are removed with new trees at a ratio of two replacement trees for each tree removed (2:1) within one year in accordance with an approved restoration plan.

a) Replacement trees may be planted at a different, nearby location if it can be determined that planting in the same location would create a new hazard or potentially damage the critical area.

b) Replacement trees must be species that are native and indigenous to the site and a minimum of one inch in diameter-at-breast height (dbh) for deciduous trees and a minimum of six feet in height for evergreen trees as measured from the top of the root ball;

v. If a tree to be removed provides critical habitat, such as an eagle perch, a qualified wildlife biologist must be consulted to determine timing and how best to minimize impacts; and

vi. Hazard trees.

a) Hazard trees may be removed or pruned by the landowner prior to receiving written approval from the city only if the hazard tree poses:

1) An imminent threat or danger to public health or safety;

2) An imminent threat to public or private property; or

3) An imminent threat of serious environmental degradation.

b) Within 14 days of removing a hazard tree, the landowner must submit a restoration plan that demonstrates compliance with the provisions of this chapter;

c. Measures to control a fire or halt the spread of disease or damaging insects consistent with the state Forest Practices Act found in RCW 76.09. The removed vegetation must be replaced in-kind or with similar native species within one year in accordance with an approved restoration plan; and

d. The necessary removal of vegetation or woody debris from a habitat conservation area or wetland as part of an approved alteration or as otherwise provided;

7. *Chemical applications.* The application of herbicides, pesticides, organic or mineral-derived fertilizers, or other hazardous substances, if necessary, as approved by the city and consistent with state department of fish and wildlife management recommendations, state department of agriculture regulations, state department of ecology regulations, and the U.S. Environmental Protection Agency regulations;

8. *Minor site investigative work.* Work necessary for land use submittals, such as surveys, soil logs, percolation tests, and other related activities, where such activities do not require construction of new roads or significant amounts of excavation. In every case, impacts to the critical area must be minimized and disturbed areas must immediately be restored; and

7.

9. *Boundary markers.* Construction or modification of boundary markers.

(Ord. No. 880, § 14, 9-12-2017)

112.20.050. - Critical area protective measures.

A. *Critical area markers and signs.*

1. The boundary at the outer edge of critical area tracts and easements must be delineated with permanent survey stakes as established by local survey standards.
2. The boundary at the outer edge of the critical area or buffer must be identified with temporary signs prior to any site alteration. The temporary signs must be replaced with permanent signs prior to occupancy or use of the site.
3. These provisions may be modified by the community development director as necessary to ensure protection of sensitive features or wildlife needs.

B. *Financial guarantee to ensure mitigation, maintenance, and monitoring.*

1. When required mitigation is not completed prior to final permit approval, the city must require the applicant to post a financial guarantee in a form and amount deemed acceptable by the city. If the development proposal is subject to mitigation, the applicant must post a financial guarantee in a form and amount deemed acceptable by the city to ensure mitigation is fully functional.
2. The bond must be in the amount of 150 percent of the estimated cost of the uncompleted actions or the estimated cost of restoring the functions and values of the critical area that are at risk, whichever is greater.
3. Financial guarantees must remain in effect until the city determines in writing that the standards bonded for have been met. Bonds or other security must be held by the city for a minimum of five years to ensure that the required mitigation has been fully implemented and demonstrated to function, and may be held for longer periods when necessary.
4. Depletion, failure, or collection of bond funds do not discharge the obligation of an applicant or violator to complete required mitigation, maintenance, monitoring, or restoration.
5. Public development proposals may be exempt from having to provide a financial guarantee if public funds have previously been committed for mitigation, maintenance, monitoring, or restoration.
6. Any failure to satisfy critical area requirements established by law or condition including, but not limited to, the failure to provide a monitoring report within 30 days after it is due or comply with other provisions of an approved mitigation plan constitute a default. The city may demand payment of any financial guarantees or require other action authorized by city code or any other law.
7. Funds recovered pursuant to this section must be used to complete the required mitigatio

7.

C. *Critical area inspections.* Reasonable access to the site must be provided to the city, state, and federal agency review staff for the purpose of inspections during any proposal review, restoration, emergency action, or monitoring period.

(Ord. No. 880, § 14, 9-12-2017)

112.20.060. - Wetlands.

A. *Definition.* Wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions.

1. *Includes:*
    a. Swamps.
    b. Marshes.
    c. Bogs.
2. *Does not include:*
    a. Artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities.
    b. Wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway.
3. *May include:*
    a. Artificial wetlands intentionally created for wetland mitigation purposes.

B. *Designation.* All areas within the city meeting the wetland designation criteria in the approved federal wetland delineation manual and applicable regional supplements are hereby designated critical areas and are subject to the provisions of this chapter.

C. *Delineation.* Wetlands must be identified and delineated in accordance with the approved federal wetland delineation manual and applicable regional supplement. Wetland delineations are valid for five years.

D. *Rating.*

1. Wetlands must be rated according to the Washington State Department of Ecology wetland rating system found in the Washington State Wetland Rating System for Western Washington (Ecology Publication #14-06-029) or as revised by Ecology. This document contains the definitions and methods for determining if the criteria below are met.
    a. *Category I wetlands.*
        i. *Definition.* Category I wetlands are those that:
            a) Represent a unique or rare wetland type; or

b) Are more sensitive to disturbance than most wetlands; or

c) Are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or

d) Provide a high level of functions.

ii. *Presence.* Category I wetlands may be located within the city. Wetlands of high conservation value can be designated based on the presence of a rare plant, rare or high-quality common plant community, or both. There are no known rare plants or high-quality wetland plant communities known to occur in the city or its vicinity.

b. *Category II wetlands.*

i. *Definition.* Category II wetlands are those that are difficult, though not impossible to replace, and provide high levels of some functions.

ii. *Presence.* Category II wetlands may be located within the city.

c. *Category III wetlands.*

i. *Definition.* Category III wetlands are wetlands with a moderate level of functions that can often be adequately replaced with a well-planned mitigation project and small interdunal wetlands one acre or less in size.

ii. *Presence.* Category III wetlands are likely located within the city.

d. *Category IV wetlands.*

i. *Definition.* Category IV wetlands are wetlands that have the lowest levels of functions and are often heavily disturbed.

ii. *Presence.* Category IV wetlands are likely located within the city.

2. *Illegal modifications.* Illegal modifications made by the applicant or with the applicant's knowledge do not change the wetland's rating.

E. *Activities allowed in wetlands.* The activities listed below are allowed in wetlands in addition to those activities listed in, and consistent with, the provisions established in Section 112.20.040, allowed activities. An activity listed below does not require a critical area report except when the activity results in a loss of functions or values of a wetland or wetland buffer. Activities allowed in wetlands include:

1. *Conservation.* Soil, water, vegetation, fish, shellfish, and other wildlife conservation or preservation that does not entail changing the structure or functions of the existing wetland.

2. *Low-impact harvesting.* Harvesting wild crops in a manner that is not injurious to natural reproduction of such crops and provided the harvesting does not require soil tilling, crop planting, chemical applications, or wetland alterations as a result of changing topography, water conditions, or water sources.

3.

7. *Utilities.* Drilling for utilities under a wetland; provided, that the drilling does not interrupt the ground water connection to the wetland or percolation of surface water down through the soil column. Specific studies by a hydrologist are necessary to determine whether the ground water connection to the wetland or percolation of surface water down through the soil column is disturbed.

4. *Wetland enhancement by removing nonnative invasive species.* Weeding is restricted to hand removal and weeded material must be removed from the site. Bare areas that remain after weed removal must be revegetated with native shrubs and trees at natural densities. Some hand seeding may also be done over the bare areas with native herbs.

F. *Supplemental information for wetland reports.* In addition to the requirements of Section 112.10.030, critical area reports, a wetland report must also include the following:

1. Existing wetland acreage;
2. A list of all local, state, and/or federal wetland-related permit(s) required for the project;
3. Documentation of any fieldwork performed on the site must include field data sheets for delineations, rating system forms, baseline hydrologic data, etc.
4. A description of the methodologies used to conduct the wetland delineations, wetland ratings, or impact analyses, including references.
5. Wetland rating, including a description of and score for each function, per Section 112.20.060.D of this chapter;
6. Vegetative, faunal, and hydrologic characteristics;
7. To the extent possible, hydrologic information such as estimated water depths within the wetland and estimated hydroperiod patterns based on visual cues;
8. An evaluation of the functions of the wetland and its buffer. Include references for the method used and data sheets.
9. A habitat and native vegetation conservation strategy that addresses methods to protect and enhance on-site habitat and wetland functions.

G. *Compensatory Mitigation.* Mitigation is required according to the sequence outlined in Section 112.10.040, mitigating for impacts. Where impacts to wetlands are unavoidable, compensatory mitigation measures may be utilized and must be consistent with this subsection.

1. *Compensating for lost or affected functions.* The proposed compensatory mitigation must achieve functional equivalency or represent an improvement over existing functions except in the following situations:

a. *Minimal Functions.* The lost wetland provides minimal functions; and

i. The proposed mitigation represents equivalent functions or an improvement over existing functions; or

ii.

7. The proposed mitigation will provide functions shown to be limiting within a watershed through a formal Washington State watershed assessment plan or protocol.

b. *Out-of-kind mitigation.* Out-of-kind mitigation will best meet formally identified watershed goals, such as replacement of historically diminished wetland types.

2. *On-site mitigation wherever feasible.* On-site mitigation must be provided wherever feasible. Where it is demonstrated that on-site mitigation is not feasible, off-site mitigation may be allowed.

3. *Mitigation Plan.* In addition to the requirements outlined in Section 112.10.040.C., wetland mitigation plans must:

a. Be consistent with the publication *Wetland Mitigation in Washington State - Part 2: Developing Mitigation Plans* (Ecology Publication #06-06-011b) or as revised by Ecology;

b. Identify how construction of mitigation projects will be timed to reduce impacts to existing wildlife and vegetation; and

c. Include a monitoring plan that ensures the goals of the proposed mitigation have been met. Monitoring must occur for at least five years but may be required for a longer period of time to ensure that lost or affected functions have been fully compensated for.

4. *Mitigation action preference.* Mitigation actions that require compensation by restoring, creating, enhancing, or protecting must occur in the following order of preference:

a. *Restoration.* Restoration may involve one or more of the following:

i. Re-establishing wetlands that used to exist. Re-establishing wetlands results in an increase in wetland area and functions.

ii. Rehabilitating existing wetlands that are degraded. Rehabilitation increases wetland functions but does not increase the wetland area.

b. *Creation/establishment.* Creating or establishing a new wetland area in a location where it did not previously exist. Creating or establishing a wetland area results in an increase in wetland area and functions.

c. *Enhancement.* Enhancing a wetland to intensify or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes. Enhancing a wetland results in a change in wetland function(s) but may lead to a decline in other wetland functions. Enhancing a wetland does not result in an increase in wetland area.

d. *Protection/maintenance.* Protecting/maintaining a wetland removes a threat to or prevents the decline of the wetland. Protection/maintenance does not result in an increase in wetland area but may, over time, result in an increase of wetland functions.

5. *Mitigation ratios.*

7.

a. *Minimum ratios.* The following table identifies the minimum amount of mitigation required based on the type of mitigation proposed.

Mitigation Ratio Based on Action (acres proposed per acre impacted)			
Wetland Category	Re-Establishment or Creation	Rehabilitation	Enhancement
Category I	4:1	8:1	16:1
Category II	3:1	6:1	12:1
Category III	2:1	4:1	8:1
Category IV	1.5:1	3:1	6:1

b. *Ratio increases.* The community development director may increase the mitigation ratio or require a different mitigation action under the following circumstances:

i. The proposed impacts are to a category I bog, natural heritage site, or mature forested wetland;

ii. Uncertainty exists as to the probable success of the proposed restoration or creation;

iii. A significant period of time will elapse between the wetland impact and the replication of wetland functions;

iv. Proposed mitigation will result in a lower category wetland or reduced functions relative to the wetland being impacted; or

v. The impact was not authorized when it occurred.

c. *Approved mitigation ratio alternatives.* As an alternative to the table above, the community development director may allow mitigation based on the credit/debit method outlined in *Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington: Final Report* (Ecology Publication #10-06-011), or as revised by Ecology.

H. *Buffers.*

1. *Required buffers.* All physical development and use is required to be set back from wetlands a distance based on the wetland rating and habitat score as follows:

Wetland Category	Required Buffer Based on Habitat Score			
	3-4	5	6-7	8-9
I	100'	140'	220'	300'
II	100'	140'	220'	300'
III	80'	140'	220'	300'
IV	50'	50'	50'	50'

2. *Measurement.* All buffers must be measured perpendicular from the wetland boundary as surveyed in the field.
    a. Buffers for a required mitigation site shall be based on subsection H.1. above.
    b. Buffers must be fully vegetated in order to be included in buffer area calculations. Lawns, walkways, driveways, and other mowed or paved areas shall not be considered buffers or included in buffer area calculations.
3. *Buffer increases.* Buffer widths may be increased on a case-by-case basis as determined by the Community Development Director when a larger buffer is necessary to protect wetland functions and values. This determination must be supported by appropriate documentation showing that it is reasonably related to protection of the functions and values of the wetland. The documentation must include, but is not limited to, the following information:
    a. The wetland is used by a state or federally listed plant or animal species or has essential or outstanding habitat for those species, or has unusual nesting or resting sites such as heron rookeries or raptor nesting trees; or
    b. The adjacent land is susceptible to severe erosion, and erosion-control measures will not effectively prevent adverse wetland impacts; or
    c. The adjacent land has minimal vegetative cover or slopes greater than 30 percent.
4. *Buffer averaging.*
    a. *Wetland protection.* Buffer averaging to improve wetland protection may be permitted when all of the following conditions are met:
        i.

7. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a "dual-rated" wetland with a category I area adjacent to a lower-rated area.

ii. The buffer is increased adjacent to the higher-functioning area of habitat or more-sensitive portion of the wetland and decreased adjacent to the lower-functioning or less-sensitive portion as demonstrated by a critical areas report from a qualified wetland professional.

iii. The total area of the buffer after averaging is equal to the area required without averaging.

iv. The buffer at its narrowest point is never less than either 75 percent of the required width or 75 feet for category I and II, 50 feet for category III, and 25 feet for category IV, whichever is greater.

b. *Reasonable use.* Averaging to allow reasonable use of a parcel may be permitted when all of the following are met:

i. There are no feasible alternatives to the site design that could be accomplished without buffer averaging.

ii. The averaged buffer will not result in degradation of the wetland's functions and values as demonstrated by a critical areas report from a qualified wetland professional.

iii. The total buffer area after averaging is equal to the area required without averaging.

iv. The buffer at its narrowest point is never less than either 75 percent of the required width or 75 feet for category I and II, 50 feet for category III and 25 feet for category IV, whichever is greater.

5. *Maintenance.* Except as otherwise specified or allowed in accordance with this chapter, wetland buffers must be retained in an undisturbed or enhanced condition. Removal of invasive non-native weeds is required for the duration of the mitigation bond.

6. *Impacts.* Impacts to buffers must be mitigated at a rate of one acre of mitigation for one acre of impact. Buffer mitigation must replace those buffer functions lost from development.

7. *Overlapping critical area buffers.* If buffers for two contiguous critical areas overlap (such as buffers for a wildlife habitat area and a wetland), the wider buffer applies.

(Ord. No. 880, § 14, 9-12-2017)

112.20.070. - Critical aquifer recharge areas (CARAs).

A. *Definition.* Critical aquifer recharge areas are areas with a critical recharging effect on aquifers used for potable water, as defined by WAC 365-190-030(3). A critical aquifer recharge area has prevailing geologic conditions associated with infiltration rates that create a high potential for

7. ontamination of ground water resources or contribute significantly to the replenishment of ground water.

1. *Includes:*
    a. Wellhead protection areas, as identified in the City of Tenino Water Plan and mapped by Washington State Department of Health.
    b. Areas having an extreme or high susceptibility to contamination, as identified by the Thurston Geodata Center.

B. *Designation.* All areas within the city meeting one or more of these criteria, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter. Critical aquifer recharge areas must be managed consistent with the best available science.

C. *Standards.*

1. *Activities.*
    a. Activities may only be permitted in a critical aquifer recharge area if the applicant can show that the proposed activity will not cause contaminants to enter the aquifer and that the proposed activity will not adversely affect the recharging of the aquifer.
    b. Activities must comply with the water source protection requirements and recommendations of the U.S. Environmental Protection Agency, Washington State Department of Health, and the Environmental Health Division of Thurston County Public Health and Human Services Department.
2. *Storage tanks.* Storage tanks proposed to be located in a critical aquifer recharge area must comply with local building code requirements and must conform to the following requirements:
    a. *Underground tanks.* All new underground storage facilities proposed for use in the storage of hazardous substances or hazardous wastes must be designed and constructed so as to:
        i. Prevent releases due to corrosion or structural failure for the operational life of the tank;
        ii. Be protected against corrosion, constructed of noncorrosive material, steel clad with a noncorrosive material, or designed to include a secondary containment system to prevent the release or threatened release of any stored substances; and
        iii. Use material in the construction or lining of the tank that is compatible with the substance to be stored.
    b.

7. *boveground tanks.* All new aboveground storage facilities proposed for use in the storage of hazardous substances or hazardous wastes must be designed and constructed so as to:

i. Not allow the release of a hazardous substance to the ground, ground waters, or surface waters;

ii. Have a primary containment area enclosing or underlying the tank or part thereof; and

iii. A secondary containment system either built into the tank structure or a dike system built outside the tank for all tanks.

3. *Vehicle repair and servicing.*

a. Vehicle repair and servicing must be conducted over impermeable pads and within a covered structure capable of withstanding normally expected weather conditions. Chemicals used in the process of vehicle repair and servicing must be stored in a manner that protects them from weather and provides containment should leaks occur.

b. Dry wells are prohibited in critical aquifer recharge areas on sites used for vehicle repair and servicing. Dry wells existing on the site prior to facility establishment must be abandoned using techniques approved by the state Department of Ecology prior to commencement of the proposed activity.

4. *Residential use of pesticides and nutrients.* Application of household pesticides, herbicides, and fertilizers must not exceed times and rates specified on the packaging.

5. *Use of reclaimed water for surface percolation or direct recharge.* Water reuse projects for reclaimed water must be in accordance with the adopted water or sewer comprehensive plans that have been approved by the state departments of ecology and health.

a. Use of reclaimed water for surface percolation must meet the ground water recharge criteria given in RCW 90.46.010(10) and 90.46.080(1). The State Department of Ecology may establish additional discharge limits in accordance with RCW 90.46.080(2).

b. Direct injection must be in accordance with the standards developed by authority of RCW 90.46.042.

(Ord. No. 880, § 14, 9-12-2017)

112.20.080. - Frequently flooded areas.

A. *Definition.* Frequently flooded areas are lands in the floodplain subject to a one percent or greater chance of flooding in any given year and lands that provide important flood storage, conveyance, and attenuation functions. Classifications of frequently flooded areas include, at a minimum, the 100-year floodplain designation of the Federal Emergency Management Agency and the National Flood Insurance Program.

1. *Includes:*

a. *Areas identified on the flood insurance map(s).* Areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for Thurston County, Washington and Incorporated Areas" dated October 16, 2012, and any revisions thereto, with accompanying flood insurance rate maps (FIRM) dated October 16, 2012, and any revisions thereto. The flood insurance study and accompanying map(s) are hereby adopted by reference, declared part of this chapter, and are available for public review at the city.

B. *Designation.* Frequently flooded areas perform important hydrologic functions and may present a risk to persons and property. Frequently flooded areas are hereby designated critical areas and are subject to the provisions of this chapter and must be managed consistent with the best available science.

C. *Maintenance of records.* Where base flood elevation data is provided through the flood insurance study or required through this chapter, the city must obtain and record the flood elevation certificates of all new or substantially improved structures, whether or not the structure contains a basement. The city must also maintain for public inspection all records of floodplain hazards, certificates of flood-proofing, and flood elevation data.

D. *Standards.*

1. *Critical facilities prohibited.* Critical facilities are prohibited within frequently flooded areas unless there is no other practical alternative.
2. *Septic systems prohibited.* On-site sewage disposal systems, including drain fields, are prohibited within the 100-year floodplain.
3. *Flood elevations.* The base flood elevation for high ground water flood hazard areas corresponds to the elevation of the outer edge of the high ground water flood hazard area.
4. *Delineation of the base flood elevation.* Applicants must submit to the approval authority hydrologic and hydrogeologic studies as necessary to delineate the high ground water flood hazard area and the base flood elevation.
5. *Buffer required.* A minimum buffer of 50 feet is required from the outer edge of the high ground water hazard area or extending to a ground elevation two feet above the base flood elevation, whichever is less.
6. *Infiltration basins.* The bottom of any infiltration facility for stormwater discharge must be located at least six feet above the base flood elevation.
7. *Subdivision proposals.* Subdivision proposals must:
   a. Be consistent with the need to minimize flood damage;
   b. Have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

c. Must have adequate drainage provided to reduce exposure to flood damage.

d. Generate base flood elevation data when it is not available from another authoritative source.

8. *Building permit review.* Where elevation data is not available either through the flood insurance study or from another authoritative source, applications for building permits must be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

9. *Nonresidential construction.* All nonresidential construction must have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy, and be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this section based on their development and/or review of the structural design, specifications and plans.

E. *Warning and disclaimer of liability.* The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by manmade or natural causes. This chapter does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This chapter does not create liability on the part of the city, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this chapter or any administrative decision lawfully made hereunder.

(Ord. No. 880, § 14, 9-12-2017)

112.20.090. - Geologically hazardous areas.

A. *Definition.* Geologically hazardous areas are areas that may not be suitable for development because of their susceptibility to erosion, sliding, earthquakes or other geological events.

1. *Includes:*

a. *Erosion hazard areas.* Erosion hazard areas are those areas identified by the United States Department of Agriculture Soil Conservation Service as having a severe rill and inter-rill erosion hazard. Rill or inter-rill are areas subject to sheet wash, or steep-sided channels resulting from accelerated erosion. The city has limited lands that possess these characteristics, and will therefore regulate any potential erosion hazards through grade and fill regulations pursuant to Title 5, Buildings and Construction, and Title 109, Shoreline Designations.

7.

b. *Landslide Hazard Areas.* Landslide hazard areas are areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of factors including, but not limited to, bedrock, soil, slope, slope aspect, structure, and hydrology. Examples of landslide hazard areas include, but are not limited to:

   i. Areas of historic failures.

   ii. Areas with all three of the following characteristics:

      a) Slopes in excess of 15 percent;

      b) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

      c) Springs or groundwater seepage.

   iii. Areas that have shown movement during the Holocene epoch (from 10,000 years ago to the present) or which are underlain or covered by mass wastage debris of that epoch.

   iv. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials.

   v. Slopes in excess of 80 percent that are subject to rockfall during seismic shaking.

   vi. Areas with a slope of 40 percent or more that have a vertical relief of ten or more feet. This does not include areas composed of consolidated rock. A slope is delineated by establishing its toe and top and is measured by averaging the inclination over at least ten feet of vertical relief.

   vii. Areas that include alluvial or colluvial fans located at the base of steep slopes and drainages.

c. *Seismic hazard areas.* Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting. One indicator of potential for future earthquake damage is a record of earthquake damage in the past. Ground shaking is the primary cause of earthquake damage in Washington. The strength of ground shaking is primarily affected by:

   i. The magnitude of an earthquake;

   ii The distance from the source of an earthquake;

   iii. The type of thickness of geologic materials at the surface; and

   iv. The type of subsurface geologic structure.

B.

7. *Designation.* Geologically hazardous areas pose a threat to the health and safety of citizens when incompatible development is sited in areas of significant hazard. Incompatible development may place itself at risk and increase the hazard to surrounding developments and uses. All areas within the city meeting one or more of these criteria, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter and must be managed consistent with the best available science.

C. *Standards.*

1. *Septic systems prohibited.* On-site sewage disposal systems, including drain fields, are prohibited within erosion and landslide hazard areas and related buffers.
2. *Critical facilities prohibited.* Critical facilities are prohibited within geologically hazardous areas unless there is no other practical alternative.
3. *Point discharges prohibited.* Point discharges from surface water facilities and roof drains onto or upstream from an erosion or landslide hazard area is prohibited.
4. *Buffers.* Buffers are used to eliminate or minimize the risk of property damage, death, or injury resulting from landslides cased in whole or in part by the development. A buffer must be provided from all edges of landslide hazard areas.
    a. *Minimum buffer.* The minimum buffer required is equal to the height of the slope.
    b. *Buffer reduction.* The buffer may be reduced to a minimum of ten feet when a qualified professional demonstrates to the city's satisfaction that the reduction will adequately protect the proposed development, adjacent developments and uses, and the subject critical area.
    c. *Buffer increases.* The city may require a wider buffer when it is necessary to prevent the risk of damage to proposed and existing development.
5. *Alterations.* Alterations of geologically hazardous areas or associated buffers may be allowed only if a hazards analysis has been submitted and certifies that the alterations:
    a. Will not increase the threat of the geological hazard to adjacent properties beyond pre-development conditions;
    b. Will not adversely impact other critical areas;
    c. Are designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than pre-development conditions; and
    d. Are certified to be safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington.
    e. The development will not increase surface water discharge or sedimentation to adjacent properties beyond pre-development conditions;
    f. The development will not decrease slope stability on adjacent properties; and

7.

6. *Vegetation retention.* Removing vegetation in an erosion hazard area, landslide hazard area, or required buffer is prohibited unless otherwise provided for in this chapter or as part of an approved alteration.
7. *Seasonal restriction.* Clearing may only be allowed during the dry season, generally from May 1st to October 1st of each year.
    a. The city may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions.
    b. Timber harvest, not including brush clearing or stump removal, may be allowed during other times of the year provided an approved forest practice permit has been issued by the Washington State Department of Natural Resources.
8. *Utility lines and pipes.* Utility lines and pipes may be permitted in erosion and landslide hazard areas only when the applicant demonstrates that no other practical alternative is available.
    a. Lines or pipes in erosion and landslide hazard areas must be located above ground, properly anchored, and designed so that it will continue to function in the event of an underlying slide.
    b. Stormwater conveyance in erosion and landslide hazard areas must be through a high-density polyethylene pipe with fuse-welded joints, or a similar product that is technically equal or superior.
9. *Land divisions.*
    a. Land that is located wholly within a landslide hazard area or its buffer must not be subdivided.
    b. Land that is located partially within a landslide hazard area or its buffer may be divided; only if each resulting lot has sufficient buildable area outside of, and will not affect, the landslide hazard or its buffer.
    c. Access roads and utilities serving the proposed subdivision may be permitted within the landslide hazard area and buffer only if the city determines that no other feasible alternative exists.

(Ord. No. 880, § 14, 9-12-2017)

112.20.100. - Fish and wildlife habitat conservation areas.

A. *Definition.* Fish and wildlife habitat conservation areas are areas necessary for maintaining species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created.
    1. *Includes:*

a. *Endangered, threatened, and sensitive species.* Habitat areas associated with state or federally designated endangered, threatened, and sensitive species. Designated species known to occur in the city or its vicinity include, but are not limited to, the following:

   i. *Animals:*

      a) Oregon Vesper Sparrow.

      b) Mazama Pocket Gopher (Olympia, Tenino, and Yelm subspecies).

      c) Taylor's Checkerspot Butterfly.

      d) Mardon Skipper Butterfly.

   ii. *Plants:*

      a) Water Howellia.

      b) Golden Paintbrush.

b. *Priority habitats and species.* Priority habitats and species, as identified by the Washington State Department of Fish and Wildlife. Priority habitats and species known to occur in the city or its vicinity include, but are not limited to, the following:

   i. *Habitats:*

      a) Oregon White Oak Woodlands.

      b) West Side Prairie.

      c) Freshwater Wetlands.

   ii. *Species:*

      a) Western Gray Squirrel.

      b) Oregon Vesper Sparrow.

      c) Mazama Pocket Gopher.

c. *Rare plants and high-quality ecosystems.* Areas of rare plant species and high-quality ecosystems identified by the Washington State Department of Natural Resources through the Natural Heritage Program. Rare plant species known to occur in the city or its vicinity include, but are not limited to, the following:

   i. White-Top Aster.

d. *Wildlife corridors and connections.* Land useful or essential for preserving connections between habitat areas and open spaces.

e. *Waters of the state.* Waters of the state, including but not limited to lakes, rivers, ponds, streams, inland waters, underground waters, and salt waters. Scatter Creek is classified as a water of the state. Standards for underground waters are addressed in Section 112.20.070, critical aquifer recharge areas.

f.

7. *Ponds.* Naturally occurring ponds under 20 acres, including their submerged aquatic beds that provide fish or wildlife habitat and artificial ponds intentionally created from dry areas in order to mitigate impacts to ponds. Naturally occurring ponds do not include ponds deliberately designed and created from dry sites, such as canals, detention facilities, wastewater treatment facilities, farm ponds, temporary construction ponds, and landscape amenities unless intentionally created for mitigation purposes. Small ponds are known to occur in the city and its urban growth area.

B. *Designation.* All areas within the city meeting one or more of the criteria in subsection A. above, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this chapter. Fish and wildlife habitat conservation areas must be managed consistent with the best available science.

C. *Standards.*

1. *Indigenous species.* Only plant, wildlife, or fish species that are indigenous to the region may be introduced into a habitat conservation area unless otherwise authorized by a state or federal permit or approval.

2. *Activity approvals.* The city may condition approval of activities that are allowed within or adjacent to a habitat conservation area or its buffers in order to minimize or mitigate any potential adverse impacts. Conditions must be based on the best available science.

3. *Alteration approvals.* Any approval of alterations or impacts to a habitat conservation area must be supported by the best available science.

4. *Mitigation.*

a. *Contiguous corridors.* Mitigation sites must be located to preserve or achieve contiguous wildlife habitat corridors in accordance with a mitigation plan.

i. The mitigation plan must be submitted and approved as part of the critical area report to minimize the isolating effects of development on habitat areas.

ii. Aquatic habitat mitigation areas must be located within the same aquatic ecosystem as the area disturbed.

b. *Equivalent or greater biological functions.* Mitigation areas must:

i. Achieve functional equivalency or represent an improvement of existing biologic and hydrologic functions;

ii. Include mitigation for adverse impacts upstream or downstream from the development proposal site; and

iii. Address each function affected by the alteration to achieve functional equivalency or improvement on a per function basis.

5.

7. *Native growth protection areas required.* Habitat conservation areas and their buffers must be preserved in perpetuity through the use of native growth protection areas and critical area tracts. Native growth protection areas include areas where native vegetation is preserved for the purpose of preventing harm to property and the environment including, but not limited to, the following:

   a. Controlling surface water runoff and erosion.

   b. Maintaining slope stability.

   c. Buffering.

   d. Protecting plants and animal habitat.

6. *Buffers.*

   a. *Buffers Required.* Buffers are used to protect the integrity, functions, and values of each affected habitat. A buffer must be provided when it is needed to protect the habitat conservation area. Buffers must consist of an undisturbed area of native vegetation or areas identified for restoration.

   b. *Buffer width.* Required buffer widths must reflect the sensitivity of the habitat as well as the type and intensity of human activity proposed. Buffer widths must be consistent with the management recommendations issued by the Washington Department of Fish and Wildlife.

   c. *Seasonal restrictions.* When a species is more susceptible to adverse impacts during specific periods of the year, seasonal restrictions may apply. Larger buffers may be required, and activities may be further restricted during the specified season.

   d. *Buffer averaging.* The city may allow the recommended buffer width to be reduced in accordance with a critical area report, the best available science, and the management recommendations issued by the Washington Department of Fish and Wildlife, only if:

      i. Buffer averaging does not reduce stream or habitat functions;

      ii. Buffer averaging provides additional natural resource protection, such as buffer enhancement;

      iii. The total area contained in the buffer after averaging is no less than that which would be contained within the standard buffer; and

      iv. The buffer width is not reduced by more than 25 percent in any location, as recommended by the Washington Department of Fish and Wildlife.

7. *Land divisions.*

   a. Land that is located wholly within a habitat conservation area or its buffer must not be subdivided.

   b.

7. and that is located partially within a habitat conservation area or its buffer may be divided only if the developable portion of each new lot and its access is be located outside of the habitat conservation area and buffer.

c. Access roads and utilities serving the proposed subdivision may be permitted within the habitat conservation area and buffer only if the City determines that no other feasible alternative exists.

8. *Endangered, threatened, and sensitive species.*

a. *Development.* Only development consistent with a management plan established by the Washington Department of Fish and Wildlife or applicable state or federal agency may be allowed in a habitat conservation area or buffer associated with endangered, threatened, or sensitive species.

b. *Protection Measures.* Protection measures identified in a critical area report that has been approved by the city, must be utilized for habitat conservation areas associated with endangered, threatened, or sensitive species.

c. *Alterations to habitat conservation areas.* Approval to alter habitat conservation areas or buffers associated with endangered, threatened, or sensitive species will not occur prior to consulting with:

i. For animal species, the Washington Department of Fish and Wildlife;

ii. For plant species, the Washington State Department of Natural Resources; and

iii. Other appropriate federal or state agencies.

9. *Wetland habitats.* Activities within or adjacent to habitat conservation areas containing wetlands must conform to the wetland standards set forth in Section 112.20.060, wetlands. If non-wetland habitat and wetlands are present at the same location, the provisions of this section or the wetlands section, whichever provides greater protection to the habitat, apply.

(Ord. No. 880, § 14, 9-12-2017)

7.

DISTRIBUTION STANDARDS

City of Tenino
Water System Standards

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WATER

4.01 General

A. These Water System Standards and Specifications are minimum base level performance, design and construction standards used to maintain uniformity of design within the water utility.

B. Any extension of the water system must be approved by the City and conform to these Standards, Department of Health regulations and guidelines, the City of Tenino Water System Plan, and Local Fire District requirements.

C. Proposed plans must show how water shall be supplied and the applicant shall demonstrate whether adequate water pressure and volume shall be maintained in case of fire. An analysis of the system may be required, at the Applicant's cost, if it appears that the system might be inadequate.

D. Anyone desiring to extend or connect to the City water system must contact the City for a Pre-construction Application form. After the completed application is returned to the City, along with any other information that may be required or requested, staff shall determine the conditions of service for connection to the water system.

E. Extension of or connection to City water lines outside of the Tenino Urban Growth Area (UGA) may be limited under the provisions of the Thurston County Comprehensive Plan. The City shall not allow service outside of the UGA without written permission from the County.

4.02 Design Criteria

A. The design of any water extension/connection shall conform to these Standards and all other applicable standards. The layout of extensions shall provide for continuation and/or looping of the existing system. The City has the authority to apply or necessitate items not covered or mentioned in this chapter. .

B. All pipe, valves, meters, hydrants, fitting and special materials shall be new undamaged and designated for use in potable water systems. All labor, equipment and materials shall be in conformance with the Standard Specifications for Road, Bridge and Municipal Construction, WSDOT and APWA, and the specification of the American Water Works Association, expect as modified herein. Materials or additives must be in compliance with NSF Standards 60 and 61 as required in WAC 246-290-220.

C. Watermains shall be sized to provide adequate Peak Hour Demand (PHD) at a minimum residual pressure of 30 psi and Maximum Day Demand (MDD) plus fire flows at a minimum residual pressure of at least 20 psi. Specific fire flow

requirements shall be determined by the City for each development application. However, the quantity of water required shall in no case be less than 500 gpm at 20psi residual pressure for 30 minutes in residential areas; 750 gpm at 20psi residual pressure for 60 minutes multi-family residential and commercial areas; or 1,000gpm at 20psi residual pressure for 60 minutes in industrial areas.

D. The minimum watermain size shall be six (6) inches in diameter where looped. Dead-end mains shall be a minimum of eight (8) inches in diameter. All mains that may be extended or looped must end with an approved mechanical joint gate valve and 3-foot pipe extension, cap and thrust blocking.

E. Larger sized mains may be required in specific areas identified in the Tenino Water System Plan. The City may also require the installation of larger mains if determined necessary to meet fire protection needs, domestic requirements and/or for future service needs.

4.03 Pipe, Valves and Fittings

A. Pipe. All pipe for watermains shall have flexible gasketed joints and shall be PVC or Ductile Iron in accordance with the following specifications:

1. Ductile Iron Pipe: Ductile Iron Pipe shall conform to AWWA C 151 Class 50 or greater if required in accordance with the criteria specified in AWWA C150. Ductile iron pipe shall be cement mortar lined with a bituminous seal coat outside in accordance with AWWA C 104. All pipes shall be joined using rubber gaskets, push-on type or mechanical joint, conforming to AWWA C 111, and be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise.

2. Polyvinyl Chloride (PVC): Six inch and larger PVC pipe shall be AWWA C900, minimum pressure Class 150. All pipe shall be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise and assembled with a non-toxic lubricant.

B. Fittings. All fittings shall be ductile iron compact fittings conforming to AWWA C153 or, AWWA C110 or C111. All fittings shall be cement mortar lined conforming to AWWA C104. All fittings shall be connected by flanges or mechanical joints. Restraining glands shall be provided on all mechanical joints unless otherwise directed.

C. Pipe Installation. Pipe installation shall be in accordance with the Standard Specifications, Standard Details and Standard Plans, except as modified herein.

1. Pipe Cover. A minimum of thirty (36) inches of cover over the pipe and, to the extent practical, a maximum of forty-two (42) inches cover is required from the finished or exiting ground surface, whichever is greater, to the top of the pipe for

all installed transmission, distribution and service piping. The City may allow thirty (30) inches of cover where ductile iron piping is utilized.

2. Tracer Tape and Locate Wire. All pipes and services shall be installed with continuous tracer tape placed twelve to eighteen inches under the proposed finished subgrade. The tracer tape shall be of plastic non-biodegradable, metal core, or backing marked "WATER" that can be detected by a standard metal detector. In addition to tracer tape, toning wire shall be installed over all pipe and services. Toning wire shall be UL listed, type UF, 12-gauge solid coated (blue) copper wire, taped to the top of the pipe and laid loose enough to prevent stretching and damage before being brought up and tied off at the valve operating nut or valve box. If the operating nut is not easily accessible from the ground surface, the copper wire shall be tied off at the valve box in such a way that the wire is easily accessible from the ground surface. Two (2) feet of slack shall be provided to allow for connection to the locator. Toning wire shall be tested prior to acceptance of the pipe system. A written notice from the Contractor to the City must be received two (2) business days prior to when testing is required.

3. Connection to Existing Mains. The City shall be responsible for approving the scope of work for connection to existing watermains. The City shall be consulted regarding fittings or couplings required. It shall be the Contractor's responsibility to verify the location and depth of the existing main and the fittings required to make the connections to the existing main. All excavation, connections, piping, tapping valve fittings, services, anchors, blocking, bedding, backfill, compaction, restoration and other labor and materials required shall be furnished and placed by the Contractor. Tapping or connecting to an existing watermain shall be done in the presence of a City representative. The City shall be given five (5) business days advance notice of a watermain tap or connection to an existing main. Water mains shall not be shut down for taps under most conditions.

4.04 Service Interruption

A. The Contractor shall notify the City five (5) business days prior to a utility shutdown. The City, at its discretion, may re-schedule shutdown and a City representative must be present at any utility shutdown. When shut downs require "field verification" of underground conditions, connection points will be exposed by the Contractor and work requirements shall be verified by the Contractor and the City two (2) business days prior to the shutdown notice. Customers involved with or affected by shutdowns will be notified by the Contractor at least forty-eight (48) hours in advance. Shutdowns will not be permitted on Fridays, weekends, or holidays without written authorization from the City.

B. Shutdowns cannot be scheduled until a Water/Sewer/Stormwater Application has been approved and all applicable fees have been paid in full.

4.05 Hydrants

A. Fire hydrants shall be installed in accordance with the Standard Specifications and the Standard Details .

1. The center of the lowest outlet of the hydrant shall be no less than 18-inches above finished grade. In addition, all hydrants shall be installed with a minimum of a 36-inch unobstructed radius around the hydrant. Hydrants shall be aligned so that pumper ports face toward the road or most probable route of access, if roads are not available, as determined by the appropriate local fire protection authority.

2. When necessary, the City shall require hydrants to be protected by two or more posts, 4-inch diameter x 5 feet high made of either reinforced concrete or steel.

3. Public fire hydrants shall be located within publicly owned easements and rights-of-way.

B. The City, in conjunction with the Fire District shall determine the required hydrant spacing. All hydrants shall be installed and placed in a manner that provides accessibility to Fire equipment as determined by the local fire authority and public works. Unless otherwise required by the City, the following guidelines shall apply for hydrant number and location:

1. In general, hydrants shall be predicated on the location of street intersections wherever possible, and located to minimize the hazard of damage by traffic.

2. Hydrants shall have an average nominal spacing of 600-feet. In no case shall hydrants be placed farther than 700-feet apart and no building shall be more than 350-feet from the nearest hydrant.

3. More stringent spacing may be required if needed to meet specific building or fire code requirements.

4. The spacing distance for hydrants shall be measured along the frontage street(s) and/or accessible side street(s) only. When determining the sufficiency of existing hydrants related to hydrant placement and spacing, hydrants located behind or on parallel streets or alleys, or hydrants with flows less than the minimum fire flows listed in Section 4.03A shall not be considered.

5. When any portion of a proposed building is in excess of 150 feet from a water supply on a public street or right-of-way, privately owned on-site hydrants shall be required. Such hydrants shall be located per the local fire authority and the International Fire Code. The hydrants shall be privately maintained and shall include the appropriate metering and backflow prevention, as noted in these

Standards. A proposed maintenance schedule shall be submitted to the City for review prior to final approval of the engineering plans.

4.06 Valves

A. Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall there be less than one (1) valve every 400 feet in school, commercial or multi-family areas, or 800 feet in residential areas, where customers are being served. Generally, there shall be three (3) valves on each tee and four (4) valves on each cross. Specific requirements for valve spacing shall be made at the plan review stage. All existing valves are to be operated by City employees only.

B. Gate Valves. Gate valves shall be used on all 2- to 12-inch lines. Resilient seated gate valves shall be manufactured and tested in accordance with AWWA C509 or C515 specifications. They shall be equipped with mechanical joints or flanged ends of Class 125 in accordance with ANSI B16-1. Gate valves, 3-inch and larger, shall be iron body, bronze-mounted, double disc and "O"-ring stem seal. Gate valves smaller than 3-inches shall be 125 psi, non-stem rising, wedge disc, all brass or bronze valves with screwed, soldered or flanged ends compatible with the connecting pipe. All valves shall open counterclockwise and, unless otherwise specified, shall be non-rising stem type equipped with standard AWWA 2-inch stem operating nuts. Gate valves shall be Mueller, M & H, Kennedy, Clow R/W or Waterous Series 500.

C. Butterfly Valves. Butterfly valves shall be used on all lines fourteen (14) inches and larger. Butterfly valves shall conform to AWWA C504, Class 150B, with cast iron short body and O-ring stem seals. When installed, they shall have a position indicator which clearly shows position of the disc. All valves shall be equipped with an underground manual operator with AWWA 2-inch square operating nut and shall open with a counterclockwise rotation. Butterfly valves shall be Mueller, Linseal III, Kennedy, or Allis Chalmers.

D. Valve Boxes. All valve boxes shall be in accordance with Standard Details.

4.07 Casing

A. Steel casing pipe shall be schedule 20 steel or equal. Pipe spacers shall have 8-inch runners. Casting pipe and spacers shall be sized for pipe being installed with a minimum of three (3) spacers per section of pipe. The casing pipe shall then be sand-packed and sealed with flexible end seal material secured with stainless pipe bands.

4.08 Combination Air Valve

A. Combination air valves shall be in accordance with the Standard Details. Combination air valves shall be set at high points of water mains. Where possible, pipes are to be graded to prevent the need for a combination air valve.

4.09 Blowoff Assembly

A. A blowoff assembly shall be installed on all permanent dead-end runs and at the designated points of low elevation within the distribution system if a fire hydrant is not located in the immediate vicinity. On watermains that may be extended in the future, the valve that operates the blowoff assembly shall be the same size as the main and provided with a saddle block along the last length of the pipe preceding the valve, in lieu of a thrust block at the end. The blowoff assembly shall be installed in the utility right-of-way.

4.10 Backflow Prevention

A. All water system connections serving buildings or properties with fire sprinklers, irrigations systems or other potential cross-connections as determined by the City, shall comply with the minimum backflow prevention requirements established by the Department of Health (DOH) and the City of Tenino Cross-Connection Control Program.

B. All assemblies must be installed in accordance with the most recent versions of the City of Tenino Cross-Connection Control Program, DOH, UPC, and the PNWS/AWWA Cross-Connection Control Manual. In addition, all assemblies must be inspected and approved by the City's Cross-Connection Specialist (CCS).

C. In-premise installation of backflow assemblies can be installed only with written permission by the City's CCS or may be mandated along with premises isolation when high health hazards are determined to exist by the CCS. All backflow assemblies (premises or in-premises) must be readily accessible to City personnel during regular working hours of 8:00 a.m. to 4:30 p.m. If there is a change of ownership of an in-premise backflow assembly and/or at any time all requirements are not met, the City has the right to enforce premises isolation and shall follow the procedures established in the City of Tenino Cross-Connection Control Plan. The City must be notified within two (2) business days of the completion of a backflow assembly installation. Upon notification, the City's CCS shall then inspect the installation to determine compliance with all applicable requirements.

D. All backflow assembly installations are also required to be tested by a Washington State DOH-certified Backflow Assembly Tester (BAT) with an annual certificate of accuracy for their testing equipment on file with the City. The test results must be delivered to the City showing the backflow assembly having successfully passed the

certified test. The property owner must schedule a backflow test annually thereafter. The City shall release or issue a Certificate of Occupancy only after all backflow assemblies have passed a certified test. A list of approved testers may be obtained from the Washington Environmental Training Resource Center (WETRC) located in Auburn, Washington.

E. All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts and repairs of a backflow assembly are the responsibility of the property owner/user.

F. Failure on the part of any customer to correct all cross-connections in accordance with these Standards is sufficient cause for the immediate discontinuance of public water service to the premises.

4.11 Service Connection

A. Each customer shall have a separate metered service. Master meters may be allowed for service to a complex under single ownership and where multiple service meters is impractical. Types of facilities where master meters may be allowed shall be in accordance with WAC 246-290-496.

B. Services shall be installed by City staff in accordance with the Standard Details. All service connection sizes used for new development shall be determined by the City and installed by the Developer at the time of mainline construction. After the lines have been constructed, tested and approved, the owner may request a water meter. The City shall install a water meter only after all applicable fees paid and the system inspected and approved. For 1½" or larger meters, the meter and gasket shall be supplied by the Contractor. The City shall lock off the setter after the Contractor has installed the meter.

C. For new service to an existing parcel or new parcel fronting an existing main, an application must be submitted to the City. Upon approval of the application and payment of all applicable fees, City staff shall tap the main, and install the meter, box, and setter. The City shall supply the water meter and setter.

D. All labor and material cost for service connections is in addition to any connection or capacity related fees and charges and shall be billed directly to the applicant.

4.12 Watermain/Sanitary Sewer Crossings

A. Transmission and distribution water piping shall be separated at least ten (10) feet horizontally from on-site waste disposal piping, drainfields, and/or gravity sewage pipes and force mains. The Contractor shall maintain a minimum of eighteen (18) inches of vertical separation between sanitary sewers and watermain crossings - with the watermains being at the higher elevation.

B. The longest standard length of water pipe shall be installed so that the joints shall fall equidistant from any sewer crossing. In cases where minimum separation cannot be maintained, it may be necessary to utilize watermain-rated pipe for the sewer line, or to encase the water pipe and/or sewer line in a casing or concrete. No concrete shall be installed unless specifically directed by the City.

C. Additional guidelines to be considered for parallel and crossing installations of water and sewer lines are the DOH Water System Design Manual, DOE Sewage Works Criteria and the "Recommended Standards for Water Works." – Ten State Standards.

4.13 Irrigation

All irrigation systems shall be installed with a backflow prevention assembly in accordance with the City of Tenino Cross-connection Control Program. Irrigation sprinklers shall be situated so as to not wet any public street or sidewalk.

4.14 Staking

A. All surveying and staking shall be performed by a surveying firm licensed in the State of Washington and capable of performing such work.

B. The minimum staking of waterlines shall be as follows:

1. Stake centerline alignment every one hundred (100) feet with cuts and/or fills to bottom of trench maintaining the minimum required depth of cover over pipe. Centerline cuts are not required when road grade is to finished subgrade elevation.

2. Stake location of all fire hydrants, hydrant flange elevations, tees, water meters, setters and other fixtures with cut or fill to finished grade.

4.15 Construction Requirements

A. Pipe placed in the trench shall be sealed with a watertight plug at the end of each day. More frequent use of a watertight plug may be required at the discretion of the City.

B. Trenching and shoring operations shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standards. The Contractor shall maintain the presence of a "competent person" as defined by the Washington State Department of Labor and Industries when any trench excavation and backfill work is being done at the project site.

C. Backfilling shall not commence until the pipe installation has been inspected and approved by the City. Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City.

D. Where governmental agencies other than the City have jurisdictions over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction, but in no case shall the backfilling or compaction be to a lower standard than that of the City.

4.16 Street Patching and Restoration

A. See Chapter 2 of these Standards for requirements regarding street patching and trench restoration.

4.17 Hydrostatic Tests

A. Prior to the acceptance of work, a hydrostatic and pressure leakage test shall be conducted by the Contractor on all newly-constructed water mains, fire lines, fire hydrants leads and stub-outs in accordance with Standard Specifications, and AWWA C600, unless specified otherwise by the City. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor. Prior to calling the City to witness the pressure test, the Contractor shall have all equipment ready for operation and have successfully performed the test to ensure that the pipe is in satisfactory condition.

B. Defective material or workmanship discovered, during a hydrostatic field test shall be replaced by the Contractor at no expense to the City. Whenever it is necessary to replace defective material or correct workmanship, the hydrostatic test shall be re-run at the Contractor's expense until a satisfactory test is obtained. Test pressure shall be maintained while the installation is inspected by the City.

4.18 Sterilization and Flushing

A. Sterilization of watermains shall be accomplished by the Contractor in accordance with the Standard Specifications. At no time shall chlorinated water from a new main be flushed into a body of water, including lakes, rivers, streams, drainage ways, and all waters where fish or other natural water life can be expected. Any discharge into a City sewer system must be approved in advance and in writing by the City. Sample collection should be scheduled with the City at least two (2) business days in advance. Samples can only be taken on Mondays, Tuesdays and Wednesdays.

General Notes (All Projects)

1. The Contractor shall provide all labor, equipment and materials to complete the work in accordance with the City Standards (referred to as "City Standards"), City of Tenino Standard Details (referred to as "Standard Details"), the most recent copy of the Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge and Municipal Construction (referred to as the "Standard Specifications") and WSDOT Standard Plans (referred to as "Standard Plans").

2. A pre-construction meeting shall be held with the City at least three business days prior to the start of construction.

3. The Contractor shall be responsible for all traffic control in accordance with MUTCD. Prior to disruption of any traffic, traffic control plans must be prepared and submitted to the city for approval. No work shall commence until all approved traffic control plans are in place.

4. All vertical and/or horizontal alignment, shall be staked by an engineering or surveying firm capable of performing such work and directed by a surveyor licensed to perform such work in the State of Washington. City datum shall be used for all vertical control.

5. Call the Utilities Underground Location Center at 1-800-424-5555 a minimum of two (2) business days prior to any excavations.

6. The Contractor shall comply with all other permits and requirements of the City and/or other governing authorities or agencies. If construction is to take place in the County right-of-way, the Contractor shall notify the County and obtain all the required approvals and permits.

7. It shall be the responsibility of the Contractor to maintain a copy of the approved construction plans on-site at all times bearing the signature of the City Public Works Director.

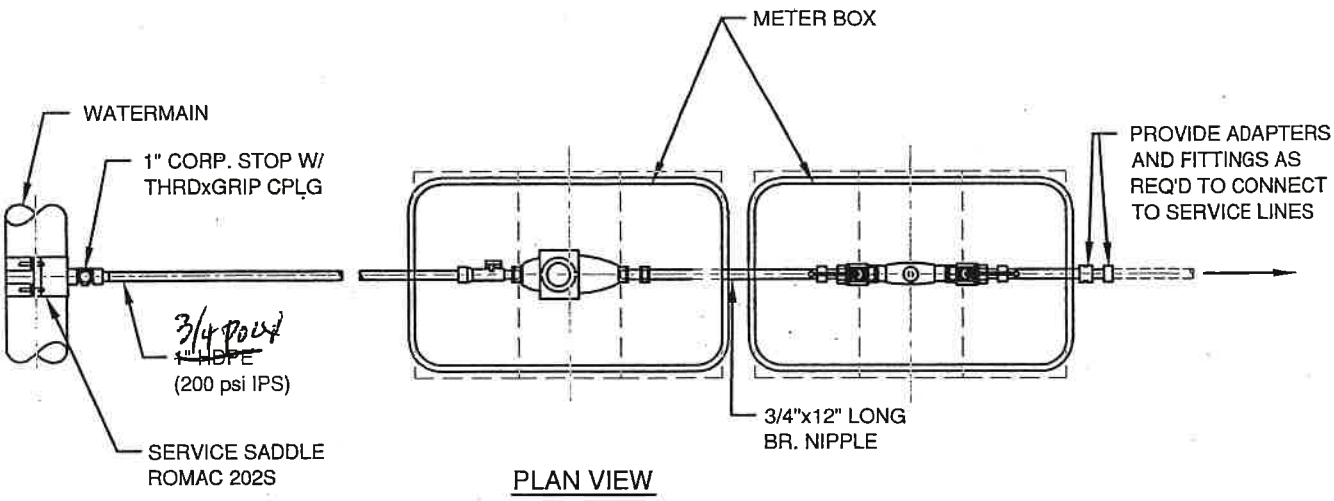
8. Any changes to the design shall first be reviewed and approved by the developer's project engineer and the City Public Works Director prior to implementation.

9. The Contractor shall notify the City five (5) business days prior to a utility shutdown. A City representative must be present for any utility shutdown. The City, at its discretion, may re-schedule shutdown. When shut downs require "field verification" of underground conditions, connection points will be exposed by the Contractor and work requirements shall be verified by the Contractor and the City two (2) business days prior to the shutdown. Customers involved with or affected by shutdowns will be notified by the Contractor at least forty-eight (48) hours in advance. Shutdowns will not be permitted on Fridays, weekends, or holidays without written authorization from the City.

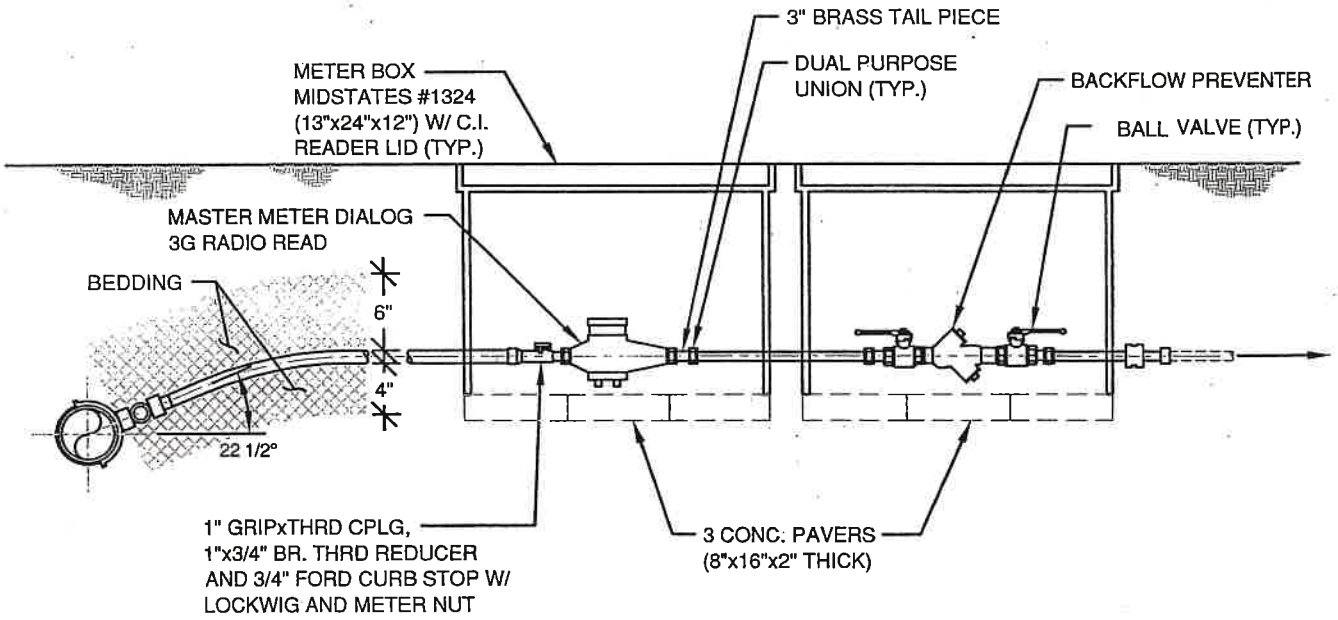
10. Prior to backfill, all buried pipe and appurtenances shall be inspected and approved by a representative of the City. It is the contactor's responsibility to notify the City in advance of all required inspections. Any pipe or appurtenance backfilled prior to inspection shall be re-excavated by the Contractor for inspection at no cost to the city. The Contractor shall retain responsibility to repair all deficiencies and failures revealed during all required testing for acceptance and throughout the duration of the warranty.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	GENERAL NOTES ALL PROJECTS	REVISED: 08-02-2007	DRAWING NO. 677

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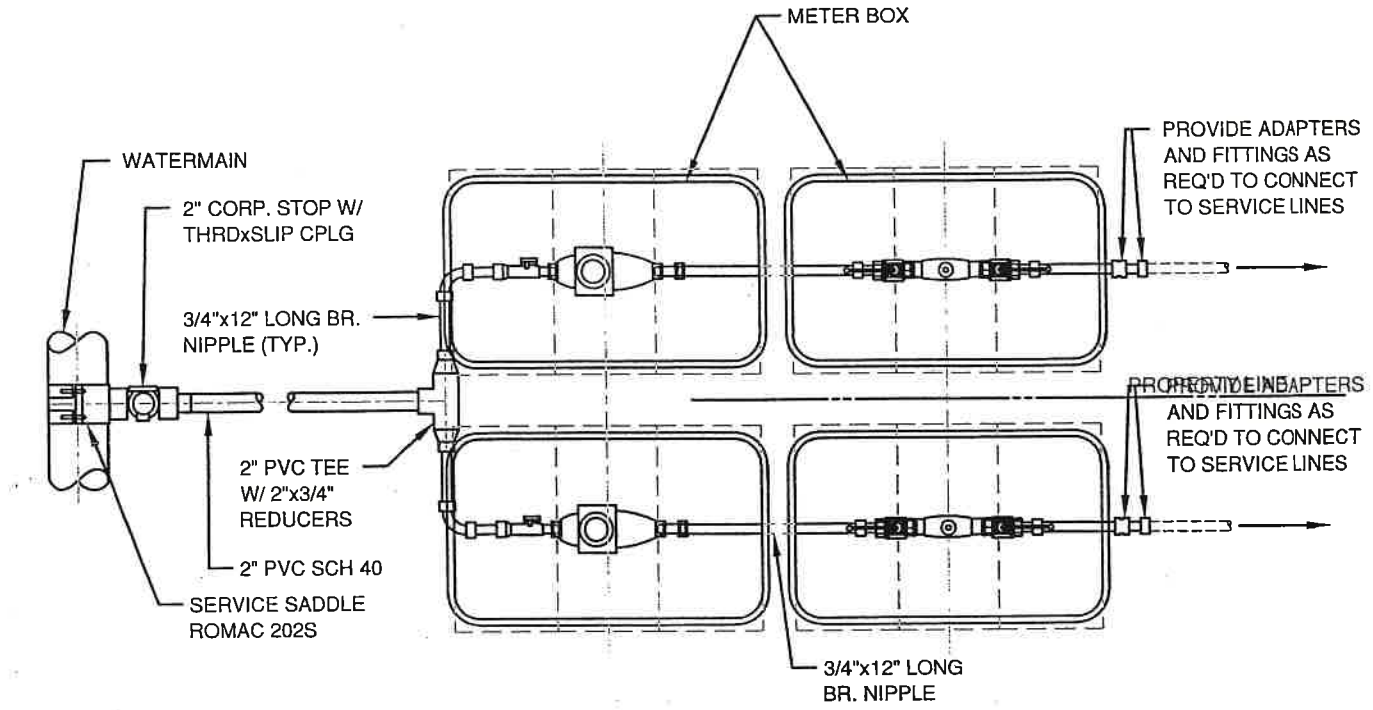
PLAN VIEW



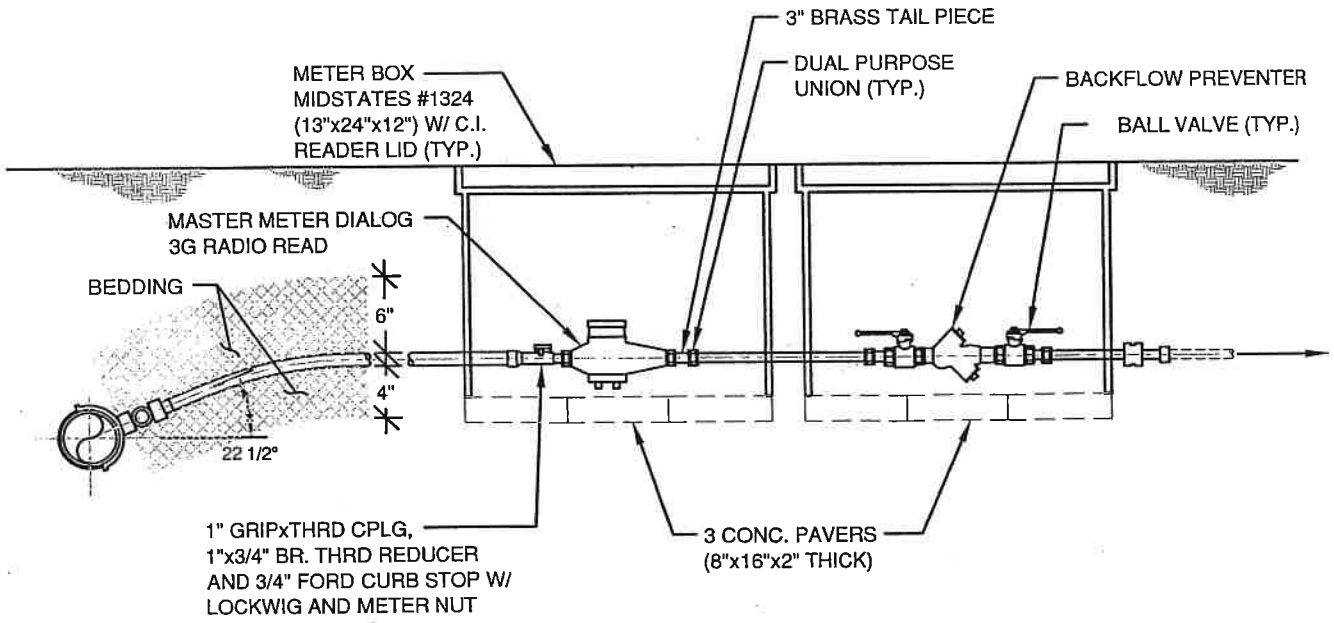
SECTION VIEW

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS 5/8" x 3/4" WATER SERVICE	REVISED: 08/02/2007	DRAWING NO. 678

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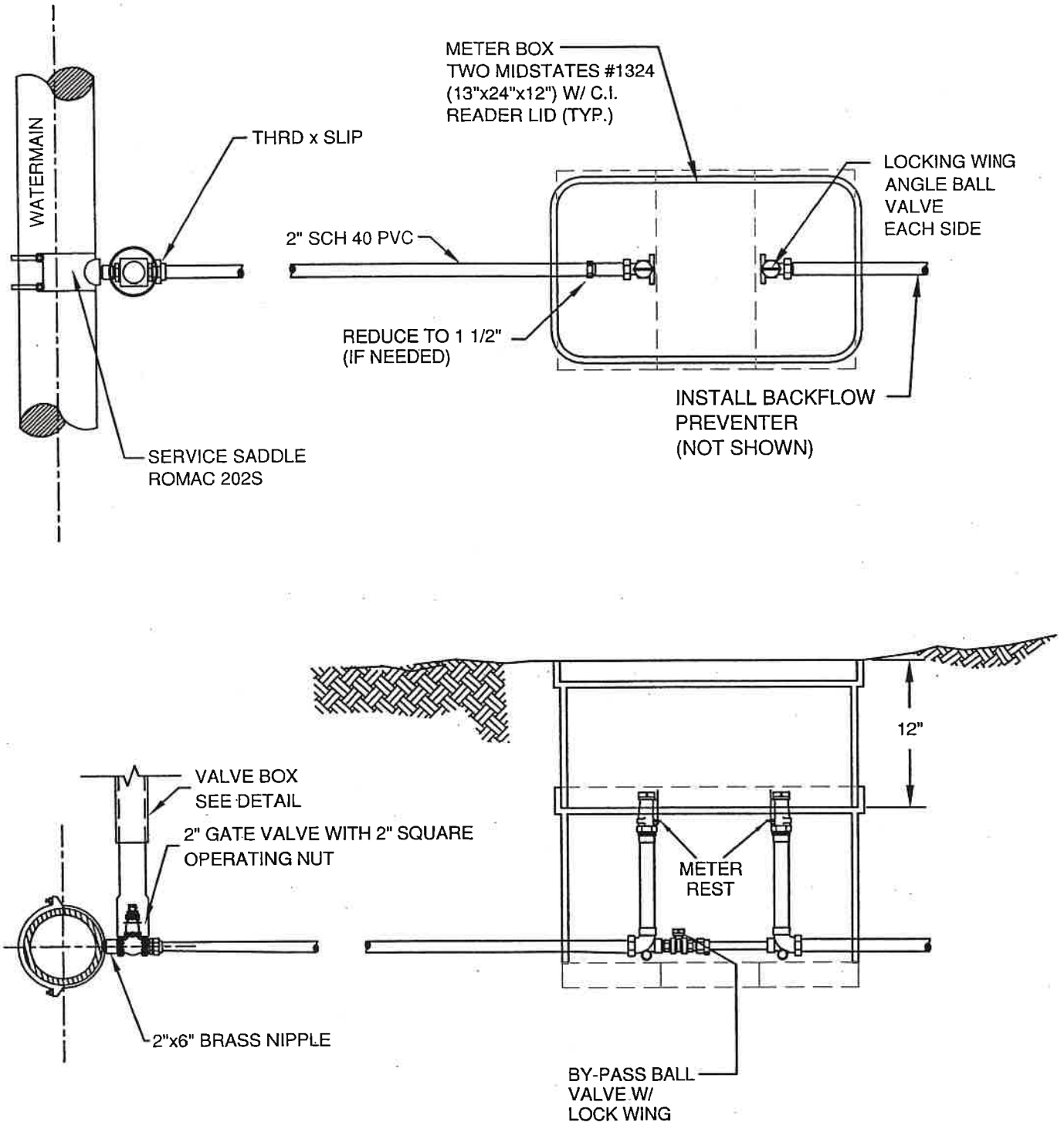
PLAN VIEW



SECTION VIEW

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS DOUBLE 5/8" x 3/4" WATER SERVICE	REVISED: 08/02/2007	DRAWING NO. 679

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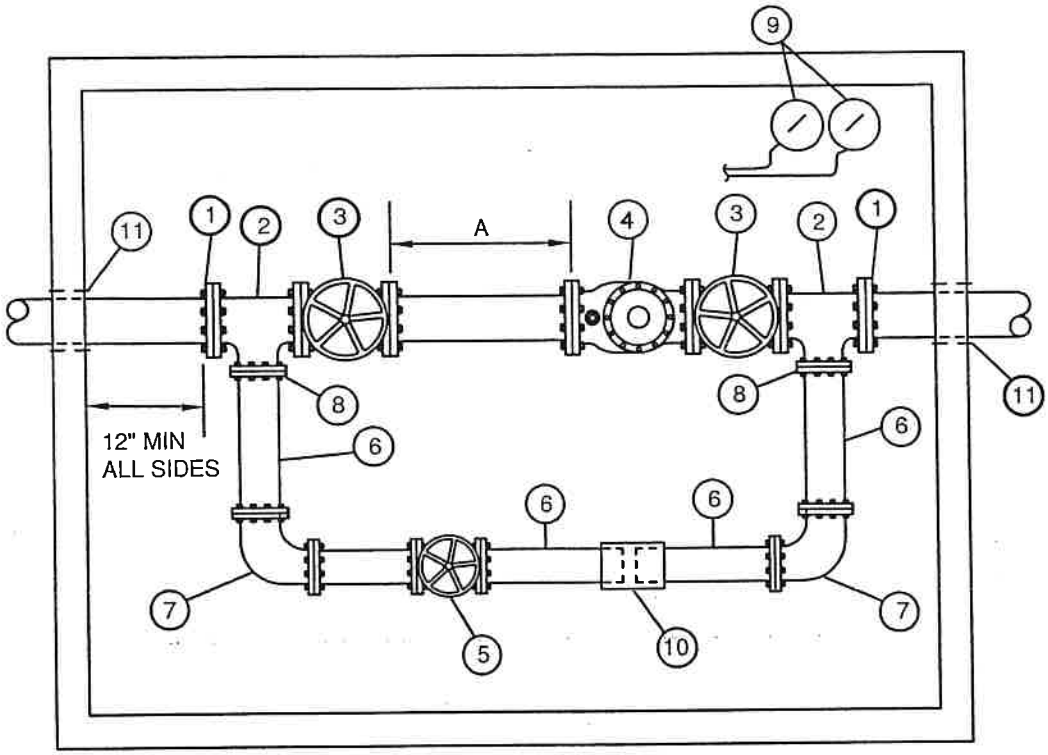


NOTES:

1. COPPER SETTERS SHALL BE:
   1 1/2" - FORD VVF76-12B-13-11-66
   2" - FORD VVF77-12B-17-11-77
2. METER INSTALLED BY CITY AT PROPERTY OWNER'S EXPENSE

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS 1 1/2" - 2" WATER SERVICE W/ BYPASS	REVISED: 08/02/2007	DRAWING NO. 680

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METER	MINIMUM DIMENSION "A"	DOOR SIZE	VAULT DEPTH	TEES
3" COMPOUND	15"	3' X 3'	5'0"	3"X1-1/2"
4" COMPOUND	20"	3' X 3'	5'0"	4"X2"
6" COMPOUND	30"	3' X 3'	5'0"	6"X4"
8" COMPOUND	40"	3' X 6'	5'0"	8"X6"

* VARIES, TO BE DETERMINED BASED ON SPECIFIC PARTS USED.

1. RESTRAINED FLG ADAPTER (RFA)
2. FLG TEE
3. FLG GATE VALVE W/ HAND WHEEL
4. COMPOUND METER
5. GATE VALVE W/HAND WHEEL
6. DUCTILE IRON SPOOL OR BRASS NIPPLES
7. 90° ELBOWS (MATERIAL TO BE SAME AS PIPE)
8. RFA OR BLIND FLG W/ THRD TAP
9. REMOTE READERS
10. MECHANICAL COUPLING OR UNION
11. SEAL ANNULAR SPACE W/ NON-SHRINK GROUT

NOTES:

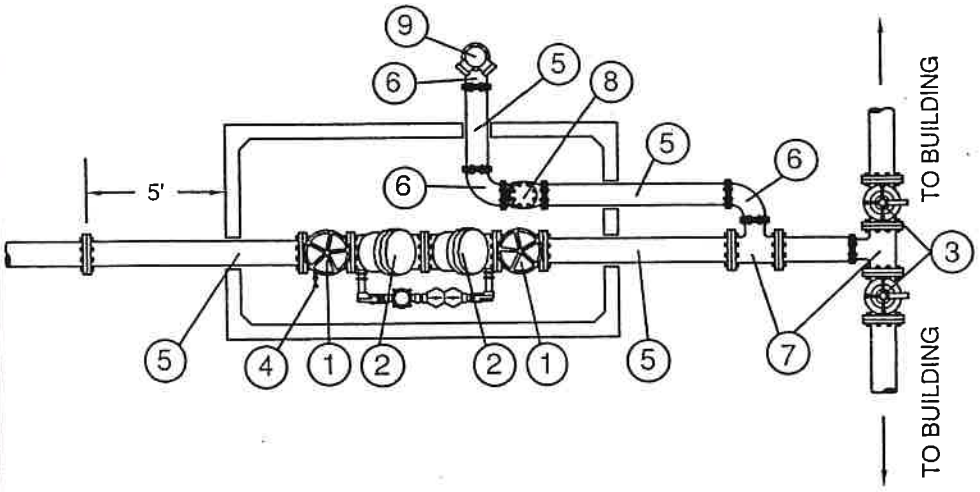
1. VAULTS SHALL BE THE STANDARD PRODUCTS AS MANUFACTURED BY UTILITY VAULT "LA" SERIES OR EQUAL. TOP SECTIONS SHALL INCLUDE HINGED LOCKING COVER (NO. 332P OR 2-332P) HINGED READER LID FOR REMOTE READERS.

2. PIPE AND FIXTURES TO BE SET ON VALVE STANDS INSTALLED ACCORDING TO MANUFACTURERS SPECS.

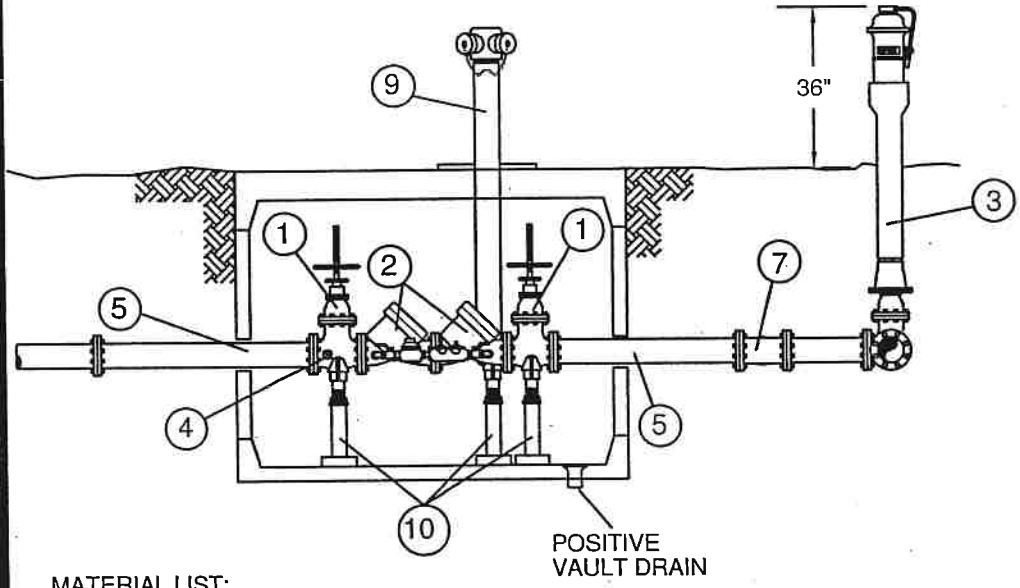
3. DRAINAGE MUST BE PROVIDED FOR THE VAULT.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	COMPOUND WATER METER W/ BYPASS FOR 3"-8" WATER SERVICE	REVISED: 08/02/2007	DRAWING NO. 681

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PLAN



PROFILE

MATERIAL LIST:

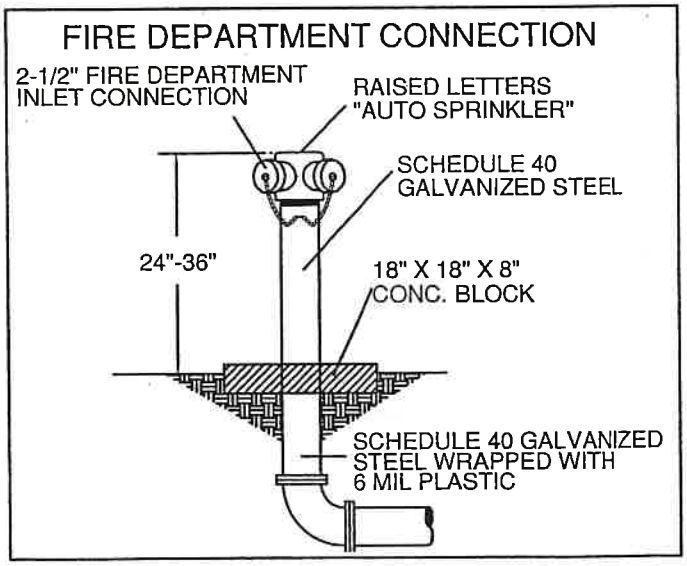
1. FLG GATE VALVE W/ HANDWHEEL
2. DOUBLE CHECK DETECTOR ASSEMBLY FLGxFLG (DOH APPROVED)
3. POST INDICATOR VALVE
4. 3/4" BALL VALVE (TEST COCK)
5. DI PIPE SPOOL
6. DI 90° FLG BEND
7. DI FLG TEE
8. SWING CHECK VALVE W/BALL DRIP ASSEMBLY
9. FIRE DEPARTMENT CONNECTION
10. VALVE STANDS
11. WHERE PIPING PASSES THROUGH CONCRETE WALL PROVIDE 2" CLEARANCE W/ WATERPROOF MASTIC OR FLEXIBLE SEALANT

GENERAL NOTES:

A. PIPE FROM WATER MAIN TO BUILDING SHALL BE CLASS 50 OR 52 DI.

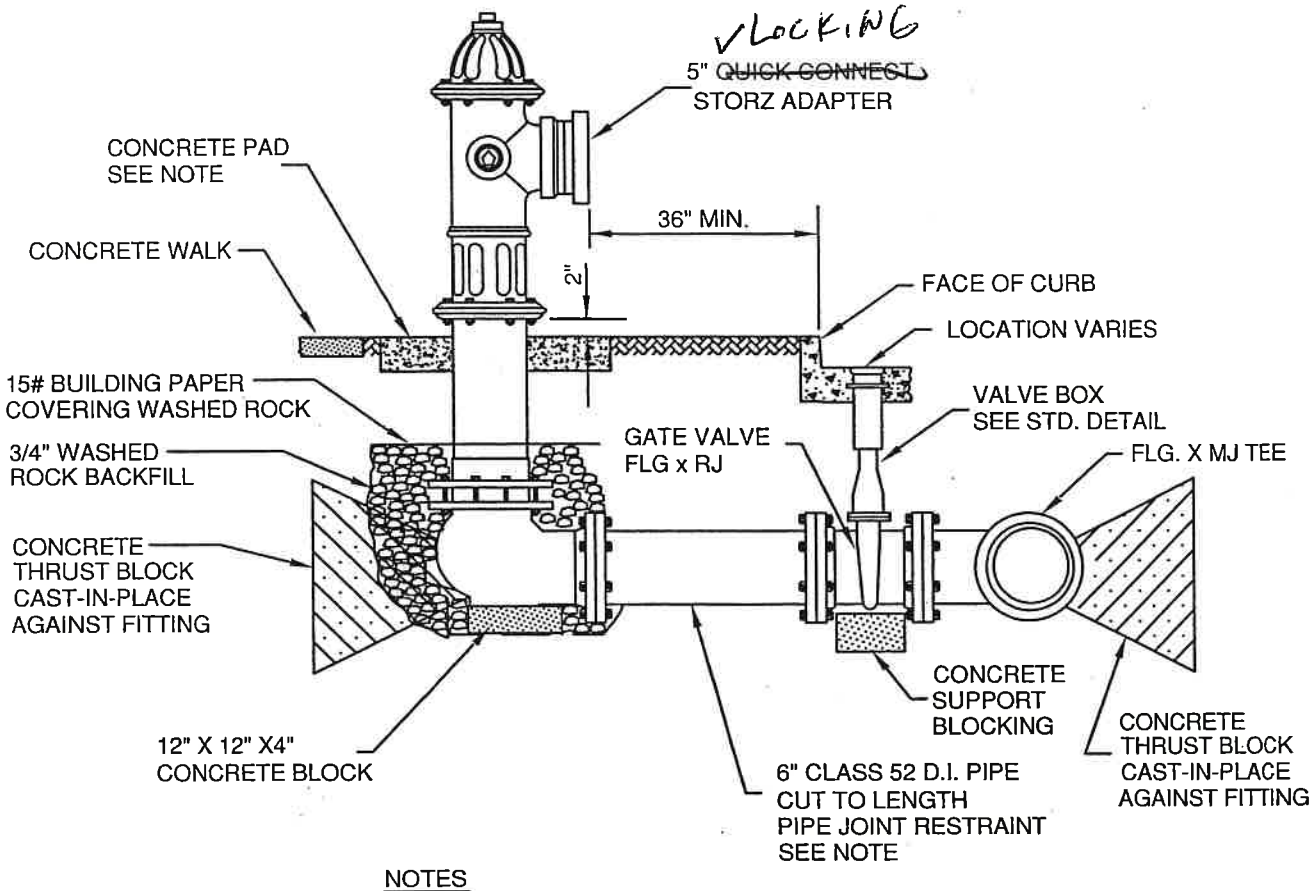
B. INSTALL PLUGS ON ALL TEST COCKS. (FINGER TIGHT)

C. ALL PIPING SHALL BE SIZED BY A LICENSED FIRE SYSTEMS DESIGNER. (MINIMUM OF 4")



CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS FIRE DEPARTMENT CONNECTION W/ DCDA	REVISED: 08/02/2007	DRAWING NO. 682

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-5FDC, 8/6/2007 9:00:51 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

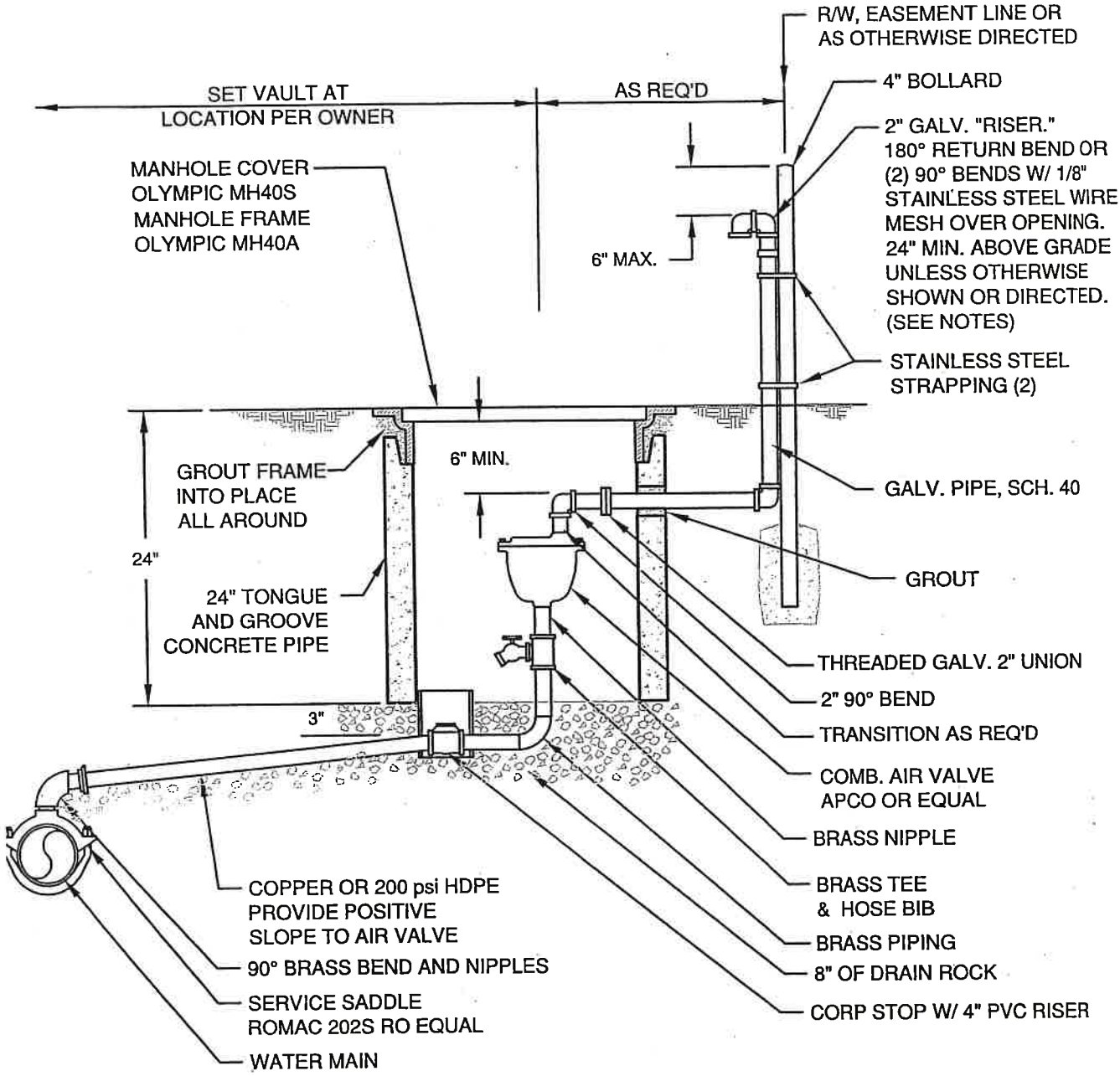


NOTES

1. HYDRANTS SHALL BE LOCATED WITHIN THE STREET RIGHT-OF-WAY, WITH A MINIMUM THREE-FOOT RADIUS UNOBSTRUCTED WORKING AREA.
2. HYDRANT SHALL BE M-H DRESSER 929.
3. HYDRANT SHALL BE PAINTED SUNBURST YELLOW HIGH-GRADE ENAMEL AFTER INSTALLATION.
4. MECHANICAL PIPE JOINTS SHALL BE MEGALUG SERIES RESTRAINING GLANDS.
5. A 4' X 4' X 8" DEEP CONCRETE PAD WILL BE POURED AROUND THE HYDRANT. ENTEND PAD TO 2' BEYOND GATE VALVE WHEN VALVE IS OUTSIDE OF PAVEMENT.
6. MINIMUM HYDRANT BURY SHALL BE 30".
7. INSTALL 4 BOLLARDS AROUND HYDRANT (4' RADIUS) IN UN-PROTECTED LOCATIONS.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS FIRE HYDRANT	REVISED: 08/02/2007	DRAWING NO. 683

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-6FH, 8/6/2007 8:00:52 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 inches), 1:1, Gibbs & Olson, Inc.

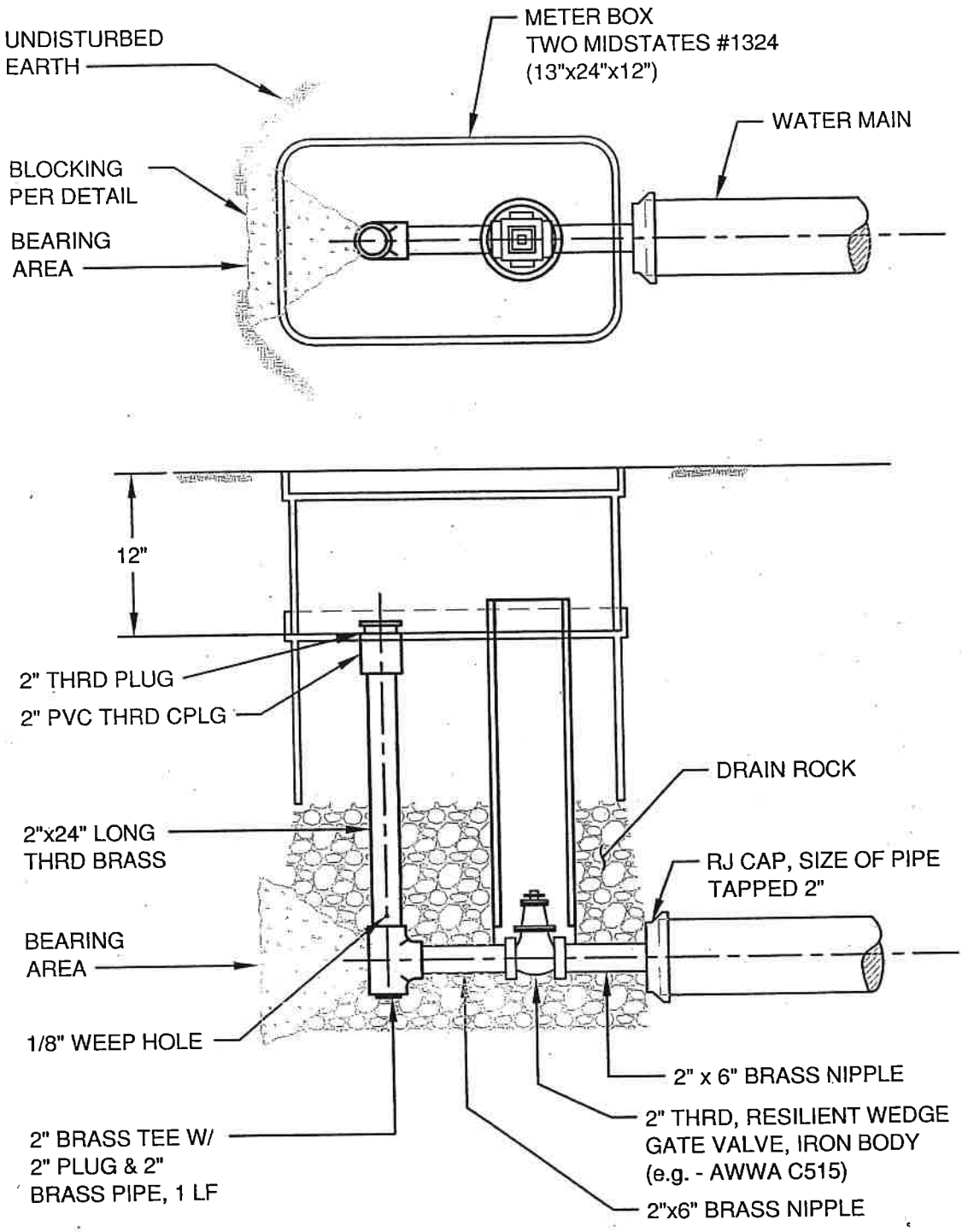


COMBINATION AIR VALVE NOTE:

1. DRAIN TO DAYLIGHT W/ 2" PVC IF APPLICABLE.
2. TERMINATE EXHAUST INSIDE VAULT W/ 90° BEND (DOWN) AND WIRE MESH IF VAULT IS DRAINED TO DAYLIGHT.

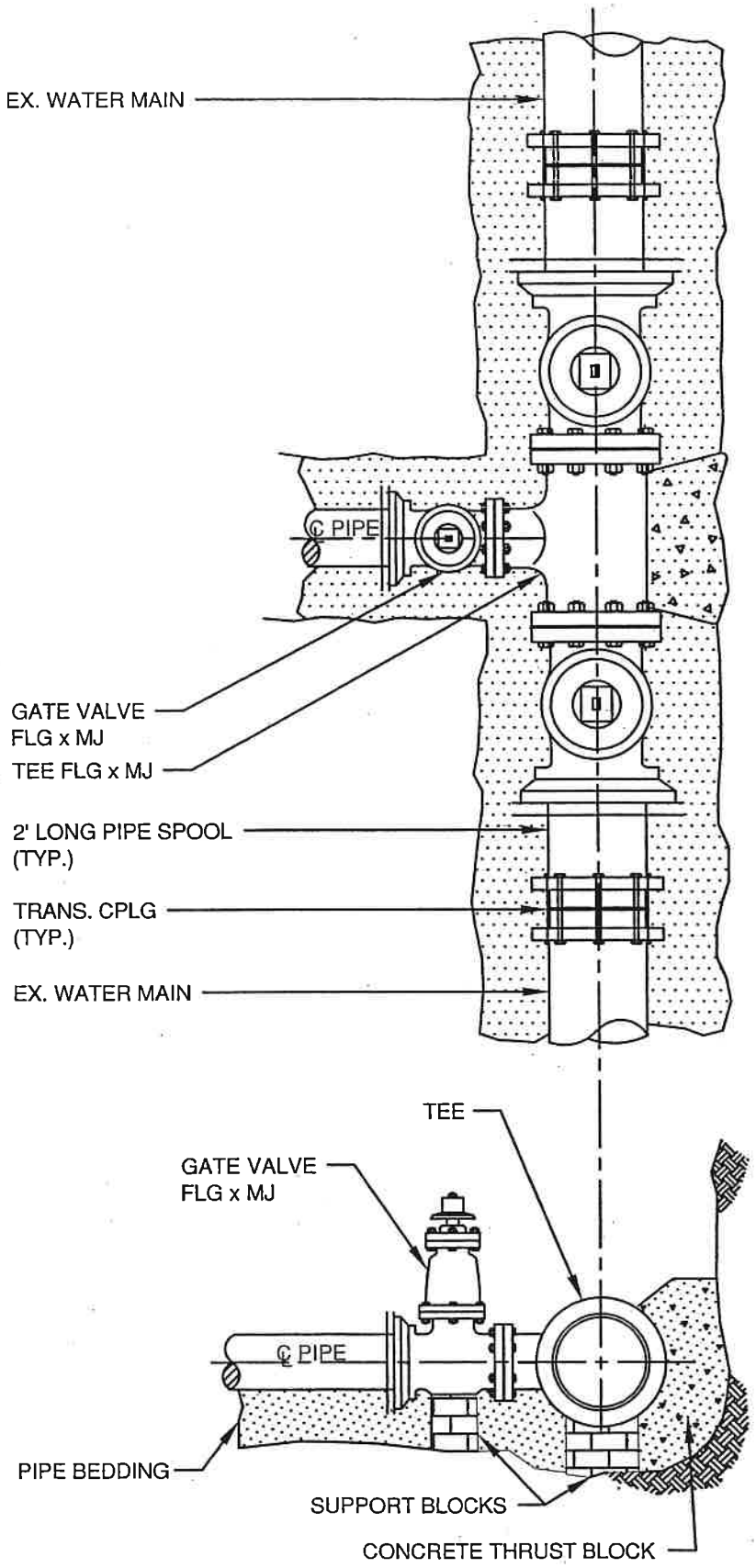
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS COMBINATION AIR VALVE	REVISED: 08/02/2007	DRAWING NO. 684

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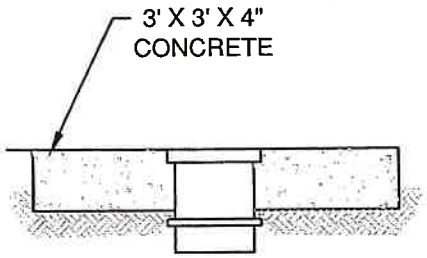
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS BLOW OFF VALVE	REVISED: 08/02/2007	DRAWING NO. 685

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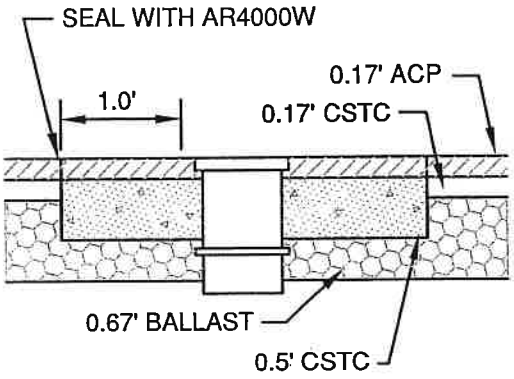


CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS CUT-IN TEE	REVISED: 08/02/2007	DRAWING NO. 686

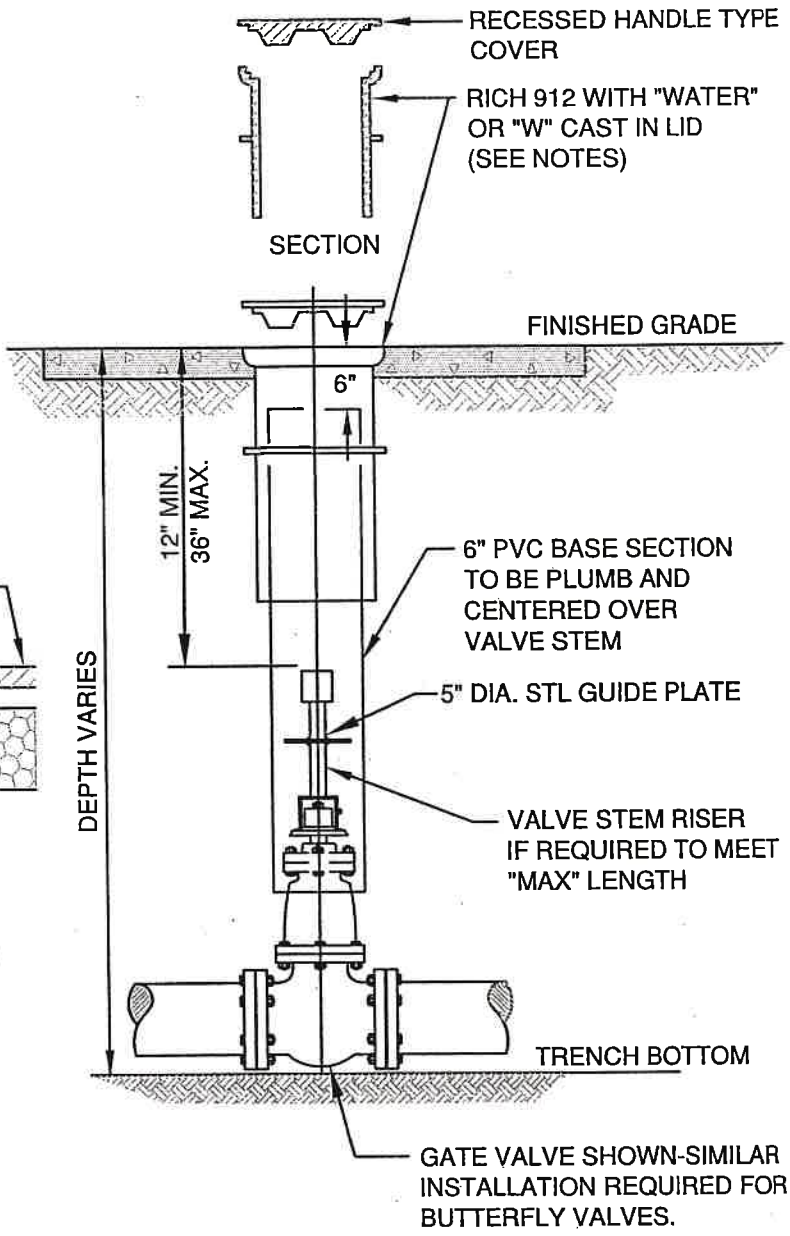
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OUTSIDE PAVED AREA



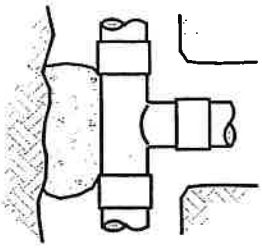
INSIDE PAVED ROADWAY



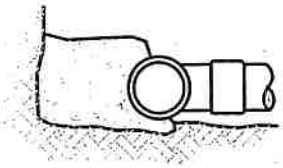
NOTES:
1. ALIGN VALVE COVER EARS IN DIRECTION OF FLOW THROUGH VALVE.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS VALVE BOX	REVISED: 08/02/2007	DRAWING NO. 4

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-10VB, 8/6/2007 9:00:58 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

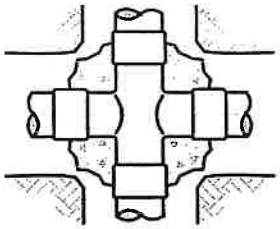


TOP VIEW

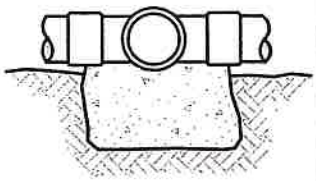


SIDE VIEW

TEE

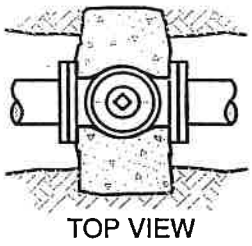


TOP VIEW

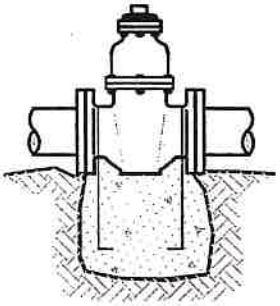


SIDE VIEW

CROSS

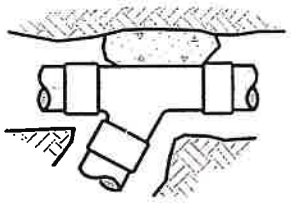


TOP VIEW



SIDE VIEW

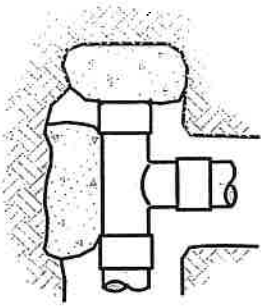
GATE VALVE



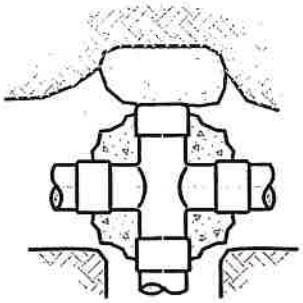
WYE



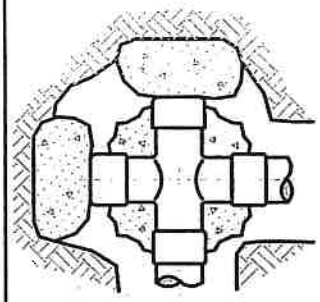
HORIZ. BEND



TEE WITH PLUG



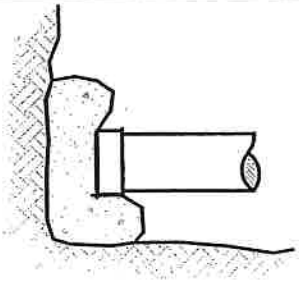
CROSS WITH PLUG



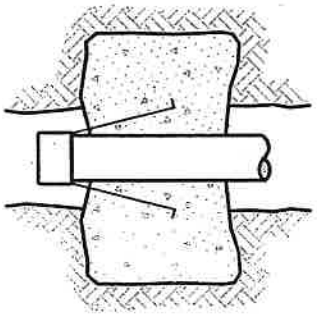
CROSS WITH PLUGS



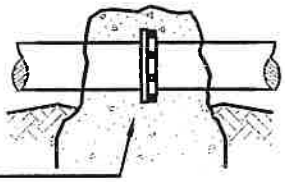
45° - 90° VERTICAL BEND



PLUG OR CAP

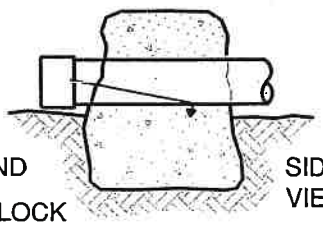


TOP VIEW



LOCKING RETAINER GLAND

ALTERNATIVE STRADDLE BLOCK



SIDE VIEW

DEAD-MAN THRUST BLOCKING

NOTES:

1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. PLASTIC BARRIER SHALL BE PLACED BETWEEN ALL THRUST BLOCKS AND PIPE AND/OR FITTINGS.
3. ANCHOR REBAR SHALL BE 5/8" MINIMUM DIAMETER.
4. CONCRETE DEAD-MAN THRUST BLOCKING MAY BE REQUIRED BY THE CITY, OR ALLOWED AT THE DISCRETION OF THE PUBLIC WORKS DIRECTOR.
5. ALL STANDARD BLOCKING AND THRUST CRITERIA, AS LISTED ON "STANDARD THRUST LOADS DETAIL", SHALL APPLY.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS THRUST BLOCKING	REVISED: 08/02/2007	DRAWING NO. 4

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-11a-TB, 8/6/2007 9:00:57 AM, DFrye, DWF8 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 inches), 1:1, Gibbs & Olson, Inc.

THRUST LOADS

THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

NOTES:

1. BLOCKING SHALL BE COMMERCIAL CONCRETE POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.

2. TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):
   EXAMPLE : 12" - 90° BEND IN SAND AND GRAVEL
   32,000 LBS 3000 LB/S.F. = 10.7 S.F. OF AREA

3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.

4. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

SAFE SOIL BEARING LOADS

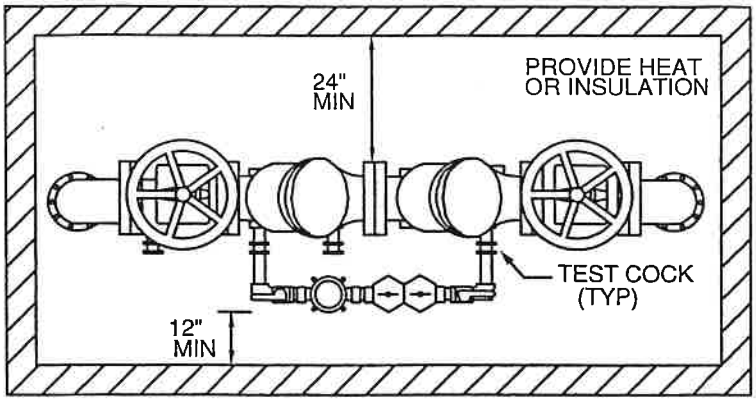
FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

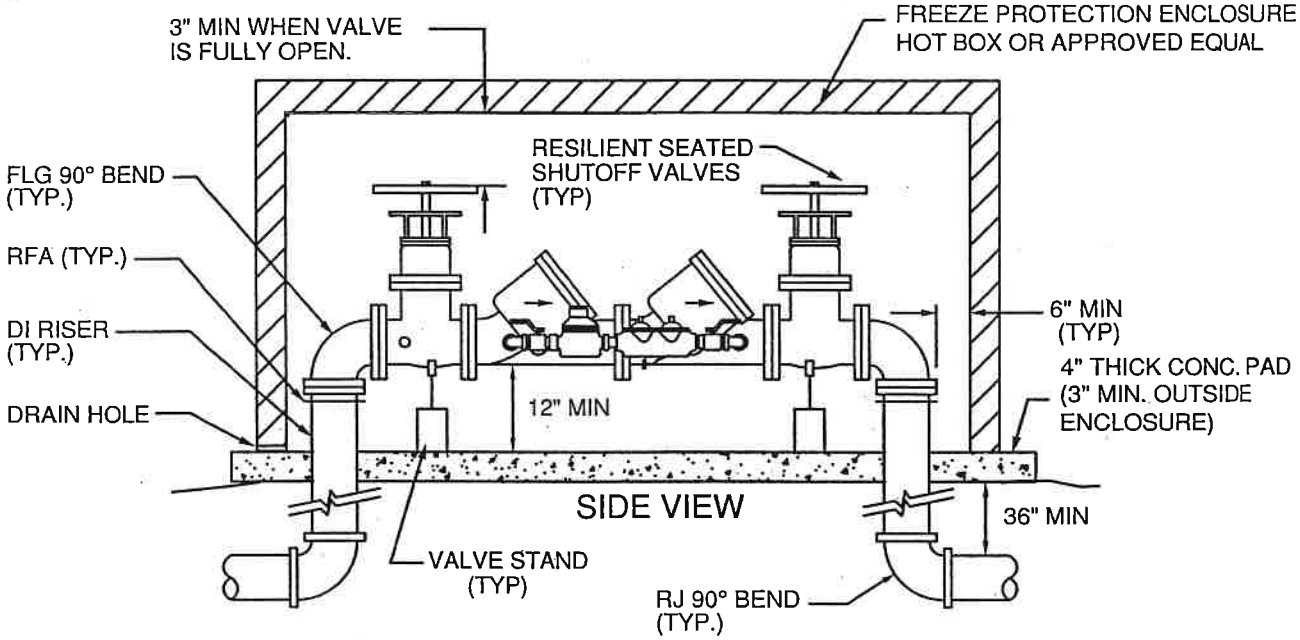
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS THRUST LOADS	REVISED: 08/02/2007	DRAWING NO. 4 689

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-11-b-TL, 8/6/2007 9:00:59 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

A CITY APPROVED VALVE IS REQ'D BETWEEN THE SUPPLY MAIN AND THE DCDA VALVE



TOP VIEW



SIDE VIEW

ABOVE GROUND INSTALLATION

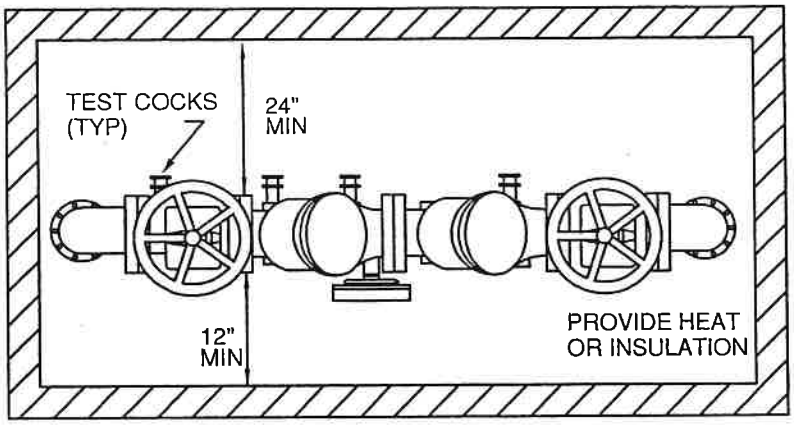
NOTES:

1. DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY (DCDA) SHALL BE ON THE CURRENT WASHINGTON STATE DEPT. OF HEALTH APPROVED LIST AND SHALL BE EQUIPED WITH 4 TEST COCKS AND A RESILIENT SEATED SHUT OFF VALVE MOUNTED AT EACH END.
2. THE BACKFLOW ASSEMBLY SHALL BE TESTED AFTER INSTALLATION BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.
3. ALL PIPE, VALVE, AND FITTING JOINTS FROM THE SUPPLY MAIN, SHALL BE FLANGED OR RESTRAINED.
4. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY.
5. THE BACKFLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND FLOODING.
6. ALL ENCLOSURES SHALL BE PRE-APPROVED BY THE CITY, PRIOR TO INSTALLATION.
7. DCDA SHALL BE INSTALLED AT PROPERTY LINE OF OWNERS PROPERTY.
8. DCDA SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
9. VALVE STANDS SHALL BE INSTALLED ACCORDING TO MANUFACTURERS RECOMMENDATIONS.

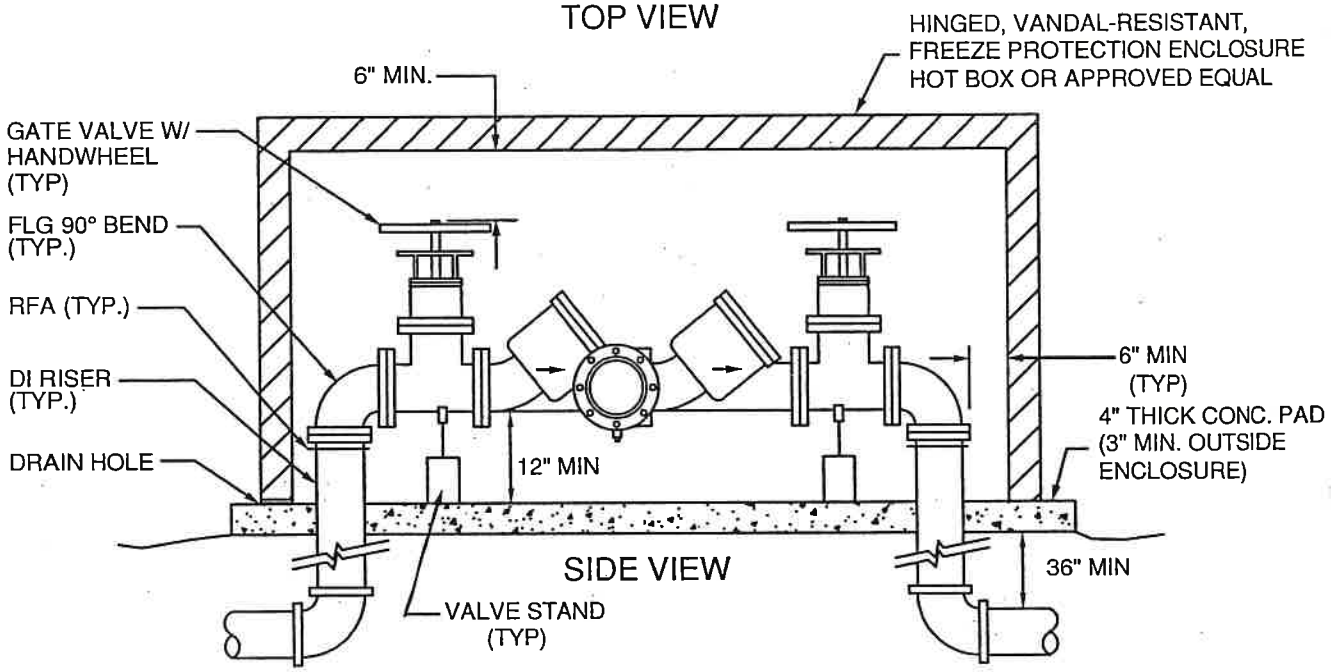
CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS DOUBLE CHECK DETECTOR ASS'Y 3" OR LARGER	REVISED: 08/02/2007	DRAWING NO. 690

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-12DCDA, 8/6/2007 9:01:00 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 inches), 1:1, Gibbs & Olson, Inc.

A CITY APPROVED VALVE IS REQ'D. BETWEEN THE SUPPLY MAIN AND THE RPBA VALVE



TOP VIEW



SIDE VIEW

NOTES:

1. REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) SHALL BE ON THE WASHINGTON STATE DEPT. OF HEALTH APPROVED LIST.
2. RPBA SHALL LAY HORIZONTAL AND BE INSTALLED ABOVE GROUND ONLY.
3. RPBA SHALL BE TESTED AFTER INSTALLATION BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.
4. ALL PIPE, VALVE AND FITTING JOINTS FROM THE SUPPLY MAIN, SHALL BE FLANGED OR RESTRAINED.
5. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY.
6. THE BACKFLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND FLOODING.
7. ALL ENCLOSURES SHALL BE PRE-APPROVED BY THE CITY, PRIOR TO INSTALLATION.
8. RPBA SHALL BE INSTALLED AT PROPERTY LINE ON OWNERS SIDE.
9. RPBA SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
10. VALVE STANDS SHALL BE INSTALLED ACCORDING TO MANUFACTURERS RECOMMENDATIONS.
11. TEST COCKS SHALL BE LOCATED SO AS TO FACILITATE ACCESS.

CITY OF TENINO PUBLIC WORKS DEPARTMENT	WATER DETAILS REDUCED PRESSURE BACKFLOW ASS'Y 3" OR LARGER	REVISED: 08/02/2007	DRAWING NO. 4

T:\Custom\Details\City of Tenino\Details-Water.dwg, 4-13RPBA, 8/8/2007 8:01:01 AM, DFrye, DWF6 ePlot.pc3, Gibbs & Olson - Report A Size (8.50 x 11.00 Inches), 1:1, Gibbs & Olson, Inc.

Appendix C

DOH Forms

7.

Water Right Self-Assessment Form for Water System Plans

331-372 • 1/13/2017

All water right permits, claims, and certificates must be evaluated in a water right self-assessment for all sources used to supply the water system. The self-assessment compares the parameters and other limitations of existing water rights against current and forecasted water production, as described in your water system plan, to determine whether the rights are adequate to serve your system's current and future water needs.

You must account for all sources of supply and total quantities of water withdrawn from the source. If you purchase water from another purveyor through a non-emergency intertie, you must complete the INTERTIES section of the self-assessment.

A Note on Exempt Wells

If you're seeking DOH approval of a new Group A or Group B water system using an exempt well, you must complete the self-assessment, although certain fields will not apply. Talk to your DOH regional planner about using the Water Right Self-Assessment form for a Small Water System Management Program instead of this version.

Local governments must ensure that an adequate potable water supply is available from the exempt well before issuing a building permit. Before developing a permit exempt well, check with your local authorities on their criteria for establishing an adequate potable water supply for your planned public water system.

Water Right Parameters

Below is a brief description of the parameters associated with a typical water right. For the self-assessment, you only need to describe the last two bulleted items if they apply to your water rights.

Source Type – this refers to whether the source is surface water, groundwater or a spring.

Source Location – this refers to the location of points of groundwater withdrawal or surface water diversion for each right.

Purpose of Use – this refers to the type of use, such as municipal water supply, community domestic, industrial or agricultural purposes.

Place of Use – this describes where water can be put to beneficial use under the right. Under the 2003 Municipal Water Law, RCW 90.03.386, the place of use for a water right held for municipal water supply purposes may be the system's service area as identified in an approved water system plan or small water system management program. See Ecology Policy 2030 for information on how Ecology administers the Municipal Water Law.

Period of Use – this refers to time-of-year limitations in which the water right may be put to use. If any water right has a time-of-year limitation, please include this information in the INTERRUPTIBLE WATER RIGHTS section.

Provisions or Limiting Conditions – this refers to any provisions or conditions placed on the water right. If a water right has a limiting condition or other provision, such as a collection and reporting requirement, other than a time-of year limitation, include this information in the ADDITIONAL COMMENTS section at the bottom of the self-assessment and in the water system plan narrative.

See Ecology Policy 1040 for more information on water right terminology. If you have questions about your water rights, please contact the Ecology regional office in your area.

Completing the Water Right Self-Assessment Form

The self-assessment is a Word document to allow users to make changes or to expand the document. You may use another format, if preferred, as long as all required information is included. Below is a description of all fields and how to complete them. This form is divided into four different sections. Each section is described in the headings below.

See the column identifiers (A, B, C, etc) at the bottom of each column for guidance in completing the necessary calculations.

Water Right Permit, Certificate, or Claim Number: This number is assigned by Ecology when a permit application is filed. It's listed at the top of the permit or certificate. For water right claims, this is the registration number stamped in the lower left hand corner of the claim form.

WFI Source #: Identify the individual sources (e.g. well #1, well #2) as defined on the DOH Water Facilities Inventory form. If a water right is associated with multiple sources, list all sources in the same row in this column. If a source is associated with multiple water rights, identify each water right on a separate row.

If you have any source(s) that is not currently being used (categorized as standby, back-up, or emergency), and the source has an associated water right that is not listed in column #1, please include the source and water right information in the ADDITIONAL COMMENTS section. This will identify that the source is still intended for a beneficial use under RCW 90.03.015(4). See Ecology Policy 1040.

EXISTING WATER RIGHTS SECTION *(olive green color, top section)*

This section refers to existing water rights. It does not include any water right applications that have been submitted to Ecology.

Primary Qi (Instantaneous Quantity): This is also known as instantaneous flow rate. It's the amount of water allowed to be taken under the right from the source during a period of peak operation. For surface water, this is generally expressed in terms of cubic feet per

second (cfs). For groundwater, this is generally expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm. Please indicate the units of measurement you are using for each source. If there are situations where the flow rate will be limited (e.g. limitations established on the source when other sources are utilized), please note them in the ADDITIONAL COMMENTS section in the form and in the WSP narrative.

Non-Additive Qi: This term was formally known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qi quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qi totals.*

Primary Qa (Annual Quantity): This is the amount of water that can be taken from the source under the right on an annual basis. It's usually expressed in terms of acre-feet. An acre-foot is the amount of water necessary to submerge an acre of land to a depth of one foot. One acre-foot equals 43,560 cubic feet or 325,851 gallons of water.

Non-Additive Qa: This term was formerly known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qa quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qa totals.*

CURRENT SOURCE PRODUCTION SECTION *(light green color, top section)*

This section refers to how much water is withdrawn from the source under each water right for the most recent full calendar year. You will need to determine any excess or deficiency for each water right after calculating how much water was withdrawn compared to how much water is allowed under each water right. If demand has decreased over past years, you may wish to include historic maximum production information in the ADDITIONAL COMMENTS section. This will provide a more complete picture of the use of your water rights.

Use the water use data and demand projections from your water system plan to define current and projected water needs. You can determine if you'll need additional water rights based on the comparison of existing water rights, current water production, and projected 10- and 20-year needs.

Total Qi (Instantaneous Quantity): This refers to the total maximum instantaneous flow rate withdrawn from the source under each water right during the most recent calendar year. For surface water, this is expressed in terms of cubic feet per second (cfs). For groundwater, this is expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm.

Current Excess or Deficiency (Qi): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

Total Qa (Annual Quantity): This refers to the total volume of water withdrawn from each source under each water right during the most recent calendar year. It's usually expressed in acre-feet.

Current Excess or Deficiency (Qa): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

10-YEAR FORECASTED SOURCE PRODUCTION SECTION *(light blue color, top section)*

This section refers to how much water you project to withdraw from each source in ten years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 10-year forecasted amounts.

20-YEAR FORECASTED SOURCE PRODUCTION SECTION *(darker blue color, top section)*

This section refers to how much water you project to withdraw from each source in twenty years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 20-year forecasted amounts. If you are unable to provide 20-year forecasts for each source, you may choose to include the combined 20-year total at the bottom.

PENDING WATER RIGHTS SECTION *(second section of form)*

Please complete this section for any water right applications that have been submitted to Ecology. Please include the application number, whether it's a new or a change application, the date submitted, and the total quantities requested.

INTERTIES SECTION *(third section of form)*

This section must be completed by purveyors who purchase any amount of wholesale water. If your system sells water to another public water system, include the quantity sold in the CURRENT SOURCE PRODUCTION section.

Purchasers of wholesale water must account for all water obtained through the intertie for non-emergency supply purposes. This is to ensure that all sources of supply are considered when evaluating whether new water rights are needed within 20 years.

Please identify the maximum quantity of water, expressed in the same manner as the above sections, allowed under each intertie contract. If there are limiting conditions or temporary

agreements that effect the long-term use of the intertie, you must account for such limiting conditions when evaluating the current and forecasted water supply needs in your water system plan.

Finally, purchasers of wholesale water are responsible for ensuring that the underlying water right (held by the purveyor selling water) are adequate for such use. You should confirm that the selling system has accounted for the wholesale area in their water system plan to ensure that the water right authorizes the distribution of water through the intertie.

INTERRUPTIBLE WATER RIGHTS SECTION *(bottom section of form)*

This section refers to water rights that have an annual time-of-year interruption. Please complete this section for any water right listed in the above fields that has a time-of-year interruption. Please include the water right number, describe the limitation, and the time period of interruption. Purveyors with interruptible rights should develop a water shortage response plan as part of their water system plan to describe how demand will be met during periods of interruption through aggressive demand-side conservation, fixing leaks or other means.

ADDITIONAL COMMENTS SECTION *(bottom section of form)*

If the system has any source that is not currently being used on a regular basis (such a source may be categorized as stand-by, back-up, emergency), you should identify the source in this section if the source has an associated water right that is not listed in the above sections. The purpose is to identify that such water rights are still intended for a future beneficial use as required under RCW 90.03.015(4). See Page 2, Item 9 (b) in ECY Policy 2030. For these water rights, please briefly describe the future intended use of the source and when you expect to utilize the water right. This does not refer to sources categorized as seasonal sources.

You should also include any other comments in this section that will explain aspects of your water right portfolio that are not identified above.

7.

Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1. 06869 G2*08779 C	Well No. 1	300 gpm		196 Acre-Feet/Year		-	-	-	-	-	-	-	-	-	-	-	-
2. G2-20933C	Well No 3.	400 gpm		74 Acre-Feet/Year	196 Acre-Feet/Year	-	-	-	-	-	-	-	-	-	-	-	-
	TOTALS =	700 gpm		270 Acre-Feet/Year		243 gpm	457 gpm	212 Acre-Feet/Year	58 Acre-Feet/Year	405 gpm	295 gpm	252 Acre-Feet/Year	18 Acre-Feet/Year	465 gpm	235 gpm	289 Acre-Feet/Year	(19) Acre-Feet/Year
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1.															
2															
3															
TOTALS =															
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
1		
2		
3		

ADDITIONAL COMMENTS:

June 2008
DOH 331-402

Setting Goals to Use Water Efficiently

Why set goals to use water efficiently?

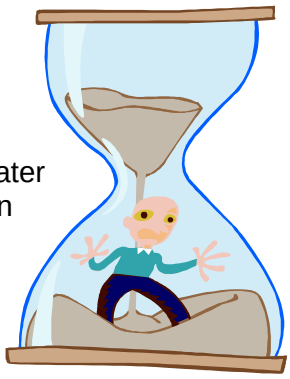
Water system owners, managers, and operators work hard to provide safe and reliable drinking water to their customers. Using water efficiently helps you manage the growing demand for water. One of the most important steps in using water efficiently is setting water efficiency goals. Goals help you track your progress and determine the success of your water use efficiency (WUE) program.

We've heard some water systems ask questions like:

- "Why should we spend the time and money to use water more efficiently?"
- "Why do we need to worry about saving water, there's water all around us?" Usually they are referring to large water bodies such as the Columbia, Snake and Yakima rivers, Lake Washington, and Puget Sound.
- "We've never run out of water before, so why set a goal to use water efficiently?"

In answering these questions, we remind systems how important it is to look at the "big picture" of water efficiency. Consider the value of water not just as a source of revenue, but also for its aesthetic, recreational and environmental benefits, and the benefits to the health of the watershed in which you live. Our water supplies are not endless; demands on the state's water are increasing daily. Understanding that water is a finite resource that we simply cannot do without helps explain why we need to set goals for using water efficiently.

Don't wait until it's too late



The water use efficiency rule is a proactive approach to protecting public health, preserving our state's water resources, and ensuring the efficient use of water. Water systems are in a better position to provide sufficient water to their customers when they take action to reduce the amount of water taken from the resource. Water efficiency becomes even more important in the event of a drought, as climate changes become more evident, as the state's population grows, and as fewer water rights become available to water suppliers.

As you think about setting your goals, consider the water supply in your community and what challenges you may face in the future. Show your community your commitment to protecting the resource. Demonstrate good stewardship by establishing goals that use water in the most efficient way possible.

Where to start

When getting ready to propose a goal, think about how your community can use water more efficiently without sacrificing cultural values. For example, if your community likes to garden, focus on how customers can change their gardening practices to use water more wisely. Consult your local nursery or county cooperative extension program to find materials and ideas you can use to educate your customers. Those water saving ideas can turn into a measurable water savings goal for the community. Here are some things to consider:

- Determine what types of cost-effective measures (such as water saving devices and education) will support the goal.
- Keep your customers informed of new water saving technology, such as soil moisture sensors or water efficient washing machines.
- Show how saving water can reduce other utility bills such as energy, gas, or wastewater.
- Identify a funding source for the measures you use to achieve the goal.
- Establish a timeline for achieving the goal.

Setting your goals

By law, you must establish at least one goal to help your customers use water efficiently. You must use a public process to do so.

Exploring what type of goals to set for your water system begins with stating a clear objective. We encourage you to adopt the most effective and water efficient goals possible. Every goal is specific to each water system. Your objective may involve different motivating factors such as water supply characteristics, infrastructure upgrade needs, social pressures, reducing outdoor water use, or the need to obtain additional connections to meet future demand.

You must evaluate and re-establish your goals every six years ***and*** any time you submit a water system planning document to the Department of Health for approval.

You have the flexibility to determine goals that makes sense for your customers and set as many goals you want.

How efficient can you be?

You might be asking yourself, “How good is good enough? Have I set a goal that the Department of Health will accept? Should I maintain the historic water use patterns of my community?” These are all questions you will need to consider. In many cases, you can find ways to reduce water use; it just takes some creativity to find those water savings.

If you end up establishing a goal to maintain a historic level (such as maintaining consumption at 65 gallons per person per day), you will need to explain to us why you are unable to reduce water use below that level.

The following are examples of acceptable goals:

- Reduce total production from wells by five percent within six years.
- Maintain daily consumption at 65 gallons per person per day for the next two years.

Before establishing your goal in a public meeting, please review the *Getting Started: Water Use Efficiency Guidebook*, DOH 331-375, for more information.

Don’t limit your choices

Many times, water systems only look at their average day demand or average use per person per day when setting goals. Consider establishing a goal that targets specific water users within your customer base. Reducing water use within the commercial or industrial class might be a good option for your goal if those customers use a large percentage of your system’s water.

For example, you might establish a goal to “Reduce industrial customer water use from 40 to 30 percent of total water system production by the year 2014.” You can achieve this by conducting water audits of your industrial customers, providing rebates, evaluating rates, and identifying how reducing water consumption can save them money.

What is the difference between setting goals and meeting the leakage standard?

In addition to setting a goal to reduce consumption by your customers, which you are required to do by law, we also encourage you to set a goal to reduce leakage within your water system. You are required to meet a leakage standard aimed at reducing leaks within your distribution system to no more than 10 percent, but this cannot be your only goal.

We realize that fixing your leaks may be your first priority and is one of the most cost-effective ways to use water efficiently. It’s also a great way to show your customers how you are protecting this important resource and might even encourage behavioral changes in how they use water.

Use education to achieve your goal while installing meters and reducing leaks

We understand that you will need to spend money on reducing leaks and installing meters. For many systems, installing meters and fixing leaks will be a priority and we support those efforts to meet the deadlines.

You can achieve your customer goal without spending a lot of money. Many water systems will rely entirely on education and outreach to achieve their goal. EPA’s WaterSense program is a great tool to help you meet your goal (see sidebar).

Educating your customers about using water efficiently is a requirement of the water use efficiency rule. It’s also one of the easiest things you can do to encourage changes in how your community uses water. As long as you educate your customers once per year, you have met the education requirement.

If you want to educate your customers more than once per year, (which we recommend) you can count it as a measure in your WUE program. The more often you can remind your customers about using water efficiently, the more likely they are to change water use patterns and understand why it’s important.

WaterSense can help!

WaterSense is a voluntary public-private partnership program sponsored by the U.S. Environmental Protection Agency (EPA). Its mission is to promote the value of water and help you and your customers make smart decisions about water use and water-using products.

For more information, visit their website http://www.epa.gov/WaterSense/ or contact the WaterSense Helpline by email at watersense@epa.gov or call 866-WTR-SENS (987-7367)

EPA WaterSense PARTNER

One good point to make: It takes energy to heat water. Using water efficient devices and appliances (such as low-flow shower heads and water efficient washing machines) will save your customers money on their gas and electricity bills and provide a great incentive to lower their water use.

Consider these educational opportunities to reduce water use:

- Add water efficiency tips to your annual Consumer Confidence Report.
- Monthly newspaper advertisements.
- Quarterly newsletter, which could include seasonal water use efficiency ideas.
- Bill stuffers.

Focal points for education and outreach

Many water systems have created demonstration gardens that show how certain landscapes can save a lot of water. Consider starting a demonstration garden or pilot project within your own community to prove how implementing water saving measures will save water. A project like this would count as part of an education and outreach strategy to help achieve your goal.

Achieve the goal using demand-side (customer) measures

There is a difference between demand-side measures and supply-side measures. When you are setting goals for your customers, you must choose demand-side measures.

Demand-side measures reflect actions that affect how much water customers use, and include things such as education programs, rebates for high-efficiency toilets, rate structures based on the amount of water use, water bills that show consumption history, or a program that notifies customers they may have a leak on their property.

Choosing the right WUE measure(s) is critical to helping you achieve your goals. Choose measures that directly relate to your goals. If you are not achieving your goals, try implementing different measures.

Pilot project idea: Select a homeowner that is willing to try out specific water savings measures within their home and compare that to historical water use patterns. Write up their story in your community newsletter to share with others. This will give you a good idea about how well the measure is working. It also gets your customers thinking about how to reduce their water use.

Achieve the leakage standard using supply-side measures

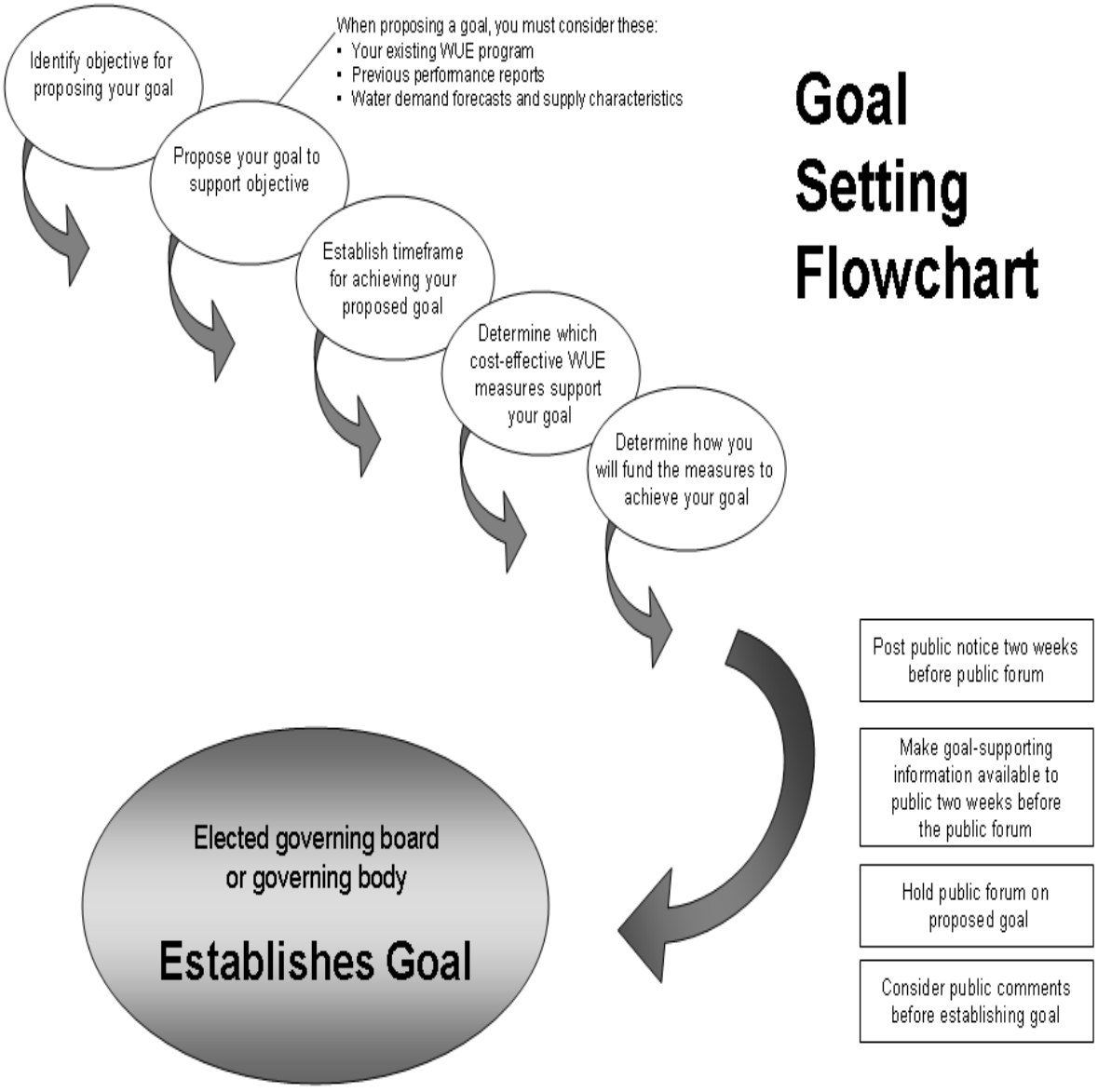
Supply-side measures show how efficiently the water system is operating, and generally include actions that will reduce leakage. They include things like meter replacement programs, source meter calibration, leak detection surveys, and water distribution system audits. You cannot use these types of measures to achieve a customer efficiency goal. These measures will not support a customer goal since they do not have a direct effect on whether customers use water more efficiently. Be careful not to select these with the assumption they will help meet the customer efficiency goal.

Setting goals in a public forum

You must engage your customers and interested members of the public when establishing your WUE goals. This meeting (forum) has many benefits. It gives your customers and the public a chance to affect decisions made by the governing body. It also helps consumers understand the need to use water more efficiently and teaches them how they can help you achieve your goals.

You should be prepared for any of the following three distinct groups to show up at your public meeting:

- Your water system's customers.
- Local community members.
- Special interest groups such as neighboring water systems, environmental organizations, tribal communities, and watershed planning units.



Public notice requirements

You must provide notice at least two weeks in advance of the meeting. The notice must include the following information:

- Purpose of the meeting.
- Date, time, and location for the meeting.
- Where your audience can find additional information supporting your proposed goal.

Use ODW's Website to provide public notice

Our water use efficiency website now has a feature that allows you to announce your goal-setting meeting and meets the public notice requirements. You can start the process by using this link on our website: How to post your goal-setting public forum to our website

Who can help

Seek out vendors and local conservation groups to find water efficiency products and services. The WaterSense website is a great resource to find products, services, manufacturers, retailers, distributors, and water efficient landscape professionals. Also available to help are the following organizations:

The Partnership for Water Conservation
http://www.partners4water.org/
206-957-2199

Evergreen Rural Water of Washington
http://www.erwow.org/
800-272-5981

Don't forget to ask your neighboring water systems about their water use efficiency programs when looking for ideas. Often they have the same questions you do, and together you may be able to form a local partnership for using water efficiently.

For more information

This and other publications are available at
http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater.aspx

Mike Dexel, Water Resources Policy Lead, 360-236-3154

Northwest Region – Kent 253-395-6750

Southwest Region – Tumwater 360-236-3030

Eastern Region – Spokane Valley 509-329-2100

It's Worth Saving Drinking Water

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

7.

7.

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 03/11/2020
Printed: 8/27/2021
WFI Printed For: On-Demand
Submission Reason: Contact 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
87400 7	TENINO CITY OF	THURSTON	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

TROY L. CANNON [PUBLIC WRKS DIR]
PO BOX 4019
TENINO, WA 98589

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS

TENINO, CITY OF
JOHN C. MILLARD CLERK/TREAS.
PO BOX 4019
TENINO, WA 98589

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS 149 S HODGDEN
CITY TENINO STATE WA ZIP 98589

9. 24 HOUR PRIMARY CONTACT INFORMATION

Primary Contact Daytime Phone: (360) 561-1506
Primary Contact Mobile/Cell Phone: (360) 701-8386
Primary Contact Evening Phone: (xxx)-xxx-xxxx
Fax:
E-mail: xxxxxxxxxxxxxxxxxxx

10. OWNER CONTACT INFORMATION

Owner Daytime Phone: (360) 264-2368
Owner Mobile/Cell Phone:
Owner Evening Phone: (xxx)-xxx-xxxx
Fax: (360) 264-5772
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
- [x] 1,000 or more person event for 2 or more days per year
- [ ] Hospital/Clinic
- [ ] Industrial
- [ ] Licensed Residential Facility
- [ ] Lodging
- [x] Recreational / RV Park
- [x] Residential
- [x] School
- [ ] Temporary Farm Worker
- [x] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

550,000

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	WELL #1 NO TAG WW				X								X			Y		X				X	89	290	NE SW	38	16N	01W
S02	WELL #2 NO TAG		X												X	Y		X				X	87	133	NE SW	38	16N	01W
S03	WELL #3 NO TAG WW				X								X			Y		X				X	58	350	NE SW	38	16N	01W
S04	WF (S01 & 3)			X									X			N		X				X	58	640	NE SW	36	16N	01W

706

7.

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
87400 7	TENINO CITY OF	THURSTON	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?)		685	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	561		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	1		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	34		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	123		
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.	71	71	
28. TOTAL SERVICE CONNECTIONS		756	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 1797

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?	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
B. How many days per month is water accessible to the public?	30	30	30	30	30	30	30	30	30	30	30	30

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month that are NOT alreay included in the residential population?	1439	1439	1439	1439	1439	71	71	71	1439	1439	1439	1439
B. How many days per month are they present?	22	22	22	22	22	22	22	22	22	22	22	22

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	4	4	4	4	4	2	2	2	4	4	4	4

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: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

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Total WFI Printed: 1

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

Water Facilities Inventory (WFI)

Report Create Date:	8/27/2021		
Water System Id(s):	874007		
Print Data on Distribution Page:	ALL		
Print Copies For:	DOH Copy		
Water System Name:	ALL		
County:	-- Any --		
Region:	ALL		
Group:	ALL		
Type:	ALL		
Permit Renewal Quarter:	ALL		
Water System Is New:	ALL		
Water System Status:	ALL		
Water Status Date From:	ALL	**To**	ALL
Water System Update Date	ALL	**To**	ALL
Owner Number:	ALL		
SMA Number:	ALL		
SMA Name:	ALL		
Active Connection Count From:	ALL	**To:**	ALL
Approved Connection Count	ALL	**To:**	ALL
Full-Time Population From:	ALL	**To:**	ALL
Water System Expanding	ALL		
Source Type:	ALL		
Source Use:	ALL		
WFI Printed For:	On-Demand		

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7.

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

Date Submitted: 6/10/2022

Water Use Efficiency
Annual Performance Report - 2021

WS Name: Tenino City of

Water System ID# : 87400 WS County: THURSTON

Report submitted by: *Troy Cannon*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not 100% metered – Did you submit a meter installation plan to DOH? No

Within your meter installation plan, what date did you commit to completing meter installation?

Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period *01/01/2021* To *12/31/2021*

Incomplete or missing data for the year? *No*

If yes, explain:

Total Water Produced & Purchased (TP) – Annual volume gallons	*64,125,027*	gallons	
Authorized Consumption (AC) – Annual Volume in gallons	*53,425,010*	gallons	
Distribution System Leakage – Annual Volume TP – AC	*10,700,017*	gallons	
Distribution System Leakage – DSL = [(TP – AC) / TP] x 100 %	*16.7 %*		
3-year annual average - %	*13.6 %*		*2019, 2020, 2021*

Goal-Setting Information:

Enter the date of most recent public forum to establish WUE goal: *02/24/2009*

Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process.

Customer WUE Goal (Demand Side):

The City plans on implementing a new utility committee to establish new goals. We will focus on consumer education, better leak detection and using reclaimed water for irrigation in the City Park. This will reduce usage for public use by 10% per year.

Customer (Demand Side) Goal Progress:

Additional Information Regarding Supply and Demand Side WUE Efforts

7.

Describe Progress in Reaching Goals:

- Estimate how much water you saved.
- Report progress toward meeting goals within your established timeframe.
- Identify any WUE measures you are currently implementing.
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day for the next two years) you must explain why you are unable to reduce water use below that level.

The following questions will help DOH better understand water usage, water resources management and drought response. The data will be used to provide technical assistance, not for regulatory purposes.

All questions are voluntary

Month	Date of Measurement	Static Water Level (feet below measuring point)	Dynamic Water Level (feet below measuring point)
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Water level data:

Please provide the following information (if known) to help us better utilize the water level data.

Well tag Id number:

Well depth:

Water level accuracy (within 0.01 ft < 1 ft ~ 1 ft)

Completion type (e.g., cased open interval, cased open-ended, cased open-ended with perforations, etc…)

Location coordinates (latitude, longitude) and accuracy of the coordinates (< 1ft, ~1ft, >1000ft)

Water level parameter name (e.g. depth below measuring point, depth below top of casing, depth below ground surface)

Elevation of top of casing OR elevation of measuring point if different than top of casing (as specified in question 7)

7.

Monthly/Seasonal Water Usage:

What was your maximum daily water demand for the previous year (in gallons per day)?

Month	Volume of Water Produced in gallons
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

Water shortage response:

Did you activate any level of water shortage response plan the previous year?

☐ Yes ☐ No ☐ There was no need to

If you activated a water shortage response plan the previous year, what level did you activate? (Check all that apply)

☐ Advisory Conservation ☐ Voluntary Conservation

☐ Mandatory Conservation ☐ Rationing ☐ Other

What factors caused your water shortage the previous year?

☐ Drought ☐ Fire ☐ Landslides ☐ Earthquakes

☐ Flooding ☐ Water Supply Limitations ☐ Other

Do not mail, fax, or email this report to DOH

7.

7.

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

Public Water System
Cross-Connection Control Activities
Annual Summary Report for ____

Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information

PWS ID:	PWS Name:	County:
Provide name and certification number of CCS who develops and implements your CCC program.		
CCS Name (Last, First & MI):		CCS Phone: (___) ___-____
CCS Cert. No.:	BAT Cert. No. (if applicable):	
CCS is (check one): PWS owner or employee ☐	On contract to PWS ☐	Volunteer or other ☐

Part 2: Status of Cross-Connection Control (CCC) Program at end of Reporting Year

PWS has (check one box in each column below):	
A written CCC program plan Y ☐ N ☐	CCC implementation activities Y ☐ N ☐

(CCC program plan may be a separate document or part of water system plan or small water system management program.)

Provide information about PWS's specific CCC Program Elements. ***Check one box in each column for each row***.

Program Element Number	**Description of Element [See WAC 246-290-490(3)]**	**This Program Element is Currently:**	
		Included in Written Program	**Being Implemented or is Completed**
1	Legal Authority Established	Y ☐ N ☐	Y ☐ N ☐
2	Hazard Evaluation Procedures and Schedules	Y ☐ N ☐	Y ☐ N ☐
3	CCC Procedures and Schedules	Y ☐ N ☐	Y ☐ N ☐
4	Certified CCS Provided	Y ☐ N ☐	Y ☐ N ☐
5	Backflow Preventer Inspection and Testing	Y ☐ N ☐	Y ☐ N ☐
6	Testing Quality Control Assurance Program	Y ☐ N ☐	Y ☐ N ☐
7	Backflow Incident Response Procedures	Y ☐ N ☐	Y ☐ N ☐
8	Public Education Program	Y ☐ N ☐	Y ☐ N ☐
9	CCC Records	Y ☐ N ☐	Y ☐ N ☐
10	Reclaimed Water Permit	Y ☐ N ☐ N/A ☐	Y ☐ N ☐ N/A ☐

Did you check one box in EACH of the above columns for EACH row?

Part 3A: System Characteristics

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). **Estimate if necessary**.

Type of Service Connection	**Number**
Residential (as defined by PWS)	
All Other (include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	
Total Number of Connections	

7.

Part 3B: Cross-Connection Control for High-Hazard Premises or Systems Served by the PWS

If PWS does not serve any high-hazard premises or systems, check here ☐ and go to Part 4.

- Complete all cells. Count only premises PWS serves water to. Enter zero (0) if PWS doesn't serve such premises.
- **Report data as accurately as possible. DOH currently bases CCC compliance actions on this information.**

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections			
	A. Being Served Water by PWS[1]	**B. With Premises Isolation by AG or RP[2]**	**C. With Column B AG Inspected or RP Tested**	**D. Granted Exception from Mandatory Premises Isolation**
Agricultural (farms and dairies)				
Beverage bottling plants (including breweries)				
Car washes				
Chemical plants				
Commercial laundries and dry cleaners				
Both reclaimed water and potable water provided				
Film processing facilities				
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies				
Food processing plants (including canneries, slaughter houses, rendering plants)				
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, blood plasma centers and mortuaries. **Please complete Part 3C on next page.**				
Dedicated irrigation systems using purveyor's water supply *and* with chemical addition[4]				
Laboratories				
Metal plating industries				
Petroleum processing or storage plants				
Piers and docks				
Radioactive material processing plants or nuclear reactors				
Survey access denied or restricted				
Wastewater lift/pump stations (non-residential only)				
Wastewater treatment plants				
Unapproved auxiliary water supply interconnected with potable water supply				
Other high-hazard premises (please list):[5]				
Totals				

[1] Count multiple connections or parallel installations to the same premises as ***separate*** connections.

[2] Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVAs or DCDAs installed for premises isolation.

[3] Count only those connections ***whose premises isolation preventers*** were inspected (AG) or tested (RPBA) during report year.

[4] For example, dedicated lines to irrigation systems in parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RPBA) 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, e.g.,: *other manufacturing* or *other commercial*. ***If needed, attach additional sheet giving same information as requested in table.***

7.

Part 3C: Cross-Connection Control for Medical Premises Served by the PWS

If PWS does not serve any medical premises of the types shown below, check here ☐ and go to Part 4.

- Complete all cells. **Do not count the same premises more than once.**
- Count only premises PWS serves water to. Enter zero (0) if PWS doesn't serve such premises.
- Report data as accurately as possible. DOH will base CCC compliance actions on this information.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of year			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG or RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Mandatory Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)				
Facilities for Treatment and Care of Patients not Located in Hospitals Counted Above				
Same day surgery centers				
Out-patient clinics and offices				
Alternative health out-patient clinics and offices				
Psychiatric out-patient clinics and offices				
Chiropractors				
Hospice care centers				
Childbirth centers				
Kidney dialysis centers				
Blood centers				
Dental clinics and offices				
Facilities for Housing Patients				
Nursing homes				
Boarding homes				
Residential treatment centers				
Other Medical-Related Facilities				
Mortuaries				
Morgues and autopsy facilities (not in hospitals)				
Veterinarian offices, clinics, and hospitals				
All other (describe in Part 6: Comments on pg 6)				
Totals				

[1] Count multiple connections or parallel installations to the same premises as ***separate*** connections.

[2] Count only connections with premises isolation AGs or RPs (RPBA or RPDA). Don't include connections with in-premises protection only or connections with DCVAs or DCDAs installed for premises isolation.

[3] Count only connections whose premises isolation preventers were inspected (AG) or tested (RP's) during report year. The number in Column C can't be larger than the number in Column B in the same row.

7.

Part 4A: Backflow Preventer Inventory and Testing Data

- Complete all cells. **Count only backflow preventers relied on to protect the PWS.** Enter zero (0), if there are no backflow preventers in that category.
- **If PWS records don't distinguish between premises isolation and in-premises protection preventers, enter all data in rows 1-6 and check box above row 1.**
- Count AVBs on irrigation systems only. **If you don't track AVBs, check the box above the "AVB" column.**
- Count multiple tests (or failures) for any particular backflow preventer as one test (or failure).
- Count each assembly separately for multiple service connections or parallel installations. Count RPDAs and DCDAs as single assemblies (don't count bypass separately).
- Count assemblies installed on dedicated fire or irrigation lines as Premises Isolation Assemblies.

If PWS doesn't track AVBs, check here. ☐

	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. ***If In-Premises Protection preventers are also included, check here*** ☐**.**									
Rows 1 – 3 pertain ONLY to Premises Isolation preventers in service at beginning of the year _____(fill in report year)									
1	In service at beginning of year								
2	Inspected and/or tested[1]								
3	Failed inspection or test this yea								
Rows 4 – 6 pertain ONLY to NEW Premises Isolation preventers installed during the reporting year									
4	New preventers installed[2]								
5	Inspected and/or tested[1]								
6	Failed inspection or test[3]								
7	Preventers taken out of service this year[3]								
Premises Isolation Total at end of year [4]									
In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.									
Rows 8 – 10 pertain ONLY *to In-Premises Protection Preventers in service at beginning of* ***report year***									
8	In service at beginning of year								
9	Inspected and/or tested[1]								
10	Failed inspection or test this year								
Rows 11 – 13 pertain ONLY to NEW In-Premises Protection preventers installed during the reporting year									
11	New preventers installed[2]								
12	Inspected and/or tested[1]								
13	Failed inspection or test this year								
14	Preventers taken out of service[3]								
In-Premises Protection Total at end of year[4]									
Grand Total at end of reporting year									

[1] Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only using DOH/USC test procedures).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at beginning of the report year. Replacement preventers may be of a different type than the original.

[3] New or existing preventers taken out of service, whether or not they were replaced by the same type or different type of preventer.

[4] Total at end of the year should be equal to the number of preventers in service at beginning of year plus those installed during the year minus the number of preventers taken out of service during the reporting year.

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Part 4B: Other Implementation Activities

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New service connections evaluated for cross-connection hazards to PWS.	
New service connections requiring backflow protection to protect the PWS.[1]	
Existing service connections evaluated for cross-connection hazards to PWS.	
Existing service connections requiring backflow protection to protect the PWS.[1, 2]	
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b).[3]	
CCC enforcement actions taken by PWS.[4]	

[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 to High-Health Hazard Premises Isolation Requirements Form (green) for each exception granted during the year.

[4] "Enforcement actions" mean actions taken by the PWS (such as water shut-off, PWS installation of backflow preventer, etc.) when the customer fails to comply with PWS's CCC requirements.

Part 5: Backflow Incidents, Risk Factors, and Indicators During Report Year: _____

Complete only one column for each row. Check "Data Not Available" if PWS doesn't track such data.

	Backflow Incidents, Risk Factors, and Indicators	Number (Enter 0 if none)	Check if Data Not Available
Backflow Incidents			
1	Backflow incidents that contaminated the PWS.[5]		☐
2	Backflow incidents that contaminated the customer's drinking water system ***only***.[5]		☐
Risk Factors for Backflow			
3	Distribution main breaks per 100 miles of pipe.		☐
4	Low-pressure events (<20 psi in PWS distribution system).		☐
5	Water outage events.		☐
Indicators of Possible Backflow			
6	Total health-related complaints received by PWS.[6]		☐
7	Received during BWA or PN events.[7]		☐
8	Received during low pressure or water outage events.		☐
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).		☐
10	Received during BWA or PN events.[7]		☐
11	Received during low pressure or water outage events.		☐

[5] Purveyors must submit a completed DOH Backflow Incident Report form for each backflow incident known to contaminate the public water system. DOH is also interested in receiving information on backflow incidents that contaminated the customer's drinking water system only. The DOH Incident Report form, Form #331-243, is available on the Office of Drinking Water (ODW) website at http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-457-F.pdf or from ODW on request.

[6] Such as stomachache, headache, vomiting, diarrhea, skin rashes, etc.

[7] "**BWA**" means ***Boil Water Advisory*** and **"PN"** means ***Public Notification*** for water quality reasons.

7.

Part 6: Comments and Clarifications

Enter comments or clarifications to any of the information included in this report. ***Please date the comment.***

Part No.	Comment	Date

Part 7: Report Completion Information

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name (print) [1]:		Title:
Signature:		Date:
Phone: (___) ___-____	E-mail: _____@_____	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
PWS Mgr./Owner Name (print) [2]:		Title:
Signature:	Op. Cert. No.:	Date:

[1] CCC Program Manager is generally the CCS responsible for developing and implementing the PWS's CCC Program.

[2] The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program. This person doesn't need to be in charge of the entire water system.

If you have a question or comment regarding this form, you can find contact information at https://www.doh.wa.gov/communityandenvironment/drinkingwater or email us at CCCprogram@doh.wa.gov.

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

7.

7.

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

Local Government Consistency Determination Form

Water System Name: City of Tenino PWS ID: 87400

Planning/Engineering Document Title: Water System Plan Plan Date: April 2023

Local Government with Jurisdiction Conducting Review: _____

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.	1-6; Fig 1-2	
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.	2-13	
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.	1-9	
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.	1-9	
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.	Full WSP to be provided after review of Ch. 2	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

_____ _____

Signature Date

_____

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents,** a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.

b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*

d) All **service area policies** for how new water service will be provided to new customers.

e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

7.

7.

Irrigation & Landscaping

Guideline 7

Did you know: Gardening professionals agree most lawns and yards receive more water than they need. Over-watering creates run-off that carries toxic fertilizers and pesticides into our streams. This not only harms wildlife and your plants, it wastes water and money, too! The following tips help protect the environment, keep your yard healthy, and save you money on your water bill.

General

1. Apply water only as fast as the soil absorbs it.
2. Water in the evening or early morning when evaporation is least likely to occur. Use drip irrigation during the day for little evaporation water loss. Do not water when it's windy.
3. Water only once a week. Water less often if your plants need less moisture (see Guideline 3—Lawn Watering).

Irrigation & Sprinklers

1. A properly designed and installed irrigation system should be included as a water conservation tool. Automated irrigation systems offer the ultimate in both control and distribution of water over other watering systems.
2. Keep your sprinkler system in good repair. Fix leaks and adjust sprinkler heads to eliminate over-spray onto paved areas or buildings. Investigate unusual runoff or puddling.



3. Turn off your sprinkler system at the first sign of saturation or run off to allow the water to soak in. Water again in an hour or 7. if needed.
4. Make sure the controller of your automated sprinkler system is properly set to achieve minimum watering levels.

Landscaping

1. Consider alternate landscaping practices. Reduce turf area or use groundcovers and/or mulches instead of turf. Generally, groundcovers use less water than turf areas.
2. Use low water using turf varieties. Consult your county extension office or local nursery to identify low water using turf varieties for your area.
3. Aerate to reduce thatch (dead grass) buildup in turf areas in spring or fall. Thatch restricts penetration of water, air and nutrients. Aeration will also increase water penetration in compacted soils.
4. Consider using organic fertilizer. Consult a nursery or landscape professional for a well balanced fertilizer program.
5. Spot spray weeds as needed and consider an integrated pest management program to control bugs and/or disease.
6. Use mulches such as bark compost to help planting beds retain moisture.
7. Consider water consumption when selecting plants. Some plants use more water than others. Consult a good gardening book or your local nursery to determine which low water using plants are correct for your area.
8. Plant placement is important. Remember, right plant, right place! Shade loving plants don't do well if placed in the sun and will require excessive watering to survive. Place plants with similar water needs in common areas so all can benefit from the same application of water.

More Information

Washington State Department of Health
Office of Drinking Water
P.O. Box 47828 • Olympia, WA 98504-7828
(360) 236-3100 • 1-800-521-0323
doh.wa.gov/DrinkingWater

7.

S. F. No. 7361—(Rev. 10-69)—10-69—5M. 15860.

7.

CERTIFICATE RECORD NO. 14, PAGE NO. 6869-A

STATE OF WASHINGTON, COUNTY OF Thurston

CERTIFICATE OF GROUND WATER RIGHT

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

THIS IS TO CERTIFY *That* TOWN OF TENINO

of Tenino, Washington, *has made proof to the satisfaction of the Department of Water Resources of a right to the use of the public ground waters of the State of Washington from* a well *located within* Stephen Hogden D.L.C. No. 38 within Town of Tenino of Sec. 19, Twp. 16 N., R. 1 W. W.M., *for the purpose(s) of* municipal supply *under and specifically subject to provisions contained in Ground Water Permit No.* 8428 *issued by the Department 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 Department of Water Resources and entered of record in Volume* 14 *at page* 6869-A; *that the priority of the right hereby confirmed dates from* June 5, 1967; *that the quantity of ground water under the right hereby confirmed for the aforesaid purposes, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 300 gallons per minute, 196 acre-feet per year, each year, for municipal supply.

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

Area served by Town of Tenino.

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

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

WITNESS the seal and signature of the Assistant Director, Division of Water Management, Department of Water Resources, affixed this 5th *day of* June, *19* 70.

Glen H. Liedlen

Assistant Director
Division of Water Management
Department of Water Resources

Engineering Data

OK

7.

Ground Water Permit No......

Certificate of Ground Water Right

Recorded in the Department of Water Resources, Olympia, Washington, in Book No...... *of Ground Water Right Certificates, on page*....., *on the* .....*day of*..... *19*.....

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

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

.....

STATE PRINTING PLANT, OLYMPIA, WASHINGTON

7.

ADD P.O.W.

7.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
SUPERSEDING

CERTIFICATE OF WATER RIGHT

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

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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 19, 1973	G2-20933	G2-20933	G2-20933

NAME
City of Tenino

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)

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

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #2 and #3

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	400	270*

QUANTITY, TYPE OF USE, PERIOD OF USE

74 acre-feet per year(primary)	Municipal supply	Year-round, as needed
*196 acre-feet per year(supplemental)	Municipal supply	Year-round, as needed

*(Supplemental to existing rights)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
Well #2) 1320 feet south and 1220 feet west of the northeast corner of Section 19.
Well #3) 1300 feet south and 1225 feet west of the northeast corner of Section 19.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼NE¼	19	16	1W	23	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Tenino

PROVISIONS

"This superseding certificate will be issued as partially supplemental to existing water right certificate 6869, and to the City's vested claim. The annual quantity of water allocated to Tenino under all existing rights shall not exceed 270 acre-feet per year. 196 acre-feet are considered supplemental, 74 acre-feet per year primary."

Nothing in this approval shall be construed as lessening or enlarging any water rights represented by Water Right Claim No. (claim no.). The water use authorized under this filing (fill in with water right no.) shall be considered supplemental to any water rights confirmed for said claim as a result of a general adjudication through Superior Court, should adjudication be undertaken.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

The well access port shall be maintained at all times.

Water levels shall be measured and recorded using a consistent methodology, in accordance with accepted industry standards. Such measurements shall be made at least monthly. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record.

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

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

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

this 13th *day of* October, *19* 94.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK VH

by Gale Blomstrom

FOR COUNTY USE ONLY

Appendix D

Water Quality

7.

Coliform Monitoring Plan for: City of Tenino

A. System Information

Plan Date: 12-27-2021

Water System Name Tenino Water System	**County** Thurston	**System I.D. Number** 87400
Name of Plan Preparer Gerald Mickelsen	**Position** Consultant	**Daytime Phone** **360-425-0991**
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S01: Well #1 No Tag WW, 89 ft, 290 gpm S02: Well #2 No Tag, 87 ft, 133 gpm S03: Well #3 No Tag WW, 58 ft, 350 gpm S04: WF (S01 & 3), 58 ft, 640 gpm	
Storage: List and Describe	(2) 275,000-gal glass lined steel tanks	
Treatment: Source Number & Process	S01 - S04: disinfection and corrosion control	
Pressure Zones: Number and name	One pressure zone	
Population by Pressure Zone	2,030	
Number of Routine Samples Required Monthly by Regulation:		Sep – May: 4 Jun – Aug: 2
Number of Sample Sites Needed to Represent the Distribution System:		7
***Request DOH Approval of Triggered Source Monitoring Plan?**		**Yes** ☐ **No** ☒

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name Thurston County Public Health Dept. Water Quality Lab	**Office Phone 360-867-2631** **After Hours Phone - -**
Address 412 Lilly Rd NE, Olympia, WA 98506	**Cell Phone - -** **Email** environmental_health@co.thurston.wa.us
Hours of Operation Monday – Friday: 9am – 4pm	
Contact Name _____	
Emergency Laboratory Name _____	**Office Phone - -** **After Hours Phone - -**
Address _____	**Cell Phone - -** **Email** _____
Hours of Operation _____	
Contact Name _____	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		

D. Routine, Repeat, and Triggered Source Sample Locations

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
1. Lesmeister 519 Huston St	**1-1.** 499 Huston St **1-2.** 535 Huston St **1-3.**	**S01** **S02** **S03** **S04**
2. Public Works 418 Wichman St S	**2-1.** 449 Wichman St S **2-2.** 388 Wichman St S **2-3.**	**S01** **S02** **S03** **S04**
3. City Hall 149 Hodgden St S	**3-1.** 125 Sussex Ave E **3-2.** 172 Central Ave E **3-3.**	**S01** **S02** **S03** **S04**
4. Deoskey 150 Stitham Ln	**4-1.** 100 Lemieux Ln **4-2.** 120 Stitham Ln **4-3.** 155 Stitham Ln	**S01** **S02** **S03** **S04**

*** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

_____

_____

_____

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

N/A

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	**1, 2, 3, 4**	**July**	**1, 2**
February	**1, 2, 3, 4**	**August**	**2, 3**
March	**1, 2, 3, 4**	**September**	**1, 2, 3, 4**
April	**1, 2, 3, 4**	**October**	**1, 2, 3, 4**
May	**1, 2, 3, 4**	**November**	**1, 2, 3, 4**
June	**3, 4**	**December**	**1, 2, 3, 4**

G. Level 1 and Level 2 Assessment Contact Information

Name **Troy Cannon**	**Office Phone 360-561-1506** **After Hours Phone 360-701-8386**
Address **PO Box 4019** **Tenino, WA 98589**	**Email tcannon@cityoftenino.org**
Name **Courtney Sheldon**	**Office Phone 360-264-2368** **After Hours Phone - -**
Address **PO Box 4019** **Tenino, WA 98589**	**Email csheldon@cityoftenino.org**

H. *E. coli*-Present Sample Response

Distribution System *E. Coli* Response Plan

If we have *E. coli* in our distribution system, we will immediately:

1. Call DOH. (360) 236-3030 or 1-877-481-4901 after hours.
2. Record description of sample collection locations,
3. Collect repeat and triggered source samples per Part D and two other routine monitoring sites.
4. Collect a sample from the nearest active well.
5. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 2-4.

E. coli-Present Triggered Source Sample Response Plan

If we have *E. coli* in any source, we will immediately:

1. Call DOH. (360) 236-3030 or 1-877-481-4901 after hours.
2. Take repeat samples.
3. Issue boil water advisory.
4. Inform local media of boil water advisory.

I. System Map

7.



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City of Tenino
Figure 3-1
Water Distribution Map

739

Generated on: 11/30/2023

Water Quality Monitoring Schedule

System: TENINO CITY OF **PWS ID: 87400 7** **Region: SOUTHWEST**
Contact: Troy L Cannon **Group: A - Comm** **County: THURSTON**

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

	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	Jun 2024	Jul 2024	Aug 2024	Sep 2024	Oct 2024
Coliform Monitoring Population	3336	3336	3336	3336	3336	3336	3336	1968	1968	1968	3336	3336
Number of Routine Samples Required	4	4	4	4	4	4	4	2	2	2	4	4

- 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 2021 - Dec 2023	standard - 3 year	09/19/2023		
Asbestos	1	Jan 2020 - Dec 2028	standard - 9 year	10/09/2018	Oct 2027	
Total Trihalomethane (THM)	1	Jan 2023 - Dec 2023	reduced - 1 year	09/19/2023		
Halo-Acetic Acids (HAA5)	1	Jan 2023 - Dec 2023	reduced - 1 year	09/19/2023		

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

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 S04 *WF (S01 & 3)* *Well Field* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Nitrate	1	Jan 2023 - Dec 2023	standard - 1 year	04/11/2023		
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/06/2018	Sep 2027	
Iron	1	Jan 2023 - Dec 2025	standard - 3 year	04/11/2023		
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	03/24/2022		
Herbicides	1	Jan 2023 - Dec 2031	waiver - 9 year	07/08/2016	Jun 2024	
Pesticides	0	Jan 2023 - Dec 2025	waiver - 3 year	07/08/2016		
PFAS	1	Jan 2023 - Dec 2025	standard - 3 year		***Mar 2023***	***Past Due***
Soil Fumigants	0	Jan 2023 - Dec 2025	waiver - 3 year			
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	05/13/2015		
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	05/13/2015		

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2023
Submit CCR certification form to ODW (Community systems only):	10/01/2023
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2023
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

Southwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Sophia Petro: (564) 669-0856 or sophia.petro@doh.wa.gov
For questions regarding DBPs:	Regina Grimm, p.e.: (360) 236-3035 or regina.grimm@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Southwest Office: (360) 236-3030 or SWRO.Coli@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.

Appendix E

Hydraulic Model Results

```
* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 11.113  03-10-2023                             *
*  Company:  GibbsOlson    Serial #:  592186               *
*  Interface:  KYnetic                                     *
*   Licensed for Pipe2018                                  *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *


 Date & Time:  Tue Apr 18 16:14:41 2023

 Master File : t:\projects\0751 tenino\5021 water system update\kypipe modeling\imports\water-distr-map_.KYP\water-distr-map_.P2K


              ************************************************
               S U M M A R Y   O F   O R I G I N A L   D A T A
              ************************************************


 U N I T S   S P E C I F I E D

    FLOWRATE ............ = gallons/minute
    HEAD (HGL) .......... = feet
    PRESSURE ............ = psig


 R E G U L A T I N G   V A L V E   D A T A

       VALVE       VALVE          VALVE
       LABEL       TYPE         SETTING
                               (ft or gpm)
 ----------------------------------------
Well Pump No  Const_FLOW_Pump       0.00
Well Pump No  Const_FLOW_Pump       0.00


 P I P E L I N E   D A T A

   STATUS CODE:   XX -CLOSED PIPE    CV -CHECK VALVE

   P I P E             NODE NAMES       LENGTH  DIAMETER  ROUGHNESS    MINOR
   N A M E            #1        #2       (ft)     (in)      COEFF.  LOSS COEFF.
 ---------------------------------------------------------------------------------
       P-1            J-1       J-10      564.56     8.00  140.0000       0.00
      P-10            J-8       J-11      209.15     2.00  140.0000       0.00
     P-100         J-145       J-62      192.29     4.00  140.0000       0.00
     P-101         J-109      J-146      280.46     4.00  140.0000       0.00
     P-102         J-146      J-128      302.88     4.00  140.0000       0.00
     P-103         J-147      J-102      254.28     8.00  140.0000       0.00
     P-104         J-148      J-147      302.70     8.00  140.0000       0.00
     P-105         J-129      J-147      301.36     8.00  140.0000       0.00
     P-106         J-129       J-61      134.92     8.00  140.0000       0.00
     P-107         J-132      J-150      348.86     8.00  140.0000       0.00
     P-108         J-150       J-60      186.99     8.00  140.0000       0.00
     P-109         J-230      J-151       35.93     6.00  140.0000       0.00
      P-11          J-12        J-9      123.31     2.00  140.0000       0.00
     P-110         J-151       J-54      304.12     6.00  140.0000       0.00
     P-111         J-152      J-174      269.57     6.00  140.0000       0.00
     P-112         J-174      J-155      296.45     6.00  140.0000       0.00
     P-113         J-155       J-44      363.91     6.00  140.0000       0.00
     P-114         J-157       J-58      216.49     8.00  140.0000       0.00
     P-115         J-158       J-52      353.86     8.00  140.0000       0.00
     P-116         J-159      J-158      273.19     8.00  140.0000       0.00
     P-117         J-159      J-160      329.29     8.00  140.0000       0.00
     P-118         J-160      J-161      303.54     8.00  140.0000       0.00
     P-119         J-161       J-27      127.34     8.00  140.0000       0.00
      P-12          J-13       J-14      572.52     4.00  140.0000       0.00
     P-120          J-34      J-161      307.34     8.00  140.0000       0.00
     P-121         J-161      J-163      185.32     8.00  140.0000       0.00
     P-122         J-163       J-39      192.72     6.00  140.0000       0.00
     P-123         J-165      J-163      303.05     4.00  140.0000       0.00
     P-124         J-101      J-165      332.73     4.00  140.0000       0.00
     P-125         J-101      J-167      271.81     4.00  140.0000       0.00
     P-126         J-167       J-51      303.40     4.00  140.0000       0.00
     P-127          J-95       J-47       32.62     6.00  130.0000       0.00
     P-128          J-50       J-49      302.12     6.00  130.0000       0.00
```

20 Year MDD + Fireflow Model Results

P-129	J-28	J-94	334.01	4.00	140.0000	0.00
P-13	J-16	J-36	577.26	4.00	140.0000	0.00
P-130	J-170	J-94	265.61	4.00	140.0000	0.00
P-131	J-48	J-170	303.50	4.00	140.0000	0.00
P-132	J-172	J-48	628.16	4.00	140.0000	0.00
P-133	J-172	J-129	300.73	4.00	140.0000	0.00
P-134	J-173	J-155	186.72	2.00	110.0000	0.00
P-135	J-159	J-174	323.79	2.00	110.0000	0.00
P-136	J-152	J-158	316.93	8.00	140.0000	0.00
P-137	J-54	J-176	85.83	6.00	140.0000	0.00
P-138	J-151	J-55	99.62	6.00	140.0000	0.00
P-139	J-179	J-59	187.39	4.00	140.0000	0.00
P-14	J-17	J-24	261.74	6.00	140.0000	0.00
P-140	J-181	J-172	139.90	4.00	140.0000	0.00
P-141	J-148	J-172	299.37	4.00	140.0000	0.00
P-142	J-183	J-49	113.95	4.00	130.0000	0.00
P-143	J-185	J-51	82.56	4.00	140.0000	0.00
P-144	J-187	J-48	298.52	8.00	140.0000	0.00
P-145	J-167	J-158	185.97	8.00	140.0000	0.00
P-146	J-96	J-170	137.72	4.00	140.0000	0.00
P-147	J-188	J-170	98.91	4.00	140.0000	0.00
P-148	J-189	J-188	199.79	2.00	110.0000	0.00
P-149	J-165	J-47	297.61	6.00	140.0000	0.00
P-15	J-18	J-19	273.18	6.00	140.0000	0.00
P-150	J-165	J-160	186.91	6.00	140.0000	0.00
P-151	J-1	J-28	267.19	8.00	140.0000	0.00
P-152	J-28	J-29	137.63	8.00	140.0000	0.00
P-153	J-29	J-163	292.61	8.00	140.0000	0.00
P-154	J-39	J-194	106.34	6.00	140.0000	0.00
P-155	J-195	J-72	275.99	2.00	110.0000	0.00
P-156	J-196	J-134	351.31	8.00	140.0000	0.00
P-157	J-196	J-69	359.98	8.00	140.0000	0.00
P-158	J-198	J-74	227.49	2.00	140.0000	0.00
P-159	J-88	J-89	67.89	2.00	140.0000	0.00
P-16	J-4	J-57	534.18	8.00	140.0000	0.00
P-160	J-201	J-89	104.40	2.00	140.0000	0.00
P-161	J-203	J-204	135.42	6.00	140.0000	0.00
P-162	J-12	J-13	398.64	4.00	140.0000	0.00
P-163	J-205	J-12	5.00	6.00	130.0000	0.00
P-164	J-207	J-11	5.00	6.00	130.0000	0.00
P-165	J-11	J-16	311.07	2.00	110.0000	0.00
P-166	J-209	J-210	60.83	6.00	130.0000	0.00
P-167	J-209	J-211	210.94	2.00	140.0000	0.00
P-168	J-212	J-209	210.94	2.00	140.0000	0.00
P-169	J-209	J-213	30.61	6.00	130.0000	0.00
P-17	J-19	J-20	1953.66	12.00	130.0000	0.00
P-170	J-15	J-41	38.95	2.00	110.0000	0.00
P-171	J-40	J-43	477.34	6.00	140.0000	0.00
P-172	J-218	J-43	24.72	6.00	140.0000	0.00
P-173	J-220	J-218	30.00	6.00	130.0000	0.00
P-174	J-222	J-220	30.00	6.00	130.0000	0.00
P-175	J-223	J-221	30.00	6.00	130.0000	0.00
P-176	J-222	J-223	60.00	6.00	130.0000	0.00
P-177	J-194	J-27	82.95	6.00	140.0000	0.00
P-178	J-1	J-189	598.02	8.00	140.0000	0.00
P-179	J-189	J-187	308.50	8.00	140.0000	0.00
P-18	J-21	J-23	739.67	6.00	140.0000	0.00
P-180	J-151	J-225	392.61	6.00	130.0000	0.00
P-181	J-225O-Well Pum		109.68	6.00	130.0000	0.00
P-182	J-225O-Well Pum		109.40	6.00	130.0000	0.00
P-183	J-230	J-82	134.15	6.00	140.0000	0.00
P-184	J-82	J-123	718.84	6.00	140.0000	0.00
P-185	J-56	J-123	367.50	6.00	140.0000	0.00
P-186	J-389	J-388	52.82	6.00	130.0000	0.00
P-187	J-58	J-150	75.19	8.00	140.0000	0.00
P-188	J-59	J-180	301.08	4.00	140.0000	0.00
P-189	J-60	J-107	400.92	8.00	140.0000	0.00
P-19	J-57	J-21	1177.27	6.00	140.0000	0.00
P-190	J-243	J-383	38.70	6.00	130.0000	0.00
P-191	J-245	J-76	40.10	2.00	110.0000	0.00
P-192	J-247	J-78	146.24	2.00	140.0000	0.00
P-193	J-62	J-250	52.07	2.00	140.0000	0.00
P-194	J-251	J-250	78.84	2.00	140.0000	0.00
P-195	J-143	J-253	184.93	8.00	140.0000	0.00
P-196	J-254	J-143	5.00	6.00	130.0000	0.00
P-197	J-141	J-86	313.12	6.00	140.0000	0.00
P-198	J-133	J-256	526.22	6.00	140.0000	0.00
P-199	J-87	J-258	196.59	6.00	140.0000	0.00
P-2	J-10	J-3	42.14	8.00	130.0000	0.00
P-20	J-37	J-15	578.48	8.00	140.0000	0.00
P-200	J-258	J-259	133.73	4.00	140.0000	0.00
P-201	J-115	J-111	40.58	6.00	140.0000	0.00
P-202	J-111	J-112	108.93	6.00	140.0000	0.00
P-203	J-260	J-116	27.25	6.00	130.0000	0.00

20 Year MDD + Fireflow Model Results

P-204	J-103	J-262	634.08	8.00	140.0000	0.00
P-205	J-262	J-263	355.80	8.00	140.0000	0.00
P-206	J-264	J-263	242.99	6.00	140.0000	0.00
P-207	J-113	J-262	303.07	6.00	140.0000	0.00
P-208	J-113	J-264	390.94	6.00	140.0000	0.00
P-209	J-264	J-265	498.95	6.00	140.0000	0.00
P-21	J-3	J-26	418.42	8.00	130.0000	0.00
P-210	J-250	J-104	71.65	2.00	140.0000	0.00
P-211	J-358	J-119	124.38	6.00	140.0000	0.00
P-212	I-Well PumWell	No. 1	16.31	6.00	130.0000	0.00
P-213	J-197	J-136	120.34	8.00	140.0000	0.00
P-214	I-Well PumWell	No. 3	17.14	6.00	130.0000	0.00
P-215	J-103	J-115	556.01	6.00	140.0000	0.00
P-216	J-120	J-88	238.04	6.00	140.0000	0.00
P-217	J-82	J-56	1379.66	6.00	140.0000	0.00
P-218	J-123	J-106	143.58	6.00	140.0000	0.00
P-219	J-125	J-68	71.81	8.00	140.0000	0.00
P-22	J-26	J-28	416.33	4.00	140.0000	0.00
P-220	J-284	J-124	19.69	6.00	130.0000	0.00
P-221	J-84	J-171	1858.48	8.00	130.0000	0.00
P-222	J-77	J-139	1497.31	6.00	140.0000	0.00
P-223	J-127	J-87	1184.74	8.00	140.0000	0.00
P-224	J-87	J-110	123.95	8.00	140.0000	0.00
P-225	J-146	J-93	862.64	6.00	140.0000	0.00
P-226	J-63	J-64	304.15	6.00	140.0000	0.00
P-227	J-78	J-77	192.73	2.00	140.0000	0.00
P-228	J-140	J-139	26.45	6.00	140.0000	0.00
P-229	J-75	J-137	1372.85	6.00	140.0000	0.00
P-23	J-29	J-30	348.98	6.00	130.0000	0.00
P-230	J-63	J-304	213.47	2.00	140.0000	0.00
P-231	J-305	J-65	51.77	6.00	130.0000	0.00
P-232	J-62	J-144	88.34	4.00	140.0000	0.00
P-233	J-61	J-132	143.54	8.00	140.0000	0.00
P-234	J-147	J-149	30.30	8.00	140.0000	0.00
P-235	J-143	J-255	5.00	6.00	130.0000	0.00
P-236	J-145	J-108	544.61	8.00	140.0000	0.00
P-237	J-64	J-128	290.01	6.00	140.0000	0.00
P-238	J-168	J-59	313.86	4.00	140.0000	0.00
P-239	J-169	J-61	296.86	6.00	130.0000	0.00
P-24	J-18	J-31	562.52	8.00	140.0000	0.00
P-240	J-65	J-66	36.13	6.00	140.0000	0.00
P-241	J-134	J-135	104.44	8.00	140.0000	0.00
P-242	J-49	J-169	326.57	6.00	130.0000	0.00
P-243	J-48	J-50	136.63	8.00	140.0000	0.00
P-244	J-50	J-167	302.42	8.00	140.0000	0.00
P-245	J-52	J-332	197.62	2.00	110.0000	0.00
P-246	J-52	J-157	285.26	8.00	140.0000	0.00
P-247	J-54	J-152	297.60	6.00	140.0000	0.00
P-248	J-51	J-168	15.20	4.00	140.0000	0.00
P-249	J-51	J-186	48.68	4.00	140.0000	0.00
P-25	J-31	J-32	537.17	8.00	140.0000	0.00
P-250	J-55	J-178	225.29	6.00	140.0000	0.00
P-251	J-47	J-29	302.61	6.00	130.0000	0.00
P-252	J-66	J-133	926.55	6.00	140.0000	0.00
P-253	J-44	J-34	27.54	8.00	140.0000	0.00
P-254	J-86	J-137	60.97	6.00	140.0000	0.00
P-255	J-24	J-37	50.43	6.00	140.0000	0.00
P-256	J-45	J-354	261.04	2.00	110.0000	0.00
P-257	J-42	J-45	70.29	6.00	140.0000	0.00
P-258	J-357	J-358	204.66	6.00	140.0000	0.00
P-259	J-135	J-197	236.97	8.00	140.0000	0.00
P-26	J-32	J-33	484.59	8.00	140.0000	0.00
P-260	J-64	J-362	239.05	2.00	140.0000	0.00
P-261	J-55	J-58	482.97	2.00	110.0000	0.00
P-262	J-116	J-365	49.95	2.00	140.0000	0.00
P-263	J-365	J-366	35.47	1.50	140.0000	0.00
P-264	J-124	J-357	179.43	6.00	140.0000	0.00
P-265	J-136	J-271	120.75	2.00	140.0000	0.00
P-266	J-358	J-368	150.58	6.00	140.0000	0.00
P-267	J-136	J-153	219.04	8.00	140.0000	0.00
P-268	J-371	J-256	186.41	6.00	140.0000	0.00
P-269	J-371	J-86	160.94	6.00	140.0000	0.00
P-27	J-33	J-40	502.13	8.00	140.0000	0.00
P-270	J-202	J-90	57.05	2.00	110.0000	0.00
P-271	J-91	J-90	69.29	2.00	110.0000	0.00
P-272	J-376	J-379	163.66	2.00	140.0000	0.00
P-273	J-378	J-379	68.46	2.00	140.0000	0.00
P-274	J-22	R-2	9.86	14.00	130.0000	0.00
P-275	J-164	J-382	102.35	2.00	140.0000	0.00
P-276	J-383	J-384	113.12	2.00	140.0000	0.00
P-277	J-78	J-386	152.39	2.00	140.0000	0.00
P-278	J-56	J-389	151.47	6.00	130.0000	0.00
P-279	J-389	J-390	93.46	2.00	140.0000	0.00
P-28	J-33	J-35	162.74	6.00	130.0000	0.00

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P-280	J-389	J-391	70.93	2.00	140.0000	0.00
P-281	J-17	J-30	16.38	6.00	130.0000	0.00
P-282	J-9	J-2	250.43	8.00	140.0000	0.00
P-283	J-24	J-42	568.60	2.00	110.0000	0.00
P-284	J-42	J-355	34.61	2.00	110.0000	0.00
P-285	J-83	J-81	343.03	4.00	140.0000	0.00
P-286	J-69	J-378	267.73	6.00	140.0000	0.00
P-287	J-98	J-95	258.46	6.00	130.0000	0.00
P-288	J-93	J-99	24.03	4.00	140.0000	0.00
P-289	J-148	J-187	627.71	8.00	140.0000	0.00
P-29	J-14	J-53	569.92	4.00	140.0000	0.00
P-290	J-203	J-6	474.49	8.00	140.0000	0.00
P-291	J-210	J-5	261.30	8.00	140.0000	0.00
P-292	J-218	J-221	30.00	6.00	130.0000	0.00
P-293	J-99	J-118	275.19	4.00	140.0000	0.00
P-294	J-153	J-84	103.07	8.00	140.0000	0.00
P-295	J-153	J-154	901.99	8.00	140.0000	0.00
P-296	J-120	J-73	537.55	6.00	140.0000	0.00
P-297	J-171	J-156	634.86	8.00	130.0000	0.00
P-298	J-156	J-130	20.94	8.00	130.0000	0.00
P-299	J-5	J-8	339.80	6.00	140.0000	0.00
P-3	J-4	J-210	258.43	8.00	140.0000	0.00
P-30	J-31	J-53	327.83	8.00	140.0000	0.00
P-300	J-8	J-9	272.62	6.00	140.0000	0.00
P-301	J-45	J-13	315.32	6.00	140.0000	0.00
P-302	J-379	J-377	110.96	2.00	140.0000	0.00
P-303	J-383	J-60	50.74	6.00	130.0000	0.00
P-304	J-91	J-74	172.40	6.00	140.0000	0.00
P-305	J-92	J-71	34.04	6.00	140.0000	0.00
P-306	J-46	J-2	314.13	8.00	140.0000	0.00
P-307	J-3	J-42	259.90	6.00	140.0000	0.00
P-308	J-27	J-162	370.90	8.00	140.0000	0.00
P-309	J-39	J-164	34.82	6.00	140.0000	0.00
P-31	J-41	J-38	116.56	2.00	110.0000	0.00
P-310	J-40	J-44	263.96	8.00	140.0000	0.00
P-311	J-43	J-217	79.70	6.00	140.0000	0.00
P-312	J-177	J-125	50.56	8.00	140.0000	0.00
P-313	J-107	J-230	655.50	6.00	140.0000	0.00
P-314	J-109	J-127	869.66	8.00	140.0000	0.00
P-32	J-26	J-17	148.18	8.00	130.0000	0.00
P-33	J-14	J-36	280.82	6.00	140.0000	0.00
P-34	J-10	J-46	698.76	8.00	140.0000	0.00
P-35	J-156	J-171	623.82	8.00	130.0000	0.00
P-36	J-13	J-16	277.39	6.00	140.0000	0.00
P-37	J-12	J-206	5.00	6.00	130.0000	0.00
P-38	J-15	J-25	98.84	8.00	140.0000	0.00
P-39	J-53	J-25	252.22	8.00	140.0000	0.00
P-4	J-5	J-203	143.82	8.00	140.0000	0.00
P-40	J-41	J-215	24.36	2.00	110.0000	0.00
P-41	J-57	J-19	41.50	8.00	140.0000	0.00
P-42	J-36	J-18	50.38	6.00	140.0000	0.00
P-43	J-37	J-14	330.97	6.00	140.0000	0.00
P-44	J-16	J-4	335.26	6.00	140.0000	0.00
P-45	J-11	J-208	5.00	6.00	130.0000	0.00
P-46	J-7	J-67	496.58	8.00	140.0000	0.00
P-47	J-6	J-177	538.73	8.00	140.0000	0.00
P-48	J-68	J-69	66.80	8.00	130.0000	0.00
P-49	J-177	J-92	580.44	6.00	140.0000	0.00
P-5	J-6	J-7	359.15	8.00	140.0000	0.00
P-50	J-71	J-72	1074.70	6.00	140.0000	0.00
P-51	J-72	J-73	331.33	6.00	140.0000	0.00
P-52	J-142	J-109	283.10	4.00	140.0000	0.00
P-53	J-74	J-378	231.53	6.00	140.0000	0.00
P-54	J-20	J-23	23.33	14.00	130.0000	0.00
P-55	J-22	R-1	9.86	12.00	130.0000	0.00
P-56	J-92	J-74	314.41	2.00	110.0000	0.00
P-57	J-79	J-80	308.00	4.00	140.0000	0.00
P-58	J-80	J-83	23.91	4.00	140.0000	0.00
P-59	J-120	J-83	264.92	4.00	140.0000	0.00
P-6	J-7	J-2	451.49	8.00	140.0000	0.00
P-60	J-125	J-85	69.51	2.00	130.0000	0.00
P-61	J-23	J-22	247.07	14.00	130.0000	0.00
P-62	J-88	J-91	151.68	6.00	140.0000	0.00
P-63	J-89	J-202	95.35	2.00	140.0000	0.00
P-64	J-90	J-373	77.16	2.00	110.0000	0.00
P-65	J-94	J-95	132.18	4.00	140.0000	0.00
P-66	J-96	J-98	5.04	6.00	130.0000	0.00
P-67	J-97	J-98	115.52	4.00	140.0000	0.00
P-68	J-50	J-96	306.54	6.00	130.0000	0.00
P-69	J-100	J-101	94.40	4.00	140.0000	0.00
P-7	J-7	J-8	569.47	8.00	140.0000	0.00
P-70	J-102	J-145	39.77	8.00	140.0000	0.00
P-71	J-75	J-105	36.23	6.00	130.0000	0.00
P-72	J-106	J-107	43.64	8.00	130.0000	0.00

P-73	J-108	J-109	54.64	8.00	130.0000	0.00
P-74	J-110	J-111	709.01	8.00	140.0000	0.00
P-75	J-112	J-113	156.89	6.00	140.0000	0.00
P-76	J-114	J-103	624.45	6.00	140.0000	0.00
P-77	J-114	J-116	211.83	6.00	140.0000	0.00
P-78	J-117	J-114	206.16	6.00	140.0000	0.00
P-79	J-118	J-117	1353.90	6.00	140.0000	0.00
P-80	J-110	J-121	250.37	4.00	140.0000	0.00
P-81	J-117	J-121	307.78	4.00	140.0000	0.00
P-82	J-121	J-122	652.43	6.00	140.0000	0.00
P-83	J-122	J-115	87.48	6.00	140.0000	0.00
P-84	J-99	J-124	267.64	6.00	140.0000	0.00
P-85	J-127	J-93	263.31	4.00	140.0000	0.00
P-86	J-126	J-127	331.31	8.00	140.0000	0.00
P-87	J-128	J-118	863.93	4.00	140.0000	0.00
P-88	J-129	J-146	1020.43	6.00	140.0000	0.00
P-89	J-131	J-63	30.24	6.00	140.0000	0.00
P-9	J-46	J-9	197.53	6.00	140.0000	0.00
P-90	J-132	J-131	504.53	6.00	130.0000	0.00
P-91	J-131	J-65	37.87	6.00	140.0000	0.00
P-92	J-66	J-75	319.45	6.00	140.0000	0.00
P-93	J-76	J-77	224.89	6.00	140.0000	0.00
P-94	J-138	J-140	25.51	6.00	140.0000	0.00
P-95	J-140	J-141	135.56	6.00	140.0000	0.00
P-96	J-107	J-76	44.82	6.00	140.0000	0.00
P-97	J-142	J-143	140.23	4.00	140.0000	0.00
P-99	J-144	J-142	588.43	4.00	140.0000	0.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		6.10	282.00	
J-10		5.60	281.30	
J-100		0.40	288.60	
J-101		3.00	290.20	
J-102		1.30	307.90	
J-103		7.80	290.30	
J-104		0.30	309.60	
J-105		0.20	277.40	
J-106		0.80	280.00	
J-107		4.90	279.20	
J-108		2.50	312.40	
J-109		6.30	312.50	
J-11		2.20	288.10	
J-110		4.70	309.20	
J-111		3.80	308.20	
J-112		1.20	307.80	
J-113		3.70	306.00	
J-114		4.50	296.00	
J-115		3.00	308.40	
J-116		1.20	303.60	
J-117		8.00	299.60	
J-118		10.70	304.70	
J-119		0.50	309.90	
J-12		2.20	283.60	
J-120		4.40	258.50	
J-121		5.20	308.70	
J-122		3.20	308.80	
J-123		5.30	281.50	
J-124		2.10	308.90	
J-125		0.80	263.90	
J-126		1.40	307.20	
J-127		11.30	310.20	
J-128		6.20	286.90	
J-129		7.60	296.40	
J-13		6.80	286.00	
J-130		0.10	282.50	
J-131		2.50	284.30	
J-132		4.30	286.40	
J-133		6.30	291.60	
J-134		1.90	258.30	
J-135		1.40	258.90	
J-136		1.90	269.10	
J-137		6.20	279.00	
J-138		0.10	279.60	
J-139		6.50	277.90	
J-14		7.60	285.70	
J-140		0.80	279.40	

J-141		1.90	279.90
J-142		4.30	308.60
J-143		1.40	308.50
J-144		2.90	308.20
J-145		3.30	308.90
J-146		10.60	307.20
J-147		3.80	305.20
J-148		5.30	304.60
J-149		0.10	306.30
J-15		3.10	280.50
J-150		2.60	279.50
J-151		3.60	275.20
J-152		3.90	277.40
J-153		5.20	277.30
J-154		3.90	263.50
J-155		3.70	278.10
J-156		5.50	282.20
J-157		2.10	281.00
J-158		4.90	286.10
J-159		4.00	287.40
J-16		6.40	287.20
J-160		3.50	287.80
J-161		3.90	287.90
J-162		1.60	283.80
J-163		4.20	289.50
J-164		0.50	287.90
J-165		4.80	290.60
J-167		4.60	287.40
J-168		1.50	286.00
J-169		2.70	290.10
J-17		1.80	289.60
J-170		3.40	286.90
J-171		13.40	275.20
J-172		5.90	294.70
J-173		0.80	284.80
J-174		3.90	278.50
J-176		0.40	279.20
J-177		5.00	264.80
J-178		1.00	281.00
J-179		0.80	281.00
J-18		3.80	281.60
J-180		1.30	290.20
J-181		0.60	290.20
J-183		0.50	287.60
J-185		0.40	285.80
J-186		0.20	286.60
J-187		5.30	296.80
J-188		1.30	286.30
J-189		4.80	290.70
J-19		9.80	275.30
J-194		0.90	287.00
J-195		1.20	281.10
J-196		3.00	259.80
J-197		1.50	264.10
J-198		1.00	260.70
J-2		4.40	275.00
J-20	reservoir co	8.50	459.90
J-201		0.40	258.60
J-202		0.60	259.10
J-203		3.20	287.50
J-204		0.60	288.40
J-205		0.00	283.60
J-206		0.00	283.70
J-207		0.00	288.30
J-208		0.00	287.90
J-209		2.20	285.70
J-21		8.30	269.00
J-210		2.50	285.10
J-211		0.90	284.30
J-212		0.90	284.80
J-213		0.10	285.60
J-215		0.10	281.50
J-217		0.30	275.30
J-218		0.30	273.80
J-22	reservoir co	1.30	477.30
J-220		0.20	273.30
J-221		0.20	274.20
J-222		0.40	273.40
J-223		0.40	274.80
J-225		3.50	273.50
J-23	reservoir co	4.40	460.10
J-230		3.60	275.00
J-24		3.70	287.80
J-243		0.20	278.30

20 Year MDD + Fireflow Model Results

J-245	0.20	278.90
J-247	0.60	276.30
J-25	1.50	279.10
J-250	0.80	309.40
J-251	0.30	308.00
J-253	0.80	308.20
J-254	0.00	308.10
J-255	0.00	308.90
J-256	3.10	288.60
J-258	1.40	308.30
J-259	0.60	308.50
J-26	4.20	287.70
J-260	0.10	304.90
J-262	5.50	300.50
J-263	2.50	303.80
J-264	4.80	304.00
J-265	2.10	303.30
J-27	2.50	286.60
J-271	0.50	276.30
J-28	4.90	288.60
J-284	0.10	309.20
J-29	4.70	291.80
J-3	3.10	282.90
J-30	1.60	289.70
J-304	0.90	295.30
J-305	0.20	284.70
J-31	6.10	269.30
J-32	4.40	269.00
J-33	5.00	269.60
J-332	0.90	279.90
J-34	1.40	278.90
J-35	0.70	272.50
J-354	1.10	280.20
J-355	0.10	282.50
J-357	1.70	309.10
J-358	2.00	309.80
J-36	3.90	282.50
J-362	1.00	301.60
J-365	0.40	303.30
J-366	0.20	302.20
J-368	0.60	310.20
J-37	4.10	287.40
J-371	1.50	281.40
J-373	0.30	259.40
J-376	0.70	260.60
J-377	0.50	261.70
J-378	2.50	262.20
J-379	1.50	261.60
J-38	0.50	280.60
J-382	0.40	289.40
J-383	0.90	277.20
J-384	0.50	277.60
J-386	0.70	276.50
J-388	0.20	282.30
J-389	1.60	282.20
J-39	1.40	288.20
J-390	0.40	281.00
J-391	0.30	283.00
J-4	4.80	284.40
J-40	5.40	275.00
J-41	0.80	280.80
J-42	3.90	283.60
J-43	2.50	273.80
J-44	2.80	278.10
J-45	2.80	284.20
J-46	5.20	273.90
J-47	2.70	288.80
J-48	5.90	287.70
J-49	3.20	289.20
J-5	3.20	286.90
J-50	4.50	287.30
J-51	2.00	286.00
J-52	3.60	282.90
J-53	5.00	276.40
J-54	3.00	276.90
J-55	3.50	278.10
J-56	8.20	280.60
J-57	7.60	277.20
J-58	3.30	279.90
J-59	3.50	283.60
J-6	5.80	275.20
J-60	2.70	277.70
J-61	2.50	289.50
J-62	1.40	309.20

J-63		2.30	284.20	
J-64		3.50	285.50	
J-65		0.60	285.00	
J-66		5.60	283.90	
J-67		2.10	278.20	
J-68		0.60	262.90	
J-69		3.00	262.20	
J-7		8.00	276.20	
J-71		4.70	272.90	
J-72		7.20	279.80	
J-73		3.70	258.80	
J-74		4.10	261.20	
J-75		7.50	277.10	
J-76		1.40	279.20	
J-77		8.20	282.40	
J-78		2.10	277.40	
J-79		1.30	260.80	
J-8		6.10	286.90	
J-80		1.40	259.40	
J-81		1.50	258.10	
J-82		9.60	273.70	
J-83		2.70	258.70	
J-84		8.40	280.00	
J-85		0.30	263.40	
J-86		2.30	278.80	
J-87		6.40	308.30	
J-88		2.00	259.80	
J-89		1.10	258.20	
J-9		3.60	279.70	
J-90		0.80	259.60	
J-91		1.70	260.80	
J-92		4.00	272.20	
J-93		4.90	309.00	
J-94		3.10	286.30	
J-95		1.80	288.60	
J-96		1.90	287.50	
J-97		0.50	289.30	
J-98		1.60	287.40	
J-99		2.50	308.80	
R-1	275,000 gal	----	467.00	478.00
R-2	275,000 gal	----	467.00	478.00
Well No. 1		----	279.10	279.10
Well No. 3		----	271.70	271.70
O-Well Pum	300 gpm capa	0.00	279.10	
O-Well Pum	400 gpm capa	0.00	271.70	
I-Well Pum	300 gpm capa	0.00	279.10	
I-Well Pum	400 gpm capa	0.00	271.70	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 10
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 312
NUMBER OF END NODES .....(J) = 256
NUMBER OF PRIMARY LOOPS .....(L) = 53
NUMBER OF SUPPLY NODES .....(F) = 4
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.77827E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

7.

20 Year MDD + Fireflow Model Results

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-10	-174.46	0.35	0.00	1.11	0.63	0.63
P-10	J-8	J-11	-3.26	0.07	0.00	0.33	0.34	0.34
P-100	J-145	J-62	14.06	0.03	0.00	0.36	0.17	0.17
P-101	J-109	J-146	4.93	0.01	0.00	0.13	0.02	0.02
P-102	J-146	J-128	2.51	0.00	0.00	0.06	0.01	0.01
P-103	J-147	J-102	95.71	0.05	0.00	0.61	0.21	0.21
P-104	J-148	J-147	94.23	0.06	0.00	0.60	0.20	0.20
P-105	J-129	J-147	5.38	0.00	0.00	0.03	0.00	0.00
P-106	J-129	J-61	-36.01	0.00	0.00	0.23	0.03	0.03
P-107	J-132	J-150	-49.54	0.02	0.00	0.32	0.06	0.06
P-108	J-150	J-60	34.37	0.01	0.00	0.22	0.03	0.03
P-109	J-230	J-151	-41.42	0.01	0.00	0.47	0.18	0.18
P-11	J-12	J-9	8.26	0.23	0.00	0.84	1.89	1.89
P-110	J-151	J-54	-52.53	0.08	0.00	0.60	0.28	0.28
P-111	J-152	J-174	-51.02	0.07	0.00	0.58	0.26	0.26
P-112	J-174	J-155	-54.78	0.09	0.00	0.62	0.30	0.30
P-113	J-155	J-44	-59.28	0.13	0.00	0.67	0.35	0.35
P-114	J-157	J-58	90.29	0.04	0.00	0.58	0.19	0.19
P-115	J-158	J-52	96.89	0.07	0.00	0.62	0.21	0.21
P-116	J-159	J-158	107.68	0.07	0.00	0.69	0.26	0.26
P-117	J-159	J-160	-111.82	0.09	0.00	0.71	0.28	0.28
P-118	J-160	J-161	-112.42	0.08	0.00	0.72	0.28	0.28
P-119	J-161	J-27	-6.58	0.00	0.00	0.04	0.00	0.00
P-12	J-13	J-14	-4.33	0.01	0.00	0.11	0.02	0.02
P-120	J-34	J-161	69.50	0.04	0.00	0.44	0.11	0.11
P-121	J-161	J-163	-40.24	0.01	0.00	0.26	0.04	0.04
P-122	J-163	J-39	13.88	0.00	0.00	0.16	0.02	0.02
P-123	J-165	J-163	-19.03	0.09	0.00	0.49	0.30	0.30
P-124	J-101	J-165	-19.21	0.10	0.00	0.49	0.31	0.31
P-125	J-101	J-167	15.81	0.06	0.00	0.40	0.21	0.21
P-126	J-167	J-51	9.70	0.03	0.00	0.25	0.09	0.09
P-127	J-95	J-47	-51.42	0.01	0.00	0.58	0.30	0.30
P-128	J-50	J-49	46.53	0.08	0.00	0.53	0.25	0.25
P-129	J-28	J-94	23.28	0.15	0.00	0.59	0.44	0.44
P-13	J-16	J-36	3.88	0.01	0.00	0.10	0.02	0.02
P-130	J-170	J-94	-18.86	0.08	0.00	0.48	0.30	0.30
P-131	J-48	J-170	-16.97	0.07	0.00	0.43	0.25	0.25
P-132	J-172	J-48	-16.96	0.15	0.00	0.43	0.24	0.24
P-133	J-172	J-129	14.52	0.06	0.00	0.37	0.18	0.18
P-134	J-173	J-155	-0.80	0.01	0.00	0.08	0.04	0.04
P-135	J-159	J-174	0.14	0.00	0.00	0.01	0.00	0.00
P-136	J-152	J-158	-8.82	0.00	0.00	0.06	0.00	0.00
P-137	J-54	J-176	0.40	0.00	0.00	0.00	0.00	0.00
P-138	J-151	J-55	4.02	0.00	0.00	0.05	0.00	0.00
P-139	J-179	J-59	-0.80	0.00	0.00	0.02	0.00	0.00
P-14	J-17	J-24	-113.01	0.30	0.00	1.28	1.14	1.14
P-140	J-181	J-172	-0.60	0.00	0.00	0.02	0.00	0.00
P-141	J-148	J-172	4.06	0.01	0.00	0.10	0.02	0.02
P-142	J-183	J-49	-0.50	0.00	0.00	0.01	0.00	0.00
P-143	J-185	J-51	-0.40	0.00	0.00	0.01	0.00	0.00
P-144	J-187	J-48	12.67	0.00	0.00	0.08	0.00	0.00
P-145	J-167	J-158	2.93	0.00	0.00	0.02	0.00	0.00
P-146	J-96	J-170	1.26	0.00	0.00	0.03	0.00	0.00
P-147	J-188	J-170	0.24	0.00	0.00	0.01	0.00	0.00
P-148	J-189	J-188	1.54	0.03	0.00	0.16	0.13	0.13
P-149	J-165	J-47	-7.87	0.00	0.00	0.09	0.01	0.01
P-15	J-18	J-19	-308.16	2.00	0.00	3.50	7.31	7.31
P-150	J-165	J-160	2.90	0.00	0.00	0.03	0.00	0.00
P-151	J-1	J-28	40.46	0.01	0.00	0.26	0.04	0.04
P-152	J-28	J-29	45.84	0.01	0.00	0.29	0.05	0.05
P-153	J-29	J-163	77.35	0.04	0.00	0.49	0.14	0.14
P-154	J-39	J-194	11.58	0.00	0.00	0.13	0.02	0.02
P-155	J-195	J-72	-1.20	0.02	0.00	0.12	0.08	0.08
P-156	J-196	J-134	43.70	0.02	0.00	0.28	0.05	0.05
P-157	J-196	J-69	-46.70	0.02	0.00	0.30	0.05	0.05
P-158	J-198	J-74	-1.00	0.01	0.00	0.10	0.04	0.04
P-159	J-88	J-89	1.66	0.01	0.00	0.17	0.10	0.10
P-16	J-4	J-57	-392.14	1.50	0.00	2.50	2.81	2.81
P-160	J-201	J-89	-0.40	0.00	0.00	0.04	0.01	0.01
P-161	J-203	J-204	0.60	0.00	0.00	0.01	0.00	0.00
P-162	J-12	J-13	-10.46	0.04	0.00	0.27	0.10	0.10
P-163	J-205	J-12	0.00	0.00	0.00	0.00	0.00	0.00
P-164	J-207	J-11	0.00	0.00	0.00	0.00	0.00	0.00
P-165	J-11	J-16	-5.46	0.43	0.00	0.56	1.37	1.37
P-166	J-209	J-210	-4.10	0.00	0.00	0.05	0.00	0.00
P-167	J-209	J-211	0.90	0.01	0.00	0.09	0.03	0.03
P-168	J-212	J-209	-0.90	0.01	0.00	0.09	0.03	0.03
P-169	J-209	J-213	0.10	0.00	0.00	0.00	0.00	0.00
P-17	J-19	J-20	-611.21	1.99	0.00	1.73	1.02	1.02

7.

20 Year MDD + Fireflow Model Results

P-170	J-15	J-41	1.40	0.00	0.00	0.14	0.11	0.11
P-171	J-40	J-43	4.30	0.00	0.00	0.05	0.00	0.00
P-172	J-218	J-43	-1.50	0.00	0.00	0.02	0.00	0.00
P-173	J-220	J-218	-0.60	0.00	0.00	0.01	0.00	0.00
P-174	J-222	J-220	-0.40	0.00	0.00	0.00	0.00	0.00
P-175	J-223	J-221	-0.40	0.00	0.00	0.00	0.00	0.00
P-176	J-222	J-223	0.00	0.00	0.00	0.00	0.00	0.00
P-177	J-194	J-27	10.68	0.00	0.00	0.12	0.01	0.01
P-178	J-1	J-189	127.90	0.21	0.00	0.82	0.35	0.35
P-179	J-189	J-187	121.56	0.10	0.00	0.78	0.32	0.32
P-18	J-21	J-23	-114.79	0.87	0.00	1.30	1.17	1.17
P-180	J-151	J-225	3.50	0.00	0.00	0.04	0.00	0.00
P-181	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-182	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-183	J-230	J-82	24.09	0.01	0.00	0.27	0.07	0.07
P-184	J-82	J-123	8.22	0.01	0.00	0.09	0.01	0.01
P-185	J-56	J-123	-4.43	0.00	0.00	0.05	0.00	0.00
P-186	J-389	J-388	0.20	0.00	0.00	0.00	0.00	0.00
P-187	J-58	J-150	86.51	0.01	0.00	0.55	0.17	0.17
P-188	J-59	J-180	1.30	0.00	0.00	0.03	0.00	0.00
P-189	J-60	J-107	30.07	0.01	0.00	0.19	0.02	0.02
P-19	J-57	J-21	-106.49	1.20	0.00	1.21	1.02	1.02
P-190	J-243	J-383	-0.20	0.00	0.00	0.00	0.00	0.00
P-191	J-245	J-76	-0.20	0.00	0.00	0.02	0.00	0.00
P-192	J-247	J-78	-0.60	0.00	0.00	0.06	0.01	0.01
P-193	J-62	J-250	1.40	0.00	0.00	0.14	0.07	0.07
P-194	J-251	J-250	-0.30	0.00	0.00	0.03	0.00	0.00
P-195	J-143	J-253	0.80	0.00	0.00	0.01	0.00	0.00
P-196	J-254	J-143	0.00	0.00	0.00	0.00	0.00	0.00
P-197	J-141	J-86	14.08	0.01	0.00	0.16	0.02	0.02
P-198	J-133	J-256	-1.07	0.00	0.00	0.01	0.00	0.00
P-199	J-87	J-258	2.00	0.00	0.00	0.02	0.00	0.00
P-2	J-10	J-3	-61.58	0.00	0.00	0.39	0.10	0.10
P-20	J-37	J-15	-45.57	0.03	0.00	0.29	0.05	0.05
P-200	J-258	J-259	0.60	0.00	0.00	0.02	0.00	0.00
P-201	J-115	J-111	-12.88	0.00	0.00	0.15	0.02	0.02
P-202	J-111	J-112	14.38	0.00	0.00	0.16	0.03	0.03
P-203	J-260	J-116	-0.10	0.00	0.00	0.00	0.00	0.00
P-204	J-103	J-262	5.42	0.00	0.00	0.03	0.00	0.00
P-205	J-262	J-263	4.51	0.00	0.00	0.03	0.00	0.00
P-206	J-264	J-263	-2.01	0.00	0.00	0.02	0.00	0.00
P-207	J-113	J-262	4.59	0.00	0.00	0.05	0.00	0.00
P-208	J-113	J-264	4.89	0.00	0.00	0.06	0.00	0.00
P-209	J-264	J-265	2.10	0.00	0.00	0.02	0.00	0.00
P-21	J-3	J-26	26.35	0.01	0.00	0.17	0.02	0.02
P-210	J-250	J-104	0.30	0.00	0.00	0.03	0.00	0.00
P-211	J-358	J-119	0.50	0.00	0.00	0.01	0.00	0.00
P-212	I-Well PumWell No. 1		0.00	0.00	0.00	0.00	0.00	0.00
P-213	J-197	J-136	38.90	0.00	0.00	0.25	0.04	0.04
P-214	I-Well PumWell No. 3		0.00	0.00	0.00	0.00	0.00	0.00
P-215	J-103	J-115	-8.72	0.01	0.00	0.10	0.01	0.01
P-216	J-120	J-88	-9.13	0.00	0.00	0.10	0.01	0.01
P-217	J-82	J-56	6.27	0.01	0.00	0.07	0.01	0.01
P-218	J-123	J-106	-1.51	0.00	0.00	0.02	0.00	0.00
P-219	J-125	J-68	75.62	0.01	0.00	0.48	0.13	0.13
P-22	J-26	J-28	33.56	0.36	0.00	0.86	0.87	0.87
P-220	J-284	J-124	-0.10	0.00	0.00	0.00	0.00	0.00
P-221	J-84	J-171	19.00	0.02	0.00	0.12	0.01	0.01
P-222	J-77	J-139	23.38	0.09	0.00	0.27	0.06	0.06
P-223	J-127	J-87	53.07	0.08	0.00	0.34	0.07	0.07
P-224	J-87	J-110	44.67	0.01	0.00	0.29	0.05	0.05
P-225	J-146	J-93	29.37	0.08	0.00	0.33	0.09	0.09
P-226	J-63	J-64	21.74	0.02	0.00	0.25	0.05	0.05
P-227	J-78	J-77	-3.40	0.07	0.00	0.35	0.37	0.37
P-228	J-140	J-139	-16.88	0.00	0.00	0.19	0.03	0.03
P-229	J-75	J-137	0.09	0.00	0.00	0.00	0.00	0.00
P-23	J-29	J-30	-98.20	0.35	0.00	1.11	1.01	1.01
P-230	J-63	J-304	0.90	0.01	0.00	0.09	0.03	0.03
P-231	J-305	J-65	-0.20	0.00	0.00	0.00	0.00	0.00
P-232	J-62	J-144	11.26	0.01	0.00	0.29	0.11	0.11
P-233	J-61	J-132	1.62	0.00	0.00	0.01	0.00	0.00
P-234	J-147	J-149	0.10	0.00	0.00	0.00	0.00	0.00
P-235	J-143	J-255	0.00	0.00	0.00	0.00	0.00	0.00
P-236	J-145	J-108	77.05	0.08	0.00	0.49	0.14	0.14
P-237	J-64	J-128	17.24	0.01	0.00	0.20	0.04	0.04
P-238	J-168	J-59	5.60	0.01	0.00	0.14	0.03	0.03
P-239	J-169	J-61	40.13	0.06	0.00	0.46	0.19	0.19
P-24	J-18	J-31	198.97	0.45	0.00	1.27	0.80	0.80
P-240	J-65	J-66	18.62	0.00	0.00	0.21	0.04	0.04
P-241	J-134	J-135	41.80	0.00	0.00	0.27	0.04	0.04
P-242	J-49	J-169	42.83	0.07	0.00	0.49	0.22	0.22
P-243	J-48	J-50	6.78	0.00	0.00	0.04	0.00	0.00
P-244	J-50	J-167	1.42	0.00	0.00	0.01	0.00	0.00
P-245	J-52	J-332	0.90	0.01	0.00	0.09	0.05	0.05

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P-246	J-52	J-157	92.39	0.06	0.00	0.59	0.19	0.19
P-247	J-54	J-152	-55.93	0.09	0.00	0.63	0.31	0.31
P-248	J-51	J-168	7.10	0.00	0.00	0.18	0.05	0.05
P-249	J-51	J-186	0.20	0.00	0.00	0.01	0.00	0.00
P-25	J-31	J-32	152.78	0.26	0.00	0.98	0.49	0.49
P-250	J-55	J-178	1.00	0.00	0.00	0.01	0.00	0.00
P-251	J-47	J-29	-61.99	0.13	0.00	0.70	0.43	0.43
P-252	J-66	J-133	5.23	0.00	0.00	0.06	0.00	0.00
P-253	J-44	J-34	70.90	0.00	0.00	0.45	0.12	0.12
P-254	J-86	J-137	6.11	0.00	0.00	0.07	0.01	0.01
P-255	J-24	J-37	-118.42	0.06	0.00	1.34	1.24	1.24
P-256	J-45	J-354	1.10	0.02	0.00	0.11	0.07	0.07
P-257	J-42	J-45	-93.31	0.06	0.00	1.06	0.80	0.80
P-258	J-357	J-358	3.10	0.00	0.00	0.04	0.00	0.00
P-259	J-135	J-197	40.40	0.01	0.00	0.26	0.04	0.04
P-26	J-32	J-33	148.38	0.23	0.00	0.95	0.47	0.47
P-260	J-64	J-362	1.00	0.01	0.00	0.10	0.04	0.04
P-261	J-55	J-58	-0.48	0.01	0.00	0.05	0.02	0.02
P-262	J-116	J-365	0.60	0.00	0.00	0.06	0.01	0.01
P-263	J-365	J-366	0.20	0.00	0.00	0.04	0.01	0.01
P-264	J-124	J-357	4.80	0.00	0.00	0.05	0.00	0.00
P-265	J-136	J-271	0.50	0.00	0.00	0.05	0.01	0.01
P-266	J-358	J-368	0.60	0.00	0.00	0.01	0.00	0.00
P-267	J-136	J-153	36.50	0.01	0.00	0.23	0.03	0.03
P-268	J-371	J-256	4.17	0.00	0.00	0.05	0.00	0.00
P-269	J-371	J-86	-5.67	0.00	0.00	0.06	0.00	0.00
P-27	J-33	J-40	142.68	0.22	0.00	0.91	0.43	0.43
P-270	J-202	J-90	-0.44	0.00	0.00	0.04	0.01	0.01
P-271	J-91	J-90	1.54	0.01	0.00	0.16	0.13	0.13
P-272	J-376	J-379	-0.70	0.00	0.00	0.07	0.02	0.02
P-273	J-378	J-379	2.70	0.02	0.00	0.28	0.24	0.24
P-274	J-22	R-2	-444.10	0.00	0.00	0.93	0.27	0.27
P-275	J-164	J-382	0.40	0.00	0.00	0.04	0.01	0.01
P-276	J-383	J-384	0.50	0.00	0.00	0.05	0.01	0.01
P-277	J-78	J-386	0.70	0.00	0.00	0.07	0.02	0.02
P-278	J-56	J-389	2.50	0.00	0.00	0.03	0.00	0.00
P-279	J-389	J-390	0.40	0.00	0.00	0.04	0.01	0.01
P-28	J-33	J-35	0.70	0.00	0.00	0.01	0.00	0.00
P-280	J-389	J-391	0.30	0.00	0.00	0.03	0.00	0.00
P-281	J-17	J-30	99.80	0.02	0.00	1.13	1.04	1.04
P-282	J-9	J-2	10.78	0.00	0.00	0.07	0.00	0.00
P-283	J-24	J-42	1.72	0.09	0.00	0.18	0.16	0.16
P-284	J-42	J-355	0.10	0.00	0.00	0.01	0.00	0.00
P-285	J-83	J-81	1.50	0.00	0.00	0.04	0.00	0.00
P-286	J-69	J-378	25.32	0.02	0.00	0.29	0.07	0.07
P-287	J-98	J-95	-50.94	0.08	0.00	0.58	0.30	0.30
P-288	J-93	J-99	23.88	0.01	0.00	0.61	0.46	0.46
P-289	J-148	J-187	-103.59	0.15	0.00	0.66	0.24	0.24
P-29	J-14	J-53	16.48	0.13	0.00	0.42	0.23	0.23
P-290	J-203	J-6	151.09	0.23	0.00	0.96	0.48	0.48
P-291	J-210	J-5	254.86	0.33	0.00	1.63	1.27	1.27
P-292	J-218	J-221	0.60	0.00	0.00	0.01	0.00	0.00
P-293	J-99	J-118	14.38	0.05	0.00	0.37	0.18	0.18
P-294	J-153	J-84	27.40	0.00	0.00	0.17	0.02	0.02
P-295	J-153	J-154	3.90	0.00	0.00	0.02	0.00	0.00
P-296	J-120	J-73	-2.17	0.00	0.00	0.02	0.00	0.00
P-297	J-171	J-156	2.79	0.00	0.00	0.02	0.00	0.00
P-298	J-156	J-130	0.10	0.00	0.00	0.00	0.00	0.00
P-299	J-5	J-8	96.77	0.29	0.00	1.10	0.86	0.86
P-3	J-4	J-210	261.46	0.34	0.00	1.67	1.33	1.33
P-30	J-31	J-53	40.09	0.01	0.00	0.26	0.04	0.04
P-300	J-8	J-9	52.97	0.08	0.00	0.60	0.28	0.28
P-301	J-45	J-13	-97.21	0.27	0.00	1.10	0.86	0.86
P-302	J-379	J-377	0.50	0.00	0.00	0.05	0.01	0.01
P-303	J-383	J-60	-1.60	0.00	0.00	0.02	0.00	0.00
P-304	J-91	J-74	-16.03	0.01	0.00	0.18	0.03	0.03
P-305	J-92	J-71	18.97	0.00	0.00	0.22	0.04	0.04
P-306	J-46	J-2	-76.84	0.04	0.00	0.49	0.14	0.14
P-307	J-3	J-42	-91.03	0.20	0.00	1.03	0.76	0.76
P-308	J-27	J-162	1.60	0.00	0.00	0.01	0.00	0.00
P-309	J-39	J-164	0.90	0.00	0.00	0.01	0.00	0.00
P-31	J-41	J-38	0.50	0.00	0.00	0.05	0.02	0.02
P-310	J-40	J-44	132.98	0.10	0.00	0.85	0.38	0.38
P-311	J-43	J-217	0.30	0.00	0.00	0.00	0.00	0.00
P-312	J-177	J-125	76.72	0.01	0.00	0.49	0.14	0.14
P-313	J-107	J-230	-13.73	0.02	0.00	0.16	0.02	0.02
P-314	J-109	J-127	65.18	0.09	0.00	0.42	0.10	0.10
P-32	J-26	J-17	-11.41	0.00	0.00	0.07	0.00	0.00
P-33	J-14	J-36	-105.36	0.28	0.00	1.20	1.00	1.00
P-34	J-10	J-46	-118.48	0.21	0.00	0.76	0.31	0.31
P-35	J-156	J-171	-2.81	0.00	0.00	0.02	0.00	0.00
P-36	J-13	J-16	-110.14	0.30	0.00	1.25	1.09	1.09
P-37	J-12	J-206	0.00	0.00	0.00	0.00	0.00	0.00
P-38	J-15	J-25	-50.07	0.01	0.00	0.32	0.06	0.06

P-39	J-53	J-25	51.57	0.02	0.00	0.33	0.07	0.07
P-4	J-5	J-203	154.89	0.07	0.00	0.99	0.50	0.50
P-40	J-41	J-215	0.10	0.00	0.00	0.01	0.00	0.00
P-41	J-57	J-19	-293.25	0.07	0.00	1.87	1.64	1.64
P-42	J-36	J-18	-105.38	0.05	0.00	1.20	1.00	1.00
P-43	J-37	J-14	-76.96	0.19	0.00	0.87	0.56	0.56
P-44	J-16	J-4	-125.88	0.47	0.00	1.43	1.39	1.39
P-45	J-11	J-208	0.00	0.00	0.00	0.00	0.00	0.00
P-46	J-7	J-67	2.10	0.00	0.00	0.01	0.00	0.00
P-47	J-6	J-177	105.70	0.13	0.00	0.67	0.25	0.25
P-48	J-68	J-69	75.02	0.01	0.00	0.48	0.15	0.15
P-49	J-177	J-92	23.98	0.04	0.00	0.27	0.06	0.06
P-5	J-6	J-7	39.59	0.01	0.00	0.25	0.04	0.04
P-50	J-71	J-72	14.27	0.03	0.00	0.16	0.02	0.02
P-51	J-72	J-73	5.87	0.00	0.00	0.07	0.00	0.00
P-52	J-142	J-109	1.86	0.00	0.00	0.05	0.00	0.00
P-53	J-74	J-378	-20.12	0.01	0.00	0.23	0.05	0.05
P-54	J-20	J-23	-619.71	0.01	0.00	1.29	0.49	0.49
P-55	J-22	R-1	-296.10	0.00	0.00	0.84	0.27	0.27
P-56	J-92	J-74	1.01	0.02	0.00	0.10	0.06	0.06
P-57	J-79	J-80	-1.30	0.00	0.00	0.03	0.00	0.00
P-58	J-80	J-83	-2.70	0.00	0.00	0.07	0.01	0.01
P-59	J-120	J-83	6.90	0.01	0.00	0.18	0.05	0.05
P-6	J-7	J-2	70.46	0.05	0.00	0.45	0.12	0.12
P-60	J-125	J-85	0.30	0.00	0.00	0.03	0.00	0.00
P-61	J-23	J-22	-738.90	0.17	0.00	1.54	0.68	0.68
P-62	J-88	J-91	-12.80	0.00	0.00	0.15	0.02	0.02
P-63	J-89	J-202	0.16	0.00	0.00	0.02	0.00	0.00
P-64	J-90	J-373	0.30	0.00	0.00	0.03	0.01	0.01
P-65	J-94	J-95	1.32	0.00	0.00	0.03	0.00	0.00
P-66	J-96	J-98	-48.84	0.00	0.00	0.55	0.28	0.28
P-67	J-97	J-98	-0.50	0.00	0.00	0.01	0.00	0.00
P-68	J-50	J-96	-45.67	0.07	0.00	0.52	0.24	0.24
P-69	J-100	J-101	-0.40	0.00	0.00	0.01	0.00	0.00
P-7	J-7	J-8	-40.97	0.02	0.00	0.26	0.04	0.04
P-70	J-102	J-145	94.41	0.01	0.00	0.60	0.20	0.20
P-71	J-75	J-105	0.20	0.00	0.00	0.00	0.00	0.00
P-72	J-106	J-107	-2.31	0.00	0.00	0.01	0.00	0.00
P-73	J-108	J-109	74.55	0.01	0.00	0.48	0.15	0.15
P-74	J-110	J-111	31.06	0.02	0.00	0.20	0.03	0.03
P-75	J-112	J-113	13.18	0.00	0.00	0.15	0.02	0.02
P-76	J-114	J-103	4.50	0.00	0.00	0.05	0.00	0.00
P-77	J-114	J-116	1.90	0.00	0.00	0.02	0.00	0.00
P-78	J-117	J-114	10.90	0.00	0.00	0.12	0.01	0.01
P-79	J-118	J-117	17.23	0.05	0.00	0.20	0.03	0.03
P-80	J-110	J-121	8.91	0.02	0.00	0.23	0.07	0.07
P-81	J-117	J-121	-1.67	0.00	0.00	0.04	0.00	0.00
P-82	J-121	J-122	2.04	0.00	0.00	0.02	0.00	0.00
P-83	J-122	J-115	-1.16	0.00	0.00	0.01	0.00	0.00
P-84	J-99	J-124	7.00	0.00	0.00	0.08	0.01	0.01
P-85	J-127	J-93	-0.59	0.00	0.00	0.02	0.00	0.00
P-86	J-126	J-127	-1.40	0.00	0.00	0.01	0.00	0.00
P-87	J-128	J-118	13.55	0.14	0.00	0.35	0.16	0.16
P-88	J-129	J-146	37.55	0.15	0.00	0.43	0.15	0.15
P-89	J-131	J-63	24.94	0.00	0.00	0.28	0.07	0.07
P-9	J-46	J-9	-46.85	0.04	0.00	0.53	0.22	0.22
P-90	J-132	J-131	46.86	0.13	0.00	0.53	0.26	0.26
P-91	J-131	J-65	19.42	0.00	0.00	0.22	0.04	0.04
P-92	J-66	J-75	7.79	0.00	0.00	0.09	0.01	0.01
P-93	J-76	J-77	34.98	0.03	0.00	0.40	0.13	0.13
P-94	J-138	J-140	-0.10	0.00	0.00	0.00	0.00	0.00
P-95	J-140	J-141	15.98	0.00	0.00	0.18	0.03	0.03
P-96	J-107	J-76	36.58	0.01	0.00	0.42	0.14	0.14
P-97	J-142	J-143	2.20	0.00	0.00	0.06	0.01	0.01
P-99	J-144	J-142	8.36	0.04	0.00	0.21	0.07	0.07

~@Well Pum-RV I-Well PumO-Well Pum
~@Well Pum-RV I-Well PumO-Well Pum

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		6.10	472.60	282.00	190.60	82.59
J-10		5.60	472.96	281.30	191.66	83.05
J-100		0.40	472.35	288.60	183.75	79.62
J-101		3.00	472.35	290.20	182.15	78.93
J-102		1.30	472.03	307.90	164.13	71.12
J-103		7.80	471.74	290.30	181.44	78.62
J-104		0.30	471.98	309.60	162.38	70.37
J-105		0.20	471.95	277.40	194.55	84.31

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J-106	0.80	472.09	280.00	192.09	83.24
J-107	4.90	472.09	279.20	192.89	83.59
J-108	2.50	471.95	312.40	159.55	69.14
J-109	6.30	471.94	312.50	159.44	69.09
J-11	2.20	473.36	288.10	185.26	80.28
J-110	4.70	471.76	309.20	162.56	70.44
J-111	3.80	471.74	308.20	163.54	70.87
J-112	1.20	471.74	307.80	163.94	71.04
J-113	3.70	471.74	306.00	165.74	71.82
J-114	4.50	471.74	296.00	175.74	76.15
J-115	3.00	471.74	308.40	163.34	70.78
J-116	1.20	471.74	303.60	168.14	72.86
J-117	8.00	471.74	299.60	172.14	74.59
J-118	10.70	471.79	304.70	167.09	72.40
J-119	0.50	471.84	309.90	161.94	70.17
J-12	2.20	473.45	283.60	189.85	82.27
J-120	4.40	473.08	258.50	214.58	92.98
J-121	5.20	471.74	308.70	163.04	70.65
J-122	3.20	471.74	308.80	162.94	70.61
J-123	5.30	472.09	281.50	190.59	82.59
J-124	2.10	471.84	308.90	162.94	70.61
J-125	0.80	473.14	263.90	209.24	90.67
J-126	1.40	471.85	307.20	164.65	71.35
J-127	11.30	471.85	310.20	161.65	70.05
J-128	6.20	471.93	286.90	185.03	80.18
J-129	7.60	472.08	296.40	175.68	76.13
J-13	6.80	473.49	286.00	187.49	81.24
J-130	0.10	473.03	282.50	190.53	82.56
J-131	2.50	471.96	284.30	187.66	81.32
J-132	4.30	472.09	286.40	185.69	80.46
J-133	6.30	471.95	291.60	180.35	78.15
J-134	1.90	473.08	258.30	214.78	93.07
J-135	1.40	473.08	258.90	214.18	92.81
J-136	1.90	473.06	269.10	203.96	88.38
J-137	6.20	471.95	279.00	192.95	83.61
J-138	0.10	471.96	279.60	192.36	83.36
J-139	6.50	471.96	277.90	194.06	84.09
J-14	7.60	473.50	285.70	187.80	81.38
J-140	0.80	471.96	279.40	192.56	83.44
J-141	1.90	471.96	279.90	192.06	83.23
J-142	4.30	471.94	308.60	163.34	70.78
J-143	1.40	471.94	308.50	163.44	70.82
J-144	2.90	471.98	308.20	163.78	70.97
J-145	3.30	472.02	308.90	163.12	70.69
J-146	10.60	471.93	307.20	164.73	71.38
J-147	3.80	472.08	305.20	166.88	72.32
J-148	5.30	472.14	304.60	167.54	72.60
J-149	0.10	472.08	306.30	165.78	71.84
J-15	3.10	473.34	280.50	192.84	83.57
J-150	2.60	472.11	279.50	192.61	83.46
J-151	3.60	472.11	275.20	196.91	85.33
J-152	3.90	472.29	277.40	194.89	84.45
J-153	5.20	473.06	277.30	195.76	84.83
J-154	3.90	473.06	263.50	209.56	90.81
J-155	3.70	472.45	278.10	194.35	84.22
J-156	5.50	473.03	282.20	190.83	82.69
J-157	2.10	472.16	281.00	191.16	82.84
J-158	4.90	472.29	286.10	186.19	80.68
J-159	4.00	472.36	287.40	184.96	80.15
J-16	6.40	473.79	287.20	186.59	80.86
J-160	3.50	472.45	287.80	184.65	80.02
J-161	3.90	472.54	287.90	184.64	80.01
J-162	1.60	472.54	283.80	188.74	81.79
J-163	4.20	472.54	289.50	183.04	79.32
J-164	0.50	472.54	287.90	184.64	80.01
J-165	4.80	472.45	290.60	181.85	78.80
J-167	4.60	472.29	287.40	184.89	80.12
J-168	1.50	472.26	286.00	186.26	80.71
J-169	2.70	472.14	290.10	182.04	78.89
J-17	1.80	472.95	289.60	183.35	79.45
J-170	3.40	472.36	286.90	185.46	80.37
J-171	13.40	473.03	275.20	197.83	85.73
J-172	5.90	472.14	294.70	177.44	76.89
J-173	0.80	472.44	284.80	187.64	81.31
J-174	3.90	472.36	278.50	193.86	84.01
J-176	0.40	472.20	279.20	193.00	83.63
J-177	5.00	473.15	264.80	208.35	90.28
J-178	1.00	472.11	281.00	191.11	82.82
J-179	0.80	472.25	281.00	191.25	82.88
J-18	3.80	473.83	281.60	192.23	83.30
J-180	1.30	472.25	290.20	182.05	78.89
J-181	0.60	472.14	290.20	181.94	78.84
J-183	0.50	472.21	287.60	184.61	80.00
J-185	0.40	472.26	285.80	186.46	80.80

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J-186		0.20	472.26	286.60	185.66	80.45
J-187		5.30	472.29	296.80	175.49	76.05
J-188		1.30	472.36	286.30	186.06	80.63
J-189		4.80	472.39	290.70	181.69	78.73
J-19		9.80	475.83	275.30	200.53	86.89
J-194		0.90	472.54	287.00	185.54	80.40
J-195		1.20	473.06	281.10	191.96	83.18
J-196		3.00	473.10	259.80	213.30	92.43
J-197		1.50	473.07	264.10	208.97	90.55
J-198		1.00	473.08	260.70	212.38	92.03
J-2		4.40	473.21	275.00	198.21	85.89
J-20	reservoir co	8.50	477.82	459.90	17.92	7.76
J-201		0.40	473.08	258.60	214.48	92.94
J-202		0.60	473.08	259.10	213.98	92.72
J-203		3.20	473.51	287.50	186.01	80.60
J-204		0.60	473.51	288.40	185.11	80.21
J-205		0.00	473.45	283.60	189.85	82.27
J-206		0.00	473.45	283.70	189.75	82.22
J-207		0.00	473.36	288.30	185.06	80.19
J-208		0.00	473.36	287.90	185.46	80.37
J-209		2.20	473.91	285.70	188.21	81.56
J-21		8.30	476.96	269.00	207.96	90.12
J-210		2.50	473.91	285.10	188.81	81.82
J-211		0.90	473.91	284.30	189.61	82.16
J-212		0.90	473.91	284.80	189.11	81.95
J-213		0.10	473.91	285.60	188.31	81.60
J-215		0.10	473.34	281.50	191.84	83.13
J-217		0.30	472.67	275.30	197.37	85.53
J-218		0.30	472.67	273.80	198.87	86.18
J-22	reservoir co	1.30	478.00	477.30	0.70	0.30
J-220		0.20	472.67	273.30	199.37	86.39
J-221		0.20	472.67	274.20	198.47	86.00
J-222		0.40	472.67	273.40	199.27	86.35
J-223		0.40	472.67	274.80	197.87	85.74
J-225		3.50	472.11	273.50	198.61	86.07
J-23	reservoir co	4.40	477.83	460.10	17.73	7.68
J-230		3.60	472.11	275.00	197.11	85.41
J-24		3.70	473.25	287.80	185.45	80.36
J-243		0.20	472.10	278.30	193.80	83.98
J-245		0.20	472.08	278.90	193.18	83.71
J-247		0.60	471.98	276.30	195.68	84.80
J-25		1.50	473.35	279.10	194.25	84.17
J-250		0.80	471.98	309.40	162.58	70.45
J-251		0.30	471.98	308.00	163.98	71.06
J-253		0.80	471.94	308.20	163.74	70.95
J-254		0.00	471.94	308.10	163.84	71.00
J-255		0.00	471.94	308.90	163.04	70.65
J-256		3.10	471.95	288.60	183.35	79.45
J-258		1.40	471.77	308.30	163.47	70.84
J-259		0.60	471.77	308.50	163.27	70.75
J-26		4.20	472.95	287.70	185.25	80.28
J-260		0.10	471.74	304.90	166.84	72.30
J-262		5.50	471.74	300.50	171.24	74.20
J-263		2.50	471.74	303.80	167.94	72.77
J-264		4.80	471.74	304.00	167.74	72.69
J-265		2.10	471.73	303.30	168.43	72.99
J-27		2.50	472.54	286.60	185.94	80.57
J-271		0.50	473.06	276.30	196.76	85.26
J-28		4.90	472.59	288.60	183.99	79.73
J-284		0.10	471.84	309.20	162.64	70.48
J-29		4.70	472.58	291.80	180.78	78.34
J-3		3.10	472.96	282.90	190.06	82.36
J-30		1.60	472.94	289.70	183.24	79.40
J-304		0.90	471.95	295.30	176.65	76.55
J-305		0.20	471.95	284.70	187.25	81.14
J-31		6.10	473.38	269.30	204.08	88.43
J-32		4.40	473.12	269.00	204.12	88.45
J-33		5.00	472.89	269.60	203.29	88.09
J-332		0.90	472.21	279.90	192.31	83.33
J-34		1.40	472.57	278.90	193.67	83.92
J-35		0.70	472.89	272.50	200.39	86.84
J-354		1.10	473.20	280.20	193.00	83.63
J-355		0.10	473.16	282.50	190.66	82.62
J-357		1.70	471.84	309.10	162.74	70.52
J-358		2.00	471.84	309.80	162.04	70.22
J-36		3.90	473.78	282.50	191.28	82.89
J-362		1.00	471.93	301.60	170.33	73.81
J-365		0.40	471.74	303.30	168.44	72.99
J-366		0.20	471.74	302.20	169.54	73.47
J-368		0.60	471.84	310.20	161.64	70.04
J-37		4.10	473.31	287.40	185.91	80.56
J-371		1.50	471.95	281.40	190.55	82.57
J-373		0.30	473.08	259.40	213.68	92.59
J-376		0.70	473.08	260.60	212.48	92.08

20 Year MDD + Fireflow Model Results

J-377		0.50	473.08	261.70	211.38	91.60
J-378		2.50	473.10	262.20	210.90	91.39
J-379		1.50	473.09	261.60	211.49	91.64
J-38		0.50	473.34	280.60	192.74	83.52
J-382		0.40	472.54	289.40	183.14	79.36
J-383		0.90	472.10	277.20	194.90	84.46
J-384		0.50	472.10	277.60	194.50	84.28
J-386		0.70	471.98	276.50	195.48	84.71
J-388		0.20	472.09	282.30	189.79	82.24
J-389		1.60	472.09	282.20	189.89	82.29
J-39		1.40	472.54	288.20	184.34	79.88
J-390		0.40	472.09	281.00	191.09	82.81
J-391		0.30	472.09	283.00	189.09	81.94
J-4		4.80	474.26	284.40	189.86	82.27
J-40		5.40	472.67	275.00	197.67	85.66
J-41		0.80	473.34	280.80	192.54	83.43
J-42		3.90	473.16	283.60	189.56	82.14
J-43		2.50	472.67	273.80	198.87	86.18
J-44		2.80	472.57	278.10	194.47	84.27
J-45		2.80	473.22	284.20	189.02	81.91
J-46		5.20	473.17	273.90	199.27	86.35
J-47		2.70	472.45	288.80	183.65	79.58
J-48		5.90	472.29	287.70	184.59	79.99
J-49		3.20	472.21	289.20	183.01	79.31
J-5		3.20	473.58	286.90	186.68	80.90
J-50		4.50	472.29	287.30	184.99	80.16
J-51		2.00	472.26	286.00	186.26	80.71
J-52		3.60	472.22	282.90	189.32	82.04
J-53		5.00	473.37	276.40	196.97	85.35
J-54		3.00	472.20	276.90	195.30	84.63
J-55		3.50	472.11	278.10	194.01	84.07
J-56		8.20	472.09	280.60	191.49	82.98
J-57		7.60	475.76	277.20	198.56	86.04
J-58		3.30	472.12	279.90	192.22	83.30
J-59		3.50	472.25	283.60	188.65	81.75
J-6		5.80	473.28	275.20	198.08	85.84
J-60		2.70	472.10	277.70	194.40	84.24
J-61		2.50	472.09	289.50	182.59	79.12
J-62		1.40	471.99	309.20	162.79	70.54
J-63		2.30	471.95	284.20	187.75	81.36
J-64		3.50	471.94	285.50	186.44	80.79
J-65		0.60	471.95	285.00	186.95	81.01
J-66		5.60	471.95	283.90	188.05	81.49
J-67		2.10	473.27	278.20	195.07	84.53
J-68		0.60	473.13	262.90	210.23	91.10
J-69		3.00	473.12	262.20	210.92	91.40
J-7		8.00	473.27	276.20	197.07	85.40
J-71		4.70	473.11	272.90	200.21	86.76
J-72		7.20	473.08	279.80	193.28	83.76
J-73		3.70	473.08	258.80	214.28	92.85
J-74		4.10	473.09	261.20	211.89	91.82
J-75		7.50	471.95	277.10	194.85	84.44
J-76		1.40	472.09	279.20	192.89	83.58
J-77		8.20	472.06	282.40	189.66	82.18
J-78		2.10	471.99	277.40	194.59	84.32
J-79		1.30	473.07	260.80	212.27	91.98
J-8		6.10	473.29	286.90	186.39	80.77
J-80		1.40	473.07	259.40	213.67	92.59
J-81		1.50	473.07	258.10	214.97	93.15
J-82		9.60	472.10	273.70	198.40	85.97
J-83		2.70	473.07	258.70	214.37	92.89
J-84		8.40	473.06	280.00	193.06	83.66
J-85		0.30	473.14	263.40	209.74	90.89
J-86		2.30	471.95	278.80	193.15	83.70
J-87		6.40	471.77	308.30	163.47	70.84
J-88		2.00	473.08	259.80	213.28	92.42
J-89		1.10	473.08	258.20	214.88	93.11
J-9		3.60	473.21	279.70	193.51	83.86
J-90		0.80	473.08	259.60	213.48	92.51
J-91		1.70	473.09	260.80	212.29	91.99
J-92		4.00	473.11	272.20	200.91	87.06
J-93		4.90	471.85	309.00	162.85	70.57
J-94		3.10	472.44	286.30	186.14	80.66
J-95		1.80	472.44	288.60	183.84	79.67
J-96		1.90	472.36	287.50	184.86	80.11
J-97		0.50	472.37	289.30	183.07	79.33
J-98		1.60	472.37	287.40	184.97	80.15
J-99		2.50	471.84	308.80	163.04	70.65
R-1	275,000 gal	----	478.00	467.00	11.00	4.77
R-2	275,000 gal	----	478.00	467.00	11.00	4.77
Well No. 1		----	279.10	279.10	0.00	0.00
Well No. 3		----	271.70	271.70	0.00	0.00
O-Well Pum	300 gpm capa	0.00	472.11	279.10	193.01	83.64
O-Well Pum	400 gpm capa	0.00	472.11	271.70	200.41	86.85

I-Well Pum	300 gpm capa	0.00	279.10	279.10	0.00	0.00
I-Well Pum	400 gpm capa	0.00	271.70	271.70	0.00	0.00

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-81	93.15	J-22	0.30
J-89	93.11	R-1	4.77
J-134	93.07	R-2	4.77
J-120	92.98	J-23	7.68
J-201	92.94	J-20	7.76
J-83	92.89	J-109	69.09
J-73	92.85	J-108	69.14
J-135	92.81	J-368	70.04
J-202	92.72	J-127	70.05
J-373	92.59	J-119	70.17

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-15	3.50	P-234	0.00
P-16	2.50	P-298	0.00
P-41	1.87	P-229	0.00
P-17	1.73	P-169	0.00
P-3	1.67	P-203	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-15	7.31	P-234	0.00
P-16	2.81	P-298	0.00
P-11	1.89	P-229	0.00
P-41	1.64	P-94	0.00
P-44	1.39	P-169	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-15	7.31	P-234	0.00
P-16	2.81	P-298	0.00
P-11	1.89	P-229	0.00
P-41	1.64	P-94	0.00
P-44	1.39	P-169	0.00

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
Well Pump No	FCV-2	0.00	BOOSTED	0.00	83.64	0.00
Well Pump No	FCV-2	0.00	BOOSTED	0.00	86.85	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	296.10	275,000 gal
R-2	444.10	275,000 gal

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      Well No. 1        0.00
      Well No. 3        0.00

 NET SYSTEM INFLOW  =    740.20
 NET SYSTEM OUTFLOW =      0.00
 NET SYSTEM DEMAND  =    740.20


================================================================================
FireFlow/Hydrant Report
         Fireflow/Hydrant Report:
         ________________________

Scenario: No Title
Global Demand Factor for this Scenario: 1.000

Specified Minimum Pressure(psi):   20.0
Minimum Static Pressure(psi)   :   20.0

 Flow-1: Flowrate to maintain the specified
         pressure at (hydrant) node
 Node-2: Node that has a lower pressure than
         specified value at Flow-1
 Flow-2: Flowrate to maintain the specified
         pressure at Node-2

 Hose Constant =    0.00
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Hydrant Node	Hydrant Constant	Elevation	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2 gpm	Flow Capacity	NFPA Color
H-83	0.0	282.2	82.6	3356.3	2963.4	J-109	2963.4	BLUE
H-54	0.0	307.5	71.3	2238.9	2197.1	J-108	2197.1	BLUE
H-30	0.0	279.2	83.7	2500.4			2500.4	BLUE
H-49	0.0	280.6	83.0	2730.1	2483.9	J-109	2483.9	BLUE
H-50	0.0	279.9	83.3	2741.9	2468.0	J-109	2468.0	BLUE
H-38	0.0	284.1	81.5	2749.6	2529.8	J-109	2529.8	BLUE
H-31	0.0	287.4	80.1	2846.7	2614.2	J-109	2614.2	BLUE
H-26	0.0	288.0	80.0	2975.9	2713.7	J-109	2713.7	BLUE
H-34	0.0	287.1	80.3	2002.8			2002.8	BLUE
H-37	0.0	292.4	77.9	1408.9			1408.9	GREEN
H-23	0.0	289.5	79.5	3101.0	3022.2	J-109	3022.2	BLUE
H-75	0.0	296.0	76.3	1683.6			1683.6	BLUE
H-33	0.0	286.4	80.6	1574.7			1574.7	BLUE
H-29	0.0	290.7	78.8	2658.7			2658.7	BLUE
H-8	0.0	280.8	83.9	3954.9	3631.5	J-109	3631.5	BLUE
H-28	0.0	282.4	82.4	3142.4	2767.6	J-109	2767.6	BLUE
H-27	0.0	292.6	78.0	2956.1	2746.2	J-109	2746.2	BLUE
H-13	0.0	284.1	82.5	4270.2	3883.3	J-109	3883.3	BLUE
H-5	0.0	288.4	80.2	2559.6			2559.6	BLUE
H-6	0.0	285.6	81.6	2894.4			2894.4	BLUE
H-7	0.0	287.3	82.3	10732.2	9433.6	J-109	9433.6	BLUE
H-42	0.0	272.3	86.6	2282.3			2282.3	BLUE
H-43	0.0	277.5	84.3	2187.9			2187.9	BLUE
H-47	0.0	282.6	82.1	2128.5			2128.5	BLUE
H-48	0.0	282.3	82.2	1652.3			1652.3	BLUE
H-51	0.0	277.6	84.3	2335.9			2335.9	BLUE
H-59	0.0	291.5	78.2	1602.0			1602.0	BLUE
H-69	0.0	304.2	72.6	1252.5			1252.5	GREEN
H-73	0.0	306.1	71.8	1372.9			1372.9	GREEN
H-72	0.0	306.0	71.8	1435.0			1435.0	GREEN
H-79	0.0	302.7	73.2	1454.8			1454.8	GREEN
H-74	0.0	303.1	73.1	1104.0			1104.0	GREEN
H-64	0.0	311.2	69.6	1049.7			1049.7	GREEN
H-71	0.0	308.6	70.7	1481.2			1481.2	GREEN
H-3	0.0	259.4	92.6	1800.1			1800.1	BLUE
H-44	0.0	279.9	83.3	1932.4			1932.4	BLUE
H-45	0.0	280.6	83.0	1872.3			1872.3	BLUE
H-46	0.0	280.8	82.9	1875.0			1875.0	BLUE
H-63	0.0	309.0	70.6	1298.1			1298.1	GREEN
H-78	0.0	274.8	85.9	1331.7	1292.2	J-130	1292.2	GREEN
H-60	0.0	281.6	82.5	1717.7			1717.7	BLUE
H-62	0.0	308.9	70.6	1674.3			1674.3	BLUE
H-58	0.0	279.1	83.6	1698.8			1698.8	BLUE
H-56	0.0	284.7	81.1	1986.9			1986.9	BLUE
H-55	0.0	286.5	80.4	1883.2			1883.2	BLUE
H-39	0.0	277.2	84.5	2701.7	2574.4	J-109	2574.4	BLUE
H-9	0.0	267.6	89.1	3543.5	3141.2	J-109	3141.2	BLUE
H-10	0.0	264.4	90.5	3330.5	3036.9	J-109	3036.9	BLUE
H-11	0.0	271.7	87.2	2377.0			2377.0	BLUE
H-16	0.0	274.8	86.0	3397.0	3294.7	J-109	3294.7	BLUE
H-4	0.0	260.8	92.0	2387.8	2332.3	J-195	2332.3	BLUE

20 Year MDD + Fireflow Model Results

H-35	0.0	304.1	72.8	2443.3	2401.6	J-109	2401.6	BLUE
H-36	0.0	298.7	75.2	2627.0	2510.7	J-109	2510.7	BLUE
H-76	0.0	278.2	84.4	1696.7	1677.9	J-130	1677.9	BLUE
H-77	0.0	267.4	89.1	1648.9			1648.9	BLUE
H-1	0.0	258.1	93.2	1712.5	1670.9	J-195	1670.9	BLUE
H-14	0.0	287.7	80.5	3062.3			3062.3	BLUE
H-12	0.0	275.8	85.6	3402.5	3180.8	J-109	3180.8	BLUE
H-17	0.0	281.6	83.0	3155.4			3155.4	BLUE
H-25	0.0	277.6	84.5	3076.8	2764.9	J-109	2764.9	BLUE
H-24	0.0	275.0	85.7	1698.1			1698.1	BLUE
H-40	0.0	275.7	85.1	2402.8			2402.8	BLUE
H-41	0.0	273.5	86.1	2333.9			2333.9	BLUE
H-53	0.0	315.1	68.0	1959.6			1959.6	BLUE
H-19	0.0	285.2	81.6	3157.3			3157.3	BLUE
H-22	0.0	276.7	85.1	3412.3	3092.6	J-109	3092.6	BLUE
H-80	0.0	286.0	81.0	1213.7			1213.7	GREEN
H-81	0.0	289.0	79.7	1200.0			1200.0	GREEN
H-82	0.0	283.1	82.3	1230.9			1230.9	GREEN
H-18	0.0	286.1	81.3	3105.7			3105.7	BLUE
H-21	0.0	279.8	83.9	3234.0	3170.5	J-109	3170.5	BLUE
H-20	0.0	287.2	80.7	3131.3			3131.3	BLUE
H-15	0.0	279.9	83.8	3309.5			3309.5	BLUE
H-2	0.0	275.6	85.6	1639.6			1639.6	BLUE
H-84	0.0	309.1	70.6	1139.2			1139.2	GREEN
H-32	0.0	289.2	79.4	1342.6			1342.6	GREEN
H-67	0.0	309.3	70.4	1556.7			1556.7	BLUE
H-70	0.0	285.7	80.6	1567.2	1512.4	J-260	1512.4	BLUE
H-68	0.0	298.7	75.0	1477.4	1458.7	J-260	1458.7	GREEN
H-65	0.0	305.5	72.1	1431.1			1431.1	GREEN
H-66	0.0	306.9	71.4	1375.9			1375.9	GREEN
H-61	0.0	311.0	69.7	1613.3			1613.3	BLUE
H-52	0.0	284.4	81.3	2244.9			2244.9	BLUE
H-57	0.0	276.4	84.7	1876.6			1876.6	BLUE

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 11.113  03-10-2023                             *
*  Company:  GibbsOlson    Serial #:  592186               *
*  Interface:  KYnetic                                     *
*   Licensed for Pipe2018                                  *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *


 Date & Time:  Tue Apr 18 15:44:43 2023

 Master File : t:\projects\0751 tenino\5021 water system update\kypipe modeling\imports\water-distr-map_.KYP\water-distr-map_.P2K


              ************************************************
               S U M M A R Y   O F   O R I G I N A L   D A T A
              ************************************************


 U N I T S   S P E C I F I E D

    FLOWRATE ............ = gallons/minute
    HEAD (HGL) .......... = feet
    PRESSURE ............ = psig


 R E G U L A T I N G   V A L V E   D A T A

       VALVE       VALVE          VALVE
       LABEL       TYPE         SETTING
                               (ft or gpm)
 ----------------------------------------
Well Pump No  Const_FLOW_Pump       0.00
Well Pump No  Const_FLOW_Pump       0.00


 P I P E L I N E   D A T A

   STATUS CODE:   XX -CLOSED PIPE    CV -CHECK VALVE

   P I P E             NODE NAMES       LENGTH  DIAMETER  ROUGHNESS    MINOR
   N A M E            #1        #2       (ft)     (in)      COEFF.  LOSS COEFF.
 ---------------------------------------------------------------------------------
       P-1            J-1      J-10      564.56     8.00  140.0000       0.00
      P-10            J-8      J-11      209.15     2.00  140.0000       0.00
     P-100         J-145      J-62      192.29     4.00  140.0000       0.00
     P-101         J-109     J-146      280.46     4.00  140.0000       0.00
     P-102         J-146     J-128      302.88     4.00  140.0000       0.00
     P-103         J-147     J-102      254.28     8.00  140.0000       0.00
     P-104         J-148     J-147      302.70     8.00  140.0000       0.00
     P-105         J-129     J-147      301.36     8.00  140.0000       0.00
     P-106         J-129      J-61      134.92     8.00  140.0000       0.00
     P-107         J-132     J-150      348.86     8.00  140.0000       0.00
     P-108         J-150      J-60      186.99     8.00  140.0000       0.00
     P-109         J-230     J-151       35.93     6.00  140.0000       0.00
      P-11          J-12       J-9      123.31     2.00  140.0000       0.00
     P-110         J-151      J-54      304.12     6.00  140.0000       0.00
     P-111         J-152     J-174      269.57     6.00  140.0000       0.00
     P-112         J-174     J-155      296.45     6.00  140.0000       0.00
     P-113         J-155      J-44      363.91     6.00  140.0000       0.00
     P-114         J-157      J-58      216.49     8.00  140.0000       0.00
     P-115         J-158      J-52      353.86     8.00  140.0000       0.00
     P-116         J-159     J-158      273.19     8.00  140.0000       0.00
     P-117         J-159     J-160      329.29     8.00  140.0000       0.00
     P-118         J-160     J-161      303.54     8.00  140.0000       0.00
     P-119         J-161      J-27      127.34     8.00  140.0000       0.00
      P-12          J-13      J-14      572.52     4.00  140.0000       0.00
     P-120          J-34     J-161      307.34     8.00  140.0000       0.00
     P-121         J-161     J-163      185.32     8.00  140.0000       0.00
     P-122         J-163      J-39      192.72     6.00  140.0000       0.00
     P-123         J-165     J-163      303.05     4.00  140.0000       0.00
     P-124         J-101     J-165      332.73     4.00  140.0000       0.00
     P-125         J-101     J-167      271.81     4.00  140.0000       0.00
     P-126         J-167      J-51      303.40     4.00  140.0000       0.00
     P-127          J-95      J-47       32.62     6.00  130.0000       0.00
     P-128          J-50      J-49      302.12     6.00  130.0000       0.00
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20 Year PHD Model Results

P-129	J-28	J-94	334.01	4.00	140.0000	0.00
P-13	J-16	J-36	577.26	4.00	140.0000	0.00
P-130	J-170	J-94	265.61	4.00	140.0000	0.00
P-131	J-48	J-170	303.50	4.00	140.0000	0.00
P-132	J-172	J-48	628.16	4.00	140.0000	0.00
P-133	J-172	J-129	300.73	4.00	140.0000	0.00
P-134	J-173	J-155	186.72	2.00	110.0000	0.00
P-135	J-159	J-174	323.79	2.00	110.0000	0.00
P-136	J-152	J-158	316.93	8.00	140.0000	0.00
P-137	J-54	J-176	85.83	6.00	140.0000	0.00
P-138	J-151	J-55	99.62	6.00	140.0000	0.00
P-139	J-179	J-59	187.39	4.00	140.0000	0.00
P-14	J-17	J-24	261.74	6.00	140.0000	0.00
P-140	J-181	J-172	139.90	4.00	140.0000	0.00
P-141	J-148	J-172	299.37	4.00	140.0000	0.00
P-142	J-183	J-49	113.95	4.00	130.0000	0.00
P-143	J-185	J-51	82.56	4.00	140.0000	0.00
P-144	J-187	J-48	298.52	8.00	140.0000	0.00
P-145	J-167	J-158	185.97	8.00	140.0000	0.00
P-146	J-96	J-170	137.72	4.00	140.0000	0.00
P-147	J-188	J-170	98.91	4.00	140.0000	0.00
P-148	J-189	J-188	199.79	2.00	110.0000	0.00
P-149	J-165	J-47	297.61	6.00	140.0000	0.00
P-15	J-18	J-19	273.18	6.00	140.0000	0.00
P-150	J-165	J-160	186.91	6.00	140.0000	0.00
P-151	J-1	J-28	267.19	8.00	140.0000	0.00
P-152	J-28	J-29	137.63	8.00	140.0000	0.00
P-153	J-29	J-163	292.61	8.00	140.0000	0.00
P-154	J-39	J-194	106.34	6.00	140.0000	0.00
P-155	J-195	J-72	275.99	2.00	110.0000	0.00
P-156	J-196	J-134	351.31	8.00	140.0000	0.00
P-157	J-196	J-69	359.98	8.00	140.0000	0.00
P-158	J-198	J-74	227.49	2.00	140.0000	0.00
P-159	J-88	J-89	67.89	2.00	140.0000	0.00
P-16	J-4	J-57	534.18	8.00	140.0000	0.00
P-160	J-201	J-89	104.40	2.00	140.0000	0.00
P-161	J-203	J-204	135.42	6.00	140.0000	0.00
P-162	J-12	J-13	398.64	4.00	140.0000	0.00
P-163	J-205	J-12	5.00	6.00	130.0000	0.00
P-164	J-207	J-11	5.00	6.00	130.0000	0.00
P-165	J-11	J-16	311.07	2.00	110.0000	0.00
P-166	J-209	J-210	60.83	6.00	130.0000	0.00
P-167	J-209	J-211	210.94	2.00	140.0000	0.00
P-168	J-212	J-209	210.94	2.00	140.0000	0.00
P-169	J-209	J-213	30.61	6.00	130.0000	0.00
P-17	J-19	J-20	1953.66	12.00	130.0000	0.00
P-170	J-15	J-41	38.95	2.00	110.0000	0.00
P-171	J-40	J-43	477.34	6.00	140.0000	0.00
P-172	J-218	J-43	24.72	6.00	140.0000	0.00
P-173	J-220	J-218	30.00	6.00	130.0000	0.00
P-174	J-222	J-220	30.00	6.00	130.0000	0.00
P-175	J-223	J-221	30.00	6.00	130.0000	0.00
P-176	J-222	J-223	60.00	6.00	130.0000	0.00
P-177	J-194	J-27	82.95	6.00	140.0000	0.00
P-178	J-1	J-189	598.02	8.00	140.0000	0.00
P-179	J-189	J-187	308.50	8.00	140.0000	0.00
P-18	J-21	J-23	739.67	6.00	140.0000	0.00
P-180	J-151	J-225	392.61	6.00	130.0000	0.00
P-181	J-225O-Well Pum		109.68	6.00	130.0000	0.00
P-182	J-225O-Well Pum		109.40	6.00	130.0000	0.00
P-183	J-230	J-82	134.15	6.00	140.0000	0.00
P-184	J-82	J-123	718.84	6.00	140.0000	0.00
P-185	J-56	J-123	367.50	6.00	140.0000	0.00
P-186	J-389	J-388	52.82	6.00	130.0000	0.00
P-187	J-58	J-150	75.19	8.00	140.0000	0.00
P-188	J-59	J-180	301.08	4.00	140.0000	0.00
P-189	J-60	J-107	400.92	8.00	140.0000	0.00
P-19	J-57	J-21	1177.27	6.00	140.0000	0.00
P-190	J-243	J-383	38.70	6.00	130.0000	0.00
P-191	J-245	J-76	40.10	2.00	110.0000	0.00
P-192	J-247	J-78	146.24	2.00	140.0000	0.00
P-193	J-62	J-250	52.07	2.00	140.0000	0.00
P-194	J-251	J-250	78.84	2.00	140.0000	0.00
P-195	J-143	J-253	184.93	8.00	140.0000	0.00
P-196	J-254	J-143	5.00	6.00	130.0000	0.00
P-197	J-141	J-86	313.12	6.00	140.0000	0.00
P-198	J-133	J-256	526.22	6.00	140.0000	0.00
P-199	J-87	J-258	196.59	6.00	140.0000	0.00
P-2	J-10	J-3	42.14	8.00	130.0000	0.00
P-20	J-37	J-15	578.48	8.00	140.0000	0.00
P-200	J-258	J-259	133.73	4.00	140.0000	0.00
P-201	J-115	J-111	40.58	6.00	140.0000	0.00
P-202	J-111	J-112	108.93	6.00	140.0000	0.00
P-203	J-260	J-116	27.25	6.00	130.0000	0.00

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20 Year PHD Model Results

P-204	J-103	J-262	634.08	8.00	140.0000	0.00
P-205	J-262	J-263	355.80	8.00	140.0000	0.00
P-206	J-264	J-263	242.99	6.00	140.0000	0.00
P-207	J-113	J-262	303.07	6.00	140.0000	0.00
P-208	J-113	J-264	390.94	6.00	140.0000	0.00
P-209	J-264	J-265	498.95	6.00	140.0000	0.00
P-21	J-3	J-26	418.42	8.00	130.0000	0.00
P-210	J-250	J-104	71.65	2.00	140.0000	0.00
P-211	J-358	J-119	124.38	6.00	140.0000	0.00
P-212	I-Well PumWell	No. 1	16.31	6.00	130.0000	0.00
P-213	J-197	J-136	120.34	8.00	140.0000	0.00
P-214	I-Well PumWell	No. 3	17.14	6.00	130.0000	0.00
P-215	J-103	J-115	556.01	6.00	140.0000	0.00
P-216	J-120	J-88	238.04	6.00	140.0000	0.00
P-217	J-82	J-56	1379.66	6.00	140.0000	0.00
P-218	J-123	J-106	143.58	6.00	140.0000	0.00
P-219	J-125	J-68	71.81	8.00	140.0000	0.00
P-22	J-26	J-28	416.33	4.00	140.0000	0.00
P-220	J-284	J-124	19.69	6.00	130.0000	0.00
P-221	J-84	J-171	1858.48	8.00	130.0000	0.00
P-222	J-77	J-139	1497.31	6.00	140.0000	0.00
P-223	J-127	J-87	1184.74	8.00	140.0000	0.00
P-224	J-87	J-110	123.95	8.00	140.0000	0.00
P-225	J-146	J-93	862.64	6.00	140.0000	0.00
P-226	J-63	J-64	304.15	6.00	140.0000	0.00
P-227	J-78	J-77	192.73	2.00	140.0000	0.00
P-228	J-140	J-139	26.45	6.00	140.0000	0.00
P-229	J-75	J-137	1372.85	6.00	140.0000	0.00
P-23	J-29	J-30	348.98	6.00	130.0000	0.00
P-230	J-63	J-304	213.47	2.00	140.0000	0.00
P-231	J-305	J-65	51.77	6.00	130.0000	0.00
P-232	J-62	J-144	88.34	4.00	140.0000	0.00
P-233	J-61	J-132	143.54	8.00	140.0000	0.00
P-234	J-147	J-149	30.30	8.00	140.0000	0.00
P-235	J-143	J-255	5.00	6.00	130.0000	0.00
P-236	J-145	J-108	544.61	8.00	140.0000	0.00
P-237	J-64	J-128	290.01	6.00	140.0000	0.00
P-238	J-168	J-59	313.86	4.00	140.0000	0.00
P-239	J-169	J-61	296.86	6.00	130.0000	0.00
P-24	J-18	J-31	562.52	8.00	140.0000	0.00
P-240	J-65	J-66	36.13	6.00	140.0000	0.00
P-241	J-134	J-135	104.44	8.00	140.0000	0.00
P-242	J-49	J-169	326.57	6.00	130.0000	0.00
P-243	J-48	J-50	136.63	8.00	140.0000	0.00
P-244	J-50	J-167	302.42	8.00	140.0000	0.00
P-245	J-52	J-332	197.62	2.00	110.0000	0.00
P-246	J-52	J-157	285.26	8.00	140.0000	0.00
P-247	J-54	J-152	297.60	6.00	140.0000	0.00
P-248	J-51	J-168	15.20	4.00	140.0000	0.00
P-249	J-51	J-186	48.68	4.00	140.0000	0.00
P-25	J-31	J-32	537.17	8.00	140.0000	0.00
P-250	J-55	J-178	225.29	6.00	140.0000	0.00
P-251	J-47	J-29	302.61	6.00	130.0000	0.00
P-252	J-66	J-133	926.55	6.00	140.0000	0.00
P-253	J-44	J-34	27.54	8.00	140.0000	0.00
P-254	J-86	J-137	60.97	6.00	140.0000	0.00
P-255	J-24	J-37	50.43	6.00	140.0000	0.00
P-256	J-45	J-354	261.04	2.00	110.0000	0.00
P-257	J-42	J-45	70.29	6.00	140.0000	0.00
P-258	J-357	J-358	204.66	6.00	140.0000	0.00
P-259	J-135	J-197	236.97	8.00	140.0000	0.00
P-26	J-32	J-33	484.59	8.00	140.0000	0.00
P-260	J-64	J-362	239.05	2.00	140.0000	0.00
P-261	J-55	J-58	482.97	2.00	110.0000	0.00
P-262	J-116	J-365	49.95	2.00	140.0000	0.00
P-263	J-365	J-366	35.47	1.50	140.0000	0.00
P-264	J-124	J-357	179.43	6.00	140.0000	0.00
P-265	J-136	J-271	120.75	2.00	140.0000	0.00
P-266	J-358	J-368	150.58	6.00	140.0000	0.00
P-267	J-136	J-153	219.04	8.00	140.0000	0.00
P-268	J-371	J-256	186.41	6.00	140.0000	0.00
P-269	J-371	J-86	160.94	6.00	140.0000	0.00
P-27	J-33	J-40	502.13	8.00	140.0000	0.00
P-270	J-202	J-90	57.05	2.00	110.0000	0.00
P-271	J-91	J-90	69.29	2.00	110.0000	0.00
P-272	J-376	J-379	163.66	2.00	140.0000	0.00
P-273	J-378	J-379	68.46	2.00	140.0000	0.00
P-274	J-22	R-2	9.86	14.00	130.0000	0.00
P-275	J-164	J-382	102.35	2.00	140.0000	0.00
P-276	J-383	J-384	113.12	2.00	140.0000	0.00
P-277	J-78	J-386	152.39	2.00	140.0000	0.00
P-278	J-56	J-389	151.47	6.00	130.0000	0.00
P-279	J-389	J-390	93.46	2.00	140.0000	0.00
P-28	J-33	J-35	162.74	6.00	130.0000	0.00

20 Year PHD Model Results

P-280	J-389	J-391	70.93	2.00	140.0000	0.00
P-281	J-17	J-30	16.38	6.00	130.0000	0.00
P-282	J-9	J-2	250.43	8.00	140.0000	0.00
P-283	J-24	J-42	568.60	2.00	110.0000	0.00
P-284	J-42	J-355	34.61	2.00	110.0000	0.00
P-285	J-83	J-81	343.03	4.00	140.0000	0.00
P-286	J-69	J-378	267.73	6.00	140.0000	0.00
P-287	J-98	J-95	258.46	6.00	130.0000	0.00
P-288	J-93	J-99	24.03	4.00	140.0000	0.00
P-289	J-148	J-187	627.71	8.00	140.0000	0.00
P-29	J-14	J-53	569.92	4.00	140.0000	0.00
P-290	J-203	J-6	474.49	8.00	140.0000	0.00
P-291	J-210	J-5	261.30	8.00	140.0000	0.00
P-292	J-218	J-221	30.00	6.00	130.0000	0.00
P-293	J-99	J-118	275.19	4.00	140.0000	0.00
P-294	J-153	J-84	103.07	8.00	140.0000	0.00
P-295	J-153	J-154	901.99	8.00	140.0000	0.00
P-296	J-120	J-73	537.55	6.00	140.0000	0.00
P-297	J-171	J-156	634.86	8.00	130.0000	0.00
P-298	J-156	J-130	20.94	8.00	130.0000	0.00
P-299	J-5	J-8	339.80	6.00	140.0000	0.00
P-3	J-4	J-210	258.43	8.00	140.0000	0.00
P-30	J-31	J-53	327.83	8.00	140.0000	0.00
P-300	J-8	J-9	272.62	6.00	140.0000	0.00
P-301	J-45	J-13	315.32	6.00	140.0000	0.00
P-302	J-379	J-377	110.96	2.00	140.0000	0.00
P-303	J-383	J-60	50.74	6.00	130.0000	0.00
P-304	J-91	J-74	172.40	6.00	140.0000	0.00
P-305	J-92	J-71	34.04	6.00	140.0000	0.00
P-306	J-46	J-2	314.13	8.00	140.0000	0.00
P-307	J-3	J-42	259.90	6.00	140.0000	0.00
P-308	J-27	J-162	370.90	8.00	140.0000	0.00
P-309	J-39	J-164	34.82	6.00	140.0000	0.00
P-31	J-41	J-38	116.56	2.00	110.0000	0.00
P-310	J-40	J-44	263.96	8.00	140.0000	0.00
P-311	J-43	J-217	79.70	6.00	140.0000	0.00
P-312	J-177	J-125	50.56	8.00	140.0000	0.00
P-313	J-107	J-230	655.50	6.00	140.0000	0.00
P-314	J-109	J-127	869.66	8.00	140.0000	0.00
P-32	J-26	J-17	148.18	8.00	130.0000	0.00
P-33	J-14	J-36	280.82	6.00	140.0000	0.00
P-34	J-10	J-46	698.76	8.00	140.0000	0.00
P-35	J-156	J-171	623.82	8.00	130.0000	0.00
P-36	J-13	J-16	277.39	6.00	140.0000	0.00
P-37	J-12	J-206	5.00	6.00	130.0000	0.00
P-38	J-15	J-25	98.84	8.00	140.0000	0.00
P-39	J-53	J-25	252.22	8.00	140.0000	0.00
P-4	J-5	J-203	143.82	8.00	140.0000	0.00
P-40	J-41	J-215	24.36	2.00	110.0000	0.00
P-41	J-57	J-19	41.50	8.00	140.0000	0.00
P-42	J-36	J-18	50.38	6.00	140.0000	0.00
P-43	J-37	J-14	330.97	6.00	140.0000	0.00
P-44	J-16	J-4	335.26	6.00	140.0000	0.00
P-45	J-11	J-208	5.00	6.00	130.0000	0.00
P-46	J-7	J-67	496.58	8.00	140.0000	0.00
P-47	J-6	J-177	538.73	8.00	140.0000	0.00
P-48	J-68	J-69	66.80	8.00	130.0000	0.00
P-49	J-177	J-92	580.44	6.00	140.0000	0.00
P-5	J-6	J-7	359.15	8.00	140.0000	0.00
P-50	J-71	J-72	1074.70	6.00	140.0000	0.00
P-51	J-72	J-73	331.33	6.00	140.0000	0.00
P-52	J-142	J-109	283.10	4.00	140.0000	0.00
P-53	J-74	J-378	231.53	6.00	140.0000	0.00
P-54	J-20	J-23	23.33	14.00	130.0000	0.00
P-55	J-22	R-1	9.86	12.00	130.0000	0.00
P-56	J-92	J-74	314.41	2.00	110.0000	0.00
P-57	J-79	J-80	308.00	4.00	140.0000	0.00
P-58	J-80	J-83	23.91	4.00	140.0000	0.00
P-59	J-120	J-83	264.92	4.00	140.0000	0.00
P-6	J-7	J-2	451.49	8.00	140.0000	0.00
P-60	J-125	J-85	69.51	2.00	130.0000	0.00
P-61	J-23	J-22	247.07	14.00	130.0000	0.00
P-62	J-88	J-91	151.68	6.00	140.0000	0.00
P-63	J-89	J-202	95.35	2.00	140.0000	0.00
P-64	J-90	J-373	77.16	2.00	110.0000	0.00
P-65	J-94	J-95	132.18	4.00	140.0000	0.00
P-66	J-96	J-98	5.04	6.00	130.0000	0.00
P-67	J-97	J-98	115.52	4.00	140.0000	0.00
P-68	J-50	J-96	306.54	6.00	130.0000	0.00
P-69	J-100	J-101	94.40	4.00	140.0000	0.00
P-7	J-7	J-8	569.47	8.00	140.0000	0.00
P-70	J-102	J-145	39.77	8.00	140.0000	0.00
P-71	J-75	J-105	36.23	6.00	130.0000	0.00
P-72	J-106	J-107	43.64	8.00	130.0000	0.00

P-73	J-108	J-109	54.64	8.00	130.0000	0.00
P-74	J-110	J-111	709.01	8.00	140.0000	0.00
P-75	J-112	J-113	156.89	6.00	140.0000	0.00
P-76	J-114	J-103	624.45	6.00	140.0000	0.00
P-77	J-114	J-116	211.83	6.00	140.0000	0.00
P-78	J-117	J-114	206.16	6.00	140.0000	0.00
P-79	J-118	J-117	1353.90	6.00	140.0000	0.00
P-80	J-110	J-121	250.37	4.00	140.0000	0.00
P-81	J-117	J-121	307.78	4.00	140.0000	0.00
P-82	J-121	J-122	652.43	6.00	140.0000	0.00
P-83	J-122	J-115	87.48	6.00	140.0000	0.00
P-84	J-99	J-124	267.64	6.00	140.0000	0.00
P-85	J-127	J-93	263.31	4.00	140.0000	0.00
P-86	J-126	J-127	331.31	8.00	140.0000	0.00
P-87	J-128	J-118	863.93	4.00	140.0000	0.00
P-88	J-129	J-146	1020.43	6.00	140.0000	0.00
P-89	J-131	J-63	30.24	6.00	140.0000	0.00
P-9	J-46	J-9	197.53	6.00	140.0000	0.00
P-90	J-132	J-131	504.53	6.00	130.0000	0.00
P-91	J-131	J-65	37.87	6.00	140.0000	0.00
P-92	J-66	J-75	319.45	6.00	140.0000	0.00
P-93	J-76	J-77	224.89	6.00	140.0000	0.00
P-94	J-138	J-140	25.51	6.00	140.0000	0.00
P-95	J-140	J-141	135.56	6.00	140.0000	0.00
P-96	J-107	J-76	44.82	6.00	140.0000	0.00
P-97	J-142	J-143	140.23	4.00	140.0000	0.00
P-99	J-144	J-142	588.43	4.00	140.0000	0.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		10.60	282.00	
J-10		9.70	281.30	
J-100		0.70	288.60	
J-101		5.20	290.20	
J-102		2.20	307.90	
J-103		13.40	290.30	
J-104		0.50	309.60	
J-105		0.30	277.40	
J-106		1.40	280.00	
J-107		8.40	279.20	
J-108		4.40	312.40	
J-109		11.00	312.50	
J-11		3.80	288.10	
J-110		7.90	309.20	
J-111		6.30	308.20	
J-112		2.00	307.80	
J-113		6.30	306.00	
J-114		7.70	296.00	
J-115		5.00	308.40	
J-116		2.20	303.60	
J-117		13.80	299.60	
J-118		18.40	304.70	
J-119		0.90	309.90	
J-12		3.80	283.60	
J-120		7.80	258.50	
J-121		8.90	308.70	
J-122		5.40	308.80	
J-123		9.10	281.50	
J-124		3.40	308.90	
J-125		1.40	263.90	
J-126		2.40	307.20	
J-127		19.50	310.20	
J-128		10.70	286.90	
J-129		12.90	296.40	
J-13		11.40	286.00	
J-130		0.20	282.50	
J-131		4.20	284.30	
J-132		7.40	286.40	
J-133		10.70	291.60	
J-134		3.40	258.30	
J-135		2.60	258.90	
J-136		3.40	269.10	
J-137		10.60	279.00	
J-138		0.20	279.60	
J-139		11.30	277.90	
J-14		12.90	285.70	
J-140		1.40	279.40	

J-141		3.30	279.90
J-142		7.40	308.60
J-143		2.40	308.50
J-144		5.00	308.20
J-145		5.70	308.90
J-146		18.20	307.20
J-147		6.50	305.20
J-148		9.00	304.60
J-149		0.20	306.30
J-15		5.30	280.50
J-150		4.60	279.50
J-151		6.10	275.20
J-152		6.50	277.40
J-153		9.10	277.30
J-154		6.70	263.50
J-155		6.30	278.10
J-156		9.50	282.20
J-157		3.70	281.00
J-158		8.30	286.10
J-159		6.80	287.40
J-16		11.10	287.20
J-160		6.00	287.80
J-161		6.80	287.90
J-162		2.70	283.80
J-163		7.20	289.50
J-164		1.10	287.90
J-165		8.30	290.60
J-167		7.80	287.40
J-168		2.40	286.00
J-169		4.60	290.10
J-17		3.10	289.60
J-170		5.90	286.90
J-171		23.00	275.20
J-172		10.00	294.70
J-173		1.40	284.80
J-174		6.60	278.50
J-176		0.60	279.20
J-177		8.70	264.80
J-178		1.70	281.00
J-179		1.40	281.00
J-18		6.60	281.60
J-180		2.20	290.20
J-181		1.00	290.20
J-183		0.80	287.60
J-185		0.60	285.80
J-186		0.40	286.60
J-187		9.10	296.80
J-188		2.20	286.30
J-189		8.20	290.70
J-19		16.70	275.30
J-194		1.40	287.00
J-195		2.00	281.10
J-196		5.30	259.80
J-197		2.70	264.10
J-198		1.70	260.70
J-2		7.50	275.00
J-20	reservoir co	14.60	459.90
J-201		0.80	258.60
J-202		1.10	259.10
J-203		5.60	287.50
J-204		1.00	288.40
J-205		0.00	283.60
J-206		0.00	283.70
J-207		0.00	288.30
J-208		0.00	287.90
J-209		3.80	285.70
J-21		14.20	269.00
J-210		4.20	285.10
J-211		1.60	284.30
J-212		1.60	284.80
J-213		0.20	285.60
J-215		0.20	281.50
J-217		0.60	275.30
J-218		0.60	273.80
J-22	reservoir co	2.00	477.30
J-220		0.40	273.30
J-221		0.40	274.20
J-222		0.60	273.40
J-223		0.60	274.80
J-225		6.10	273.50
J-23	reservoir co	7.50	460.10
J-230		6.10	275.00
J-24		6.50	287.80
J-243		0.30	278.30

20 Year PHD Model Results

J-245	0.30	278.90
J-247	1.10	276.30
J-25	2.60	279.10
J-250	1.50	309.40
J-251	0.60	308.00
J-253	1.40	308.20
J-254	0.00	308.10
J-255	0.00	308.90
J-256	5.30	288.60
J-258	2.50	308.30
J-259	1.00	308.50
J-26	7.30	287.70
J-260	0.20	304.90
J-262	9.50	300.50
J-263	4.40	303.80
J-264	8.40	304.00
J-265	3.70	303.30
J-27	4.20	286.60
J-271	0.90	276.30
J-28	8.60	288.60
J-284	0.10	309.20
J-29	8.00	291.80
J-3	5.30	282.90
J-30	2.70	289.70
J-304	1.60	295.30
J-305	0.40	284.70
J-31	10.60	269.30
J-32	7.60	269.00
J-33	8.50	269.60
J-332	1.50	279.90
J-34	2.50	278.90
J-35	1.20	272.50
J-354	1.90	280.20
J-355	0.30	282.50
J-357	2.80	309.10
J-358	3.50	309.80
J-36	6.80	282.50
J-362	1.80	301.60
J-365	0.70	303.30
J-366	0.30	302.20
J-368	1.10	310.20
J-37	7.10	287.40
J-371	2.60	281.40
J-373	0.60	259.40
J-376	1.20	260.60
J-377	0.80	261.70
J-378	4.20	262.20
J-379	2.50	261.60
J-38	0.90	280.60
J-382	0.80	289.40
J-383	1.50	277.20
J-384	0.80	277.60
J-386	1.10	276.50
J-388	0.40	282.30
J-389	2.70	282.20
J-39	2.50	288.20
J-390	0.70	281.00
J-391	0.50	283.00
J-4	8.30	284.40
J-40	9.10	275.00
J-41	1.40	280.80
J-42	6.90	283.60
J-43	4.30	273.80
J-44	4.80	278.10
J-45	4.70	284.20
J-46	9.00	273.90
J-47	4.60	288.80
J-48	10.00	287.70
J-49	5.40	289.20
J-5	5.50	286.90
J-50	7.70	287.30
J-51	3.30	286.00
J-52	6.20	282.90
J-53	8.50	276.40
J-54	5.00	276.90
J-55	6.00	278.10
J-56	14.00	280.60
J-57	12.90	277.20
J-58	5.80	279.90
J-59	5.90	283.60
J-6	10.20	275.20
J-60	4.80	277.70
J-61	4.30	289.50
J-62	2.50	309.20

J-63		4.00	284.20	
J-64		6.10	285.50	
J-65		1.00	285.00	
J-66		9.50	283.90	
J-67		3.70	278.20	
J-68		1.00	262.90	
J-69		5.20	262.20	
J-7		13.90	276.20	
J-71		8.20	272.90	
J-72		12.30	279.80	
J-73		6.40	258.80	
J-74		7.00	261.20	
J-75		12.80	277.10	
J-76		2.30	279.20	
J-77		14.20	282.40	
J-78		3.60	277.40	
J-79		2.30	260.80	
J-8		10.20	286.90	
J-80		2.50	259.40	
J-81		2.50	258.10	
J-82		16.50	273.70	
J-83		4.70	258.70	
J-84		14.50	280.00	
J-85		0.50	263.40	
J-86		4.00	278.80	
J-87		11.20	308.30	
J-88		3.40	259.80	
J-89		2.00	258.20	
J-9		6.30	279.70	
J-90		1.50	259.60	
J-91		2.90	260.80	
J-92		6.90	272.20	
J-93		8.50	309.00	
J-94		5.50	286.30	
J-95		3.10	288.60	
J-96		3.30	287.50	
J-97		0.90	289.30	
J-98		2.80	287.40	
J-99		4.20	308.80	
R-1	275,000 gal	----	467.00	480.00
R-2	275,000 gal	----	467.00	480.00
Well No. 1		----	279.10	279.10
Well No. 3		----	271.70	271.70
O-Well Pum	300 gpm capa	0.00	279.10	
O-Well Pum	400 gpm capa	0.00	271.70	
I-Well Pum	300 gpm capa	0.00	279.10	
I-Well Pum	400 gpm capa	0.00	271.70	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 10
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 312
NUMBER OF END NODES .....(J) = 256
NUMBER OF PRIMARY LOOPS .....(L) = 53
NUMBER OF SUPPLY NODES .....(F) = 4
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.37016E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

7.

20 Year PHD Model Results

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-10	-299.31	0.96	0.00	1.91	1.71	1.71
P-10	J-8	J-11	-5.63	0.19	0.00	0.57	0.93	0.93
P-100	J-145	J-62	24.39	0.09	0.00	0.62	0.48	0.48
P-101	J-109	J-146	8.36	0.02	0.00	0.21	0.07	0.07
P-102	J-146	J-128	4.31	0.01	0.00	0.11	0.02	0.02
P-103	J-147	J-102	164.85	0.14	0.00	1.05	0.57	0.57
P-104	J-148	J-147	162.07	0.17	0.00	1.03	0.55	0.55
P-105	J-129	J-147	9.47	0.00	0.00	0.06	0.00	0.00
P-106	J-129	J-61	-61.96	0.01	0.00	0.40	0.09	0.09
P-107	J-132	J-150	-85.15	0.06	0.00	0.54	0.17	0.17
P-108	J-150	J-60	58.79	0.02	0.00	0.38	0.08	0.08
P-109	J-230	J-151	-71.24	0.02	0.00	0.81	0.49	0.49
P-11	J-12	J-9	14.29	0.64	0.00	1.46	5.21	5.21
P-110	J-151	J-54	-90.35	0.23	0.00	1.03	0.75	0.75
P-111	J-152	J-174	-87.57	0.19	0.00	0.99	0.71	0.71
P-112	J-174	J-155	-93.97	0.24	0.00	1.07	0.81	0.81
P-113	J-155	J-44	-101.67	0.34	0.00	1.15	0.94	0.94
P-114	J-157	J-58	155.13	0.11	0.00	0.99	0.50	0.50
P-115	J-158	J-52	166.53	0.20	0.00	1.06	0.58	0.58
P-116	J-159	J-158	184.66	0.19	0.00	1.18	0.70	0.70
P-117	J-159	J-160	-191.66	0.25	0.00	1.22	0.75	0.75
P-118	J-160	J-161	-192.88	0.23	0.00	1.23	0.76	0.76
P-119	J-161	J-27	-11.23	0.00	0.00	0.07	0.00	0.00
P-12	J-13	J-14	-7.51	0.03	0.00	0.19	0.05	0.05
P-120	J-34	J-161	119.62	0.10	0.00	0.76	0.31	0.31
P-121	J-161	J-163	-68.84	0.02	0.00	0.44	0.11	0.11
P-122	J-163	J-39	23.93	0.01	0.00	0.27	0.06	0.06
P-123	J-165	J-163	-32.65	0.25	0.00	0.83	0.82	0.82
P-124	J-101	J-165	-32.95	0.28	0.00	0.84	0.84	0.84
P-125	J-101	J-167	27.05	0.16	0.00	0.69	0.58	0.58
P-126	J-167	J-51	16.20	0.07	0.00	0.41	0.22	0.22
P-127	J-95	J-47	-88.37	0.03	0.00	1.00	0.83	0.83
P-128	J-50	J-49	79.85	0.21	0.00	0.91	0.69	0.69
P-129	J-28	J-94	39.94	0.40	0.00	1.02	1.20	1.20
P-13	J-16	J-36	6.51	0.02	0.00	0.17	0.04	0.04
P-130	J-170	J-94	-32.34	0.22	0.00	0.83	0.81	0.81
P-131	J-48	J-170	-29.05	0.20	0.00	0.74	0.66	0.66
P-132	J-172	J-48	-29.12	0.42	0.00	0.74	0.67	0.67
P-133	J-172	J-129	25.00	0.15	0.00	0.64	0.50	0.50
P-134	J-173	J-155	-1.40	0.02	0.00	0.14	0.11	0.11
P-135	J-159	J-174	0.20	0.00	0.00	0.02	0.00	0.00
P-136	J-152	J-158	-14.88	0.00	0.00	0.09	0.01	0.01
P-137	J-54	J-176	0.60	0.00	0.00	0.01	0.00	0.00
P-138	J-151	J-55	6.90	0.00	0.00	0.08	0.01	0.01
P-139	J-179	J-59	-1.40	0.00	0.00	0.04	0.00	0.00
P-14	J-17	J-24	-194.38	0.81	0.00	2.21	3.11	3.11
P-140	J-181	J-172	-1.00	0.00	0.00	0.03	0.00	0.00
P-141	J-148	J-172	6.88	0.01	0.00	0.18	0.05	0.05
P-142	J-183	J-49	-0.80	0.00	0.00	0.02	0.00	0.00
P-143	J-185	J-51	-0.60	0.00	0.00	0.02	0.00	0.00
P-144	J-187	J-48	21.41	0.00	0.00	0.14	0.01	0.01
P-145	J-167	J-158	5.05	0.00	0.00	0.03	0.00	0.00
P-146	J-96	J-170	2.16	0.00	0.00	0.06	0.01	0.01
P-147	J-188	J-170	0.45	0.00	0.00	0.01	0.00	0.00
P-148	J-189	J-188	2.65	0.07	0.00	0.27	0.36	0.36
P-149	J-165	J-47	-13.38	0.01	0.00	0.15	0.02	0.02
P-15	J-18	J-19	-530.22	5.45	0.00	6.02	19.96	19.96
P-150	J-165	J-160	4.77	0.00	0.00	0.05	0.00	0.00
P-151	J-1	J-28	69.40	0.03	0.00	0.44	0.11	0.11
P-152	J-28	J-29	78.45	0.02	0.00	0.50	0.14	0.14
P-153	J-29	J-163	132.62	0.11	0.00	0.85	0.38	0.38
P-154	J-39	J-194	19.53	0.00	0.00	0.22	0.04	0.04
P-155	J-195	J-72	-2.00	0.06	0.00	0.20	0.21	0.21
P-156	J-196	J-134	76.00	0.05	0.00	0.49	0.13	0.13
P-157	J-196	J-69	-81.30	0.05	0.00	0.52	0.15	0.15
P-158	J-198	J-74	-1.70	0.02	0.00	0.17	0.10	0.10
P-159	J-88	J-89	3.15	0.02	0.00	0.32	0.32	0.32
P-16	J-4	J-57	-675.08	4.11	0.00	4.31	7.69	7.69
P-160	J-201	J-89	-0.80	0.00	0.00	0.08	0.03	0.03
P-161	J-203	J-204	1.00	0.00	0.00	0.01	0.00	0.00
P-162	J-12	J-13	-18.09	0.11	0.00	0.46	0.28	0.28
P-163	J-205	J-12	0.00	0.00	0.00	0.00	0.00	0.00
P-164	J-207	J-11	0.00	0.00	0.00	0.00	0.00	0.00
P-165	J-11	J-16	-9.43	1.17	0.00	0.96	3.77	3.77
P-166	J-209	J-210	-7.20	0.00	0.00	0.08	0.01	0.01
P-167	J-209	J-211	1.60	0.02	0.00	0.16	0.09	0.09
P-168	J-212	J-209	-1.60	0.02	0.00	0.16	0.09	0.09
P-169	J-209	J-213	0.20	0.00	0.00	0.00	0.00	0.00
P-17	J-19	J-20	-1051.64	5.44	0.00	2.98	2.78	2.78

20 Year PHD Model Results

P-170	J-15	J-41	2.50	0.01	0.00	0.26	0.32	0.32
P-171	J-40	J-43	7.50	0.00	0.00	0.09	0.01	0.01
P-172	J-218	J-43	-2.60	0.00	0.00	0.03	0.00	0.00
P-173	J-220	J-218	-1.00	0.00	0.00	0.01	0.00	0.00
P-174	J-222	J-220	-0.60	0.00	0.00	0.01	0.00	0.00
P-175	J-223	J-221	-0.60	0.00	0.00	0.01	0.00	0.00
P-176	J-222	J-223	0.00	0.00	0.00	0.00	0.00	0.00
P-177	J-194	J-27	18.13	0.00	0.00	0.21	0.04	0.04
P-178	J-1	J-189	219.31	0.57	0.00	1.40	0.96	0.96
P-179	J-189	J-187	208.47	0.27	0.00	1.33	0.87	0.87
P-18	J-21	J-23	-197.46	2.37	0.00	2.24	3.20	3.20
P-180	J-151	J-225	6.10	0.00	0.00	0.07	0.01	0.01
P-181	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-182	J-225O-Well Pum		0.00	0.00	0.00	0.00	0.00	0.00
P-183	J-230	J-82	41.48	0.02	0.00	0.47	0.18	0.18
P-184	J-82	J-123	14.19	0.02	0.00	0.16	0.02	0.02
P-185	J-56	J-123	-7.51	0.00	0.00	0.09	0.01	0.01
P-186	J-389	J-388	0.40	0.00	0.00	0.00	0.00	0.00
P-187	J-58	J-150	148.54	0.04	0.00	0.95	0.47	0.47
P-188	J-59	J-180	2.20	0.00	0.00	0.06	0.01	0.01
P-189	J-60	J-107	51.39	0.03	0.00	0.33	0.07	0.07
P-19	J-57	J-21	-183.26	3.29	0.00	2.08	2.79	2.79
P-190	J-243	J-383	-0.30	0.00	0.00	0.00	0.00	0.00
P-191	J-245	J-76	-0.30	0.00	0.00	0.03	0.01	0.01
P-192	J-247	J-78	-1.10	0.01	0.00	0.11	0.05	0.05
P-193	J-62	J-250	2.60	0.01	0.00	0.27	0.22	0.22
P-194	J-251	J-250	-0.60	0.00	0.00	0.06	0.01	0.01
P-195	J-143	J-253	1.40	0.00	0.00	0.01	0.00	0.00
P-196	J-254	J-143	0.00	0.00	0.00	0.00	0.00	0.00
P-197	J-141	J-86	24.03	0.02	0.00	0.27	0.06	0.06
P-198	J-133	J-256	-1.77	0.00	0.00	0.02	0.00	0.00
P-199	J-87	J-258	3.50	0.00	0.00	0.04	0.00	0.00
P-2	J-10	J-3	-106.36	0.01	0.00	0.68	0.29	0.29
P-20	J-37	J-15	-78.52	0.08	0.00	0.50	0.14	0.14
P-200	J-258	J-259	1.00	0.00	0.00	0.03	0.00	0.00
P-201	J-115	J-111	-22.12	0.00	0.00	0.25	0.06	0.06
P-202	J-111	J-112	24.87	0.01	0.00	0.28	0.07	0.07
P-203	J-260	J-116	-0.20	0.00	0.00	0.00	0.00	0.00
P-204	J-103	J-262	9.43	0.00	0.00	0.06	0.00	0.00
P-205	J-262	J-263	7.94	0.00	0.00	0.05	0.00	0.00
P-206	J-264	J-263	-3.54	0.00	0.00	0.04	0.00	0.00
P-207	J-113	J-262	8.00	0.00	0.00	0.09	0.01	0.01
P-208	J-113	J-264	8.56	0.00	0.00	0.10	0.01	0.01
P-209	J-264	J-265	3.70	0.00	0.00	0.04	0.00	0.00
P-21	J-3	J-26	44.82	0.02	0.00	0.29	0.06	0.06
P-210	J-250	J-104	0.50	0.00	0.00	0.05	0.01	0.01
P-211	J-358	J-119	0.90	0.00	0.00	0.01	0.00	0.00
P-212	I-Well PumWell No. 1		0.00	0.00	0.00	0.00	0.00	0.00
P-213	J-197	J-136	67.30	0.01	0.00	0.43	0.11	0.11
P-214	I-Well PumWell No. 3		0.00	0.00	0.00	0.00	0.00	0.00
P-215	J-103	J-115	-15.14	0.02	0.00	0.17	0.03	0.03
P-216	J-120	J-88	-15.78	0.01	0.00	0.18	0.03	0.03
P-217	J-82	J-56	10.79	0.02	0.00	0.12	0.01	0.01
P-218	J-123	J-106	-2.42	0.00	0.00	0.03	0.00	0.00
P-219	J-125	J-68	131.22	0.03	0.00	0.84	0.37	0.37
P-22	J-26	J-28	57.59	0.98	0.00	1.47	2.36	2.36
P-220	J-284	J-124	-0.10	0.00	0.00	0.00	0.00	0.00
P-221	J-84	J-171	32.70	0.06	0.00	0.21	0.03	0.03
P-222	J-77	J-139	40.23	0.25	0.00	0.46	0.17	0.17
P-223	J-127	J-87	91.19	0.22	0.00	0.58	0.19	0.19
P-224	J-87	J-110	76.49	0.02	0.00	0.49	0.14	0.14
P-225	J-146	J-93	50.44	0.22	0.00	0.57	0.26	0.26
P-226	J-63	J-64	37.57	0.05	0.00	0.43	0.15	0.15
P-227	J-78	J-77	-5.80	0.19	0.00	0.59	0.98	0.98
P-228	J-140	J-139	-28.93	0.00	0.00	0.33	0.09	0.09
P-229	J-75	J-137	0.24	0.00	0.00	0.00	0.00	0.00
P-23	J-29	J-30	-168.51	0.96	0.00	1.91	2.74	2.74
P-230	J-63	J-304	1.60	0.02	0.00	0.16	0.09	0.09
P-231	J-305	J-65	-0.40	0.00	0.00	0.00	0.00	0.00
P-232	J-62	J-144	19.29	0.03	0.00	0.49	0.31	0.31
P-233	J-61	J-132	2.79	0.00	0.00	0.02	0.00	0.00
P-234	J-147	J-149	0.20	0.00	0.00	0.00	0.00	0.00
P-235	J-143	J-255	0.00	0.00	0.00	0.00	0.00	0.00
P-236	J-145	J-108	132.55	0.21	0.00	0.85	0.38	0.38
P-237	J-64	J-128	29.67	0.03	0.00	0.34	0.10	0.10
P-238	J-168	J-59	9.50	0.03	0.00	0.24	0.08	0.08
P-239	J-169	J-61	69.05	0.16	0.00	0.78	0.53	0.53
P-24	J-18	J-31	342.17	1.23	0.00	2.18	2.19	2.19
P-240	J-65	J-66	31.77	0.00	0.00	0.36	0.11	0.11
P-241	J-134	J-135	72.60	0.01	0.00	0.46	0.12	0.12
P-242	J-49	J-169	73.65	0.19	0.00	0.84	0.59	0.59
P-243	J-48	J-50	11.35	0.00	0.00	0.07	0.00	0.00
P-244	J-50	J-167	2.00	0.00	0.00	0.01	0.00	0.00
P-245	J-52	J-332	1.50	0.02	0.00	0.15	0.13	0.13

7.

20 Year PHD Model Results

P-246	J-52	J-157	158.83	0.15	0.00	1.01	0.53	0.53
P-247	J-54	J-152	-95.95	0.25	0.00	1.09	0.84	0.84
P-248	J-51	J-168	11.90	0.00	0.00	0.30	0.13	0.13
P-249	J-51	J-186	0.40	0.00	0.00	0.01	0.00	0.00
P-25	J-31	J-32	262.48	0.72	0.00	1.68	1.34	1.34
P-250	J-55	J-178	1.70	0.00	0.00	0.02	0.00	0.00
P-251	J-47	J-29	-106.35	0.35	0.00	1.21	1.17	1.17
P-252	J-66	J-133	8.93	0.01	0.00	0.10	0.01	0.01
P-253	J-44	J-34	122.12	0.01	0.00	0.78	0.32	0.32
P-254	J-86	J-137	10.36	0.00	0.00	0.12	0.01	0.01
P-255	J-24	J-37	-203.84	0.17	0.00	2.31	3.40	3.40
P-256	J-45	J-354	1.90	0.05	0.00	0.19	0.19	0.19
P-257	J-42	J-45	-160.73	0.15	0.00	1.82	2.19	2.19
P-258	J-357	J-358	5.50	0.00	0.00	0.06	0.00	0.00
P-259	J-135	J-197	70.00	0.03	0.00	0.45	0.12	0.12
P-26	J-32	J-33	254.88	0.61	0.00	1.63	1.27	1.27
P-260	J-64	J-362	1.80	0.03	0.00	0.18	0.11	0.11
P-261	J-55	J-58	-0.80	0.02	0.00	0.08	0.04	0.04
P-262	J-116	J-365	1.00	0.00	0.00	0.10	0.04	0.04
P-263	J-365	J-366	0.30	0.00	0.00	0.05	0.02	0.02
P-264	J-124	J-357	8.30	0.00	0.00	0.09	0.01	0.01
P-265	J-136	J-271	0.90	0.00	0.00	0.09	0.03	0.03
P-266	J-358	J-368	1.10	0.00	0.00	0.01	0.00	0.00
P-267	J-136	J-153	63.00	0.02	0.00	0.40	0.10	0.10
P-268	J-371	J-256	7.07	0.00	0.00	0.08	0.01	0.01
P-269	J-371	J-86	-9.67	0.00	0.00	0.11	0.01	0.01
P-27	J-33	J-40	245.18	0.59	0.00	1.56	1.18	1.18
P-270	J-202	J-90	-0.75	0.00	0.00	0.08	0.03	0.03
P-271	J-91	J-90	2.85	0.03	0.00	0.29	0.41	0.41
P-272	J-376	J-379	-1.20	0.01	0.00	0.12	0.05	0.05
P-273	J-378	J-379	4.50	0.04	0.00	0.46	0.61	0.61
P-274	J-22	R-2	-763.89	0.01	0.00	1.59	0.73	0.73
P-275	J-164	J-382	0.80	0.00	0.00	0.08	0.03	0.03
P-276	J-383	J-384	0.80	0.00	0.00	0.08	0.03	0.03
P-277	J-78	J-386	1.10	0.01	0.00	0.11	0.05	0.05
P-278	J-56	J-389	4.30	0.00	0.00	0.05	0.00	0.00
P-279	J-389	J-390	0.70	0.00	0.00	0.07	0.02	0.02
P-28	J-33	J-35	1.20	0.00	0.00	0.01	0.00	0.00
P-280	J-389	J-391	0.50	0.00	0.00	0.05	0.01	0.01
P-281	J-17	J-30	171.21	0.05	0.00	1.94	2.82	2.82
P-282	J-9	J-2	18.69	0.00	0.00	0.12	0.01	0.01
P-283	J-24	J-42	2.96	0.25	0.00	0.30	0.44	0.44
P-284	J-42	J-355	0.30	0.00	0.00	0.03	0.01	0.01
P-285	J-83	J-81	2.50	0.00	0.00	0.06	0.01	0.01
P-286	J-69	J-378	43.72	0.05	0.00	0.50	0.20	0.20
P-287	J-98	J-95	-87.36	0.21	0.00	0.99	0.81	0.81
P-288	J-93	J-99	40.74	0.03	0.00	1.04	1.24	1.24
P-289	J-148	J-187	-177.95	0.41	0.00	1.14	0.65	0.65
P-29	J-14	J-53	28.33	0.36	0.00	0.72	0.63	0.63
P-290	J-203	J-6	260.41	0.63	0.00	1.66	1.32	1.32
P-291	J-210	J-5	439.03	0.91	0.00	2.80	3.47	3.47
P-292	J-218	J-221	1.00	0.00	0.00	0.01	0.00	0.00
P-293	J-99	J-118	24.74	0.14	0.00	0.63	0.49	0.49
P-294	J-153	J-84	47.20	0.01	0.00	0.30	0.06	0.06
P-295	J-153	J-154	6.70	0.00	0.00	0.04	0.00	0.00
P-296	J-120	J-73	-4.02	0.00	0.00	0.05	0.00	0.00
P-297	J-171	J-156	4.83	0.00	0.00	0.03	0.00	0.00
P-298	J-156	J-130	0.20	0.00	0.00	0.00	0.00	0.00
P-299	J-5	J-8	166.52	0.79	0.00	1.89	2.34	2.34
P-3	J-4	J-210	450.43	0.94	0.00	2.87	3.64	3.64
P-30	J-31	J-53	69.08	0.04	0.00	0.44	0.11	0.11
P-300	J-8	J-9	90.88	0.21	0.00	1.03	0.76	0.76
P-301	J-45	J-13	-167.33	0.74	0.00	1.90	2.36	2.36
P-302	J-379	J-377	0.80	0.00	0.00	0.08	0.03	0.03
P-303	J-383	J-60	-2.60	0.00	0.00	0.03	0.00	0.00
P-304	J-91	J-74	-28.08	0.01	0.00	0.32	0.09	0.09
P-305	J-92	J-71	32.92	0.00	0.00	0.37	0.12	0.12
P-306	J-46	J-2	-131.47	0.12	0.00	0.84	0.37	0.37
P-307	J-3	J-42	-156.48	0.54	0.00	1.78	2.08	2.08
P-308	J-27	J-162	2.70	0.00	0.00	0.02	0.00	0.00
P-309	J-39	J-164	1.90	0.00	0.00	0.02	0.00	0.00
P-31	J-41	J-38	0.90	0.01	0.00	0.09	0.05	0.05
P-310	J-40	J-44	228.58	0.27	0.00	1.46	1.04	1.04
P-311	J-43	J-217	0.60	0.00	0.00	0.01	0.00	0.00
P-312	J-177	J-125	133.12	0.02	0.00	0.85	0.38	0.38
P-313	J-107	J-230	-23.66	0.04	0.00	0.27	0.06	0.06
P-314	J-109	J-127	111.89	0.24	0.00	0.71	0.28	0.28
P-32	J-26	J-17	-20.07	0.00	0.00	0.13	0.01	0.01
P-33	J-14	J-36	-181.16	0.77	0.00	2.06	2.73	2.73
P-34	J-10	J-46	-202.65	0.58	0.00	1.29	0.83	0.83
P-35	J-156	J-171	-4.87	0.00	0.00	0.03	0.00	0.00
P-36	J-13	J-16	-189.31	0.82	0.00	2.15	2.96	2.96
P-37	J-12	J-206	0.00	0.00	0.00	0.00	0.00	0.00
P-38	J-15	J-25	-86.32	0.02	0.00	0.55	0.17	0.17

P-39	J-53	J-25	88.92	0.05	0.00	0.57	0.18	0.18
P-4	J-5	J-203	267.01	0.20	0.00	1.70	1.38	1.38
P-40	J-41	J-215	0.20	0.00	0.00	0.02	0.00	0.00
P-41	J-57	J-19	-504.71	0.19	0.00	3.22	4.49	4.49
P-42	J-36	J-18	-181.45	0.14	0.00	2.06	2.74	2.74
P-43	J-37	J-14	-132.42	0.51	0.00	1.50	1.53	1.53
P-44	J-16	J-4	-216.34	1.27	0.00	2.45	3.80	3.80
P-45	J-11	J-208	0.00	0.00	0.00	0.00	0.00	0.00
P-46	J-7	J-67	3.70	0.00	0.00	0.02	0.00	0.00
P-47	J-6	J-177	183.40	0.37	0.00	1.17	0.69	0.69
P-48	J-68	J-69	130.22	0.03	0.00	0.83	0.42	0.42
P-49	J-177	J-92	41.58	0.10	0.00	0.47	0.18	0.18
P-5	J-6	J-7	66.81	0.04	0.00	0.43	0.11	0.11
P-50	J-71	J-72	24.72	0.07	0.00	0.28	0.07	0.07
P-51	J-72	J-73	10.42	0.00	0.00	0.12	0.01	0.01
P-52	J-142	J-109	3.09	0.00	0.00	0.08	0.01	0.01
P-53	J-74	J-378	-35.02	0.03	0.00	0.40	0.13	0.13
P-54	J-20	J-23	-1066.24	0.03	0.00	2.22	1.35	1.35
P-55	J-22	R-1	-509.31	0.01	0.00	1.44	0.73	0.73
P-56	J-92	J-74	1.75	0.05	0.00	0.18	0.17	0.17
P-57	J-79	J-80	-2.30	0.00	0.00	0.06	0.01	0.01
P-58	J-80	J-83	-4.80	0.00	0.00	0.12	0.02	0.02
P-59	J-120	J-83	12.00	0.03	0.00	0.31	0.13	0.13
P-6	J-7	J-2	120.28	0.14	0.00	0.77	0.32	0.32
P-60	J-125	J-85	0.50	0.00	0.00	0.05	0.01	0.01
P-61	J-23	J-22	-1271.20	0.46	0.00	2.65	1.87	1.87
P-62	J-88	J-91	-22.32	0.01	0.00	0.25	0.06	0.06
P-63	J-89	J-202	0.35	0.00	0.00	0.04	0.01	0.01
P-64	J-90	J-373	0.60	0.00	0.00	0.06	0.02	0.02
P-65	J-94	J-95	2.10	0.00	0.00	0.05	0.01	0.01
P-66	J-96	J-98	-83.66	0.00	0.00	0.95	0.75	0.75
P-67	J-97	J-98	-0.90	0.00	0.00	0.02	0.00	0.00
P-68	J-50	J-96	-78.20	0.20	0.00	0.89	0.66	0.66
P-69	J-100	J-101	-0.70	0.00	0.00	0.02	0.00	0.00
P-7	J-7	J-8	-71.07	0.07	0.00	0.45	0.12	0.12
P-70	J-102	J-145	162.65	0.02	0.00	1.04	0.55	0.55
P-71	J-75	J-105	0.30	0.00	0.00	0.00	0.00	0.00
P-72	J-106	J-107	-3.82	0.00	0.00	0.02	0.00	0.00
P-73	J-108	J-109	128.15	0.02	0.00	0.82	0.41	0.41
P-74	J-110	J-111	53.29	0.05	0.00	0.34	0.07	0.07
P-75	J-112	J-113	22.87	0.01	0.00	0.26	0.06	0.06
P-76	J-114	J-103	7.69	0.00	0.00	0.09	0.01	0.01
P-77	J-114	J-116	3.40	0.00	0.00	0.04	0.00	0.00
P-78	J-117	J-114	18.79	0.01	0.00	0.21	0.04	0.04
P-79	J-118	J-117	29.61	0.13	0.00	0.34	0.10	0.10
P-80	J-110	J-121	15.30	0.05	0.00	0.39	0.20	0.20
P-81	J-117	J-121	-2.98	0.00	0.00	0.08	0.01	0.01
P-82	J-121	J-122	3.42	0.00	0.00	0.04	0.00	0.00
P-83	J-122	J-115	-1.98	0.00	0.00	0.02	0.00	0.00
P-84	J-99	J-124	11.80	0.00	0.00	0.13	0.02	0.02
P-85	J-127	J-93	-1.20	0.00	0.00	0.03	0.00	0.00
P-86	J-126	J-127	-2.40	0.00	0.00	0.02	0.00	0.00
P-87	J-128	J-118	23.28	0.38	0.00	0.59	0.44	0.44
P-88	J-129	J-146	64.58	0.41	0.00	0.73	0.40	0.40
P-89	J-131	J-63	43.17	0.01	0.00	0.49	0.19	0.19
P-9	J-46	J-9	-80.18	0.12	0.00	0.91	0.60	0.60
P-90	J-132	J-131	80.54	0.35	0.00	0.91	0.70	0.70
P-91	J-131	J-65	33.17	0.00	0.00	0.38	0.12	0.12
P-92	J-66	J-75	13.34	0.01	0.00	0.15	0.02	0.02
P-93	J-76	J-77	60.23	0.08	0.00	0.68	0.36	0.36
P-94	J-138	J-140	-0.20	0.00	0.00	0.00	0.00	0.00
P-95	J-140	J-141	27.33	0.01	0.00	0.31	0.08	0.08
P-96	J-107	J-76	62.83	0.02	0.00	0.71	0.38	0.38
P-97	J-142	J-143	3.80	0.00	0.00	0.10	0.02	0.02
P-99	J-144	J-142	14.29	0.10	0.00	0.36	0.18	0.18

~@Well Pum-RV I-Well PumO-Well Pum
~@Well Pum-RV I-Well PumO-Well Pum

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		10.60	465.26	282.00	183.26	79.41
J-10		9.70	466.22	281.30	184.92	80.13
J-100		0.70	464.57	288.60	175.97	76.25
J-101		5.20	464.57	290.20	174.37	75.56
J-102		2.20	463.70	307.90	155.80	67.51
J-103		13.40	462.90	290.30	172.60	74.79
J-104		0.50	463.57	309.60	153.97	66.72
J-105		0.30	463.49	277.40	186.09	80.64

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J-106	1.40	463.87	280.00	183.87	79.68
J-107	8.40	463.87	279.20	184.67	80.02
J-108	4.40	463.47	312.40	151.07	65.46
J-109	11.00	463.45	312.50	150.95	65.41
J-11	3.80	467.32	288.10	179.22	77.66
J-110	7.90	462.97	309.20	153.77	66.63
J-111	6.30	462.92	308.20	154.72	67.04
J-112	2.00	462.91	307.80	155.11	67.21
J-113	6.30	462.90	306.00	156.90	67.99
J-114	7.70	462.91	296.00	166.91	72.33
J-115	5.00	462.92	308.40	154.52	66.96
J-116	2.20	462.90	303.60	159.30	69.03
J-117	13.80	462.91	299.60	163.31	70.77
J-118	18.40	463.04	304.70	158.34	68.62
J-119	0.90	463.17	309.90	153.27	66.42
J-12	3.80	467.56	283.60	183.96	79.72
J-120	7.80	466.54	258.50	208.04	90.15
J-121	8.90	462.92	308.70	154.22	66.83
J-122	5.40	462.92	308.80	154.12	66.78
J-123	9.10	463.87	281.50	182.37	79.03
J-124	3.40	463.17	308.90	154.27	66.85
J-125	1.40	466.71	263.90	202.81	87.88
J-126	2.40	463.21	307.20	156.01	67.60
J-127	19.50	463.21	310.20	153.01	66.30
J-128	10.70	463.42	286.90	176.52	76.49
J-129	12.90	463.84	296.40	167.44	72.56
J-13	11.40	467.67	286.00	181.67	78.72
J-130	0.20	466.41	282.50	183.91	79.69
J-131	4.20	463.50	284.30	179.20	77.65
J-132	7.40	463.85	286.40	177.45	76.90
J-133	10.70	463.48	291.60	171.88	74.48
J-134	3.40	466.55	258.30	208.25	90.24
J-135	2.60	466.54	258.90	207.64	89.98
J-136	3.40	466.50	269.10	197.40	85.54
J-137	10.60	463.49	279.00	184.49	79.94
J-138	0.20	463.52	279.60	183.92	79.70
J-139	11.30	463.52	277.90	185.62	80.44
J-14	12.90	467.70	285.70	182.00	78.87
J-140	1.40	463.52	279.40	184.12	79.78
J-141	3.30	463.51	279.90	183.61	79.56
J-142	7.40	463.45	308.60	154.85	67.10
J-143	2.40	463.45	308.50	154.95	67.14
J-144	5.00	463.56	308.20	155.36	67.32
J-145	5.70	463.68	308.90	154.78	67.07
J-146	18.20	463.43	307.20	156.23	67.70
J-147	6.50	463.84	305.20	158.64	68.74
J-148	9.00	464.01	304.60	159.41	69.08
J-149	0.20	463.84	306.30	157.54	68.27
J-15	5.30	467.28	280.50	186.78	80.94
J-150	4.60	463.91	279.50	184.41	79.91
J-151	6.10	463.93	275.20	188.73	81.78
J-152	6.50	464.41	277.40	187.01	81.04
J-153	9.10	466.48	277.30	189.18	81.98
J-154	6.70	466.47	263.50	202.97	87.96
J-155	6.30	464.84	278.10	186.74	80.92
J-156	9.50	466.41	282.20	184.21	79.82
J-157	3.70	464.06	281.00	183.06	79.32
J-158	8.30	464.41	286.10	178.31	77.27
J-159	6.80	464.60	287.40	177.20	76.79
J-16	11.10	468.49	287.20	181.29	78.56
J-160	6.00	464.85	287.80	177.05	76.72
J-161	6.80	465.08	287.90	177.18	76.78
J-162	2.70	465.08	283.80	181.28	78.55
J-163	7.20	465.10	289.50	175.60	76.09
J-164	1.10	465.09	287.90	177.19	76.78
J-165	8.30	464.85	290.60	174.25	75.51
J-167	7.80	464.41	287.40	177.01	76.70
J-168	2.40	464.34	286.00	178.34	77.28
J-169	4.60	464.01	290.10	173.91	75.36
J-17	3.10	466.21	289.60	176.61	76.53
J-170	5.90	464.61	286.90	177.71	77.01
J-171	23.00	466.41	275.20	191.21	82.86
J-172	10.00	463.99	294.70	169.29	73.36
J-173	1.40	464.82	284.80	180.02	78.01
J-174	6.60	464.60	278.50	186.10	80.64
J-176	0.60	464.16	279.20	184.96	80.15
J-177	8.70	466.73	264.80	201.93	87.50
J-178	1.70	463.93	281.00	182.93	79.27
J-179	1.40	464.31	281.00	183.31	79.44
J-18	6.60	468.61	281.60	187.01	81.04
J-180	2.20	464.31	290.20	174.11	75.45
J-181	1.00	463.99	290.20	173.79	75.31
J-183	0.80	464.20	287.60	176.60	76.53
J-185	0.60	464.34	285.80	178.54	77.37

20 Year PHD Model Results

J-186		0.40	464.34	286.60	177.74	77.02
J-187		9.10	464.42	296.80	167.62	72.63
J-188		2.20	464.61	286.30	178.31	77.27
J-189		8.20	464.68	290.70	173.98	75.39
J-19		16.70	474.06	275.30	198.76	86.13
J-194		1.40	465.08	287.00	178.08	77.17
J-195		2.00	466.49	281.10	185.39	80.33
J-196		5.30	466.60	259.80	206.80	89.61
J-197		2.70	466.51	264.10	202.41	87.71
J-198		1.70	466.55	260.70	205.85	89.20
J-2		7.50	466.92	275.00	191.92	83.16
J-20	reservoir co	14.60	479.50	459.90	19.60	8.49
J-201		0.80	466.52	258.60	207.92	90.10
J-202		1.10	466.52	259.10	207.42	89.88
J-203		5.60	467.72	287.50	180.22	78.10
J-204		1.00	467.72	288.40	179.32	77.71
J-205		0.00	467.56	283.60	183.96	79.72
J-206		0.00	467.56	283.70	183.86	79.67
J-207		0.00	467.32	288.30	179.02	77.58
J-208		0.00	467.32	287.90	179.42	77.75
J-209		3.80	468.83	285.70	183.13	79.35
J-21		14.20	477.16	269.00	208.16	90.20
J-210		4.20	468.83	285.10	183.73	79.61
J-211		1.60	468.81	284.30	184.51	79.95
J-212		1.60	468.81	284.80	184.01	79.74
J-213		0.20	468.83	285.60	183.23	79.40
J-215		0.20	467.27	281.50	185.77	80.50
J-217		0.60	465.45	275.30	190.15	82.40
J-218		0.60	465.45	273.80	191.65	83.05
J-22	reservoir co	2.00	479.99	477.30	2.69	1.17
J-220		0.40	465.45	273.30	192.15	83.27
J-221		0.40	465.45	274.20	191.25	82.88
J-222		0.60	465.45	273.40	192.05	83.22
J-223		0.60	465.45	274.80	190.65	82.62
J-225		6.10	463.93	273.50	190.43	82.52
J-23	reservoir co	7.50	479.53	460.10	19.43	8.42
J-230		6.10	463.91	275.00	188.91	81.86
J-24		6.50	467.03	287.80	179.23	77.66
J-243		0.30	463.90	278.30	185.60	80.43
J-245		0.30	463.85	278.90	184.95	80.15
J-247		1.10	463.58	276.30	187.28	81.15
J-25		2.60	467.30	279.10	188.20	81.55
J-250		1.50	463.57	309.40	154.17	66.81
J-251		0.60	463.57	308.00	155.57	67.41
J-253		1.40	463.45	308.20	155.25	67.27
J-254		0.00	463.45	308.10	155.35	67.32
J-255		0.00	463.45	308.90	154.55	66.97
J-256		5.30	463.48	288.60	174.88	75.78
J-258		2.50	462.98	308.30	154.68	67.03
J-259		1.00	462.98	308.50	154.48	66.94
J-26		7.30	466.21	287.70	178.51	77.35
J-260		0.20	462.90	304.90	158.00	68.47
J-262		9.50	462.90	300.50	162.40	70.37
J-263		4.40	462.90	303.80	159.10	68.94
J-264		8.40	462.90	304.00	158.90	68.86
J-265		3.70	462.90	303.30	159.60	69.16
J-27		4.20	465.08	286.60	178.48	77.34
J-271		0.90	466.49	276.30	190.19	82.42
J-28		8.60	465.23	288.60	176.63	76.54
J-284		0.10	463.17	309.20	153.97	66.72
J-29		8.00	465.21	291.80	173.41	75.14
J-3		5.30	466.23	282.90	183.33	79.44
J-30		2.70	466.16	289.70	176.46	76.47
J-304		1.60	463.48	295.30	168.18	72.88
J-305		0.40	463.50	284.70	178.80	77.48
J-31		10.60	467.38	269.30	198.08	85.83
J-32		7.60	466.66	269.00	197.66	85.65
J-33		8.50	466.05	269.60	196.45	85.13
J-332		1.50	464.18	279.90	184.28	79.86
J-34		2.50	465.17	278.90	186.27	80.72
J-35		1.20	466.05	272.50	193.55	83.87
J-354		1.90	466.88	280.20	186.68	80.89
J-355		0.30	466.77	282.50	184.27	79.85
J-357		2.80	463.17	309.10	154.07	66.76
J-358		3.50	463.17	309.80	153.37	66.46
J-36		6.80	468.47	282.50	185.97	80.59
J-362		1.80	463.42	301.60	161.82	70.12
J-365		0.70	462.90	303.30	159.60	69.16
J-366		0.30	462.90	302.20	160.70	69.64
J-368		1.10	463.17	310.20	152.97	66.29
J-37		7.10	467.20	287.40	179.80	77.91
J-371		2.60	463.49	281.40	182.09	78.90
J-373		0.60	466.52	259.40	207.12	89.75
J-376		1.20	466.55	260.60	205.95	89.24

7.

20 Year PHD Model Results

J-377		0.80	466.55	261.70	204.85	88.77
J-378		4.20	466.60	262.20	204.40	88.57
J-379		2.50	466.56	261.60	204.96	88.81
J-38		0.90	467.26	280.60	186.66	80.89
J-382		0.80	465.08	289.40	175.68	76.13
J-383		1.50	463.90	277.20	186.70	80.90
J-384		0.80	463.89	277.60	186.29	80.73
J-386		1.10	463.58	276.50	187.08	81.07
J-388		0.40	463.87	282.30	181.57	78.68
J-389		2.70	463.87	282.20	181.67	78.72
J-39		2.50	465.09	288.20	176.89	76.65
J-390		0.70	463.87	281.00	182.87	79.24
J-391		0.50	463.87	283.00	180.87	78.38
J-4		8.30	469.77	284.40	185.37	80.33
J-40		9.10	465.45	275.00	190.45	82.53
J-41		1.40	467.27	280.80	186.47	80.80
J-42		6.90	466.77	283.60	183.17	79.38
J-43		4.30	465.45	273.80	191.65	83.05
J-44		4.80	465.18	278.10	187.08	81.07
J-45		4.70	466.93	284.20	182.73	79.18
J-46		9.00	466.80	273.90	192.90	83.59
J-47		4.60	464.85	288.80	176.05	76.29
J-48		10.00	464.41	287.70	176.71	76.58
J-49		5.40	464.20	289.20	175.00	75.83
J-5		5.50	467.92	286.90	181.02	78.44
J-50		7.70	464.41	287.30	177.11	76.75
J-51		3.30	464.34	286.00	178.34	77.28
J-52		6.20	464.21	282.90	181.31	78.57
J-53		8.50	467.34	276.40	190.94	82.74
J-54		5.00	464.16	276.90	187.26	81.15
J-55		6.00	463.93	278.10	185.83	80.53
J-56		14.00	463.87	280.60	183.27	79.42
J-57		12.90	473.88	277.20	196.68	85.23
J-58		5.80	463.95	279.90	184.05	79.75
J-59		5.90	464.31	283.60	180.71	78.31
J-6		10.20	467.10	275.20	191.90	83.16
J-60		4.80	463.90	277.70	186.20	80.69
J-61		4.30	463.85	289.50	174.35	75.55
J-62		2.50	463.58	309.20	154.38	66.90
J-63		4.00	463.50	284.20	179.30	77.69
J-64		6.10	463.45	285.50	177.95	77.11
J-65		1.00	463.50	285.00	178.50	77.35
J-66		9.50	463.49	283.90	179.59	77.82
J-67		3.70	467.06	278.20	188.86	81.84
J-68		1.00	466.68	262.90	203.78	88.30
J-69		5.20	466.65	262.20	204.45	88.60
J-7		13.90	467.06	276.20	190.86	82.71
J-71		8.20	466.62	272.90	193.72	83.94
J-72		12.30	466.54	279.80	186.74	80.92
J-73		6.40	466.54	258.80	207.74	90.02
J-74		7.00	466.57	261.20	205.37	88.99
J-75		12.80	463.49	277.10	186.39	80.77
J-76		2.30	463.85	279.20	184.65	80.02
J-77		14.20	463.77	282.40	181.37	78.60
J-78		3.60	463.58	277.40	186.18	80.68
J-79		2.30	466.50	260.80	205.70	89.14
J-8		10.20	467.13	286.90	180.23	78.10
J-80		2.50	466.50	259.40	207.10	89.75
J-81		2.50	466.50	258.10	208.40	90.31
J-82		16.50	463.89	273.70	190.19	82.41
J-83		4.70	466.50	258.70	207.80	90.05
J-84		14.50	466.47	280.00	186.47	80.80
J-85		0.50	466.71	263.40	203.31	88.10
J-86		4.00	463.49	278.80	184.69	80.03
J-87		11.20	462.98	308.30	154.68	67.03
J-88		3.40	466.55	259.80	206.75	89.59
J-89		2.00	466.52	258.20	208.32	90.27
J-9		6.30	466.92	279.70	187.22	81.13
J-90		1.50	466.53	259.60	206.93	89.67
J-91		2.90	466.55	260.80	205.75	89.16
J-92		6.90	466.62	272.20	194.42	84.25
J-93		8.50	463.21	309.00	154.21	66.82
J-94		5.50	464.83	286.30	178.53	77.36
J-95		3.10	464.83	288.60	176.23	76.37
J-96		3.30	464.61	287.50	177.11	76.75
J-97		0.90	464.62	289.30	175.32	75.97
J-98		2.80	464.62	287.40	177.22	76.79
J-99		4.20	463.18	308.80	154.38	66.90
R-1	275,000 gal	----	480.00	467.00	13.00	5.63
R-2	275,000 gal	----	480.00	467.00	13.00	5.63
Well No. 1		----	279.10	279.10	0.00	0.00
Well No. 3		----	271.70	271.70	0.00	0.00
O-Well Pum	300 gpm capa	0.00	463.93	279.10	184.83	80.09
O-Well Pum	400 gpm capa	0.00	463.93	271.70	192.23	83.30

I-Well Pum	300 gpm capa	0.00	279.10	279.10	0.00	0.00
I-Well Pum	400 gpm capa	0.00	271.70	271.70	0.00	0.00

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-81	90.31	J-22	1.17
J-89	90.27	R-1	5.63
J-134	90.24	R-2	5.63
J-21	90.20	J-23	8.42
J-120	90.15	J-20	8.49
J-201	90.10	J-109	65.41
J-83	90.05	J-108	65.46
J-73	90.02	J-368	66.29
J-135	89.98	J-127	66.30
J-202	89.88	J-119	66.42

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-15	6.02	P-220	0.00
P-16	4.31	P-234	0.00
P-41	3.22	P-298	0.00
P-17	2.98	P-169	0.00
P-3	2.87	P-203	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-15	19.96	P-234	0.00
P-16	7.69	P-298	0.00
P-11	5.21	P-220	0.00
P-41	4.49	P-94	0.00
P-44	3.80	P-169	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-15	19.96	P-234	0.00
P-16	7.69	P-298	0.00
P-11	5.21	P-220	0.00
P-41	4.49	P-94	0.00
P-44	3.80	P-169	0.00

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
Well Pump No	FCV-2	0.00	BOOSTED	0.00	80.09	0.00
Well Pump No	FCV-2	0.00	BOOSTED	0.00	83.30	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	509.31	275,000 gal
R-2	763.89	275,000 gal

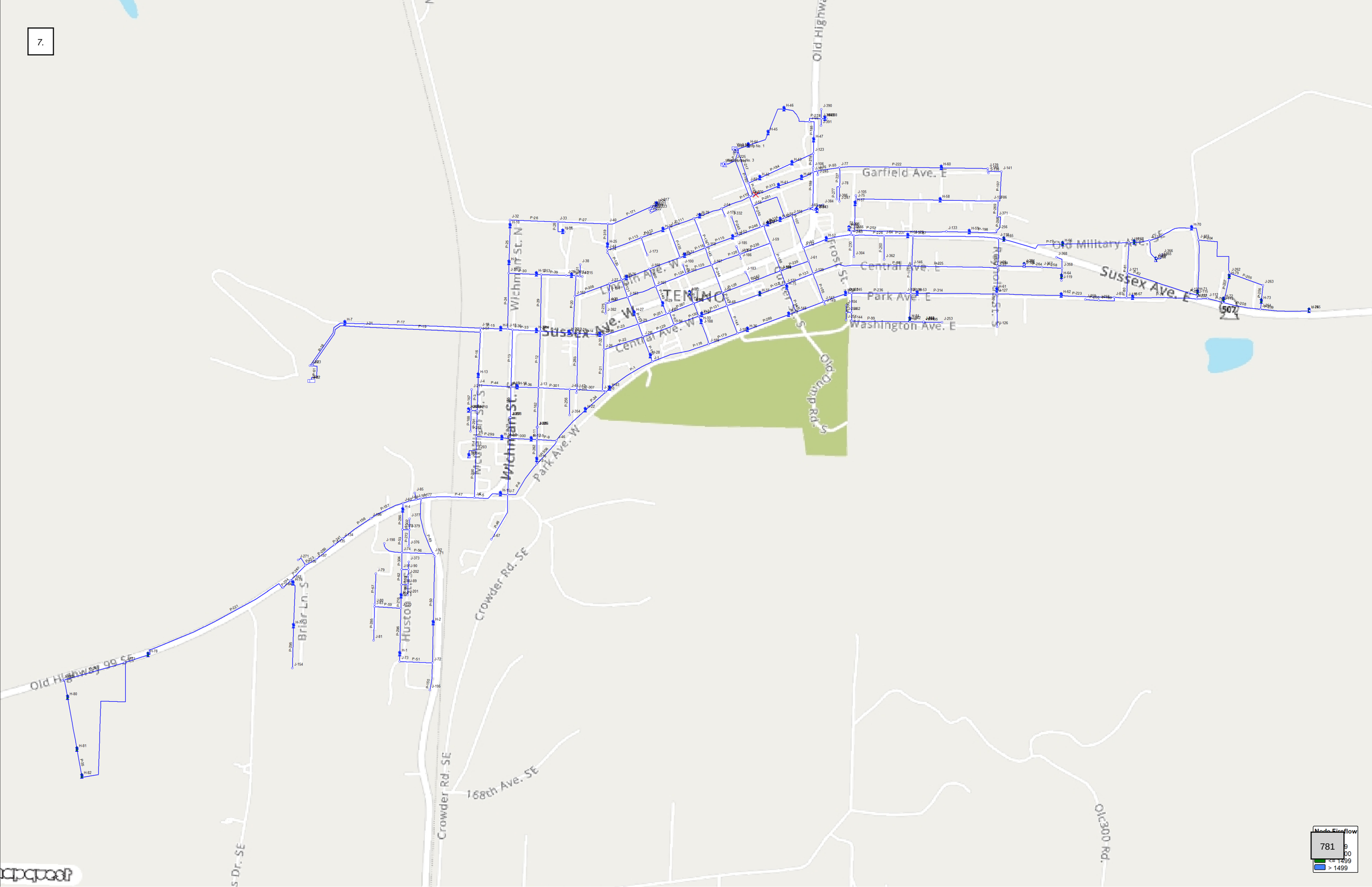
```
      Well No. 1        0.00
      Well No. 3        0.00

 NET SYSTEM INFLOW  =   1273.20
 NET SYSTEM OUTFLOW =      0.00
 NET SYSTEM DEMAND  =   1273.20


          ***** HYDRAULIC ANALYSIS COMPLETED *****
```

7.

7.


Garfield Ave. E
Central Ave. E
Park Ave. E
Washington Ave. E
Old Military Rd. E
Sussex Ave. E
Sussex Ave. W
Central Ave. W
Park Ave. W
Old Highway 90 SE
Briar Ln. S
Crowder Rd. SE
168th Ave. SE
Old Dump Rd. S
Wichman St. N
Wichman St. S
Huston St. S
Main St. S
Old Highway 90
Well House No. 1
Well House No. 3
Node Fireflow
781
<= 1499
> 1499

Appendix F

Public Correspondence

<Date>

<County Emergency Management>
<County "Community Development>
<Department of Ecology>
<Department of Natural Resources>

Subject: City of Tenino Water System – Wellhead Protection Areas.

Dear (Agency/Local Government):

As part of the wellhead protection program for the City of Tenino Water System, we are hereby informing you of the findings of our wellhead protection area delineation. This is in accordance with State regulations (WAC 246-290-135).

The City of Tenino Water System has approximately 833 service connections, and serves a population of approximately 2,030 people. The State Department of Health has not yet rated our new drinking water sources, but they are likely to be classified as "moderate to highly susceptible". This means that our drinking water supply can be vulnerable to contamination.

The enclosed map shows the 1, 5, and 10-year time of travel boundaries for our wellhead protection area. Any ground water contamination that occurs within this wellhead protection area has the potential to reach our well. It is therefore of utmost importance to us that all reasonable steps be taken to ensure that land use activities within this area do not contaminate our customers' drinking water supplies.

Thank you for your support in protecting our drinking water. If you have any questions, please call me at (360) 264-2368.

Sincerely,

Troy Cannon
Public Works Director
City of Tenino

7.

<Date>

<General Land Owner>
<Address>
<City>, <State> <zip>

Subject: City of Tenino Water System – Wellhead Protection Areas.

Dear _____

In order to protect the drinking water supply for the customers of City of Tenino, we are developing a wellhead protection program in accordance with State requirements. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supplies (see attached). This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an assessment of activities within our wellhead protection area that have the potential to impact water quality. We have not identified any potential issues with your property, but we wanted to let you know that the way you use your property may have an impact on our drinking water supply. We realize you may already be aware of these issues and are careful to protect the environment. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

If you have any questions regarding appropriate land management practices, please contact the Department of Natural Resources or the Department of Ecology. If you have any questions regarding this correspondence or our wellhead protection program in general, please call me at (360) 264-2368.

Sincerely,

Troy Cannon
Public Works Director
City of Tenino

7.

<Date>

<Agricultural Land Owner>
<Address>
<City>, <State> <zip>

Subject: City of Tenino Water System – Wellhead Protection Areas.

Dear _____

In order to protect the drinking water supply for the customers of City of Tenino, we are developing a wellhead protection program in accordance with State requirements. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supplies (see attached). This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an assessment of activities within our wellhead protection area that have the potential to impact water quality. It is apparent that the primary us of your property is agricultural. Some agricultural practices, such as pesticide and herbicide application, may have the potential to affect our customers' drinking water supply. We realize you may already be aware of these issues and are careful to protect the environment. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

If you have any questions regarding appropriate land management practices, please contact the Department of Natural Resources or the Department of Ecology. If you have any questions regarding this correspondence or our wellhead protection program in general, please call me at (360) 264-2368.

Sincerely,

Troy Cannon
Public Works Director
City of Tenino

7.

CITY OF TENINO
COMPLAINT / ACTION FORM

149 S Hodgden Street, P O Box 4019
Tenino, WA 98589
(360) 264-2368

To Be Completed by Person Making Complaint

NOTE: Your personal information will be protected pursuant to RCW 42.17.310(1)(e). However, in the event that this matter enters the courts, you may be called as a witness.

Your Name: _____ **Phone:** _____
(Please Print)

Mailing Address: _____
Street Address or P O Box *City* *State* *Zip*

Complaint: _____

(use back if more room is needed)

Your Signature (Required): **Date:** _____

For Internal Use Only

Date Received: _____ **By:** _____

Route Copy To:
- ☐ Mayor
- ☐ City Clerk
- ☐ Building Inspector
- ☐ Public Works
- ☐ Police
- ☐ Animal Control

DEPARTMENT ACTION TAKEN:

Department: _____ **Date received by Dept:** _____

Investigation & Response: _____

By: _____ **Date:** _____

After final action send original complaint and a copy of all documents to the City Clerk.

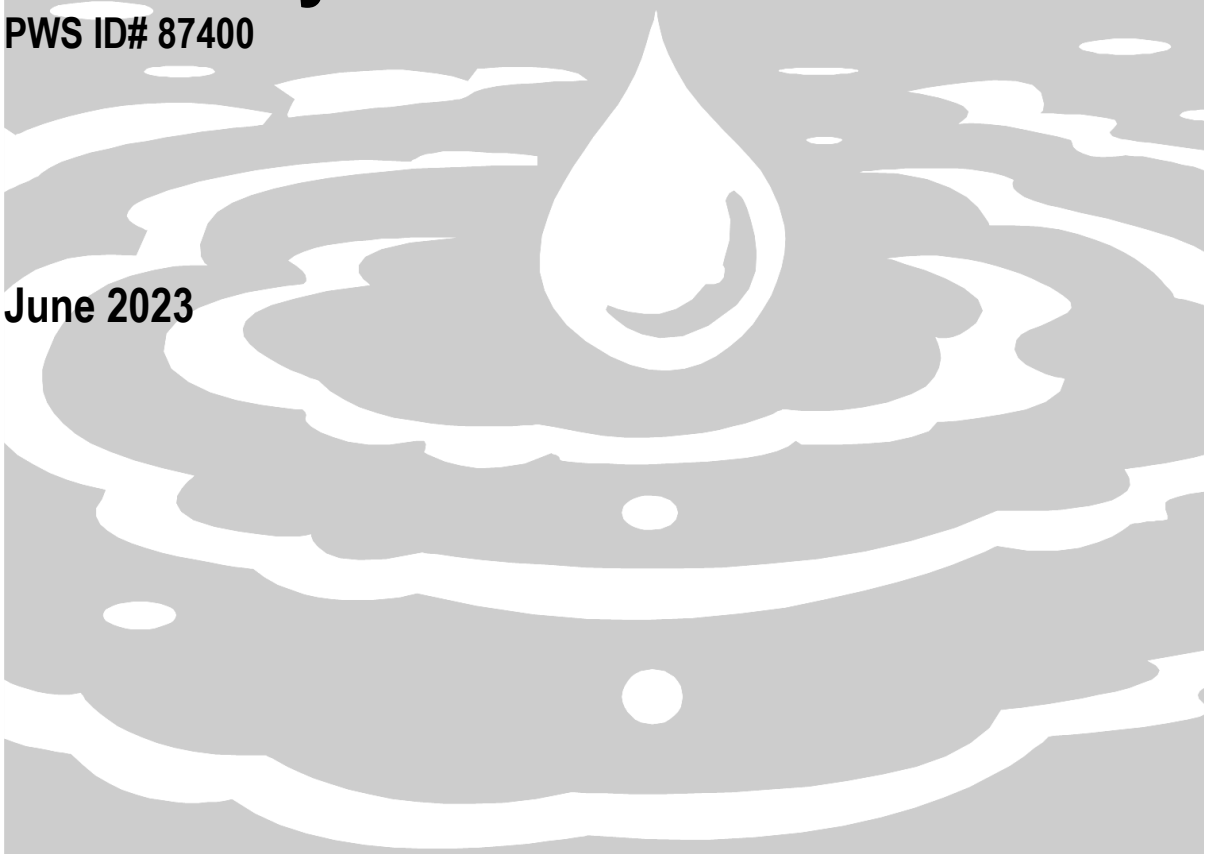
Appendix G

Emergency Response Plan
and
Water Shortage Response Plan

Emergency Response Plan

City of Tenino Water System

PWS ID# 87400



June 2023

Adapted From: Emergency Response Planning Guide for Public Drinking Water Systems - DOH PUB. #331-211

7.

Contents

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7.

Introduction: Protecting public health

Safe and reliable drinking water is vital to every community. Emergency response planning is an essential part of managing a drinking water system. Most public water systems have had routine operating emergencies such as pipe breaks, pump malfunctions, coliform contamination, and power outages. These are manageable if the water system has an emergency response plan that can be put into action quickly. More serious non-routine emergencies may result from intentional acts of sabotage, chemical spills, floods, earthquakes, windstorms, or droughts. These can drastically affect the system and the community that depends on it.

Each emergency has unique effects on different parts of a water system. Floods can cause widespread bacterial contamination, earthquakes can damage sources and distribution systems, and storms can disrupt power supplies. The common element is that each emergency may threaten the system's ability to deliver safe and reliable drinking water.

Emergency response planning is a process by which water system managers and staff explore vulnerabilities, make improvements, and establish procedures to follow in an emergency. It is also a process that encourages people to form partnerships and get to know one another. Preparing a response plan and practicing it can save lives, prevent illness, enhance system security, minimize property damage, and lessen liability.

The operations and maintenance section of the state rule, Chapter 246-290-415 (2)(b) WAC, requires public water systems in Washington to have an emergency response plan as part of a water system plan or small water system management program. It also requires that systems employ reasonable security measures to protect the raw water intake facilities, water treatment processes, storage facilities, pump-houses, and distribution systems from possible damage or intruders.

This guidance document can be used to help meet the requirement for developing an emergency response program. Other methods or formats can also be used to meet the emergency response program requirement.

How to use this document

Developing an emergency response plan can take a lot of time and effort. The purpose of this document is to make the job easier and help create a plan that works for your water system. The document is intended for use by any water system and may be modified to fit the specific needs of each system.

Section 1.
Emergency response mission and goals

Stating a mission and goals for emergency response is an important first step because it helps a water system focus on the important aspects of the plan. The mission statement and goals should reflect the system's obligation to protect the health and safety of its customers, staff, and assets – and be able to maintain or restore safe and reliable drinking water. Developing partnerships with key response agencies should be reflected in the goals.

System personnel should begin by understanding what needs to be accomplished during an emergency. Protecting your customers' health is paramount. If the water has been contaminated, you must notify customers quickly. Then you must resolve the situation at hand and restore safe and reliable water throughout the system. In any event, there are a series of general steps that a water system should take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate actions to save lives.
3. Take action to reduce injuries and system damage.
4. Make repairs based on priority demand.

Return the system to normal operation.

Emergency response mission and goals

Mission statement for emergency response	In an emergency, the mission of the City is to protect the health of our customers by being prepared to respond immediately to a variety of events that may result in contamination of the water or disruption of supplying water.
Goal 1	Be able to quickly identify an emergency and initiate timely and effective response action.
Goal 2	Be able to quickly notify local, state, and federal agencies to assist in the response.
Goal 3	Protect public health by being able to quickly determine if the water is not safe to drink or use and being able to immediately notify customers effectively of the situation and advise them of appropriate protective action.
Goal 4	To be able to quickly respond and repair damages to minimize system down time.

Section 2.
System Information

In any emergency, a water system needs to have basic information available for both system personnel, and external parties such as emergency responders, repair people, the media, and others. Basic information that should be presented in the emergency response plan are the system's ID number, system name, system address or location, directions to the system, population served, number of service connections, system owner, and information about the person in charge of managing the emergency. Below is basic water system information.

System information

System identification number	87400	
System name and address	City of Tenino 149 S Hodgen Street Tenino, Washington 98589	
Basic description and location of system facilities	The water system has two groundwater wells of 94' and 93' depth. Each well utilizes disinfection and pH adjustment for treatment. The wells pump into the distribution grid at common location and fill the two steel storage tanks on Lemon Hill.	
Population served and service connections from Division of Drinking Water records.	2,030 people	833 connections
Name, title, and phone number of person responsible for maintaining and implementing the emergency plan.	Troy Cannon Public Works Director	(360) 264-2368 Phone (360) 261-1506 Phone (360) 264-5772 FAX

Section 3.
Chain of Command – Lines of Authority

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 the entire emergency.

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.

The first response 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.

Chain of command – lines of authority

Name and title	Responsibilities during an emergency	Contact numbers
Mayor	Policy making and final decisions.	
Public Works Director	Responsible for overall management and decision making for the water system. The Public Works Director is the lead for managing the emergency, providing information to regulatory agencies, the public and news media. All communications to external parties are to be routed through the Public Works Director.	(360) 264-2368 Phone (360) 261-1506 Director of Public Works
Lead Water System Operator	In charge of operating the water system, performing inspections, maintenance and sampling and relaying critical information, assessing facilities, and providing recommendations to the Public Works Director.	Cell:
City Clerk	Responsible for administrative functions in the office including receiving phone calls and keeping a log of events. This person will provide a standard pre-scripted message to those who call with general questions. Additional information will be released through the Public Works Director.	Phone: (360) 264-2368
Field Staff	Supports the lead water system operator.	(360) 951-0876

Assembly Areas and Accountability: Obtain an accurate account of personnel using designated assembly areas where personnel should gather. *The designated gathering place for water system personnel is the public works shop. The designated command center is City Hall.*

Section 4.
Events that Cause Emergencies

Why do emergencies happen? There are a variety of reasons including:

- Natural disasters.
- Accidents.
- Deliberate acts of vandalism or terrorism.
- System neglect or deferred maintenance.

An emergency may affect the entire water system or only isolated sections. Each type of event can cause different types of damage to system components or contamination resulting in a disruption in service. These evaluations should be reflected in the water system's vulnerability assessment and procedures for responding to specific events that are discussed later in this document.

Natural Disasters

More common natural disasters that may impact the City include:

Earthquakes: The Nisqually earthquake in February 2001, although not severe, caused problems for water systems in western Washington. Distribution pipes and service lines broke, storage reservoirs shifted, and buildings were damaged. Although no major outages were reported, it was a serious reminder that these things can and do happen.

Floods: Floods are a common event in the Pacific Northwest. They can cause widespread contamination as turbid waters carry bacteria that can overflow sources, transmission lines, treatment facilities, and pumping facilities. Floods can also ruin electrical components and telemetry systems.

High winds: Pacific Northwest storms often generate winds in excess of 50 miles an hour and have exceeded hurricane-force sustained winds of 74 miles an hour or greater from time-to-time. These storms often disrupt power and damage water system facilities.

Human-caused events

Human-caused events that can result in a water system emergency include chemical spills, vandalism, terrorism, cyber-attack, fires, construction accidents, and basic neglect of maintaining the system.

Vandalism: Vandalism is generally a spur-of-the-moment act using materials at hand rather than pre-planned or pre-meditated activities. Vandals often break into systems, damage facilities, and paint graffiti. These acts are relatively easy to prevent by enhancing security, increasing lighting, installing locks on doors and hatches, and putting up security fencing.

Terrorism: Acts of terrorism are conducted by someone whose intent is to instill fear or induce harm to people and facilities. Acts of terrorism are a very real threat in America. Even though it may seem unlikely, it would only take one well-staged event to undermine confidence in drinking

water safety. Being prepared and knowing what to look for are crucial elements of preventing an attack on the system.

System neglect: System neglect, often referred to as deferred maintenance, is a major cause of emergencies. System components that are aging and need replacement go without attention for so long that they fail, causing an emergency. Drinking water systems need to continuously evaluate facilities and replace them before a massive failure occurs. In one case, a drinking water system continuously put off repairing its major transmission line that traversed a hillside in town. The line finally failed and caused an immense slide, destroying a number of homes and causing significant damage.

Construction accidents: Construction accidents sometime fall into the category of a routine operating emergency. For example, when a contractor damages a water line and the system needs to be shut down for repair. If the response is not timely and effective, this kind of incident can turn into a serious emergency. The system may lose pressure, resulting in serious backflow incidents that contaminate the water. The utility must be aware of construction in and around the system and be prepared to respond quickly to an accident if it happens.

In preparing a plan, you may not consider it necessary to do an extensive analysis of a rare event such as a tornado in the Pacific Northwest. However, analyzing the impacts of an earthquake, flood, or storm is important because they happen quite often in Washington. Consider the probability of an event and its likely effect on the water system. Then focus on the actions needed to reduce impacts and respond in a timely and effective manner.

Example: Events that cause emergencies

Type of event	Probability or risk (High – Med – Low)	Comments
Earthquake	Low to Medium	Only minor earthquake exposures historically.
Flood	Low	Both Wells are not located in areas susceptible to flooding.
High winds	Low	Back-up power for Well No. 3 and communication telemetry is buried.
Ice storm	Low	Low probability that and event will impact water service.
Drought	Low	Local aquifers are not affected by typical drought conditions.
Terrorism	Low	Vulnerability assessment was conducted in 2004
Construction accident	Low	Pipes are typically well documented and located prior to construction.
Chemical spill	Moderate	Aquifer is moderately susceptible to chemical spills.

Section 5.
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.

An assessment of severity, once decided, 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 alternative method of communicating if cell phones and pagers won't work.

In classifying the severity of an emergency, define as many levels and descriptions as you find useful. The following is a four-level example for a water system supplied by groundwater that has been used in many settings. This is just an example; you may choose to classify emergencies in some other way. Smaller systems may prefer a three-level scheme; some larger systems may want to use five or more levels.

Level I – Normal (Routine) Emergency: The system experiences a normal emergency, such as a line break or power outage. System personnel are able to handle the problem with minimal outside assistance. In this situation is not likely that public health will be immediately jeopardized. Although it is important to begin responding, system personnel should have no difficulty remaining calm and thoroughly working through the situation. Normal events can usually be resolved within 24 hours.

Example: Level I emergency

Description: Level I emergencies:

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

The system has specific response activities identified for these types of emergencies, including proper sampling, disinfection, and pressure testing activities. System personnel are advised and are directed to work on the problem and are usually capable of resolving the problem within 24 hours. If it is determined that the problem will take longer than 24 hours to resolve and storage is likely to be drawn down below a safe operating level, the situation will be elevated to level II.

Level II – Minor Emergency (Alert Status): The system experiences minor disruption in supply or has indications of possible contamination where it may need to coordinate with DOH and consider issuing a health advisory to customers. In these types of emergencies, public health may be jeopardized, so it is important for system personnel to be on alert and initiate a quick response. Minor emergencies can usually be resolved within 72 hours.

Example: Level II emergency

Description: Level II emergencies:

- Disruption in supply such as a transmission main line break, pump failure with a potential for backflow, and loss of pressure.
- Storage is not adequate to handle disruption in supply.
- An initial positive coliform or E. coli sample.
- An initial primary chemical contaminant sample.
- A disruption in chlorine/chemical feed from the groundwater sources.
- A minor act of vandalism.
- Drought, with a noticeable and continuing decline of water level in the well.

Level III – Significant Emergency: The system experiences significant mechanical or contamination problems where disruption in supply is inevitable and issuance of a health advisory is needed to protect public health. Major emergencies should be reported to DOH as soon as possible to determine the best available means to protect customers' health. System personnel are directed to the situation, and outside entities are notified to aid in the response. Major emergencies may require more than 72 hours to resolve.

Example: Level III emergency

Description: Level III or actual emergencies:

- A verified acute confirmed coliform MCL or E. coli/fecal positive sample requiring immediate consideration of a health advisory notice to customers.
- A confirmed sample of another primary contaminant requiring immediate consideration of a health advisory notice to customers.
- A loss or complete malfunction of the water treatment facilities for the surface water source, including chlorination.
- A major line break or other system failure resulting in a water shortage or requiring system shutdown.
- An act of vandalism or terrorist threat such as intrusion or damage to a primary facility.
- An immediate threat to public health of the customers and an advisory is required.
- Severe drought significantly affecting well yield.

Level IV – Catastrophic Disaster/Major Emergency: The system experiences major damage or contamination from a natural disaster, an accident, or an act of terrorism. These 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.

Example: Level IV emergency

Description: Level IV or major emergencies:

- Natural or Human event that shuts down the system or severely impacts sources, lines, etc.
- Act of terrorism possibly contaminating the water system with biological or chemical agents.
- Flood that infiltrates system facilities and sources.
- Storm that significantly damages power grid and system facilities.
- Mudslide or other earth shift that causes failure of transmission or loss of water in well.

Section 6.
Emergency Notification

During most emergencies, it will be necessary to quickly notify a variety of parties.

Preparation for such notification has 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.

Notification procedures

These procedures describe how to make notifications to specific parties, who is responsible for conducting the notifications, who assists in the notifications, and what methods are used to complete them.

Who is responsible:	The Mayor is ultimately responsible for making the decision to notify customers regarding contamination, potential water shortage or the need for water use restrictions. The Mayor will consult with Public Works Director and the water system operator to make the decision. Once the decision is made procedures for notification will be initiated.
Procedures:	• Mayor and Public Works Director confer with key staff to verify problems. • Public Works Director consults with staff and DOH to develop message. • Mayor approves message. • Public Works Director, with assistance from staff prepares door hangers, signs and/or radio message. • Water system operator continues to investigate problem and make repairs as necessary. • Notifications will be distributed by newspaper and radio stations for all levels of emergency. Signs at key locations and on main travel routes will be utilized for extreme high hazard events. • An administrative support person will be assigned by the City Clerk to read a pre-scripted message to phone callers and log in each phone call. • Water system operator will continuously update the Public Works Director. • Once the emergency situation is resolved, re-notify customers and media.

Notification call-up list

Call-up lists should be comprehensive, including local law enforcement, DOH Division of Drinking Water regional office, Department of Ecology spill response, local mayors and city officials, local health officials, safety officials, local emergency responders ,water testing laboratories, and service/repair providers. A list of priority customers, such as hospitals, nursing homes, clinics, and schools should also be maintained for immediate notification. See the following pages for comprehensive notification lists.

Local Notification List (area code 360 unless otherwise noted)

ORGANIZATION	CONTACT	TELEPHONE	TELEPHONE	EMAIL
Fire Department	Duty Person		911	
Police Department	Joe Vukich		911	
FBI Field Office			(206) 622-0460	
Health Department				
Primacy Agency District Office	Reg. Engr. DOH		1-877-481-4901	
Local Hospital				
Local Emergency Planning Committee			911	
EMS	Duty Person		911	
Local Pharmacy				
Local Nursing Homes				
Local Schools	Tenino School District			
Local Prisons				
Local Government Official				
Local Hazmat Team				
Water System Operator	Troy Cannon			
Neighboring Water System				
Neighboring Water System				
Other				

Service/Repair Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (N
Electrician			
Electrician			
Electric Utility Company			
Gas Utility Company			
Sewer Utility Company	City of Tenino		
Telephone Utility Company			
Plumber			
Pump Specialist			

Pump Specialist			
"Dig Safe" or local equivalent	Utility Locate	1-800-553-4344	
Soil Excavator/Backhoe Operator			
Equipment Rental (Power Generators)			
Equipment Rental (Chlorinators)	TMG Services	253-779-4160	1-800-562-2310
Equipment Rental (Portable Fencing)			
Equipment Repairman			
Radio/Telemetry Repair Service			
Bottled Water Source			
Bulk Water Hauler	LTI, Inc.	1-800-530-6455	
Pump Supplier			
Well Drillers			
Pipe Supplier			
Chemical Supplier			
Local/Regional Analytical Laboratory			

State Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)
Drinking Water Primacy Agency	_____, Regional Engineer, WSDOH	(360) 236-3030	1-877-481-4901
Department of Environmental Protection (or state equivalent)	Department of Ecology	(360) 407-6300	NA
Department of Health			
Emergency Management Agency			
Hazmat Hotline	Dale Jensen, Ecology Spill Response	(360) 407-7450	(360) 407-7450

Media Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)
Designated Water System Spokesperson	Mayor		
Newspaper - Local			
Newspaper – Regional/State			
Radio			
Radio			

Television	KOMO, KING	1-TVTIPS-KOMO, 206-448-5555	
Television	KIRO, FOX	(206) 728-7777	

Section 7.
Water Quality Sampling

The ERP needs to identify and address special water sampling and monitoring issues that may arise during and after a major event. Some water sampling and monitoring issues to consider include:

- Identifying proper sampling procedures for different types of contaminants;
- Obtaining sample containers;
- Identifying who is responsible for taking samples;
- Confirming laboratory capabilities and certifications; and
- Interpreting monitoring or laboratory results.

The following is guidance for basic testing that is common for most emergency conditions:

Coliform Bacteria: Most pathogens that contaminate water supplies come from the feces of humans or animals. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. It is, however, relatively quick, easy, and inexpensive to test water for coliform bacteria. All systems must have a coliform monitoring plan, as required by drinking water regulations that designates sampling sites, procedures, laboratory requirements, and contact numbers. This plan is an integral part of the emergency response plan. In the event of an emergency, testing for coliform is a standard first test, and if coliform is detected it is a signal that the system may be contaminated. Coliform bacteria generally do not cause illness, but their presence indicates that other disease-causing organisms (pathogens) may be in the water system.

Chlorine Residual: In chlorinated systems, this test indicates if materials introduced into the water have created a demand for the chlorine, leaving lower-than-normal or no residual and signaling the need for further evaluations.

Cyanide/Other: Cyanide or other specific contaminant tests are not easily performed, but should be done immediately if cyanide or other specific contamination is suspected. Cyanide, in particular, is very toxic, causing death upon ingestion. If contamination is suspected, DOH Division of Drinking Water regional office personnel are available to help identify what testing should be done.

If intentional sabotage of the system or contamination of the water is suspected, this may be a crime scene. Call your local law enforcement and DOH Division of Drinking Water regional office, and be sure not to disturb any potential evidence.

Water quality sampling

Sampling parameter	Do we have procedures? Yes/No	Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)
Coliform Bacteria	Lewis County Health Department Lab - Chehalis. Arrange non-working hour samples through the County Emergency Management office when needed.	Basic guidance for collecting samples is included in the current Coliform Monitoring Plan (CMP). Specific procedures for emergencies will not differ with regard to sampling techniques, but will change with regard to sample locations
Chlorine Residual	Water Department has equipment to conduct chlorine residual analysis.	Conduct samples at locations upstream and downstream of suspected areas. Sample as many times as warranted to positively confirm that contamination does or does not exist.
Nitrate/Nitrite	Samples must be analyzed at the State Public Health Lab or at a private Lab.	Conduct samples at wells. Sample as many times as warranted to positively confirm that contamination does or does not exist.
Cyanide/Other	Special Samples must be analyzed at the State Public Health Lab or at a private Lab.	Special sampling will be based on a specific known or suspected threat. The City will likely have to confer with DOH and other outside experts to determine the best course of action and sampling locations.

Section 8.
Effective Communication

Effective communications is a key element of emergency response. Make sure you have a well thought out communications strategy in place as part of your emergency response plan. If you haven't planned ahead by the time a crisis hits, it's too late. How you communicate with your employees, customers, and the media can affect the outcome of the situation.

Preparation for such notification has 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.

Communication Tips

Do:

- Be prepared.
- Designate a spokesperson.
- Provide complete, accurate, and timely information.
- Tell the truth.
- Express empathy.
- Acknowledge uncertainty and offer to get back with more information later.
- Document your communications.

Do not:

- Speculate on the cause or outcome of an incident.
- Blame or debate.
- Minimize or brush off concerns of customers.
- Treat inquiries from interested parties as an annoying distraction from the real business of emergency response.

Designated public spokesperson

Spokesperson	Alternate 1	Alternate 2
Public Works Director	Mayor	As Assigned

Key messages

Develop possible messages in advance, and update them as the emergency develops:

- We are taking this incident seriously and doing everything we can to resolve it.
- Our primary concern is protecting our customers' health.
- Another important concern is keeping the system operational and preventing damage.
- What we know right now is _____
- The information we have is incomplete. We will keep you informed as soon as we know more.
- We have contacted state and local officials to help us respond effectively.
- If you think you may be ill or need medical advice, contact a physician.
- We are sampling the water and doing tests to determine whether there is contamination.
-

Health Advisories

During events when water quality and human health are in question, it may be necessary to issue a health advisory that gives advice or recommendations to water system customers on how to protect their health when drinking water is considered unsafe. These advisories are issued when the health risks to the consumers are sufficient, in the estimation of the water system or state or local health officials, to warrant such advice.

Health advisories usually take the form of a drinking water warning or boil water advisory. Communication during these times is critical. Health advisories should always be well thought out and provide very clear messages. Once initiated, a health advisor cannot be rescinded without prior consent by DOH.

The Division of Drinking Water has put together a number of tools, including fact sheets, brochures, forms, and templates to help prepare for a health advisory. These are on the Web at: http://www.doh.wa.gov/ehp/dw and in the Coliform Monitoring Plan

Section 9.
The Vulnerability Assessment

Community water systems serving populations greater than 3,300 persons are now being required by the Environmental Protection Agency to identify vulnerabilities to intentional acts of terrorism. This document uses the term vulnerability assessment to mean the process by which the water system evaluates each water system component for weaknesses or deficiencies that may make the system susceptible to damage or failure during a natural or human-caused emergency. The City conducted this exercise in 2004. The results are on file at City Hall. The information is considered to be sensitive and is made available to staff only as needed.

Other, less sensitive vulnerability information is provided in the following:

Facility vulnerability assessment and improvements identification

System component	Description and condition	Vulnerability	Improvements or mitigating actions
Source	Two groundwater wells are in relatively unconfined geologic settings. The sources are in excellent condition.	The wells are most vulnerable to large chemical spills upstream.	City is addressing vulnerability by planning to implement a well in the southwest service area.
Storage	The tanks are in sound condition.	City has redundant tanks with proper security systems installed. No specific vulnerability identified.	No current deficiencies.
Treatment	Treatment systems are sound and reliable.	Redundant systems and control safeguards at each well have mitigated most vulnerabilities.	No current deficiencies.
Computer and telemetry system	Telemetry system at the wells and storage tanks. All systems are in good operating condition.	The lease lines to the Main Reservoir are buried.	No current deficiencies.

Section 10.
Response Actions for Specific Events

Develop a detailed response plan for each type of emergency event that the system may experience. In any event there are a series of general steps that a water system should take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate actions to save lives.
3. Take action to reduce injuries and system damage.
4. Make repairs based on priority demand.
5. Return the system to normal operation.

Knowing the various elements of emergency response planning and keeping in mind these general steps will help you develop response actions for specific events.

Establishing response actions for specific events

There are numerous events which may cause an emergency that are dictated by the system's size, complexity, type of source, and geographic location. As discussed before, likely causes of emergencies in our state that a system should consider are power outages, transmission or distribution line breaks, chlorine treatment failure, surface water treatment malfunction, source pump failures, microbial (coliform, E. coli) contamination, chemical contamination, acts of terrorism, vandalism, loss of water in the well, drought, floods, ice storms, earthquakes, and hazardous spills in the vicinity of sources or distribution lines. In any of these situations your priority is the protection of people using the water. Be observant of what is going on around you, and if you suspect vandalism or terrorism, contact local law enforcement and make every effort to preserve evidence. Based on previous section of this ERP, the water system has relatively low vulnerability to most events other than Power Outage, Microbial Contamination, Flood and High Winds. The following addresses specific response to those events.

Microbial (coliform, E. coli) contamination

Assessment	The water system is vulnerable to microbial contamination, both acute and non-acute.
Immediate actions	1. Call DOH immediately. 2. Consult Coliform Monitoring Plan for basic information and guidelines. 3. Notify system and take follow up samples as required. This may include various levels of notification and sampling. The general steps will mostly be prescribed by DOH.
Notifications	1. DOH - to obtain specific instructions 2. Customers – to describe severity of event and specific actions to take during and after (as needed).
Follow-up actions	1. Additional sampling in the following month.

High Winds

Assessment	The water system is vulnerable to high winds that can affect power supply and telemetry, but service is not typically impacted by them. Storage capacity is able to supply the system for multiple days until power and telemetry is restored.
Immediate actions	1. Operate wells manually until telemetry systems can be repaired. 2. Call phone company to make sure that lease line is a priority.
Notifications	1. Phone company to make sure telemetry cables are a priority.
Follow-up actions	1. Inspect reservoir and well telemetry system operation to ensure proper operation.

Section 11.
Alternative Water Sources

It is important to evaluate potential alternative water supplies ahead of time to ensure the water is safe and the supply is available. Sources that the water system may use when the primary sources cannot meet demands are defined as "emergency sources." They are used only when required by extreme, and mostly unpredictable, circumstances. Alternative sources might include emergency or back-up wells, surface water sources, or springs.

Another important consideration is whether the water system can establish an intertie with an approved water supply that might benefit both systems in an emergency. Other alternatives include bottled water suppliers or a local tanker truck that could bring in water for various uses.

Intertie to adjacent water supply system

Water systems within one-quarter mile of our system	Feasibility of connecting
Intertie not currently available	

Short-term outages might be due to contamination or electrical power outages. If your CWS has been contaminated, a public health notification such as "boil water," "do not drink," or "do not use," may be issued by the drinking water primacy agency. If a "boil water" notice is issued, no alternative water source is needed. If a "do not drink" order is issued, then the suspect water can still be used for other activities that do not involve ingestion of the water. In this situation, it will only be necessary to provide an alternate drinking water supply for consumption and related activities such as food preparation.

A "do not use" order is much more restrictive. In this case, a sufficient alternate water source is needed to supply water for consumption, hygiene, and emergency needs. A "do not use" notice may also have implications with respect to water used for firefighting. Although a prohibition on use of water for firefighting is likely to occur only if the water is contaminated with certain substances, an alternate source of firefighting water, such as a pond, river, or stream, may be necessary in this event.

Alternate source(s) of water

Alternative sources	Names	Phone	Availability	Is the water safe for drinking?
Bottled water suppliers				
Tanker trucks in the area available to deliver bulk water	LTI, Inc. (the contract haulers for Dairy Gold in Chehalis)	360-256-2577 or 1-800-530-6455	9,000 gallons in less than 8 hours	Yes, If taken from a compliant public water system.

Section 12.
Curtailing Water Use

An emergency may require reducing water usage. Possible measures include restrictions on landscape watering, car washing, filling of swimming pools and hot tubs, and other nonessential activities such as cleaning driveways and sidewalks. There can be various combinations of voluntary and mandatory measures. The water system should develop and formally adopt measures through ordinance, resolution, or by-laws.

Curtailing water use

Water curtailment measures	Actions
Stage 1 - Voluntary: Request reduction in outside water usage including watering lawns, washing cars, etc. Stage 2 - Mandatory: Require reduction in outside water usage including watering lawns, washing cars, etc. Initiate specific council action through resolution to enact temporary policy for charges and penalties.	Upon making the decision that curtailment is needed: 1. Draft door hanger with curtailment messages. 2. Post on customer doors. 3. Contact local media to announce message. 4. Monitor system usage and spot check meter usage as needed. 5. Continue message as long as curtailment is warranted.

As part of this effort, consider ways to inform customers about the need to curtail water use. Examples include door-to-door postings, phone contact, posting of signs in visible community areas, and contacting the news media. Curtailment messages should be pre-scripted to ensure proper messages are delivered.

Section 13.
Returning to Normal Operation

As the emergency passes and you regain control, the system must prepare to return to normal operating condition. 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 back-up generator is disconnected. Or it could mean the system has to obtain the proper number of satisfactory coliform tests and disinfect the system in order to lift a health advisory.

Many factors might need to be considered before you decide to return to normal operation. For example:

- Has the system been repaired to the point that it can meet demand?
- Has the system operator 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 standards?
- Is there adequate staff to operate and manage the system?
- Do federal, state, and local agencies support returning to normal operation?
- Have you developed the proper public messages?

The emergency response plan should include a discussion of the follow-up actions and staff responsibilities that the system must take before returning to normal operation.

Returning to normal operations

Action	Description and actions
Inspect, flush, and disinfect the system,	Water system operator and support staff inspect all system facilities, ensure all water quality tests have been done and the system has been flushed and disinfected if necessary. Water system operator makes a report to the water system manager. Water system manager makes decision on current condition of system.
Verification of water quality	Water system manager verifies water quality sampling results.
Coordinate with DOH	Water system manager coordinates with DOH on system condition and water quality results.
Notify customers	Water system manager meets with water system operator and communications lead to write notice to customers. Water system manager directs communications lead to distribute public notice.

Section 14.
Training and Rehearsals

Training

Emergency response training is essential. Training educates system personnel about emergency situations and resulting effects on water systems and also provides an opportunity to practice responses. Any training should have a purpose, appropriately selected personnel, and qualified instruction and supporting materials.

Training can be conducted in a variety of ways, including attending training classes or bringing in experienced trainers for on-site training and exercises. On-site exercises with experienced trainers are very useful, as they involve activities that are specific to the water system. Personnel can practice emergency communications, isolating parts of the system, inspecting system components, and learning what to look for in case of a security breach. It is also important to train staff on risk communications or how to communicate with the media and customers during an emergency.

When planning training, consider the system's size, the type and complexity of its components, staff needs, and operational needs. Periodic training reinforces previous efforts, as people often forget things that they don't use very often. It also provides an opportunity to train new staff and learn about new problems, new techniques, and changes in equipment. Be aware of current and upcoming training topics, especially hot topics that tend to come around as a result of a specific event.

Training

Identify staff position training needs and expectations.

Position	Training needs and expectations
Water System Manager	Emergency response communications, emergency response planning, issuing health advisories
Water System Operator	Emergency response communications, emergency response planning, suspicious activity training
Field support	Emergency response communications, suspicious activity training
Administrative Support	Emergency response communications, emergency response planning,

Emergency rehearsals

Emergency rehearsals, sometimes referred to as "table-top exercises" are valuable tools to make sure employees are always prepared to respond. Ideally, rehearsals are set up by the water system manager and are unannounced to employees. During these rehearsals, employees are required to conduct actual responses. They make phone or radio calls, perform

inspections, respond to inquires, and do other tasks. Get assistance from partners such as local health jurisdictions and local emergency response people.

Practicing for an emergency is the only real way to thoroughly evaluate the emergency response plan and the system's ability to implement it. The final step of a rehearsal is to evaluate and discuss the results. Conduct a staff meeting to go over the results and get input from those involved in the rehearsal. Then make modifications or set up training to be better prepared.

Example: Emergency rehearsals

Schedule for drills, tabletop exercises, and other ways to practice emergency response:

Event	Description	People and organizations involved
Rehearsal	Conduct actual emergency drill	Water system staff
On-site training drills	Conduct specific drills, i.e, communications, water line breaks, sampling with a professional trainer	Water system staff and professional trainer

Section 15.
Plan Approval

Representatives of the water system who are ultimately responsible, such as water system manager, owner, board members, commissioners and council members, should review, approve, and sign the emergency response plan. This demonstrates support for the plan, acknowledges the effort put into its preparation, and puts it officially into effect.

Be sure to secure and protect the emergency response plan as it may contain sensitive information about facilities and response activities that you may not want others to know in order to safeguard the water system.

Plan approval

This plan is officially in effect when reviewed, approved, and signed by the following people:

Name/Title	Signature	Date
Mayor		
Public Works Director		

7.

Water Shortage Response Plan

Tenino

Prepared By:

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

June 2023

Gibbs & Olson Project No. 0751.5021

Tenino Water Shortage Response Plan

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Water Shortage Response Plan
for
Tenino

Introduction

Introduction

DOH guidance document *Water Shortage Response Plans* (DOH PUB 331-316) was used to prepare this Water Shortage Response Plan (WSRP) for Tenino. The goal of the WSRP is to maintain essential public health and safety services and minimize adverse impacts affecting the lifestyles of Tenino's water customers. The WSRP outlines Tenino's short-term water shortage response activities to minimize the impacts of events that can be weather-related water shortages, natural or human-caused disasters, or other water system operating emergencies. The objective of the WSRP is to establish procedures for managing water supply and demand in times of shortage. The WSRP identifies the range of demand reduction actions that are available and defines the mechanism(s) by which decisions will be made during a shortage event. Since each situation has unique characteristics, the WSRP cannot address all of the possible scenarios, or all of the supply and demand management actions that are appropriate to a given situation. For this reason, the WSRP is intended as a framework of actions that will be tailored to meet the specific needs of a shortage situation.

Background

Tenino's water supplies are solely from groundwater sources. There are two wells in close proximity to one another near the Middle School. Both are just less than 100' deep in a prolific aquifer.

Water from both wells are treated with chlorine for disinfection and calcium for pH adjustment.

Combined well production is 700 gpm and maximum day demand (MDD) is 371 gpm. Due to Tenino's water supply solely deriving from groundwater, the water system is not highly vulnerable to short-term drought conditions. Summer drought conditions are a normal part of our annual weather cycle, and measures to meet annual summer demand are addressed in the City's Water System Plan.

This WSRP establishes procedures intended for use during unexpected periods of water shortage. There are several scenarios that could result in such a shortage and impair the ability of the City's water supplies to meet demand.

Drought conditions resulting in less than average fall/winter precipitation may decrease recharge to local aquifers. Impacts from this scenario may not be immediately evident due to lag times between drought conditions, recharge and groundwater withdrawal. Impacts may become evident in shallow aquifers 6 months to 1 year following below-average rainfall, and would likely be evident following a 1-2 year period of below-average precipitation.

Unusually warm and dry weather sustained over the summer months also holds the potential to impact water supplies if our usual period of peak demand extends in duration. Effects of from this scenario would be immediate.

Events such as natural disasters including earthquakes, flooding, snow and windstorms that result in power failures can result in water shortage situations lasting a longer period of time than a routine water main break. The same is true for human caused emergencies such as hazardous material spill, chlorine solution leak or an act of vandalism. Such emergencies can result in a critical water component to be out of service for an extended period of time resulting in a curtailment of water production.

Problem Assessment

There are no known issues that would affect Tenino's ability to meet system demands.

Demand Analysis

The MDD is 371 gpm or 534,031 gpd.

Supply Analysis

Tenino has two wells that produce 700 gpm or 1,008,000 gpd.

Demand and Supply Comparison Summary

During the peak demand period, the system now is able to produce 1,008,000 gpd which is almost twice the MDD of 534,031 gpd. The supply is therefore adequate. There is also 550,000 gallons of storage available.

Options for Dealing with a Water Shortage

Water Resource Policies

Tenino is governed by many federal, state and local laws, regulations, policies and plans that form the

legal context within which the public water system operates. Those dealing with water resource policies include, at a minimum: water rights (chapter 173-152 WAC), water code (chapter 90.03 RCW), groundwater (chapter 90.44 RCW), Group A water systems (chapter 246-290 WAC), water use efficiency (RCW 90.03.386(3), watershed planning (chapter 90.82 RCW), Tenino's ordinances and policies for service.

Water Shortage Response Team

When a **potential** water shortage is identified, the public water system would assemble a Water Shortage Response (WSR) Team to consider whether the WSRP should be implemented. The team would be comprised of the following staff though additional staff would be brought in, as needed:

- Public Works Director
- Mayor
- City Council

The WSR Team would consider the following **water supply** factors:

- Total supply availability.
- Groundwater rights status for that particular year.
- Operational condition of all sources, storage tanks, and other facilities.
- The rate of decline in groundwater levels compared with the normal operating levels.
- Amount of time required to implement a supply-enhancement measure.
- Weather conditions as derived from short- and long-term weather forecasts and modeling by the National Weather Service.

The WSR Team would then consider the following water demand factors:

- Current trends and seasonal forecasts for the system's daily water demands.
- The estimated margin of safety provided by the demand reduction compared with the level of risk assumed if no action is taken.
- Amount of time required to implement a water use reduction measure.
- Magnitude of expected savings provided by a water use reduction measure.

Other factors the WSR Team would consider include:

- The value of lost water sales revenue compared with the increased margin of supply reliability.
- Consultation with Council members, state resource agencies, the County, and interested organizations.
- Required time lags to institute measures.
- Ultimate cost to Tenino customers, both residential and commercial.
- Equity in demand reduction between customer classes.
- Current events.
- Actions taken by neighboring jurisdictions (i.e. City of Rainier), which influence or directly affect Tenino customers.
- Environmental benefits.

Stages of a Water Shortage

The four stages of phased responses are implemented in an effort to manage water demand when supplies become limited. Stages will be implemented progressively, if conditions allow or as needed depending on the situation. Each stage includes a variety of communications, internal operations, supply side actions and demand management strategies, as appropriate. Below is a summary of those stages.

Stage 1. Advisory
In this stage, customers would be informed as early as meaningful data is available, that water supply and demand conditions may result in a less than normal supply of water. If the supply and demand situation foreseen at the Advisory Stage develops, then the Utility would move to the Voluntary Stage.

Stage 2. Voluntary Reductions
This is the first step in reducing water consumption during a potential or actual water shortage. At this stage, voluntary cooperation and support of customers is requested to meet water use reduction goals.

Stage 3. Mandatory Restrictions
If voluntary measures do not provide the necessary reduction in water use, then mandatory activities would be implemented.

Stage 4. Emergency Curtailment
This stage would only be used when extraordinary levels of reduction are required to ensure demand does not exceed supply and public health and safety are not compromised.

Demand Reduction Options

Table 1, on the next page, provides a brief description of possible demand reduction options the Utility could possibly use based on the water shortage stage and an estimate (percentage) of water savings associated with it.

Table 1. Demand Reduction Options

Action	Stage and Consumption Reduction Goal Percentage				Comments
	Advisory	Voluntary	Mandatory	Emergency	
Communications	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
Media coordination.	X	X	X	X	
Develop and implement public outreach and education plan.	X	X	X	X	
Coordination with resource agencies and local jurisdictions.	X	X	X	X	
Coordination with largest water users.	X	X	X	X	
Notify irrigation customers of potential shut down procedures.			X	X	
Tenino	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
WSR Team coordination and planning.	X	X	X	X	
Reduce all maintenance and operations water uses to essential levels.		X	X	X	
Assess water main flushing activities.	X	X	X	X	
Increase water quality monitoring actions as necessary.					
Finalize water use restrictions, exemptions, and enforcement procedures and penalties.			X	X	Subject to Council approval.
Apply surcharges and penalties.			X	X	
Initiate “Water watcher” patrols.			X	X	
Declare water emergency.				X	Subject to Council approval.
Customers	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
Initiate residential indoor water use recommendations	X	X	X	X	
Initiate residential outdoor water use recommendations/tip (non-landscape)	X	X	X	X	

Initiate residential landscape water use recommendations/tips.	X	X	X	X	
Initiate commercial water use recommendations/tips.	X	X	X	X	
Initiate commercial landscape water use recommendations/tips.	X	X	X	X	
Contact water waste customers to cease waste.			X	X	
Initiate time of day watering restrictions (i.e., prohibited from 6 a.m. to 10 p.m.).			X	X	
Initiate day(s) of week lawn watering restrictions.			X	X	
Prohibit all lawn/turf watering, including new installations.			X	X	Possible exemptions for ballfields / playfields for safety purposes. All lawn watering banned prior to moving to Emergency Stage.
Prohibit all garden/ornamental landscape watering				X	
Initiate ornamental fountain operation restrictions		X	X	X	Prohibited at Mandatory and Emergency Stages.
Initiate car washing restrictions.		X	X	X	Request at Voluntary Stage, restrictions as necessary.
Initiate construction site water use restrictions				X	Water use prohibited. Exemptions as necessary to meet air quality regulations.
Restrict outdoor use by customers with special medical needs				X	Special medical needs like home dialysis are exempt from any emergency surcharge or re-strictions, provided they notify Tenino of

					such a need.
Initiate sidewalk, deck and driveway washing restrictions.			X	X	Except as necessary for public health or safety.
Initiate building pressure washing restrictions.			X	X	Limited at Mandatory Stage, prohibited at Emergency Stage.
Restrict filling of swimming pools			X	X	Prohibited at Emergency Stage for both private and public pools.
Penalties	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
None	X	X			
Issue warnings, make site visit, collect shut off and reconnection fee			X		
Institute rate changes to further encourage conservation			X	X	Requires Council approval.
Impose surcharges			X	X	Requires Council approval.

Triggering Criteria

Individual triggers for implementing the WSRP include both environmental (i.e., temperature, rainfall, instream flow, snowpack, climatologic data, etc.) or infrastructure. **Tables 2 –5** provide details each stage as it relates to the objectives, triggers, actions, and communications.

Advisory Stage

There are a variety of conditions that may cause concern about water availability and signal a potential water shortage. Responses to triggering an Advisory Stage are shown in **Table 2**. A public message that might be drafted could be: "*The potential exists for lower than normal water supply. Customers may be asked to reduce consumption unless conditions return to normal. Please use water wisely. We will keep you informed."* The Advisory Stage may be discontinued when water supply conditions return to a normal situation.

Voluntary Stage

As information further confirms the need to step up the surveillance of conditions contributing to both environmental and or infrastructure concerns about meeting water needs, **Table 3** provides responses that could occur during the Voluntary Stage. A public message that might be drafted would be: "We are

relying on the support and cooperation of **all** water users to reduce consumption and stretch the available water supply. Water use needs to be reduced by ten percent, approximately 25 gallons per household per day.

Customers are responsible for determining how they will meet that goal. Water waste is not allowed. If everyone cooperates, more stringent restrictions may be avoided. In addition to meeting essential water needs of customers, the needs of fish habitat and other environmental concerns is a priority." **Appendix B** lists water use reductions actions customers can do.

Mandatory Stage

At this point if voluntary actions do not result in needed demand reductions, Tenino will implement more aggressive actions and will limit or prohibit certain uses of water by customers. **Table 4** provides response that could occur during the Mandatory Stage. A public message that might be drafted would be: "We are imposing mandatory restrictions to reduce demand because the voluntary approach is not resulting in necessary water use reductions. We are continuing to rely on the support and cooperation of our customers to reduce water use.

However, we need the certainty and predictability of restricting certain water uses. This way, we can ensure that an adequate supply of water is available for public health and safety throughout this shortage."

Emergency Stage

At this stage, Tenino would recognize that a critical water situation exists. Without additional significant curtailment actions, a shortage of water for public health and safety would be imminent.

This stage is characterized by two basic approaches. First, increasingly stringent water use restrictions would be established and enforced. Secondly, significant rate surcharges would be used to encourage customer compliance. While a rate surcharge may be implemented in either the Voluntary or Mandatory stages, a surcharge is a key component to the success of this stage, and any previous surcharge may be increased if appropriate. A public message that might be drafted would be: "A water supply emergency exists. Severe restrictions on water use are necessary to maintain adequate water supplies essential for basic public health and safety. The public's continued cooperation is requested. Restrictions will be strenuously enforced."

TABLE 2. ADVISORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Prepare Tenino staff, relevant agencies, and water users for a potential water shortage, thereby allowing all parties adequate time for planning and coordination. 2. Undertake supply management actions that forestall or minimize the need for more stringent demand or supply management actions later on.	1. River and stream levels that are historically low in August/September (when levels are at their annual lowest). Staff would begin monitoring precipitation and analyzing all available data. If stream levels do not come up to historical levels, we would declare an Advisory Stage in June. 2. River and stream levels that are significantly below historical normals for the current time of year and data indicates that expected demands may not be met if this trend worsens or continues. 3. Lower than normal winter precipitation or snow pack.	1. Convene Tenino's Water Shortage Response Team to evaluate conditions, determine actions, and assign tasks. 2. Intensify communication with all Tenino staff so they can communicate our message clearly to concerned customers. 3. Intensify data collection actions for well pumping records, tank level records, monitoring river and stream levels and weather conditions. 4. Assess water quality in the distribution system to target areas that may experience degradation with reduced consumption. 5. Develop a list of critical water uses and users. 6. Initiate planning and preparation for Voluntary Stage actions, including an assessment of potential staffing impacts, training needs, and communications strategies.	1. Brief Council members. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes. Specific entities include City of Rainier, Thurston County, State Departments of Health and Enterprise Services, interested environmental and community organizations, and large commercial customers. 3. Develop a status report for customers/businesses with special interests. 4. Develop and distribute public outreach and education materials explaining the drought response stages and expected ranges of actions through a variety of communication channels (i.e., print and radio media, TCTV, Tenino website, direct mail, etc.). Post updated status reports on Tenino's website and through other communication channels. Prepare information for customers, including developers, who may be planning new landscaping.

TABLE 3. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Inform Tenino water customers of a water shortage and the need to reduce water use and eliminate water waste. 2. Reduce water use to meet consumption goals through voluntary customer actions. 3. Forestall or minimize the need for more stringent demand or supply management actions. 4. Minimize the disruption to customers while meeting consumption goals. 5. Maintain the highest water quality standards throughout the shortage.	1. River and stream levels continue to be low. 2. Rainfall and snowpack is significantly less than normal by April 1. 3. The summer is predicted to be hot and dry. 4. Water use demand projections indicate a systematic response to reducing demand is required.	1. Continue Advisory Stage actions. 2. WSR Team to prepare weekly reports for distribution to staff and local media on supply conditions and consumption levels. 3. WSR Team will consider the current and projected supply conditions and seasonal demand and set consumption goals that may be revised as necessary. 4. Reduce all operating system water uses to essential levels. 5. Increase water quality monitoring actions as necessary. 6. WSR Team will evaluate whether target consumption levels and supply conditions warrant a rate surcharge to reinforce voluntary actions and/or to recover revenue losses. The WSR Team would make recommendations to the Mayor for recommendation to the full Council. 7. Implement staffing reassignments as needed and plan staffing changes that may be needed for the Mandatory Stage, including staff to enforce mandatory restrictions. **8.** Contact the Tenino Fire Department to inform them of the situation and request implementation of action listed in **Appendix D.**	1. WSR Team would establish systematic communications with the City Council, including the suggested nature and scope of the voluntary measures and strategies. 2. **Appendix A** contains a list of public agencies, large customers and business groups who should be provided status reports on the situation. Specific entities include City of Rainier, Thurston County, State Departments of Health, State and Enterprise Services, interested environmental and community organizations, and large commercial customers. Post updated status reports on the Tenino website. 3. Develop and implement a comprehensive public awareness and education campaign with the goal of keeping customers informed about supply and demand conditions. This campaign will recommend customer actions to significantly reduce demand, reinforce desired customer actions, and remind customers that if goals are not achieved, mandatory restrictions may be necessary.

TABLE 3. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUE

Objectives	Triggers	Actions	Communications
			4. Promote consumption goals for typical households and a percentage reduction goal for commercial customers. 5. Prepare a current list of commercial car washes in Tumwater and Centralia that recycle water. 6. Contact Tenino largest water users and request a percentage reduction. Contact public agencies to inform them of conditions and request their cooperation. 7. Identify customers with large irrigation accounts and promote the use of daily weather information, such as rainfall and reduced evapotranspiration (ET) rates to minimize irrigation use. Provide current ET rates on Tenino's website. 8. Provide water quality information in public information so that if flushing is necessary, the public understands that it is essential for water quality maintenance. 9. Initiate remaining planning and preparation for the Mandatory Stage. 10. Establish regular communication with staff that has regular contact with the public, such as Utility Billing representatives, meter readers, and Water Operations staff. Keep them up to date on conditions, goals, and City Council's actions so they can provide accurate information to our customers.

TABLE 4. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Achieve targeted consumption reduction goals by restricting defined water uses. 2. Ensure that an adequate water supply will be available during the duration of the water shortage to protect public health and safety and to provide sufficient in-stream flows for fish habitat. 3. Minimize the disruption to customers' lives and businesses while meeting target consumption goals. 4. Promote equity among customers by establishing clear restrictions that affect all customers.	1. The current water supply would not be able to meet demand projections. 2. Measures implemented in the Voluntary Stage are not adequately reducing demand. 3. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary compliance. 4. It is evident the level of water use reduction required would not be achieved through voluntary compliance.	1. Continue actions from Advisory and Voluntary Stages, as appropriate. 2. The WSR Team would develop a list of recommended water use restrictions and exemptions from restrictions. 3. The WSR Team would finalize and implement a process for receiving, recording, and responding to reported violations of restrictions. 4. The WSR Team would make recommendations to move to the Mandatory Stage and adopt mandatory restrictions, emergency surcharges, and fees to the City Council for adoption. The WSR Team would recommend the nature, scope, and timing of restrictions. 5. **Appendix C** provides an enforcement checklist the WSR Team would finalize and implement procedures and assess fines where mandatory restrictions are not followed. The WSR Team would review and process all requests for exemptions from mandatory requirements. 6. Initiate planning and preparation for the Emergency Stage.	1. WSR Team will provide periodic reports to the City Council, including the suggested nature and scope of the mandatory restrictions, implementation strategies, and customer response data. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes (**Appendix A** includes a list of appropriate contacts). Specific entities include the City of Rainier, the Tenino School District, Thurston County, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, interested environmental and community organizations, and large commercial customers. Post updated status reports on the Tenino website. 3. Through a media campaign and direct mail communicate: • Scope and nature of mandatory restrictions. • Reasons for imposing the restrictions. • Consumption goals and ways in which to achieve those goals.

TABLE 4. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
			• Additional restrictions that may be imposed if water use reduction goals are not achieved. • Enforcement mechanisms and fines. • Rate surcharges. • Projections for how long restrictions will be in place. 4. In communicating mandatory restrictions to the public, a clear distinction will be made between lawn/turf watering and watering gardens and ornamental plantings. The type and amount of watering will be clearly defined. 5. Any exemptions from water use restrictions will be clearly identified. 6. Contact irrigation customers and inform them that Tenino may shut down their irrigation meters in the event of an immediate water shortage situation. 7. Provide area landscape management and property management companies with water use restriction information. 8. Restrict hydrant usage to essential purposes, including recall of hydrant meters previously issued. This should include contacting each registered hydrant user. Require the use of best management practices (BMPs) to reduce water use, meet operational needs, and provide for dust control.

Objectives	Triggers	Actions	Communications
			9. Post updated status reports on the Tenino website. 10. Continue and enhance communication actions from the Advisory and Voluntary Stages 11. **No exemptions will be allowed for watering new lawn installations**. 12. Evaluate resources and plans for moving into the Emergency Stage. As appropriate, begin preparatory measures.

TABLE 5. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Ensure throughout the water shortage, an adequate water supply exists to protect public health and safety. 2. Sharply reduce water demand. 3. Restrict certain defined water uses in order to meet consumption goals.	1. Measures to reduce water use implemented in the Voluntary and Mandatory Stages have not adequately reduced demand. 2. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary or mandatory compliance.	1. The WSR Team would define the water shortage as an emergency and, through the Mayor, would implement procedures for the full Council to formally declare a Water Shortage Emergency. 2. The WSR Team would develop a list of water use restrictions, prohibitions, exemptions, and surcharge rates for recommendation to the Council for consideration through the Mayor. 3. The WSR Team would increase the frequency of reports to the Mayor and the full Council. Reports would provide detail on the implementation of the Emergency Stage and customer response data. 4. The WSR Team would establish water use reduction goals. Consumption goals may be set in a variety of ways. Determining factors include equity among customers and the utility billing software in use. Single-family residential goals may be set as a standard per house allotment or as a percentage reduction from the previous year's consumption. Consumption goals may be below customers' average winter month use. Commercial, institutional, and multifamily residential customers may be asked to reduce water use by a set percentage of their average consumption during the previous year.	1. Define the problem to the public as an emergency, and institute formal procedures to declare a water emergency. 2. Inform customers of the rate surcharge and how it will affect them. Provide information on an appeal process. 3. Define and communicate exemptions for medical facilities and other public health situations. 4. Consult with and provide status reports to state resource agencies, interest groups and Native American Tribes. Specific entities include the City of Rainier, the Tenino School District, Thurston County, Washington Departments of Health, Enterprise Services, Fish and Wildlife, and Natural Resources; interested environmental and community organizations and large commercial customers. Post updated status reports on Tenino's website.

TABLE 5. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
		5. Adjust or modify utility billing systems to implement any approved surcharges and penalties. 6. Increase enforcement actions in accordance with the applicable ordinances approved by the full Council. 7. Provide training for personnel and deploy additional "Water Watcher" patrols. 8. Water Shortage Response Team to increase meeting frequency to daily status briefings to review the current situation and determine which actions are working and those that need to be improved. Focus on messages that are easy to communicate, implement, and have the potential to sharply reduce demand.	5. Through a media campaign and direct mail communicate to Tenino customers the: • Scope and nature of rationing and curtailments, • Reasons for imposing the curtailments, • Water use reduction goals, • Enforcement mechanisms and fines, • Projections for how long curtailments will be in place, and • Rate surcharges. 6. Clearly identify any exemptions from the water use curtailment. 7. Inform customers about possible pressure reductions and problems this may cause. 8. Provide area landscape firms with water use curtailment information. 9. Post updated status reports on the Tenino website. 10. Continue and enhance communication actions from the Advisory, Voluntary, and Mandatory Stages.

Supply Augmentation Options

There are no other water systems with an intertie to Tenino. The City of Rainier system is five miles away.

In the event of a severe water shortage, the only other source of water would be for Tenino to buy water from the City of Rainier and truck it to Tenino.

Plan Implementation

In order to properly implement this Plan, the City Council must adopt the key policies within it and inform the customers of new requirements including possible rate structure changes and tiered rate increases along with financial penalties for not complying with mandatory water use restrictions.

Appendix F contains health advisory templates to be used in the event of a water outage or severe shortage.

Emergency Declaration

In the event that this Plan must be implemented due to a water shortage, that action constitutes an "Emergency" as defined by the departments of Health and Ecology.

Appendix A

Water Shortage Response Contact List

WATER SHORTAGE RESPONSE CONTACT LIST

A working list of contacts for easy reference should be developed and regularly updated by staff. In the event of a water shortage caused by a drought, the following will be contacted directly. They will be apprised of the situation, and their support and cooperation in reducing demand will be requested.

Other Public Agencies

- City of Rainier
- Thurston County
- Tenino School District
- State Department of General Administration
- State Department of Ecology
- State Department of Health

Large Customers

Staff will develop a contact list based on previous two year's water consumption

Landscape Interests

- WSU/Lewis County Cooperative Extension
- Local nurseries
- Local landscape contractors
- The Irrigation Association
- Washington Association of Landscape Professionals
- Washington State Nursery and Landscape Association

Business Groups

- Thurston County Chamber of Commerce
- Master Builders Association
- Rotary Clubs of Thurston County

Appendix B

Voluntary Customer Water Use Reductions

VOLUNTARY CUSTOMER WATER USE REDUCTIONS

Residential Indoor

- Flush the toilet less often. Each flush uses 1.6 to 7 gallons of water, depending upon the age of the toilet.
- Dishwashers should be run only when there are full loads of dishes. Each load uses 8 to 13 gallons of water, less than by hand washing.
- Wash only full loads of laundry. Each load uses 15 to 40 gallons of water. High-Efficiency washing machines use approximately 30 percent less water than standard models.
- Keep a pitcher of cold drinking water in the refrigerator rather than running the faucet until the water gets cold.
- Take shorter showers. Each minute of showering time uses 2.0 to 5 gallons of water. Try to limit showering time to five minutes.
- Avoid letting the faucet run while shaving, brushing teeth, or washing vegetables.
- While waiting for hot water, use a container to catch wasted tap water for use on plants.

Residential Outdoors

- Wash cars less often. Instead of using a hose, consider a commercial car wash that recycles water.
- Always use a shutoff nozzle when using a hose. Be sure there are no leaks in any hose fittings.

Commercial and Residential Landscape

- Water lawns and gardens only early in the morning or late in the evening to reduce water loss from evaporation.
- Consider letting established lawns go dormant until the shortage is over. Homes that normally water lawns will save from 25 to 50 percent by not watering them.
- Do not water lawns when it is raining. If you have an automatic irrigation system, learn how to change the program that controls your system in order to cut back on irrigation time. Turn off automated irrigation system clocks during rainy spells. Install a rain sensor on automatic irrigation systems that will override the system during rainfall.
- Eliminate outdoor water play, such as running through a sprinkler, plastic water slides, and wading/swimming pools that requires frequent refilling.
- Eliminate all hosing of sidewalks, driveways, and decks. Use a broom instead.
- Water established plants only when necessary, testing the soil moisture levels in the root zone with your fingers. Two to four inches of mulch in your planting beds will help retain moisture.
- Create tree wells around trees to minimize runoff when watering.

Commercial

- Set goals for reduced water use and inform managers and employees. Give businesses ideas for limiting water use and ask them for their ideas.
- Repair all leaks and dripping faucets. Ensure that constantly running toilets are repaired. Urge employees to report leaks.
- Reduce or eliminate routine vehicle cleaning during the shortage. Use a local commercial car wash facility that recycles water.
- Ensure that all hoses are fitted with shutoff nozzles.
- Eliminate all hosing of walkways, parking lots, and loading docks. If washing paved areas is

necessary for public health and safety, pressure washers use substantially less water.

- Postpone routine building washing until after the shortage.
- Post signs informing customers of the nature of the water shortage and ask for cooperation in reducing water use.
- Turn off all non-recirculating fountains. On windy days, when there is significant water loss, turn off all fountains.
- Ask restaurants to deliver water only on request.
- Accelerate restroom upgrades by replacing older toilets with low-flow (1.6-gallon-per-flush) or high-efficiency (1.0 to 1.3 gallon per flush) models.

Appendix C

Mandatory Restrictions

Enforcement Procedural Checklist

_____ Determine fines and/or surcharges to be imposed for mandatory restriction infractions, including whether or not there will be "one fine for all infractions" or whether certain selected water use reduction actions would command a higher fine than others.

_____ Determine the number of warnings before fines or surcharges apply.

_____ Establish a database for tracking violations.

_____ Print self-duplicating "Notice of Violation" forms: one copy for location where violation occurred and one to record violation with billing. Print violations and fines on the Notice of Violation.

_____ Assign and train staff with customer service and communication experience to "Water Watch".

_____ Establish a procedure for "Water Watchers" to record warnings and penalties on customer accounts.

_____ Establish a "hotline" for customers to report violations. To help avoid frivolous complaints, recorded message should note that only complains with name and address of complainant will be pursued.

_____ Provide all field and customer service staff members with fact sheets and question and answer sheets. Provide briefings on restrictions and enforcement procedures. Train field staff to tag obvious violations.

Appendix D

Tenino Fire Department Shortage Response

Tenino Fire Department Shortage Response

The Fire Department uses water in a variety of ways. These uses include:

- Fire flow pressure testing
- Vehicle washing
- Washing of drill pad
- Training (evolution/wet training)
- Irrigation

The following explains how these water uses might be affected during the four stages of drought response.

Advisory Stage

At this stage, we would be communicating a possible water supply shortage to our customers. It may make sense to schedule any line flushing or wet training for earlier in the season in case restrictions are in place.

Voluntary Stage

In this stage, we would be asking our water customers to reduce their water use by a certain amount (generally about 5-10 percent). The Fire Department may change their water use at this stage in the following ways:

- Vehicle washing: Currently, several of the vehicles are washed or at least rinsed daily. Washing is more frequent during the wet season when vehicles are muddy. During this stage, vehicles would only be washed if they have mud on them but could continue to be rinsed each evening.
- Drill pad washing: The pad is now washed twice during the summer. If the voluntary stage occurs during summer months, a sweeper from the Public Works Department would be brought in to sweep the pad instead of washing it.
- Fire flow testing: Testing could still occur at this stage.
- Training: Scheduled training could still occur at this stage. However, the need for training should be weighed carefully against water use.
- Irrigation: Irrigation of landscape should be slightly reduced at this stage.

Mandatory Stage

At this stage, we would acknowledge a serious water supply shortage. Water use restriction would be enforced with fines. The Fire Department may alter their water use in the following way at this stage:

- Vehicle washing: As in the Voluntary Stage, vehicles would only be washed or rinsed if there is mud on them.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Fire flow testing: Testing should be postponed during this stage.
- Training: Scheduled training should not occur at this stage. If this stage continues for more than

one month, limited training exercises would resume.

- Irrigation: Irrigation of landscape should be reduced at this stage.

Emergency Stage

At this stage, the utility would be faced with a critical water supply shortage. The goal would be to provide enough water to provide for our customers' health and safety during the duration of the emergency. No outdoor irrigation would be allowed for any of our customers. At this stage, the Fire Department would need to change their water uses in the following ways:

- Vehicle washing: Vehicles would only be washed if there is mud on them. No rinsing could occur. Vehicles that can fit in commercial washes must be washed only at facilities that recycle water.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Fire flow testing: Testing may not occur during this stage.
- Training: Scheduled training may not occur at this stage.
- Irrigation: Irrigation of landscape may not occur at this stage.

Appendix E

Tenino Parks Department Alternative Irrigation Plan

Tenino Parks Department Alternative Irrigation Plan

This plan will provide for reductions in irrigation water usage that meet thresholds provided for each of the stages of the Water Shortage Response Plan. The plan reduces water use at City owned parks, streetscapes and other facilities by shifting irrigation schedules and prioritizing City facilities based on the age of landscaping, watering needs and public use.

In Stage 2, the Voluntary Stage, water use consumed through non-exempt meters will be reduced by 5 to 10%. Stage 3, the Mandatory Stage, provides for water use reduction of 10 to 20%. In Stage 4, the Emergency Stage provides for water use reduction of 20 to 30%, which may also be required for ballfields/playfields.

Appendix F

Health Advisory Templates

APPENDIX F – Health Advisory Templates

DRINKING WATER WARNING

The Tenino Water System, ID#09-0501, located in Thurston County may be contaminated because of a water outage and loss of pressure in the water system.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a rolling boil for one minute, and let it cool before using. Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until *further notice*. Boiling kills bacteria and other organisms in the water.

When a loss of pressure occurs, it is possible that contamination from the environment or from human or animal waste may be drawn into the water system. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. <u>These symptoms are not only caused by organisms in drinking water</u>. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care provider.

What happened?

The following is being done to correct the problem:

We have consulted with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water. We anticipate resolving the problem by _____.

For more information, please contact _____ at ( )_____-_____ or at
(owner or operator) (phone number)
_____ (address).

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

This notice is sent to you by _____ Water System on ___/___/____

::

Drinking Water Warning:
BOIL WATER – RESTRICT WATER USE

The Tenino Water System, ID#09-0501, located in Thurston County is having difficulty maintaining water pressure within the distribution system because of the reason(s) checked below:

- ❑ The well and/or booster pumps have failed.
- ❑ There is a major leak or break in the distribution system.
- ❑ The source is failing (i.e. declining water table/low stream flow).
- ❑ The system was without power for a significant period of time and our tank water levels are low.
- ❑ Hot weather has created a demand greater than the system facilities can satisfy.
- ❑ Other:

The situation is being addressed and we will notify you when it is resolved. In the meantime, please follow all of the steps indicated below:

- ❑ Conserve Water by:
  - Water outside before 10 AM or after 7 PM, and avoid doing laundry or taking showers between 5 PM and 7 PM.
- ❑ Limit outside watering to every other day and no watering on Mondays.
- ❑ Curtail all use of water outside except spot watering of plants in critical need.
- ❑ Bring water to a rolling boil for one minute. Boiled water should be used for drinking, making ice, food preparation, washing dishes, and brushing teeth.
- ❑ Other:

The state Drinking Water Regulations require that the water system be designed and operated to maintain 30 pounds of water pressure throughout the distribution system under normal circumstances. When a loss of pressure occurs, it is possible for contamination from the environment, such as human or animal waste, to be drawn into the water system. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms of illness. This may pose a special health risk for infants, young children, the elderly, and people with severely compromised immune systems. Please note that these symptoms may also be the result of events totally unrelated to drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about disease causing organisms in drinking water from their health care provider.

What happened?

The following is being done to correct the problem:

We will be keeping you informed of our progress and it may be necessary to conduct a community meeting to discuss whether additional facilities will be required to correct the problem. For more information, please contact _____ at ( )_____-_____.
(owner or operator) (phone number)

Please share this notice with all the other people who use this water system, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

Water Outages

Water outages may allow contaminants to enter the pipes.
The water, when it returns, may be temporarily unsafe to drink.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.

Knowing the following information can help.

Before a water outage

- Store one gallon of water per person per day.
- Store at least a three-day supply of water per person.
- Collect the water from a safe supply.
- Thoroughly washed plastic containers such as soft drink bottles are best. You can also purchase food-grade plastic buckets or drums.
- If you are storing water in buckets or drums, put a couple of drops of chlorine bleach (unscented) into each bucket or drum.
- Seal water containers tightly, label with date, and store in a cool, dark place.
- Replace water every six months.
- Never reuse a container that contained toxic materials such as pesticides, solvents, chemicals, oil or antifreeze.

During a water outage

- Remove any garden hoses from taps or spigots.
- Listen to your hot water heater for gurgling or boiling noises. If it is making noise, turn it off until water service is restored.
- If water service is out, but you still have water in your pipes: Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes and food preparation until further notice.
- Conserve water and try to prevent your taps from running dry.

After a water outage

- Until you hear from your water provider that they have sampled the water and it is safe to drink:
- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.**
- Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes and food preparation until further notice.
- Let water boil for one minute and allow it to cool before using it.
- If you are experiencing illness symptoms, it is recommended that you see your health care provider.

In the event of a water outage, call [Phone#], even if the power is out. After hours, follow the voice mail instructions and someone will be paged. We will make every effort to keep you informed, however, in the event of a region-wide event, we may not be able to return all calls.

[Contact Info]

Appendix H

Financial Program

2019 BUDGET POSITION

ty Of Tenino

Time: 14:25:16 Date: 02/16/2023

401 Water Fund — 01/01/2019 To: 12/31/2019

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 80 00 06	Beginning Balance	1,047,415.00	1,047,414.79	0.21	0.0%
308 Beginning Balances		1,047,415.00	1,047,414.79	0.21	0.0%
340 Charges For Services					
343 40 00 00	Water Services	231,971.00	244,443.92	(12,472.92)	0.0%
343 40 00 02	Water Account Activation Fee	3,403.00	3,080.00	323.00	9.5%
343 40 03 00	Excise Tax	11,527.00	12,218.04	(691.04)	0.0%
343 40 04 00	Hydrant Permits	103.00	235.00	(132.00)	0.0%
359 00 00 04	Late Charge Penalty - Water	15,000.00	18,170.46	(3,170.46)	0.0%
340 Charges For Services		262,004.00	278,147.42	(16,143.42)	0.0%
360 Misc Revenues					
361 11 45 24	Interest	2,006.00	4,603.72	(2,597.72)	0.0%
360 Misc Revenues		2,006.00	4,603.72	(2,597.72)	0.0%
Fund Revenues:		**1,311,425.00**	**1,330,165.93**	**(18,740.93)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	1,284.00	3,347.53	(2,063.53)	0.0%
534 80 10 00	Salaries & Wages	91,803.00	94,615.42	(2,812.42)	0.0%
534 80 20 00	Benefits - Taxes	13,770.00	13,639.76	130.24	0.9%
534 80 21 00	Benefits - Health Care	11,016.00	12,765.38	(1,749.38)	0.0%
534 80 22 00	Benefits - Retirement	2,754.00	9,908.47	(7,154.47)	0.0%
534 80 23 00	Safety Clothing	1,200.00	896.96	303.04	25.3%
534 80 31 00	Supplies	7,000.00	5,621.77	1,378.23	19.7%
534 80 31 01	Corrosion Control Supplies	3,000.00	1,735.03	1,264.97	42.2%
534 80 33 00	Small Tools & Equipment	1,500.00	1,548.06	(48.06)	0.0%
534 80 35 00	Fuel, Unspecified	500.00	876.12	(376.12)	0.0%
534 80 35 01	Fuel, Backhoe	100.00	595.64	(495.64)	0.0%
534 80 35 03	Fuel, Chevy 3/4t	2,600.00	3,199.83	(599.83)	0.0%
534 80 35 04	Fuel, Dump Truck	100.00	155.46	(55.46)	0.0%
534 80 35 13	Fuel, Kumatsu	100.00	141.09	(41.09)	0.0%
534 80 35 15	Fuel, Vactor Truck	100.00	521.30	(421.30)	0.0%
534 80 40 01	State Water Excise Tax	13,000.00	13,578.18	(578.18)	0.0%
534 80 42 00	Telephone (Land Line)	2,000.00	2,384.42	(384.42)	0.0%
534 80 42 01	Internet Connectivity	900.00	1,149.80	(249.80)	0.0%
534 80 42 03	IT Service Provider	391.00	702.08	(311.08)	0.0%
534 80 42 05	PRA Compliance Software	249.00	249.00	0.00	0.0%
534 80 42 06	City Web Site	109.00	0.00	109.00	100.0%
534 80 42 07	Web Bill Pay Service Provider	420.00	17.50	402.50	95.8%
534 80 42 08	Postage	2,750.00	3,478.95	(728.95)	0.0%
534 80 42 09	Telephone (Cellular)	1,500.00	1,869.21	(369.21)	0.0%
534 80 42 10	Office Productivity Software	216.00	419.17	(203.17)	0.0%
534 80 45 03	Professional Testing Service	2,000.00	3,273.40	(1,273.40)	0.0%
534 80 45 04	Repair & Maintenance	15,000.00	26,894.61	(11,894.61)	0.0%
534 80 45 05	Computer Software Maintenance	15,000.00	1,612.06	13,387.94	89.3%
534 80 46 00	Insurance	21,250.00	21,250.00	0.00	0
534 80 47 00	Utilities	13,750.00	12,053.04	1,696.96	12

2019 BUDGET POSITION

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401 Water Fund — 01/01/2019 To: 12/31/2019

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 48 01	Education / Training	1,000.00	484.00	516.00	51.6%
534 80 48 02	Meals/Lodging/Travel	1,500.00	400.80	1,099.20	73.3%
534 80 49 00	Misc Dues, Subs & Tuition	2,000.00	1,727.60	272.40	13.6%
534 80 50 00	Lien Fees	170.00	0.00	170.00	100.0%
534 Water Utilities		230,032.00	241,111.64	(11,079.64)	0.0%
597 Interfund Transfers					
597 00 00 04	Transfer To Wat Cap Imp Fund (#402)	0.00	586,585.00	(586,585.00)	0.0%
597 Interfund Transfers		0.00	586,585.00	(586,585.00)	0.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**230,032.00**	**827,696.64**	**(597,664.64)**	**0.0%**
Fund Excess/(Deficit):		**1,081,393.00**	**502,469.29**		

2019 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2019 To: 12/31/2019

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 80 00 07	Beginning Balance	638,625.00	638,625.68	(0.68)	0.0%
308 Beginning Balances		638,625.00	638,625.68	(0.68)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/cap. Improve	60,733.00	38,632.63	22,100.37	36.4%
343 40 02 00	Tapping Fees	78,750.00	2,500.00	76,250.00	96.8%
343 40 06 00	Meter Installation	500.00	0.00	500.00	100.0%
340 Charges For Services		139,983.00	41,132.63	98,850.37	70.6%
360 Misc Revenues					
361 11 45 25	Investment Interest	523.00	2,794.31	(2,271.31)	0.0%
360 Misc Revenues		523.00	2,794.31	(2,271.31)	0.0%
397 Interfund Transfers					
397 00 00 04	Transfer From #401	0.00	586,585.00	(586,585.00)	0.0%
397 Interfund Transfers		0.00	586,585.00	(586,585.00)	0.0%
Fund Revenues:		**779,131.00**	**1,269,137.62**	**(490,006.62)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,546.00	6,534.10	11.90	0.2%
591 Debt Repayment		6,546.00	6,534.10	11.90	0.2%
594 Capital Expenditures					
534 20 41 00	Water Comp Plan Update	7,000.00	1,553.00	5,447.00	77.8%
594 34 61 00	Water Rights	40,000.00	0.00	40,000.00	100.0%
594 34 61 01	Third Well	30,000.00	0.00	30,000.00	100.0%
594 34 63 01	Well #1	10,000.00	5,911.20	4,088.80	40.9%
594 34 63 02	Fire Hydrants	2,500.00	0.00	2,500.00	100.0%
594 34 63 09	Water Main Replacement	10,000.00	0.00	10,000.00	100.0%
594 34 64 00	Computer Purchase	750.00	0.00	750.00	100.0%
594 34 64 05	Radio Read Meter Reading	2,000.00	3,540.37	(1,540.37)	0.0%
594 34 65 00	Water System Repairs	7,500.00	1,677.80	5,822.20	77.6%
594 34 66 01	Water Valve Exercise Tool	5,000.00	3,941.47	1,058.53	21.2%
594 34 66 02	Mower Head	6,500.00	7,159.17	(659.17)	0.0%
595 50 60 02	PW Shop Extension	15,000.00	5,042.24	9,957.76	66.4%
594 Capital Expenditures		136,250.00	28,825.25	107,424.75	78.8%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%

2019 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2019 To: 12/31/2019

Expenditures	Amt Budgeted	Expenditures	Remaining	
Fund Expenditures:	**142,796.00**	**35,359.35**	**107,436.65**	**75.2%**
Fund Excess/(Deficit):	**636,335.00**	**1,233,778.27**		

2019 BUDGET POSITION TOTALS

Fund	Revenue Budgeted	Received		Expense Budgeted	Spent	
401 Water Fund	1,311,425.00	1,330,165.93	0.0%	230,032.00	827,696.64	0%
402 Water Capital Imp Fund	779,131.00	1,269,137.62	0.0%	142,796.00	35,359.35	75%
	2,090,556.00	2,599,303.55	0.0%	372,828.00	863,055.99	0.0%

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2020 BUDGET POSITION

401 Water Fund 01/01/2020 To: 12/31/2020

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 07	Beginning Balance	500,000.00	502,469.29	(2,469.29)	0.0%
308 Beginning Balances		500,000.00	502,469.29	(2,469.29)	0.0%
340 Charges For Services					
343 40 00 00	Water Services	255,141.00	244,733.17	10,407.83	4.1%
343 40 00 02	Water Account Activation Fee	2,047.00	3,240.00	(1,193.00)	0.0%
343 40 03 00	Excise Tax	12,028.00	12,136.71	(108.71)	0.0%
343 40 04 00	Hydrant Permits	100.00	885.61	(785.61)	0.0%
359 00 00 04	Late Charge Penalty - Water	19,785.00	4,249.64	15,535.36	78.5%
340 Charges For Services		289,101.00	265,245.13	23,855.87	8.3%
360 Misc Revenues					
361 11 45 24	Interest	2,716.00	2,257.86	458.14	16.9%
360 Misc Revenues		2,716.00	2,257.86	458.14	16.9%
Fund Revenues:		**791,817.00**	**769,972.28**	**21,844.72**	**2.8%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	0.00	0.00	0.00	100.0%
534 80 10 00	Salaries & Wages	64,783.00	106,037.53	(41,254.53)	0.0%
534 80 20 00	Benefits - Taxes	12,471.00	12,377.17	93.83	0.8%
534 80 21 00	Benefits - Health Care	11,453.00	16,898.17	(5,445.17)	0.0%
534 80 22 00	Benefits - Retirement	2,267.00	14,888.92	(12,621.92)	0.0%
534 80 23 00	Safety Clothing	1,200.00	547.48	652.52	54.4%
534 80 31 00	Supplies	7,000.00	6,844.07	155.93	2.2%
534 80 31 01	Corrosion Control Supplies	3,000.00	2,225.86	774.14	25.8%
534 80 33 00	Small Tools & Equipment	1,500.00	1,012.94	487.06	32.5%
534 80 35 00	Fuel, Unspecified	907.00	976.83	(69.83)	0.0%
534 80 35 01	Fuel, Backhoe	25.00	70.45	(45.45)	0.0%
534 80 35 03	Fuel, Chevy 3/4t	650.00	1,355.39	(705.39)	0.0%
534 80 35 04	Fuel, Dump Truck	25.00	43.42	(18.42)	0.0%
534 80 35 13	Fuel, Kumatsu	25.00	74.39	(49.39)	0.0%
534 80 35 15	Fuel, Vactor Truck	25.00	550.90	(525.90)	0.0%
534 80 42 00	Telephone (Land Line)	1,250.00	2,876.23	(1,626.23)	0.0%
534 80 42 03	MNS Service Provider	754.00	1,393.29	(639.29)	0.0%
534 80 42 05	PRA Compliance Software	290.00	249.00	41.00	14.1%
534 80 42 06	City Web Site	136.00	115.38	20.62	15.2%
534 80 42 08	Postage	2,905.00	4,621.72	(1,716.72)	0.0%
534 80 42 09	Telephone (Cellular)	1,585.00	1,604.74	(19.74)	0.0%
534 80 42 10	Office Productivity Software	215.00	926.87	(711.87)	0.0%
534 80 42 13	BIAS Financial Software	863.00	500.00	363.00	42.1%
534 80 45 03	Professional Testing Service	2,083.00	1,900.00	183.00	8.8%
534 80 45 04	Repair & Maintenance	15,000.00	5,963.06	9,036.94	60.2%
534 80 45 05	Computer Software Maintenance	3,750.00	1,500.00	2,250.00	60.0%
534 80 45 17	Maintenance - Vactor Truck	0.00	5,597.34	(5,597.34)	0.0%
534 80 46 00	Insurance	13,529.00	13,529.00	0.00	0.0%
534 80 47 00	Utilities	1,200.00	13,020.22	(11,820.22)	0
534 80 48 01	Education / Training	1,000.00	872.00	128.00	12

2020 BUDGET POSITION

401 Water Fund 01/01/2020 To: 12/31/2020

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 48 02	Meals/Lodging/Travel	1,500.00	0.00	1,500.00	100.0%
534 80 49 00	Misc Dues, Subs & Tuition	2,242.00	580.20	1,661.80	74.1%
534 80 53 00	State Water Excise Tax	13,000.00	16,051.77	(3,051.77)	0.0%
534 Water Utilities		166,633.00	235,204.34	(68,571.34)	0.0%
597 Interfund Transfers					
597 00 00 15	Transfer To #402	287,447.43	287,447.43	0.00	0.0%
597 Interfund Transfers		287,447.43	287,447.43	0.00	0.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**454,080.43**	**522,651.77**	**(68,571.34)**	**0.0%**
Fund Excess/(Deficit):		**337,736.57**	**247,320.51**		

2020 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2020 To: 12/31/2020

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 08	Beginning Balance	608,000.00	1,233,778.27	(625,778.27)	0.0%
308 Beginning Balances		608,000.00	1,233,778.27	(625,778.27)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/cap. Improve	38,188.00	39,863.35	(1,675.35)	0.0%
343 40 02 00	Tapping Fees	7,500.00	70,000.00	(62,500.00)	0.0%
343 40 06 00	Meter Installation	0.00	0.00	0.00	100.0%
340 Charges For Services		45,688.00	109,863.35	(64,175.35)	0.0%
360 Misc Revenues					
361 11 45 25	Investment Interest	1,251.00	1,460.37	(209.37)	0.0%
360 Misc Revenues		1,251.00	1,460.37	(209.37)	0.0%
397 Interfund Transfers					
397 00 00 15	Transfer From #401	287,447.43	287,447.43	0.00	0.0%
397 Interfund Transfers		287,447.43	287,447.43	0.00	0.0%
Fund Revenues:		**942,386.43**	**1,632,549.42**	**(690,162.99)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,545.00	6,686.39	(141.39)	0.0%
591 Debt Repayment		6,545.00	6,686.39	(141.39)	0.0%
594 Capital Expenditures					
594 34 43 00	Water Comp Plan Update	6,425.00	0.00	6,425.00	100.0%
594 34 45 03	Resevoir Cleaning	7,000.00	0.00	7,000.00	100.0%
594 34 61 00	Water Rights	10,000.00	0.00	10,000.00	100.0%
594 34 61 01	Third Well	7,500.00	0.00	7,500.00	100.0%
594 34 62 01	Emergency Response Vehicle	20,000.00	84,684.88	(64,684.88)	0.0%
594 34 63 01	Well #1	2,500.00	7,270.81	(4,770.81)	0.0%
594 34 63 02	Fire Hydrants	706.00	0.00	706.00	100.0%
594 34 63 09	Water Main Replacement	2,500.00	0.00	2,500.00	100.0%
594 34 64 05	Radio Read Meter Reading	2,770.00	103,620.59	(100,850.59)	0.0%
594 34 65 00	Water System Repairs	7,500.00	5,575.59	1,924.41	25.7%
595 50 60 02	PW Shop Extension	0.00	5,419.74	(5,419.74)	0.0%
594 Capital Expenditures		66,901.00	206,571.61	(139,670.61)	0.0%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**73,446.00**	**213,258.00**	**(139,812.00)**	**0**

2020 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2020 To: 12/31/2020

Fund Excess/(Deficit):	**868,940.43**	**1,419,291.42**

2020 BUDGET POSITION TOTALS

Fund	Revenue Budgeted	Received		Expense Budgeted	Spent	
401 Water Fund	791,817.00	769,972.28	2.8%	454,080.43	522,651.77	0%
402 Water Capital Imp Fund	942,386.43	1,632,549.42	0.0%	73,446.00	213,258.00	0%
	1,734,203.43	2,402,521.70	0.0%	527,526.43	735,909.77	0.0%

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2021 BUDGET POSITION

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401 Water Fund — 01/01/2021 To: 12/31/2021

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 07	Beginning Balance	0.00	247,320.51	(247,320.51)	0.0%
308 91 00 07	Beginning Balance	250,000.00	0.00	250,000.00	100.0%
308 Beginning Balances		250,000.00	247,320.51	2,679.49	1.1%
340 Charges For Services					
343 40 00 00	Water Services	235,579.00	236,191.82	(612.82)	0.0%
343 40 00 02	Water Account Activation Fee	2,362.00	3,480.00	(1,118.00)	0.0%
343 40 03 00	Excise Tax	11,724.00	12,097.51	(373.51)	0.0%
343 40 04 00	Hydrant Permits	231.00	152.49	78.51	34.0%
359 00 00 04	Late Charge Penalty - Water	27,163.00	602.52	26,560.48	97.8%
340 Charges For Services		277,059.00	252,524.34	24,534.66	8.9%
360 Misc Revenues					
361 11 45 24	Interest	2,500.00	351.73	2,148.27	85.9%
360 Misc Revenues		2,500.00	351.73	2,148.27	85.9%
Fund Revenues:		**529,559.00**	**500,196.58**	**29,362.42**	**5.5%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	0.00	0.00	0.00	100.0%
534 80 10 00	Salaries & Wages	63,353.00	66,689.46	(3,336.46)	0.0%
534 80 20 00	Benefits - Taxes	6,643.00	5,827.10	815.90	12.3%
534 80 21 00	Benefits - Health Care	12,894.00	2,775.48	10,118.52	78.5%
534 80 22 00	Benefits - Retirement	7,978.00	4,947.28	3,030.72	38.0%
534 80 23 00	Safety Clothing	1,124.00	1,887.46	(763.46)	0.0%
534 80 31 00	Supplies	5,424.00	3,133.17	2,290.83	42.2%
534 80 31 01	Corrosion Control Supplies	2,439.00	1,440.35	998.65	40.9%
534 80 33 00	Small Tools & Equipment	610.00	1,947.59	(1,337.59)	0.0%
534 80 35 00	Fuel, Unspecified	1,150.00	1,454.79	(304.79)	0.0%
534 80 35 01	Fuel, Backhoe	124.00	415.20	(291.20)	0.0%
534 80 35 03	Fuel, Chevy 3/4t	1,000.00	1,542.25	(542.25)	0.0%
534 80 35 04	Fuel, Dump Truck	90.00	0.00	90.00	100.0%
534 80 35 13	Fuel, Kumatsu	83.00	62.26	20.74	25.0%
534 80 35 15	Fuel, Vactor Truck	273.00	471.01	(198.01)	0.0%
534 80 42 00	Telephone (Land Line)	4,306.00	2,836.18	1,469.82	34.1%
534 80 42 03	MNS Service Provider	1,779.00	1,433.80	345.20	19.4%
534 80 42 05	PRA Compliance Software	249.00	249.00	0.00	0.0%
534 80 42 06	City Web Site	125.00	121.23	3.77	3.0%
534 80 42 08	Postage	3,648.00	1,855.29	1,792.71	49.1%
534 80 42 09	Telephone (Cellular)	1,688.00	1,390.90	297.10	17.6%
534 80 42 10	Office Productivity Software	0.00	187.41	(187.41)	0.0%
534 80 42 13	BIAS Financial Software	1,988.48	1,813.48	175.00	8.8%
534 80 45 03	Professional Testing Service	2,435.00	1,839.00	596.00	24.5%
534 80 45 04	Repair & Maintenance	15,000.00	13,963.02	1,036.98	6.9%
534 80 45 05	Computer Software Maintenance	1,500.00	0.00	1,500.00	100.0%
534 80 45 17	Maintenance - Vactor Truck	0.00	0.00	0.00	100.0%
534 80 46 00	Insurance	5,828.00	6,036.62	(208.62)	0
534 80 47 00	Utilities	13,079.00	13,322.17	(243.17)	0

2021 BUDGET POSITION

401 Water Fund 01/01/2021 To: 12/31/2021

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 48 01	Education / Training	1,000.00	820.00	180.00	18.0%
534 80 48 02	Meals/Lodging/Travel	500.00	0.00	500.00	100.0%
534 80 49 00	Misc Dues, Subs & Tuition	2,228.00	2,147.20	80.80	3.6%
534 80 53 00	State Water Excise Tax	13,168.00	17,200.84	(4,032.84)	0.0%
534 Water Utilities		171,706.48	157,809.54	13,896.94	8.1%
597 Interfund Transfers					
597 00 00 15	Transfer To #402	0.00	0.00	0.00	100.0%
597 00 00 49	Transfer To Water Capital Improvement	100,000.00	0.00	100,000.00	100.0%
597 Interfund Transfers		100,000.00	0.00	100,000.00	100.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
508 91 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**271,706.48**	**157,809.54**	**113,896.94**	**41.9%**
Fund Excess/(Deficit):		**257,852.52**	**342,387.04**		

2021 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2021 To: 12/31/2021

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 08	Beginning Balance	0.00	1,419,291.42	(1,419,291.42)	0.0%
308 91 00 08	Beginning Balance	886,392.00	0.00	886,392.00	100.0%
308 Beginning Balances		886,392.00	1,419,291.42	(532,899.42)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/cap. Improve	38,542.00	39,681.24	(1,139.24)	0.0%
343 40 02 00	Tapping Fees	8,333.00	15,000.00	(6,667.00)	0.0%
343 40 06 00	Meter Installation	0.00	0.00	0.00	100.0%
340 Charges For Services		46,875.00	54,681.24	(7,806.24)	0.0%
360 Misc Revenues					
361 11 45 25	Investment Interest	1,301.00	214.72	1,086.28	83.5%
360 Misc Revenues		1,301.00	214.72	1,086.28	83.5%
397 Interfund Transfers					
397 00 00 15	Transfer From #401	0.00	0.00	0.00	100.0%
397 00 00 49	Transfer From Water Fund	100,000.00	0.00	100,000.00	100.0%
397 Interfund Transfers		100,000.00	0.00	100,000.00	100.0%
Fund Revenues:		**1,034,568.00**	**1,474,187.38**	**(439,619.38)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,545.00	6,519.23	25.77	0.4%
591 Debt Repayment		6,545.00	6,519.23	25.77	0.4%
594 Capital Expenditures					
594 34 43 00	Water Comp Plan Update	6,425.00	6,346.50	78.50	1.2%
594 34 45 03	Resevoir Cleaning	7,000.00	0.00	7,000.00	100.0%
594 34 61 00	Water Rights	10,000.00	0.00	10,000.00	100.0%
594 34 61 01	Third Well	7,500.00	0.00	7,500.00	100.0%
594 34 62 01	Emergency Response Vehicle	40,000.00	(88.25)	40,088.25	100.2%
594 34 63 01	Well #1	2,500.00	2,500.00	0.00	0.0%
594 34 63 02	Fire Hydrants	516.00	0.00	516.00	100.0%
594 34 63 09	Water Main Replacement	15,000.00	4,223.73	10,776.27	71.8%
594 34 64 05	Radio Read Meter Reading	2,770.00	1,847.40	922.60	33.3%
594 34 64 06	Meter Read Tower	163,000.00	0.00	163,000.00	100.0%
594 34 65 00	Water System Repairs	6,157.00	6,818.00	(661.00)	0.0%
595 50 60 02	PW Shop Extension	0.00	0.00	0.00	100.0%
594 Capital Expenditures		260,868.00	21,647.38	239,220.62	91.7%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100
508 91 00 06	Ending Balance	0.00	0.00	0.00	100

2021 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2021 To: 12/31/2021

Expenditures	Amt Budgeted	Expenditures	Remaining	
999 Ending Balance				
999 Ending Balance	0.00	0.00	0.00	100.0%
Fund Expenditures:	**267,413.00**	**28,166.61**	**239,246.39**	**89.5%**
Fund Excess/(Deficit):	**767,155.00**	**1,446,020.77**		

2021 BUDGET POSITION TOTALS

Fund	Revenue Budgeted	Received		Expense Budgeted	Spent	
401 Water Fund	529,559.00	500,196.58	5.5%	271,706.48	157,809.54	42%
402 Water Capital Imp Fund	1,034,568.00	1,474,187.38	0.0%	267,413.00	28,166.61	89%
	1,564,127.00	1,974,383.96	0.0%	539,119.48	185,976.15	65.5%

7.

2022 BUDGET POSITION

401 Water Fund 01/01/2022 To: 12/31/2022

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 07	Beginning Balance	0.00	0.00	0.00	100.0%
308 91 00 07	Beginning Balance	0.00	342,387.04	(342,387.04)	0.0%
308 Beginning Balances		0.00	342,387.04	(342,387.04)	0.0%
340 Charges For Services					
343 40 00 00	Water Services	242,647.00	250,687.57	(8,040.57)	0.0%
343 40 00 02	Water Account Activation Fee	3,000.00	3,120.00	(120.00)	0.0%
343 40 03 00	Excise Tax	11,724.00	12,605.68	(881.68)	0.0%
343 40 04 00	Hydrant Permits	231.00	93.22	137.78	59.6%
359 00 00 04	Late Charge Penalty - Water	27,163.00	11,918.97	15,244.03	56.1%
340 Charges For Services		284,765.00	278,425.44	6,339.56	2.2%
360 Misc Revenues					
361 11 45 24	Interest	2,500.00	0.00	2,500.00	100.0%
360 Misc Revenues		2,500.00	0.00	2,500.00	100.0%
Fund Revenues:		**287,265.00**	**620,812.48**	**(333,547.48)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 00 40 00	Audit Costs	4,963.00	0.00	4,963.00	100.0%
534 80 10 00	Salaries & Wages	79,953.00	77,434.09	2,518.91	3.2%
534 80 20 00	Benefits - Taxes	7,042.00	7,439.89	(397.89)	0.0%
534 80 21 00	Benefits - Health Care	14,655.00	13,680.98	974.02	6.6%
534 80 22 00	Benefits - Retirement	8,196.00	7,838.99	357.01	4.4%
534 80 22 01	Benefits - Retirement (DCP)	476.00	0.00	476.00	100.0%
534 80 23 00	Safety Clothing	1,200.00	1,242.45	(42.45)	0.0%
534 80 31 00	Supplies	5,500.00	5,609.47	(109.47)	0.0%
534 80 31 01	Corrosion Control Supplies	2,500.00	2,910.13	(410.13)	0.0%
534 80 33 00	Small Tools & Equipment	1,500.00	1,122.67	377.33	25.2%
534 80 35 00	Fuel	3,000.00	4,830.51	(1,830.51)	0.0%
534 80 35 01	Fuel - Diesel	2,000.00	2,004.64	(4.64)	0.0%
534 80 41 03	Water Utilities - Professional Services	30,265.00	22,146.25	8,118.75	26.8%
534 80 42 00	Telephone (Land Line)	4,500.00	3,018.33	1,481.67	32.9%
534 80 42 03	MNS Service Provider	1,779.00	3,059.51	(1,280.51)	0.0%
534 80 42 05	PRA Compliance Software	249.00	273.90	(24.90)	0.0%
534 80 42 06	City Web Site	125.00	121.23	3.77	3.0%
534 80 42 08	Postage	3,648.00	2,451.67	1,196.33	32.8%
534 80 42 09	Telephone (Cellular)	1,688.00	1,394.32	293.68	17.4%
534 80 42 10	Office Productivity Software	190.00	109.70	80.30	42.3%
534 80 42 13	BIAS Financial Software	2,200.00	2,001.22	198.78	9.0%
534 80 45 03	Professional Testing Service	2,500.00	3,052.96	(552.96)	0.0%
534 80 45 04	Repair & Maintenance	15,000.00	7,899.26	7,100.74	47.3%
534 80 45 05	Computer Software Maintenance	1,500.00	0.00	1,500.00	100.0%
534 80 45 17	Maintenance - Vactor Truck	0.00	338.30	(338.30)	0.0%
534 80 46 00	Insurance	6,370.00	5,856.00	514.00	8.1%
534 80 47 00	Utilities	13,079.00	17,234.89	(4,155.89)	0.0%
534 80 48 01	Education / Training	1,000.00	260.00	740.00	74
534 80 48 02	Meals/Lodging/Travel	500.00	0.00	500.00	100

2022 BUDGET POSITION

401 Water Fund 01/01/2022 To: 12/31/2022

Expenditures		Amt Budgeted	Expenditures	Remaining	
534 Water Utilities					
534 80 49 00	Misc Dues, Subs & Tuition	2,500.00	1,555.20	944.80	37.8%
534 80 53 00	State Water Excise Tax	13,300.00	14,884.89	(1,584.89)	0.0%
534 Water Utilities		231,378.00	209,771.45	21,606.55	9.3%
597 Interfund Transfers					
597 00 00 15	Transfer To #402	0.00	0.00	0.00	100.0%
597 00 00 49	Transfer To Water Capital Improvement	0.00	0.00	0.00	100.0%
597 Interfund Transfers		0.00	0.00	0.00	100.0%
999 Ending Balance					
508 80 00 05	Ending Balance	0.00	0.00	0.00	100.0%
508 91 00 05	Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance		0.00	0.00	0.00	100.0%
Fund Expenditures:		**231,378.00**	**209,771.45**	**21,606.55**	**9.3%**
Fund Excess/(Deficit):		**55,887.00**	**411,041.03**		

2022 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2022 To: 12/31/2022

Revenues		Amt Budgeted	Revenues	Remaining	
308 Beginning Balances					
308 51 00 08	Beginning Balance	1,227,227.98	1,446,020.77	(218,792.79)	0.0%
308 91 00 08	Beginning Balance	0.00	0.00	0.00	100.0%
308 Beginning Balances		1,227,227.98	1,446,020.77	(218,792.79)	0.0%
340 Charges For Services					
343 40 01 00	Water Surcharge/Cap. Improve	38,542.00	56,960.07	(18,418.07)	0.0%
343 40 02 00	Tapping Fees	10,000.00	20,000.00	(10,000.00)	0.0%
343 40 06 00	Meter Installation	0.00	0.00	0.00	100.0%
340 Charges For Services		48,542.00	76,960.07	(28,418.07)	0.0%
360 Misc Revenues					
361 11 45 25	Investment Interest	1,301.00	0.00	1,301.00	100.0%
360 Misc Revenues		1,301.00	0.00	1,301.00	100.0%
397 Interfund Transfers					
397 00 00 15	Transfer From #401	0.00	0.00	0.00	100.0%
397 00 00 49	Transfer From Water Fund	0.00	0.00	0.00	100.0%
397 Interfund Transfers		0.00	0.00	0.00	100.0%
Fund Revenues:		**1,277,070.98**	**1,522,980.84**	**(245,909.86)**	**0.0%**

Expenditures		Amt Budgeted	Expenditures	Remaining	
591 Debt Repayment					
591 34 70 00	DWSRF Loan Repayment	6,545.00	6,519.23	25.77	0.4%
591 Debt Repayment		6,545.00	6,519.23	25.77	0.4%
594 Capital Expenditures					
594 34 43 00	Water Comp Plan Update	6,425.00	5,257.50	1,167.50	18.2%
594 34 45 03	Reservoir Cleaning	7,000.00	5,967.00	1,033.00	14.8%
594 34 61 00	Water Rights	10,000.00	0.00	10,000.00	100.0%
594 34 61 01	Third Well	7,500.00	0.00	7,500.00	100.0%
594 34 62 01	Emergency Response Vehicle	40,000.00	38,164.33	1,835.67	4.6%
594 34 63 01	Well #1	2,500.00	2,105.00	395.00	15.8%
594 34 63 02	Fire Hydrants	516.00	339.21	176.79	34.3%
594 34 63 09	Water Main Replacement	219,292.79	375,591.62	(156,298.83)	0.0%
594 34 64 05	Radio Read Meter Reading	10,000.00	728.35	9,271.65	92.7%
594 34 64 06	Meter Read Tower	0.00	0.00	0.00	100.0%
594 34 65 00	Water System Repairs	10,000.00	55,471.66	(45,471.66)	0.0%
594 50 60 02	PW Shop Maintenance	2,500.00	1,305.61	1,194.39	47.8%
595 50 60 02	PW Shop Extension	0.00	0.00	0.00	100.0%
594 Capital Expenditures		315,733.79	484,930.28	(169,196.49)	0.0%
999 Ending Balance					
508 80 00 06	Ending Balance	0.00	0.00	0.00	100

2022 BUDGET POSITION

402 Water Capital Imp Fund 01/01/2022 To: 12/31/2022

Expenditures	Amt Budgeted	Expenditures	Remaining	
999 Ending Balance				
508 91 00 06 Ending Balance	0.00	0.00	0.00	100.0%
999 Ending Balance	0.00	0.00	0.00	100.0%
Fund Expenditures:	**322,278.79**	**491,449.51**	**(169,170.72)**	**0.0%**
Fund Excess/(Deficit):	**954,792.19**	**1,031,531.33**		

7.

RESOLUTION 2019-02

A RESOLUTION OF THE CITY OF TENINO, WASHINGTON AMENDING THE 2019 CONSOLIDATED FEE SCHEDULE

WHEREAS, Ordinance 870, establishing the City of Tenino Consolidated Fee Schedule was duly adopted the City Council on January 24, 2017; and

WHEREAS, Resolution 2018-11, adopted on December 11, 2018, established the Consolidated Fee Schedule for the Fiscal Year ending December 31, 2019; and

WHEREAS, Ordinance 900 requires a fee to attend the Tenino-Toledo Reserve Academy and the Chief of Police has set the amount for tuition; and

WHEREAS, The City Council has authorized a new "No Child Left Inside" Quarry Pool Pass program and established a fee therefore.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TENINO, WASHINGTON, that the City of Tenino 2019 Consolidated Fee Schedule is amended as shown below:

Section 1. Use of all City facilities or permits shall be granted only through the application process established for the type of use being requested. All applications shall be submitted to the City Clerk's Office for processing.

Section 2. Application forms shall be available at City Hall, or online on the City's Web Page, which can be accessed at: www.CityOfTenino.us. Downloaded applications forms must still be submitted to the City Clerk's Office for processing. The Clerk shall accept the forms in person, via the U.S. Mail, or via e-mail.

Section 3. The amended 2019 General Schedule of Fees and Charges is set forth below:

	FEES	DEPOSIT
ANIMAL LICENSES		
New License	$ 15.00	
New License – senior citizen	$ 12.00	
Renewal – Spayed or Neutered	$ 8.00	
Renewal – Non-altered	$12.00	
Renewal – Senior Citizen	$ 5.00	
Replacement Tag	$ 5.00	
Documented Rescued Animal	1st License free	
BALLFIELD FEES		

Tournaments (Deposit non-refundable if Canceled less than 72 hours prior to event)	$ 25.00 per field, per day	$ 50.00 per field
Tournament Maintenance	$ 15.00 per game	
League Practices (Adults Only – Maximum 2 Practices per week, 10 weeks)	$ 50.00 per league	
Other than Leagues (All Day)	$ 60.00 per day	$ 50.00
Other than Leagues (Half Day)	$ 30.00 per ½ day	$ 50.00
Youth Sports	$ 5.00 per player, per season	
Field Maintenance/Capital Improvement	$250.00 per league per season	
BUSINESS LICENSES		
New Business	$ 55.00	
Renewal	$ 45.00	
Late Renewal Penalty	$ 75.00	
CONCESSION STAND RENTAL		
All Day	$100.00	$100.00
Half Day (4 Hours)	$50.00	$100.00
Youth Seasonal Activities	$50.00/month	
Commercial Vehicle (Food Vendor – Business License Required)	$50.00/month	
Concession at Pool (Business License Required_		
Non-profit	10% of gross sales $25/day cap	
For Profit	10% of gross sales $50/day cap	
COUNCIL CHAMBERS RENTAL		
2 Hour Minimum (No alcoholic beverages)	$ 25.00 per hour	$ 50.00
MISCELLANEOUS		
Photocopies	$ 0.15 each	
Copy onto CD or disc (includes cost of CD or disc)	$ 5.00	
Notary Service (1st signature)	$ 10.00	
Each additional signature	$ 1.50	
Credit Card Convenience Fee	2% of transaction amount	
NSF Check Fee	$ 40.00	
Copy of Police Reports	$ 7.50 per report	
PARKING		
Designated Parking Stalls		
Hourly (First 15 minutes free)	$ 2.00	
Permit (Daily)	$ 12.00	
Permit (Weekly)	$ 48.00	
Permit (Monthly)	$ 150.00	
Permit (Yearly)	$1600.00	

PARK FEES		
Premium Numbered Sites	$ 15.00/night	
1 unit per site (1-8 people)		
Unit = tent/RV/camping structure		
Open Camp Sites	$ 10.00/unit/night	
Camping Fees (Single entity / unit / night)	$ 8.00	
Groups		
Areas 1, 2, 4, 5		
1-50 people	$ 50.00	$ 75.00
51-75 people	$100.00	$ 75.00
76-125 people	$150.00	$ 75.00
Area 3 (Concession Stand Not Included)		
1-50 people	$ 50.00	$ 75.00
51-75 people	$100.00	$ 75.00
76-125 people	$150.00	$ 75.00
Area 6 (Concession Stand Not Included)		
1-50 people	$ 50.00	$ 75.00
51-75 people	$100.00	$ 75.00
76-125 people	$150.00	$ 75.00
Designated Rentable Spaces & Shelters		
Shelters 2 & 3, Quarry House Back Porch		
All Day (8:00 a.m. to dusk)	$ 60.00	$ 75.00
½ Day (8 a.m. – 2 p.m. or 2:30 p.m. to dusk)	$ 35.00	$ 75.00
PARADES & SPECIAL EVENTS		
Permit Fee	$100.00	$500.00
Plus cost for any necessary police, public works, or other City personnel or services required.	Per FY Salary Schedule	
QUARRY HOUSE RENTAL		
All Day (8:00 a.m. – 2:00 p.m. the next day)	$130.00	$ 100.00
½ Day (8:00 am – 4:00 pm or 5:00 pm – 1:00 pm the next day	$100.00	$ 100.00
Meetings (2-hour minimum)	$ 25.00/hour	$ 75.00
Non-Profit Organizations	$ 30.00 utility fee	
Senior Lunch Program	$115.00/month	
QUARRY POOL FEES	**Inside TSD**	**Outside TSD**
Per Person / Per Day	$ 3.00	$ 5.00
Per Season / Per Family (2 adults and 3 children)	$125.00	$200.00
Early Bird (purchased prior to June 1st)	$100.00	$175.00
No Child Left Inside Program Pass	$ 75.00	$150.00
Day Pass Punch Card (pay for nine, get one free)	$ 27.00	$ 45.00
Corporate Sponsor Day Use Fee	$1000.00	$1000.00
Non-Profit Sponsor Day Use Fee	$800.00	$800.00
SCOTCH BROOM PULLER RENTAL	$ 15.00/day	$ 75.00
STREET USE PERMITS		

Surface Improvements	$120.00	
Underground Improvements in Roadway	$180.00	
Underground Improvements Outside Roadway	$ 75.00	
Miscellaneous	$ 50.00	
Street Cleaning Deposit		$200.00
Street Closure Deposit		$200.00
Bond Required	125% of improvements	
TENINO-TOLEDO RESERVE ACADEMY		
Tuition	$750.00	
UTILITIES		
Establishment of Service		
New Account Application Fee	$ 40.00	
Service		
Connection/Disconnection		
Turn water service on or off	$ 40.00	
Tapping Fee	$2,500.00 plus cost of materials	
Water Service per month (up to 500 cf)		
¾" meter (up to 500 cf)	$ 12.65	
1" meter (up to 500 cf)	$ 17.63	
1-1/2" meter (up to 500 cf)	$ 29.58	
2" meter (up to 500 cf)	$ 44.84	
3" meter (up to 500 cf)	$ 93.04	
4" meter (up to 500 cf)	$138.38	
Senior Citizen (in city only, up to 300 cf)	$ 7.59	
Outside City Limits (up to 300 cf)	$ 18.95	
Quarry Pool Rate	$ 9.11	
Vacancy Rate	$ 3.16	
Overage		
Within city per additional 100 cf	$ 3.22	
Outside city per additional 100 cf	$ 4.56	
Senior (in city only) per add 100 cf	$ 0.81	
Hydrant		
Permit Fee	$ 75.00	$250.00
Use and rent of meter	$ 35.00	
First 300 cubic feet	$ 18.22	
Each additional 100 cubic feet	$ 3.10	
Municipal Rate		
Base Rate (first 500 cubic feet)	$ 8.93	
Each additional 100 cubic feet	$ 0.77	
Sewer Service		
Per ERU	$125.66	
Per ERU w/Grinder Credit	$122.38	
Per ERU w/Grinder Charge	$128.95	
Vacancy Rate	$ 71.03	
Connection/Disconnection		

Facility Charge	$7,000.00 plus cost of materials	
Remove or Install Grinder Pump	$300.00	
Late Fee	$ 25.00	
Interest	2% of outstanding balance	
Lien Recordation	$ 36.00	
Lien Removal	$ 36.00	

COMMUNITY DEVELOPMENT – PLANNING & BUILDING		
Application, Permit, or Request Type*†	**Fee**	**Initial Engineering Deposit§**
Physical Development Permits		
Building Permit	$40 + Building Fee**	$0
Design Standards Review	$264	$0
Sign Permit	$33	$0
Site Development Permit	$198	$450
Shoreline Substantial Development Permit	$660	$450
Use Permits		
Administrative Use Permit	$396	$450
Home Occupation	$198	$300
Conditional Use Permit – including shoreline conditional use permits	$1,320	$450
Public Facilities Use Permit	$1,320	$450
Development Option/Subdivision Permits		
Binding Site Plan – Preliminary	$1,980	$1,800
Binding Site Plan – Final	$990	$1,500
Boundary Line Adjustment	$396	$450
Lot Combination/Segregation	$132	$0
Density Transfer Program	$1,320	$900
Short Plat – Preliminary	$1,320	$900
Short Plat – Final	$330	$1,500
Subdivision – Preliminary	$1,980	$1,800
Subdivision – Final	$990	$1,500
Environmental Review‡		
Critical Area Report Review	$528	$450
SEPA Threshold Determination	$528	$450
Waiver - Critical Area Report or Shoreline Substantial Development Permit	$198	$450
Environmental Impact Statement Review	Staff/ Consultant Costs	Staff/ Consultant Costs
Mitigation Plan Review	$528	$450
Amendments to the LDRs/Comprehensive Plan		
Rezone	$1,980	$0
Text Amendment		
Initial Application Fee	$0	$0
Accepted on City Council Docket	$1,980	$1,800
Master Planned Development	$1,980	$1,800
Comprehensive Plan Amendment		

COMMUNITY DEVELOPMENT – PLANNING & BUILDING		
Application, Permit, or Request Type*†	**Fee**	**Initial Engineering Deposit§**
Initial Application Fee	$0	$0
Accepted on City Council Docket	$1,980	$1,800
Relief from the LDRs		
Administrative Variance	$660	$450
Appeal of Administrative or Planning Commission Decision§§	$660	$0
Extension Request	$198	$0
Reasonable Use Determination	$1,320	$450
Variance – including shoreline variances	$1,320	$450
Interpretations of the LDRs		
Administrative Interpretation	$660	$450
Zoning Decision	Hourly Rate	$0
Other Requests		
Annexation	$1,320	$900
Notification Posting	$33	$0
Pre-Application Conference	$264	$450
Right-of-Way Vacation	$990	$1,500
City Council Reconsideration	$264	$0

*A review deposit may apply in addition to the application fee.

†**County Reviews.** Applications may also be required to be reviewed by Thurston County. Please check with the individual County department for possible review/application fees.

§**Engineering Deposit.** For applications requiring an initial engineering deposit, projects may be evaluated on a case-by-case basis to determine if the deposit is necessary. All Engineering review fees are required to be paid, including fees in excess of the initial deposit. Any of the deposit remaining after completion of the review will be returned to the applicant.

Building Permits. Building fees are based on current Thurston County Building Fee Guide and fee tables. See http://www.co.thurston.wa.us/permitting/fees/fees-building-explain.html for more information.

‡**Wetland/Stream Reviews.** Applications requiring a review of wetlands and/or streams may require an additional $990 review deposit.

§§**Appeals.** The application fee for appealing an Administrative or Planning Commission decision shall be refunded if appellant prevails.

PASSED at a regular meeting of the Tenino City Council this 9th day of April, 2019.

Wayne Fournier, Mayor

ATTEST:

John C. Millard, City Clerk-Treasurer

APPROVED AS TO FORM:

Richard L. Hughes, City Attorney

7.

City of Tenino Water System Plan
Planning Level Opinion of Probable Cost
Storage Improvement
200,000 Gallon Reinforced Concrete Water Reservoir

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$89,000	$89,000
2	Erosion Control	1	LS	$9,000	$9,000
3	Clearing and Grubbing	1	LS	$8,500	$8,500
4	Shoring	1	LS	$8,000	$8,000
5	Earthwork	1	LS	$110,000	$110,000
6	Crushed Surfacing Base Course (CSBC)	300	TN	$40	$12,000
7	Crushed Surfacing Top Course (CSTC)	150	TN	$40	$6,000
8	Import Foundation Material	300	TN	$40	$12,000
9	Riprap	40	TN	$85	$3,400
10	Chain Link Fencing	400	LF	$40	$16,000
11	Topsoil and Hydroseed	1,000	SY	$30	$30,000
12	Retaining Walls	800	SF	$100	$80,000
13	200,000 Gallon Reinforced Concrete Water Reservoir (Including Foundation)	1	LS	$450,000	$450,000
14	Storm Drainage Structures, Piping, Fittings, and Accessories	1	LS	$20,000	$20,000
15	Potable Water Piping, Fittings, Valves, and Accessories	1	LS	$45,000	$45,000
16	Electrical and Control	1	LS	$85,000	$85,000
				Subtotal	$984,000
				Sales Tax @ 8.1%	$80,000
				Subtotal	$1,064,000
				Contingency @ 20%	$213,000
				Subtotal	$1,277,000
				Engineering, Permitting, and Administrative Costs @ 30%	$383,000
				Total Estimated Project Cost	$1,660,000

Notes and Assumptions
- April 2023 - ENR Seattle Construction Cost Index - 15,031.28
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000

7.

Amortization Schedule for Contract Num: 99-65199-046

Contractor Name: Tenino City of
Project Name: Water System Corrosion Control Program
Loan Information: Loan# 1

Loan Amount: $199,410.00
Interest Rate/Type: 0.0000 % (None)
Amortized Loan Fee: 0.0000 %
Payment Frequency: Annual - 360 Days
Periods Principal Deferred: 2
Draw Based Loan: Yes

Loan Type: Amortizing Loan
Loan Term: 31 Years
Amortization Term: 30 Years
Paid Off:
Loan Source: DWSRF
Terminated Date:

Loan Start Date: 10/1/1999
Accrual Start Date:
First Payment Date: 10/1/2000
Last Payment Date: 10/1/2030
Distressed Community: N/A
Subordination Allowed: N/A

Amortization Schedule

Pmt #	Pmt Due Date	Principal	Accrued Interest	Interest	Payment Due	Loan Balance	Invoice Date	Inv#	Paid Date	Paid Amt	Extra Principal Paid Date	Extra Principal Paid Amt
1	10/1/2000	$0.00	$0.00	$0.00	$0.00	$0.00	10/01/2000	65794				
2	10/1/2001	$0.00	$0.00	$0.00	$0.00	$170,497.80	10/01/2001	65795				
3	10/1/2002	$6,547.79	$0.00	$0.00	$6,547.79	$183,260.04	05/30/2002	65796	09/27/2002	$6,547.79		
4	10/1/2003	$6,545.10	$0.00	$0.00	$6,545.10	$176,714.94	05/30/2003	65797	09/12/2003	$6,545.10		
5	10/1/2004	$6,545.10	$0.00	$0.00	$6,545.10	$170,169.84	05/30/2004	65798	10/28/2004	$6,545.10		
6	10/1/2005	$6,545.10	$0.00	$0.00	$6,545.10	$163,624.74	05/30/2005	65799	10/06/2005	$6,545.10		
7	10/1/2006	$6,545.10	$0.00	$0.00	$6,545.10	$157,079.64	05/30/2006	65800	09/20/2006	$6,545.10		
8	10/1/2007	$6,542.40	$0.00	$0.00	$6,542.40	$150,537.24	10/01/2007	65801	10/01/2007	$6,542.40		
9	10/1/2008	$6,545.09	$0.00	$0.00	$6,545.09	$143,992.15	10/01/2008	65802	10/02/2008	$6,545.09		
10	10/1/2009	$6,545.10	$0.00	$0.00	$6,545.10	$137,447.05	10/01/2009	65803	10/01/2009	$6,545.10		
11	10/1/2010	$6,545.10	$0.00	$0.00	$6,545.10	$130,901.95	10/01/2010	65804	10/01/2010	$6,545.10		
12	10/1/2011	$6,545.10	$0.00	$0.00	$6,545.10	$124,356.85	08/31/2011	65825	09/29/2011	$6,545.10		
13	10/1/2012	$6,545.10	$0.00	$0.00	$6,545.10	$117,811.75	09/04/2012	65826	09/13/2012	$6,545.10		
14	10/1/2013	$6,545.10	$0.00	$0.00	$6,545.10	$111,266.65	08/28/2013	65827	10/01/2013	$6,545.10		
15	10/1/2014	$6,545.10	$0.00	$0.00	$6,545.10	$104,721.55	08/28/2014	65828	10/21/2014	$6,545.10		
16	10/1/2015	$6,545.10	$0.00	$0.00	$6,545.10	$98,176.45	08/31/2015	65829	09/25/2015	$6,545.10		
17	10/1/2016	$6,545.10	$0.00	$0.00	$6,545.10	$91,631.35	09/01/2016	65830	10/05/2016	$6,545.10		
18	10/1/2017	$6,545.10	$0.00	$0.00	$6,545.10	$85,086.25	09/01/2017	65831	09/15/2017	$6,545.10		
19	10/1/2018	$6,545.10	$0.00	$0.00	$6,545.10	$78,541.15	11/01/2018	65199	11/13/2018	$6,673.43		
20	10/1/2019	$6,545.10	$0.00	$0.00	$6,545.10	$71,996.05	09/01/2019	1093	09/10/2019	$6,534.10		
21	10/1/2020	$6,545.10	$0.00	$0.00	$6,545.10	$65,450.95	09/01/2020	1702	09/08/2020	$6,686.39		
22	10/1/2021	$6,545.09	$0.00	$0.00	$6,545.09	$58,905.86	09/01/2021	2337	09/21/2021	$6,519.23		

Pmt	Pmt Due Date	Principal	Accrued Interest	Interest	Payment Due	Loan Balance	Invoice Date	Inv#	Paid Date	Paid Amt	Extra Principal Paid Date	Extra Principal Paid Amt
23	10/1/2022	$6,545.10	$0.00	$0.00	$6,545.10	$52,360.76	09/01/2022	2815	09/13/2022	$6,519.23		
24	10/1/2023	$6,545.10	$0.00	$0.00	$6,545.10	$45,815.66	09/01/2023	28680	09/12/2023	$6,519.23		
25	10/1/2024	$6,545.09	$0.00	$0.00	$6,545.09	$39,270.57						
26	10/1/2025	$6,545.10	$0.00	$0.00	$6,545.10	$32,725.47						
27	10/1/2026	$6,545.09	$0.00	$0.00	$6,545.09	$26,180.38						
28	10/1/2027	$6,545.10	$0.00	$0.00	$6,545.10	$19,635.28						
29	10/1/2028	$6,545.09	$0.00	$0.00	$6,545.09	$13,090.19						
30	10/1/2029	$6,545.10	$0.00	$0.00	$6,545.10	$6,545.09						
31	10/1/2030	$6,545.09	$0.00	$0.00	$6,545.09	$0.00						
	Totals:	**$189,807.83**	**$0.00**	**$0.00**	**$189,807.83**					$144173.19		