COUNCIL REGULAR SESSION

Wednesday, May 04, 2022 at 7:00 PM

COUNCIL MEMBERS:

Mayor Rick Scholl
Council President Doug Morten
Councilor Patrick Birkle
Councilor Stephen R. Topaz
Councilor Jessica Chilton

LOCATION & CONTACT:

HYBRID: Council Chambers & Zoom (details below)
Website | www.sthelensoregon.gov
Email | kpayne@sthelensoregon.gov
Phone | 503-397-6272
Fax | 503-397-4016

AGENDA

CALL REGULAR SESSION TO ORDER

PLEDGE OF ALLEGIANCE

VISITOR COMMENTS – *Limited to five (5) minutes per speaker*

DELIBERATIONS

1. Vacation of the entire 7th Street Street Right-of-Way of the South St. Helens Addition, lying Northeast of the Kaster Road Right-of-Way

ORDINANCES – *Final Reading*

2. **Ordinance No. 3282:** An Ordinance to Amend the City of St. Helens Zoning District Map to Add a Planned Development Overlay Zone for Certain Property Generally Located at the Northern Termini of N. 8th, 9th, and 10th Streets North of Deer Island Road

RESOLUTIONS

3. **Resolution No. 1950:** A Resolution Adopting the St. Helens Water Master Plan and Water Management and Conservation Plan
4. **Resolution No. 1951:** A Resolution Determining that a Nuisance Exists Upon Property Located at 394 S. 12th Street within the City of St. Helens and Directing that Notice to Abate the Nuisance be Posted on Said Premises
5. **Resolution No. 1952:** A Resolution to Amend the City of St. Helens Personnel Policies and Procedures Handbook (Resolution No. 1913) Regarding Payroll Policies
6. **Resolution No. 1953:** A Resolution of the City of St. Helens City Council Adopting a Strategic Workplan for 2022-2024

APPROVE AND/OR AUTHORIZE FOR SIGNATURE

7. Amendment No. 2 to Contract with JH Kelly, LLC for Columbia Pacific Food Bank Renovation Project
8. Independent Contractor Agreement with E2C Corp. for Events Management

CONSENT AGENDA FOR APPROVAL

9. - Council Work Session, Executive Session, Public Hearing, and Regular Session Minutes dated April 6, 2022
   - Council Executive Session Summary Minutes dated April 18, 2022
   - Council Work Session and Regular Session Minutes dated April 20, 2022
10. Declare Surplus Property - Library Items
11. Accounts Payable Bill Lists

WORK SESSION ACTION ITEMS

COUNCIL MEMBER REPORTS

MAYOR SCHOLL REPORTS

OTHER BUSINESS

ADJOURN

VIRTUAL MEETING DETAILS

Join: https://us02web.zoom.us/j/89324658403?pwd=YWhZZEJIVHpIS0hYNkEyTWJjanVYQT09

Meeting ID: 893 2465 8403

Passcode: 244895

Dial: 669-900-9128

The meeting location is accessible to persons with disabilities. A request for an interpreter for the hearing impaired or for other accommodations for persons with disabilities should be made at least 48 hours before the meeting to City Hall at 503-397-6272.

Be a part of the vision and get involved…volunteer for a City Board or Commission! For more information or for an application, go to www.sthelensoregon.gov or call 503-366-8217.

City of St. Helens
ORDINANCE NO. 3282

AN ORDINANCE TO AMEND THE CITY OF ST. HELENS ZONING DISTRICT MAP TO ADD A PLANNED DEVELOPMENT OVERLAY ZONE FOR CERTAIN PROPERTY GENERALLY LOCATED AT THE NORTHERN TERMINI OF N. 8TH, 9TH, AND 10TH STREETS NORTH OF DEER ISLAND ROAD

WHEREAS, applicants have requested to amend the City of St. Helens Zoning District Map for property described in **Exhibit "A"** and depicted in **Exhibit "B"** attached hereto and made part of this reference to add a Planned Development Overlay Zone; and

WHEREAS, the St. Helens Planning Commission did hold a duly noticed public hearing and did conclude to recommend such a change to the City Council; and

WHEREAS, the City Council did hold a duly noticed public hearing and did find that after due consideration of all the evidence in the record compared to the criteria, that they agreed with the application; and

WHEREAS, the Council has considered the findings of compliance with criteria and law applicable to the proposal.

NOW, THEREFORE, THE CITY OF ST. HELENS DOES ORDAIN AS FOLLOWS:

Section 1. The above recitations are true and correct and are incorporated herein by reference.

Section 2. The City of St. Helens Zoning District Map is amended to add a Planned Development Overlay Zone for the property described herein.

Section 3. In support of the aforementioned Zone District Map Amendment, the Council hereby adopts the Findings of Fact and Conclusions of Law, attached hereto as **Exhibit "C"** and made part of this reference.

Section 4. No development allowed under this Planned Development Overlay Zone shall preclude manufactured homes. This includes development standards and other factors such as use restrictions (e.g., CCRs) the developer may place on themselves.

Section 5. The effective date of this Ordinance shall be 30 days after approval, in accordance with the City Charter and other applicable laws.

Read the first time:	April 20, 2022
Read the second time:	May 4, 2022

APPROVED AND ADOPTED this 4th day of May 2022 by the following vote:

Ayes:

Nays:

Rick Scholl, Mayor

ATTEST:

Kathy Payne, City Recorder

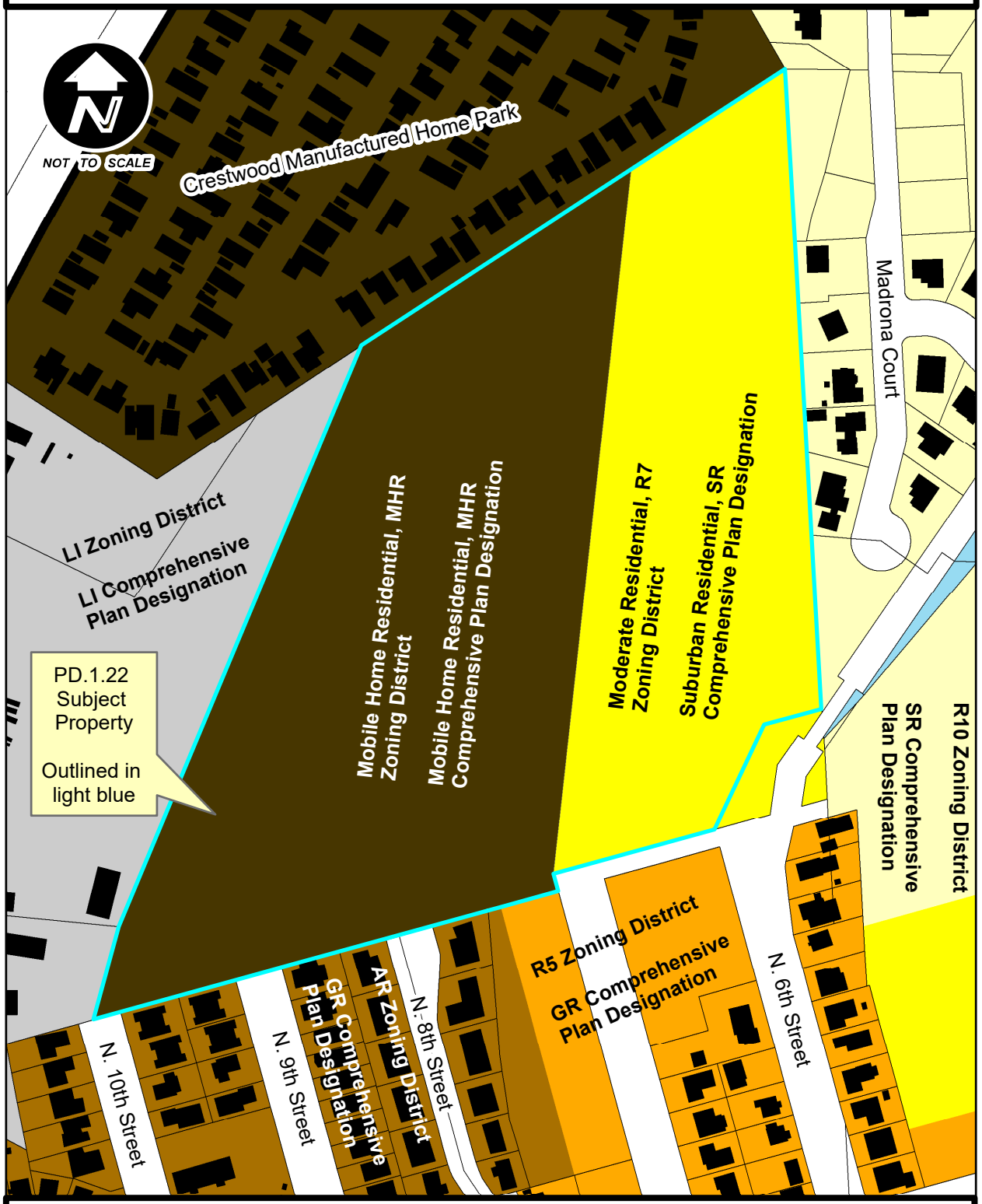
EXHIBIT "A"
Legal Description

Parcel 2: A tract of land in the East half of Section 33, Township 5 North, Range 1 West, Willamette Meridian, Columbia County, Oregon, and being a portion of that tract described in Deed to Frank J. Thompson et ux in Book 205, Page 298, Deed Records of Columbia County, Oregon, described as follows:

Beginning at the Northeast corner of Lot 21, Block 3, First Addition to Rose Hill; thence Northerly 330 feet, more or less, to a point on the Easterly line of that tract described in Deed to Columbia County in Book 67, Page 492, which bears 850 feet Southwesterly from the Northeasterly corner thereof; thence Northeasterly along said Easterly line, 850 feet to said Northeast corner; thence North 55°21'50" East, along the Northerly line of said Thompson tract, 423.44 feet to a point; thence Southwesterly, 1130 feet, more or less to the Northeast corner of Lot 22, Block 2, First Addition to Rose Hill; thence South 73°02'37" West along the Northerly line of said Subdivision, 280 feet to the true point of beginning.

EXHIBIT "B"

Planned Development (Overlay Zone) PD.1.22



Zoning (color and text) and Comprehensive Plan Designations (text only).
January 2022

CITY OF ST. HELENS PLANNING DEPARTMENT
FINDINGS OF FACT AND CONCLUSIONS OF LAW
Planned Developed (overlay zone) PD.1.22

APPLICANT: North 8th Street LLC (Shawn Clark)
OWNER: same as applicant

ZONING: Mobile Home Residential, MHR and Moderate Residential, R7
LOCATION: At the current northern termini of N. 8th and 9th Streets lying north of Deer Island Road; 5N1W-33-00700
PROPOSAL: Planned Development (Zoning Overlay)

SITE INFORMATION / BACKGROUND

The subject property is approximately 23.68 acres in size and is irregular in topography and contains multiple wetlands and drainages. Two of the wetlands, D-10 and D-11 located on the east side of the site are Type 1 significant per Chapter 17.40 SHMC. There are several other wetlands as well.

The site is undeveloped. The area may have been used as a quarry in the early years of St. Helens but has been idle and wooded for decades. Much of the site was logged around early 2019. Staff has been discussing development of the site with the applicant since around 2016. The 2019 logging effort and some gravel fill, both resulted in unintended impacts to wetlands and the applicant has been working with the Division of State Lands, US Army Corps of Engineers and other agencies since the logging effort. This resulted in changes to the applicant's proposed plans, which was a substantial reduction of overall buildable area. As a result, the applicant is seeking a Planned Development overlay zone to achieve a reasonable density compared to the gross land size, on the western portion of the site.

Associated files: Subdivision Preliminary Plat SUB.1.22, Subdivision Variance V.1.22, and Sensitive Lands Permits SL.1.22, SL.2.22, and SL.3.22.

PUBLIC HEARING & NOTICE

Public hearing before the Planning Commission for *recommendation to the City Council*: March 8, 2022. Public hearing before the City Council: April 6, 2022.

Notice of this proposal was sent to the Oregon Department of Land Conservation and Development on February 1, 2022 through their PAPA Online Submittal website.

Notice of this proposal was sent to surrounding property owners within 300 feet of the subject property(ies) on February 10, 2022 via first class mail. Notice was sent to agencies by mail or e-mail on the same date.

Notice was published on February 16, 2022 in The Chronicle newspaper.

APPLICATION COMPLETENESS

This application was originally received on October 12, 2021. Staff identified missing information or other aspects that rendered the application incomplete and notified the applicant of the issue pursuant to SHMC 17.24.050 on November 8, 2022. The applicant provided revised or new information for this zoning amendment and the application was deemed complete on January 12, 2022.

The 120-day rule (ORS 227.178) for final action for this land use decision is not applicable per ORS 227.178(7).

APPLICABLE CRITERIA, ANALYSIS & FINDINGS

SHMC 17.148.060 – Planned Development Allowed and Disallowed

(1) A planned development shall not be allowed on any lands, with less than a two-acre minimum, shown on the comprehensive plan map as "developing areas".

(2) A planned development shall not be allowed in residential zones located in areas designated as "established areas" on the comprehensive plan map, except the commission may approve a planned development within an "established area" where the commission finds:

(a) Development of the land in accordance with the provisions of the "established area" would:

(i) Result in an inefficient use of land;

(ii) Result in removing significant natural features; or

(iii) Result in a change of the character of the area surrounding a significant historic feature or building;

(b) The planned development approach is the most feasible method of developing the area; and

(c) The site is of a size and shape that the compatibility provisions of Chapter 17.56 SHMC can be met.

Discussion: If the subject property is considered "developing," SHMC 17.148.060(1) is the section to review for the planned development (PD) overlay consideration. If the subject property is considered "established," SHMC 17.148.060(2) is the section to review for the PD overlay consideration.

Finding(s): Consistent with SHMC 17.112.020 and OAR 660-008-0005, the property is considered "established" because it is subject to natural resource protection measures determined under Statewide Planning Goals 5 and has some slopes 25 percent or greater. Thus, the criteria of SHMC 17.148.060(2) applies:

(a) Subdivision of the site would result in an inefficient use of land. There are several wetlands throughout the site (see DSL Wetland Delineation WD # 2019-0281). Standard lot size and dimension combined with the encumbrances of these wetlands would make achieving a reasonable density compared to the total size of the lot nearly impossible without significant wetland impacts.

(b) Because of the wetlands as noted, staff recommended the applicant pursue the Planned Development overlay zone as the most feasible method of developing the area.

(c) A development proposal submitted with the PD overlay application included a density calculation showing a potential density in excess of 100 lots. However, the actual proposal, even after utilizing the flexibility of the PD overlay is 66 lots. Though, the actual developed under the PD overlay zoned could change, this provides sufficient evidence for this criterion.

SHMC 17.08.040 – Quasi-judicial amendments and standards.

(1) Quasi-Judicial Amendments and Standards for Making Decisions.

(a) A recommendation or a decision to approve, approve with conditions, or to deny an application for a quasi-judicial amendment shall be based on all of the following standards:

(i) The applicable comprehensive plan policies and map designation; and that the change will not adversely affect the health, safety, and welfare of the community;

(ii) The applicable Oregon Statewide Planning Goals adopted under ORS Chapter 197, until acknowledgment of the comprehensive plan and ordinances;

(iii) The standards applicable of any provision of this code or other applicable implementing ordinance; and

(iv) A proposed change to the St. Helens zoning district map that constitutes a spot zoning is prohibited. A proposed change to the St. Helens comprehensive plan map that facilitates a spot zoning is prohibited.

(b) Consideration may also be given to:

(i) Any applicable evidence of change in the neighborhood or community or a mistake or inconsistency in the comprehensive plan or zoning map as it relates to the property which is the subject of the development application.

Discussion: A single property is involved, and thus by definition (Chapter 17.16) the quasi-judicial zone change process applies.

* * *

Finding(s): (1)(a)(i). Most of the property (the west approximate two-thirds) has a Comprehensive Plan designation of Mobile Home Residential. This is one of two properties with such designation within city limits. Mobile or manufactured homes are a type of needed housing per ORS 197.303.

In order to meet the intent of this comprehensive plan designation it is important that any development under this Planned Development overlay not preclude manufactured homes. For example, in a residential lot subdivision, the lot size, dimension and standards (e.g., yard/setback requirements) need to be such that manufactured homes, consistent with city standards, could be included.

St. Helens' standards for manufactured homes on individual lot per SHMC 17.60.030, includes requiring them to be multisectional and enclose a space of not less than 1,000 square feet. Average widths and lengths for double-wide manufactured homes are around 26 feet and 56 feet respectively. Common widths are 20, 24, 28 and 32 feet and common lengths are 42 and 60 feet. Building envelope would need to accommodate a reasonable array of multisectional (double wide at a minimum) manufactured homes.

The applicant acknowledges the Mobile Home Residential Comprehensive Plan designation. And discusses how the proposal will not preclude manufactured homes.

The smallest lot size proposed is 3,690 square feet. Considering that the Planned Development overlay does not (and cannot by law) allow a change in how much lot area buildings and structures can occupy (i.e., 40%) on a lot, that standard is one to consider for the preclusion of manufactured homes. 40% of 3,690 is 1,476. This can accommodate the minimum size, 1,000 square feet, for manufactured homes in St. Helens,

The minimum lot width proposed is 29 feet. The minimum side yard proposed is 4 feet. 29 minus 8 is 21. 20' is a common width for manufactured homes and can be accommodated.

The minimum lot depth proposed is 85 feet. Subtracting a common length (42 feet) from that leaves 45 feet, and plenty to accommodate a front and rear yard.

In addition, all proposed lots (still subject to review separate from this Planned Development zoning map amendment) exceed some of the minimum standards proposed.

The concept provided by the application does not preclude manufactured homes for the subject property from a proposed standards point of view. However, since the actual development under the PD overlay zoned could change, this approval must be based on the development allowed under this PD overlay not precluding manufactured homes.

* * *

(1)(a)(ii). The city has an adopted comprehensive plan and ordinances approved under the state land use program. As such, the statewide planning goals needn't be analyzed.

Though this criterion states that we do not need to address the Oregon Statewide Planning Goals, because this is a zoning map amendment and thus could impact housing, Goal 10 is at issue and must be addressed.

Statewide Planning Goal 10: Housing
Goal 10 requires buildable lands for residential use shall be inventoried and plans shall encourage the availability of adequate numbers of needed housing units at price ranges and rent levels which are commensurate with the financial capabilities of Oregon households and allow for flexibility of housing location, type and density

This Goal has a couple components: 1) inventorying of land for housing need, and 2) demographic broad spectrum housing availability in both quantity and variety of type.

Inventorying

St. Helens completed and adopted a Housing Needs Analysis (HNA) and Buildable Lands Inventory (BLI) in 2019 (Ordinance No. 3244). The results of the housing needs analysis indicates that the current St. Helens Urban Growth Boundary is sufficient to

accommodate future housing needs, with a small deficiency of high-density land for multi-family development.

Per the HNA, Commercial/Mixed Use land can make up for the high-density land deficiency. Even though there are no guarantees Commercial/Mixed Use lands will be used for residential purposes, the following residential developments on commercial/mixed use lands since the inventorying effort of the HNA creation process are noteworthy:

- St. Helens Place Apartments at 700 Matzen Street. Originally approved by Conditional Use Permit CUP.2.18 in 2018, this 204-unit multi-dwelling project was completed late 2020.

  Zone: General Commercial. Total acres used: 7.72 out of 7.72 ac.

- Broadleaf Arbor: A Gathering Place being developed by the Northwest Oregon Housing Authority (NOHA) and Community Development Partners at 2250 Gable Road. Originally approved by Conditional Use Permit CUP.3.19, this 239-unit multi-dwelling project is currently under construction. The site has wetlands that will be preserved so only a portion of the property will be developed.

  Zone: General Commercial, GC. Total acres used: approx. 13.7 ac. out of 16.7 ac.

Based on these two projects alone, the high-density deficiency is resolved, or at least will be assuming the completion of Broadleaf Arbor: A Gathering Place.

Demographic broad spectrum housing availability in both quantity and variety of type

The subject property would not be efficiently developed as a subdivision without the Planned Development overlay zone because of its substantial make up of wetlands. This proposal simply allows a greater potential number of units.

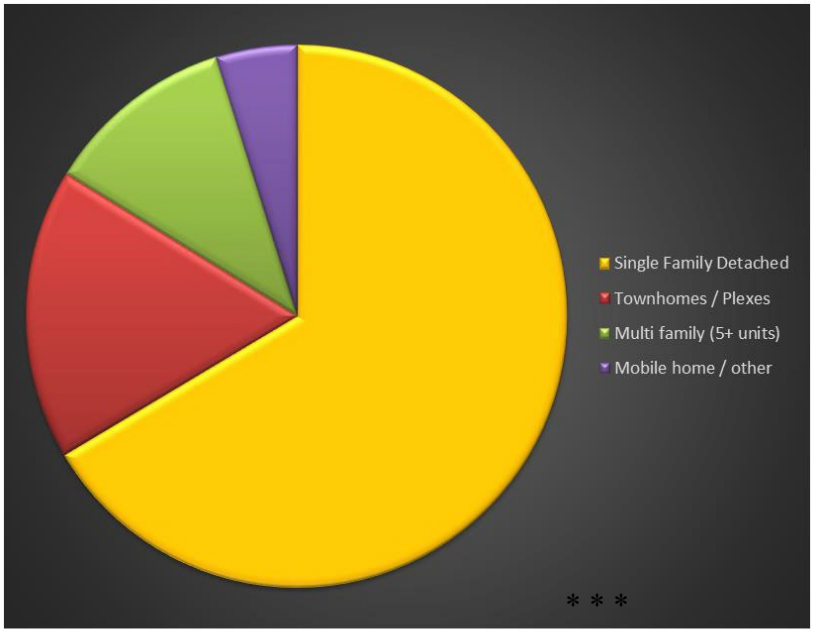
Land Need (net acres)	
Low Density*	240
Medium Density**	40
High Density	24
Manufactured Home Parks	5
Total	**309**
Buildable Land Inventory (net acres)	
Low Density	532
Medium Density	93
High Density	16
Manufactured Home Parks	45
Commercial/Mixed Use***	19
Total	**705**
UGB Land Surplus/Deficit (net acres)	
Low Density*	293
Medium Density**	53
High Density	(8)
Manufactured Home Parks	40
Commercial/Mixed Use	19
Total	**397**
Adequacy of UGB to meet housing need	adequate

* Includes detached units and mobile homes. ** Includes townhomes, plexes and group quarters.

Left: This table summarizes the City's HNA findings. The area clouded in red identifies the surplus of low and medium density lands, and slight deficit of high density lands. These numbers reflect a projection of residential land needs accommodating a 20-year housing demand forecast (from 2019).

As noted above, the deficit in high density residential is resolved by mulitdwelling development on commercial lands subsequent to the HNA's (and BLI's) adoption in 2019.

However, type of housing is also a component of this (not just quantity). Mobile or manufactured homes are underrepresented in St. Helens and provide a relatively economical option compared to traditional stick-built detached homes. Given the city's Comprehensive Plan designation and zoning, as detailed above, it is important that allowing this Planned Development overlay zone does not preclude manufactured homes. Such condition is warranted.



Left: Existing housing mix 2013-2017, City of St. Helens.

Source: U.S. Census, American Community Survey, 2013-2017.

(1)(a)(iii). The applicable code standards for consideration are the minimum size standards for manufactured homes—multi-sectional and enclose a space not less than 1,000 square feet—and how that related to the zoning standards as proposed by the Planned Development allow the possibility of manufactured homes or preclude them.

As already described, allowing this Planned Development overlay must be based on any development not precluding manufactured homes. This includes development standards and other factors such as use restrictions (e.g., CCRs) the developer may place on themselves.

* * *

(1)(a)(iv). "Spot zoning" does apply as long as all other criteria for allowing a PD overlay zone are met.

CONCLUSION & DECISION

Based upon the facts and findings herein, the City Council approves this Planned Developed Overlay Zone with the condition that:

No development allowed under this Planned Development (overlay zone) shall preclude manufactures homes. This includes development standards and other factors such as use restrictions (e.g., CCRs) the developer may place on themselves.

Rick Scholl, Mayor

Date

City of St. Helens
RESOLUTION NO. 1950

A RESOLUTION ADOPTING THE ST. HELENS WATER MASTER PLAN AND WATER MANAGEMENT AND CONSERVATION PLAN

WHEREAS, the last update to the City's Water Master Plan and Water Management and Conservation Plan and was in April 2013; and

WHEREAS, ORS 197.712 (2) (e) requires a city to develop and adopt public facility plans for areas within their urban growth boundary containing a population greater than 2,500 persons; and

WHEREAS, OAR 690-086 requires the city, as a water supplier, to periodically update its water management and conservation plan; and

WHEREAS, The City of St. Helens Municipal Code 19.08.030 Public Services And Facilities Goals promote the development of an orderly arrangement of public facilities and services to serve as a framework for urban development, and the designing and locating public facilities so that capacities are related to future as well as present demands, that ample land is available for building and plant expansion, and that public works plants and utility structures reflect due regard for their environmental impact; and

WHEREAS, an updated St. Helens Water Master Plan is needed to provide for growth and planning for future development; and

WHEREAS, Engineering consultant, Keller Associates, has prepared an updated St. Helens Water Master Plan which includes an updated Water Management and Conservation Plan (attached as **Exhibit A**) and has presented said plan to the City Council at the April 6, 2022 Work Session and to the Planning Commission on April 12, 2022; and

WHEREAS, consultant has prepared the St. Helens Water Master Plan and corresponding Water Management and Conservation Plan after extensive review and analysis of existing plans, policies, studies, and other information, and has afforded all interested parties opportunity to review the plan.

NOW, THEREFORE, THE CITY OF ST. HELENS RESOLVES that the St. Helens Water Master Plan and corresponding Water Management and Conservation Plan attached hereto is adopted and shall be used as a guide for the development and implementation of a complete, water system.

APPROVED AND ADOPTED by the City Council on May 4, 2022 by the following vote:

Ayes:
Nays:

_____
Rick Scholl, Mayor

ATTEST:

_____
Kathy Payne, City Recorder

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APRIL 2022
PROJECT NO. 221096

CITY OF ST. HELENS

WATER MASTER PLAN

DocuSigned by:
[signature]
7A3A486630E4D48B...

REGISTERED PROFESSIONAL ENGINEER
83510PE
Digitally Signed
OREGON
NOV. 10, 2009
PETER OLSEN
EXPIRES: 12-31-2022

4/27/2022

PREPARED BY

KELLER ASSOCIATES

KELLER ASSOCIATES, INC.
245 Commercial St. SE, Suite 210
Salem, OR 97301
(503) 364-2002

PREPARED FOR

City of St. Helens
FOUNDED 1850
Oregon

CITY OF ST. HELENS
265 Strand St.
St. Helens, OR 97051
(208) 773-3511

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE OF CONTENTS

SECTION 1 - EXECUTIVE SUMMARY 1-1

1.1 STUDY AREA 1-1
1.2 DEMOGRAPHICS 1-1
1.3 WATER USAGE 1-2
1.4 REGULATORY PLANNING CRITERIA 1-6
1.5 WATER FILTRATION FACILITY EVALUATION 1-7
1.6 WATER DISTRIBUTION SYSTEM EVALUATION 1-7
1.6.1 CONDITIONS ASSESSMENT 1-7
1.6.2 SUPPLY ANALYSIS 1-7
1.6.3 DELIVERY ANALYSIS 1-8
1.6.4 STORAGE ANALYSIS 1-8
1.6.5 HYDRAULIC MODEL EVALUATION 1-9
1.7 SEISMIC RESILIENCY PLAN 1-12
1.8 ALTERNATIVES ANALYSIS 1-14
1.9 OPERATIONS AND MAINTENANCE 1-14
1.10 STAFFING EVALUATION 1-15
1.11 CAPITAL IMPROVEMENT PLAN 1-15
1.12 ADDITIONAL CONSIDERATIONS 1-19
1.13 WATER MANAGEMENT AND CONSERVATION PLAN 1-19

SECTION 2 - PROJECT PLANNING 2-1

2.1 LOCATION AND STUDY AREA 2-1
2.2 ENVIRONMENTAL RESOURCES PRESENT 2-1
2.2.1 LAND USE 2-1
2.2.2 FLOODPLAINS 2-1
2.2.3 WETLANDS 2-1
2.2.4 HISTORIC SITES, STRUCTURES, AND LANDMARKS 2-2
2.2.5 BIOLOGICAL RESOURCES 2-2
2.2.6 WATER RESOURCES 2-3
2.2.7 COASTAL RESOURCES 2-3
2.2.8 SOCIO-ECONOMIC CONDITIONS 2-3
2.2.9 CLIMATE 2-3
2.2.10 GEOLOGIC HAZARDS AND SOILS 2-3
2.2.11 AIR QUALITY 2-4
2.3 POPULATION PROJECTIONS 2-4
2.4 GROWTH AREAS 2-5

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

2.5 SYSTEM CONNECTIONS 2-7
2.6 EXISTING AND FUTURE WATER USE 2-9
2.6.1 EXISTING WATER DEMANDS AND PLANNING CRITERIA 2-9
2.6.2 FUTURE WATER USE 2-13
2.7 REGULATORY PLANNING CRITERIA 2-14
2.7.1 WATER STORAGE CRITERIA 2-14
2.7.2 DISTRIBUTION NETWORK CRITERIA 2-15
SECTION 3 - EXISTING SYSTEM CONDITIONS 3-1
3.1 GENERAL WATER SYSTEM OPERATION 3-1
3.2 WATER SUPPLY 3-2
3.2.1 RANNEY COLLECTOR WELL #1 3-2
3.2.2 RANNEY COLLECTOR WELL #2 3-4
3.2.3 RANNEY COLLECTOR WELL #3 3-5
3.2.4 BAYPORT WELL 3-6
3.3 BOOSTER STATIONS 3-7
3.3.1 LEMONT BOOSTER STATION 3-7
3.3.2 ELK RIDGE BOOSTER STATION 3-8
3.4 STORAGE RESERVOIRS 3-9
3.4.1 2.0 MG RESERVOIR 3-9
3.4.2 2.5 MG RESERVOIR 3-10
3.4.3 GREEN TANK 3-11
3.4.4 ELK RIDGE RESERVOIR 3-12
3.5 WATER FILTRATION FACILITY (WFF) 3-12
3.5.1 RAW WATER SUPPLY 3-13
3.5.2 WATER TREATMENT PROCESS 3-13
3.5.3 SCADA AND POWER SUPPLY 3-14
3.5.4 CT (CONCENTRATION X TIME) CALCULATIONS 3-15
3.5.5 RECOMMENDED IMPROVEMENTS 3-17
3.5.6 REPLACEMENT SCHEDULE 3-18
3.6 DISTRIBUTION SYSTEM 3-20
3.7 SEISMIC RESILIENCY PLAN 3-21
3.7.1 SEISMIC HAZARDS 3-21
3.7.2 IDENTIFYING CRITICAL ELEMENTS 3-24
3.7.3 STRUCTURAL EVALUATION 3-26
3.7.4 LIKELIHOOD AND CONSEQUENCE OF FAILURE 3-28
3.7.5 SYSTEM IMPROVEMENTS 3-29
3.7.6 SEISMIC RESLIENCY PLAN CONCLUSION 3-31

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 4 - CAPACITY ANALYSIS 4-1
4.1 SUPPLY ANALYSIS 4-1
4.2 DELIVERY ANALYSIS 4-1
4.2.1 MAIN PRESSURE ZONE 4-1
4.2.2 HIGH PRESSURE ZONE 4-2
4.2.3 ELK RIDGE PRESSURE ZONE 4-2
4.3 STORAGE ANALYSIS 4-3
4.4 EXISTING HYDRAULIC MODEL ANALYSIS 4-6
4.4.1 MODEL DEVELOPMENT 4-6
4.4.2 MODEL CALIBRATION 4-7
4.4.3 2021 OPERATING PRESSURES 4-9
4.4.4 2021 MAXIMUM DAY DEMAND PLUS FIRE FLOW 4-11
4.4.5 ADDITIONAL CONSIDERATIONS 4-13
4.5 FUTURE HYDRAULIC MODEL EVALUATION 4-14
4.5.1 2041 MODEL DEVELOPMENT 4-14
4.5.2 2041 OPERATING PRESSURES 4-17
4.5.3 2041 MAXIMUM DAY DEMAND PLUS FIRE FLOW 4-17
SECTION 5 - ALTERNATIVES ANALYSIS 5-1
5.1 STORAGE ALTERNATIVES 5-1
5.2 FUTURE STORAGE LOCATION 5-2
5.3 REDUNDANT DELIVERY FACILITY TO HIGH PZ ALTERNATIVES 5-5
5.4 MAIN PZ HIGH PRESSURES 5-6
5.5 GROWTH AREA ALTERNATIVES 5-7
5.5.1 GROWTH AREA 0 AND 5 – ELK RIDGE DEVELOPMENT 5-7
5.5.2 GROWTH AREA 2 – RIVERFRONT DISTRICT 5-8
5.5.3 GROWTH AREA 3 – HOULTON BUSINESS DISTRICT 5-9
5.5.4 GROWTH AREA 4 – CURRENTLY VACANT COMMERCIAL PROPERTY 5-10
5.5.5 GROWTH AREA 1, 9, 11, 13 5-10
5.5.6 GROWTH AREA 10 – RESIDENTIAL 5-12
5.5.7 GROWTH AREA 16 – INDUSTRIAL BUSINESS PARK 5-12
5.5.8 GROWTH AREA 8 - RESIDENTIAL 5-14
5.5.9 GROWTH AREAS 6, 7, 12, 14, 15 – NO ADDITIONAL IMPROVEMENTS 5-15
SECTION 6 - STAFFING AND O&M EVALUATION 6-1
6.1 OPERATIONS AND MAINTENANCE ACTIVITIES 6-1
6.1.1 WATER FILTRATION FACILITY 6-1
6.1.2 WATER USE AND MEASUREMENT AND REPORTING PROGRAM 6-1
6.1.3 FLUSHING PROGRAM 6-1

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

6.1.4 VALVE EXERCISING AND REPLACEMENT PROGRAM....6-2
6.1.5 RESERVOIR MAINTENANCE....6-2
6.1.6 WATERLINE REPLACEMENT PROGRAM....6-2
6.1.7 WATER METERS....6-2
6.1.8 LEAK DETECTION PROGRAM....6-3
6.1.9 RESPONDING TO REPORTED PROBLEM AREAS....6-3
6.1.10 PUBLIC EDUCATION....6-3
6.1.11 LARGE WATER SYSTEM IMPROVEMENTS....6-4
6.1.12 ADDITIONAL O&M ITEMS....6-4
6.2 WATER SYSTEM REPLACEMENT PROGRAM....6-4
6.3 STAFFING EVALUATION....6-4
6.3.1 GENERAL....6-4
6.3.2 EXISTING WATER STAFFING....6-5
6.3.3 RECOMMENDED WATER STAFFING....6-5
SECTION 7 - CAPITAL IMPROVEMENT PLAN....7-1
7.1 BASIS FOR ESTIMATE....7-1
7.2 PROJECT PRIORITIZATION....7-1
7.3 PRIORITY 1 IMPROVEMENTS (6-YEAR CIP)....7-2
7.4 PRIORITY 2 IMPROVEMENTS (5-10 YEAR)....7-3
7.5 PRIORITY 3 IMPROVEMENTS (5-20 YEAR)....7-4
7.6 PRIORITY 4 IMPROVEMENTS (DEVELOPMENT DRIVEN WITHIN 0-20 YEARS)....7-5
7.7 PRIORITY 5 IMPROVEMENTS (20-50 YEAR)....7-6
7.8 CAPITAL IMPROVEMENT SUMMARY....7-6
7.9 SYSTEM DEVELOPMENT CHARGES (SDC)....7-7
7.10 PLANNING RECOMMENDATIONS....7-7
7.11 FINANCIAL CONSIDERATIONS....7-8
SECTION 8 - WATER MANAGEMENT & CONSERVATION PLAN....8-1
8.1 REPORT ELEMENTS....8-3
8.1.1 AFFECTED LOCAL GOVERNMENTS....8-3
8.1.2 PLAN UPDATE SCHEDULE....8-3
8.1.3 REQUEST FOR ADDITIONAL TIME FOR METERING OR BENCHMARKS....8-3
8.2 WATER SUPPLIER DESCRIPTION....8-3
8.2.1 SUPPLIER'S SOURCE DESCRIPTION....8-3
8.2.2 CURRENT SERVICE AREA AND POPULATION....8-3
8.2.3 ADEQUACY AND RELIABILITY OF WATER RIGHTS/SUPPLY....8-3
8.2.4 CUSTOMER USE CHARACTERISTICS AND USE PATTERNS....8-4
8.2.5 INTERCONNECTIONS WITH OTHER WATER SUPPLY SYSTEMS....8-4

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

8.2.6 WATER SYSTEM SCHEMATIC 8-4
8.2.7 WATER LOSSES AND NON-REVENUE WATER 8-4
8.3 WATER CONSERVATION ELEMENT 8-5
8.3.1 PROGRESS REPORT 8-5
8.3.2 WATER USE MEASUREMENT AND REPORTING PROGRAM 8-5
8.3.3 CURRENTLY IMPLEMENTED CONSERVATION MEASURES 8-5
8.3.4 ANNUAL WATER AUDIT 8-5
8.3.5 FULL METERING OF SYSTEM 8-5
8.3.6 METER TESTING AND MAINTENANCE 8-6
8.3.7 WATER RATE STRUCTURE 8-6
8.3.8 SYSTEM LEAKAGE REDUCTION PROGRAM <10% 8-6
8.3.9 PUBLIC EDUCATION 8-6
8.3.10 TECHNICAL AND FINANCIAL ASSISTANCE PROGRAMS 8-7
8.3.11 RETROFIT / REPLACEMENT OF INEFFICIENT FIXTURES 8-7
8.3.12 RATE STRUCTURE / BILLING PRACTICES FOR CONSERVATION 8-7
8.3.13 WATER REUSE, RECYCLING, AND NON-POTABLE WATER OPPORTUNITES 8-7
8.3.14 OTHER PROPOSED CONSERVATION MEASURES 8-7
8.4 SUMMARY OF 5-YEAR BENCHMARKS 8-7
8.5 WATER CURTAILMENT ELEMENT 8-8
8.5.1 HISTORY OF SUPPLY DEFICIENCIES AND CAPACITY LIMITATIONS 8-8
8.5.2 STAGES OF ALERT FOR WATER CURTAILMENT 8-8
8.5.3 WATER CURTAILMENT ACTIONS 8-8
8.6 WATER SUPPLY ELEMENT 8-11
8.6.1 SERVICE AREAS AND POPULATION PROJECTIONS 8-11
8.6.2 SCHEDULE FOR FULLY EXERCISING WATER USE PERMITS 8-11
8.6.3 WATER DEMAND FORECAST AND COMPARISON WITH SUPPLY 8-11
8.6.4 ANALYSIS OF ALTERNATIVES 8-12
8.6.5 EXPANSION OF WATER PERMITS UNDER EXISTING PERMITS 8-12

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLES

TABLE 1-1: HISTORICAL PRODUCTION RATES (2016-2021) AND PLANNING CRITERIA....1-3
TABLE 1-2: UNACCOUNTED FOR WATER FOR 2017-2021....1-5
TABLE 1-3: FUTURE WATER DEMAND SUMMARY....1-6
TABLE 1-4: FIRE FLOW DEMAND....1-7
TABLE 1-5: DISTRIBUTION SYSTEM CRITERIA....1-7
TABLE 1-6: MAIN PZ STORAGE ANALYSIS....1-8
TABLE 1-7: HIGH PZ STORAGE ANALYSIS....1-9
TABLE 1-8: BACKBONE WATER SYSTEM SUMMARY....1-12
TABLE 1-9: ANNUAL REPLACEMENT PROGRAM....1-15
TABLE 1-10: CIP PRIORITIZATION CRITERIA....1-16
TABLE 1-11: 6-YEAR CIP SUMMARY....1-16
TABLE 1-12: CIP SUMMARY TABLE....1-17
TABLE 1-13: WMCP 5-YEAR BENCHMARKS....1-19
TABLE 1-14: 50-YEAR WATER DEMAND PROJECTIONS....1-20
TABLE 1-15: WATER CURTAILMENT PLAN....1-21
TABLE 2-1: CLIMATOLOGICAL DATA (2006-2020)....2-3
TABLE 2-2: ST. HELENS POPULATION....2-5
TABLE 2-3: ANTICIPATED GROWTH SUMMARY....2-6
TABLE 2-4: COLUMBIA CITY WATER CONSUMPTION (2017-2020)....2-7
TABLE 2-5: TOP 20 WATER CONSUMERS FROM 2020....2-8
TABLE 2-6: WATER USAGE BY TYPE....2-9
TABLE 2-7: HISTORICAL PRODUCTION RATES (2016-2021) AND PLANNING CRITERIA....2-11
TABLE 2-8: PEAKING FACTORS OF SIMILAR WATER SYSTEMS....2-12
TABLE 2-9: UNACCOUNTED WATER FOR 2017-2021....2-13
TABLE 2-10: FUTURE DEMANDS SUMMARY....2-14
TABLE 2-11: FIRE FLOW DEMANDS....2-15
TABLE 2-12: DISTRIBUTION SYSTEM CRITERIA....2-15
TABLE 3-1: WFF PROCESS CAPACITY SUMMARY....3-4
TABLE 3-2: 2021 WATER QUALITY SUMMARY....3-5
TABLE 3-3: WFF INVENTORY AND ANNUAL REPLACEMENT BUDGET....3-9
TABLE 3-4: PIPELINE INVENTORY....3-20
TABLE 3-5: PIPELINE AGE....3-20
TABLE 3-6: WATER SYSTEM INVENTORY....3-25
TABLE 4-1: WATER SUPPLY ANALYSIS (WATER RIGHTS)....4-1
TABLE 4-2: WHOLE SYSTEM DELIVERY CAPACITY ANALYSIS....4-2
TABLE 4-3: HIGH PZ DELIVERY CAPACITY ANALYSIS....4-2
TABLE 4-4: ELK RIDGE PZ DELIVERY ANALYSIS....1-3
TABLE 4-5: STORAGE RESERVOIR CHARACTERISTICS....4-4
TABLE 4-6: MAIN PZ STORAGE ANALYSIS SUMMARY....4-5
TABLE 4-7: HIGH PZ STORAGE ANALYSIS SUMMARY....4-6
TABLE 4-8: MODEL CALIBRATION RESULTS....4-9
TABLE 4-9: FUTURE DEMANDS SUMMARY....4-14
TABLE 5-1: STORAGE ALTERNATIVES BENEFITS AND DRAWBACKS....5-2
TABLE 5-2: FUTURE STORAGE LOCATION BENEFITS AND DRAWBACKS....5-4
TABLE 6-1: ANNUAL REPLACEMENT PROGRAM....6-4
TABLE 7-1: CIP PRIORITIZATION CRITERIA....7-2
TABLE 7-2: 6-YEAR CIP SUMMARY....7-2

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 7-3: CIP SUMMARY TABLE 7-7
TABLE 8-1: WMCP DIRECTORY 8-2
TABLE 8-2: WATER RIGHTS INVENTORY 8-4
TABLE 8-3: WATER USAGE COMPARISON WITH PREVIOUS WMCP 8-4
TABLE 8-4: ST. HELENS WATER UTILITY BILLING RATES 8-6
TABLE 8-5: 5-YEAR CONSERVATION BENCHMARKS 8-8
TABLE 8-6: WATER CURTAILMENT PLAN 8-9
TABLE 8-7: 50-YEAR WATER DEMAND PROJECTIONS 8-12

FIGURES

FIGURE 1-1: CITY LIMITS AND UGB 1-1
FIGURE 1-2: CITY ZONING AND COMP PLAN 1-2
FIGURE 1-3: WATER CONSUMPTION BY TYPE 1-3
FIGURE 1-4: ST. HELENS WATER USAGE DIURNAL CURVE 1-4
FIGURE 1-5: AVAILABLE FIRE FLOW BELOW FIRE FLOW DEMANDS 1-10
FIGURE 1-6: FUTURE GROWTH AREAS AND PIPE ALIGNMENTS 1-11
FIGURE 1-7: BACKBONE WATER SYSTEM 1-13
FIGURE 1-8: LIKELIHOOD AND CONSEQUENCE OF FAILURE PRIORITIZATION 1-14
FIGURE 1-9: CAPITAL IMPROVEMENT PLAN 1-18
FIGURE 2-1: 20-YEAR GROWTH AREAS 2-6
FIGURE 2-2: 2019-2020 AVERAGE WATER CONSUMPTION BY TYPE 2-9
FIGURE 2-3: HISTORICAL MONTHLY PRODUCTION (2016-2020) 2-10
FIGURE 2-4: ST. HELENS WATER USAGE DIURNAL CURVE 2-12
FIGURE 3-1: WATER SYSTEM SCHEMATIC 3-1
FIGURE 3-2: RANNEY WELL #1 PIPING CONFIGURATION 3-3
FIGURE 3-3: RANNEY WELL #2 3-4
FIGURE 3-4: RANNEY WELL #3 3-5
FIGURE 3-5: BAYPORT WELL HOUSE 3-6
FIGURE 3-6: LEMONT BOOSTER STATION 3-8
FIGURE 3-7: ELK RIDGE BOOSTER STATION 3-9
FIGURE 3-8: 2.0 MG STORAGE RESERVOIR 3-10
FIGURE 3-9: 2.5 MG STORAGE RESERVOIR 3-10
FIGURE 3-10: GREEN TANK 3-11
FIGURE 3-11: ELK RIDGE STORAGE RESERVOIR 3-12
FIGURE 3-12: 2021 WATER QUALITY TRENDS 3-16
FIGURE 3-13: LOG GIARDIA INACTIVATION PROFILE 3-17
FIGURE 3-14: LANDSLIDE HAZARDS WITH WATER SYSTEM 3-22
FIGURE 3-15: EARTHQUAKE INTENSITY SHAKING WITH WATER SYSTEM 3-23
FIGURE 3-16: SEISMIC BACKBONE WATER SYSTEM 3-26
FIGURE 3-17: LIKELIHOOD AND CONSEQUENCE OF FAILURE PRIORITIZATION 3-29
FIGURE 3-18: CRITICAL PIPELINE REPLACEMENT 3-30
FIGURE 4-1: COMMERCIAL DEMAND ALLOCATION 4-7
FIGURE 4-2: 2021 PEAK HOUR DEMAND PRESSURES 4-10
FIGURE 4-3: 2021 AVERAGE DAY DEMAND PRESSURES 4-11
FIGURE 4-4: 2021 AVAILABLE FIRE FLOW 4-12
FIGURE 4-5: 2021 MEETS FIRE FLOW DEMAND? 4-13
FIGURE 4-6: 2041 WATER SYSTEM PIPELINES 4-16
FIGURE 4-7: 2041 PEAK HOUR DEMAND PRESSURES 4-17
FIGURE 4-8: 2041 MDD PLUS FIRE FLOW 4-18

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 5-1: FUTURE STORAGE LOCATIONS 5-3
FIGURE 5-2: LEMONT BS DELIVERY, EXISTING CONDITION 5-5
FIGURE 5-3: RIVERFRONT DEVELOPMENT WATER ALIGNMENT 5-8
FIGURE 5-4: HOULTON BUSINESS DISTRICT FIRE FLOW IMPROVEMENTS 5-9
FIGURE 5-5: GROWTH AREA 4 RECOMMENDED IMPROVEMENTS 5-10
FIGURE 5-6: GROWTH AREA 1, 9, 11, 13 IMPROVEMENTS 5-11
FIGURE 5-7: GROWTH AREA 10 IMPROVEMENTS 5-12
FIGURE 5-8: INDUSTRIAL BUSINESS PARK IMPROVEMENTS 5-13
FIGURE 5-9: GROWTH AREA 8 RECOMMENDED ALTERNATIVES 5-14
FIGURE 5-10: GROWTH AREA 6 PROPOSED PIPING 5-15
FIGURE 5-11: GROWTH AREA 7 PROPOSED PIPING 5-16
FIGURE 5-12: GROWTH AREA 12, 14, AND 15 PROPOSED PIPING 5-16

APPENDICES

Appendix A – Figures
- Figure 1 – Study Area
- Figure 2 – Existing and Future Zoning
- Figure 3 – Flood Hazard Zones
- Figure 4 – Wetlands
- Figure 5 – Designated Landmarks and Downtown Historic District
- Figure 6 – Landslide Hazards
- Figure 7 – Earthquake Hazards
- Figure 8 – NRCS Hydrologic Soil Categories
- Figure 9 – 20-Year Growth Areas
- Figure 10 – Water System Map
- Figure 11 – Pipelines by Size
- Figure 12 – Pipelines by Age
- Figure 13 – 2021 Average Day Demand – Pressures
- Figure 14 – 2021 Peak Hour Demand – Pressures
- Figure 15 – 2021 Maximum Day Demand Plus Fire Flow
- Figure 16 – 2021 Meets Fire Flow Demand?
- Figure 17 – 2041 Average Day Demand – No Improvements
- Figure 18 – 2041 Peak Hour Demand – No Improvements
- Figure 19 – 2041 MDD + FF – No Improvements
- Figure 20 – 2041 Meets Fire Flow Demand?
- Figure 21 – Riverfront Development Proposed Water Alignment
- Figure 22 – Industrial Business Park Alignment
- Figure 23 – Capital Improvement Plan
- Figure 24 – Small Pipe Replacement Program

Appendix B – Project Planning

Appendix C – Facility Inventory Sheets

Appendix D – Supporting Calculations

Appendix E – Capital Improvement Plan

Appendix F – WMCP Supplemental Material

Appendix G – Notice to Affected Local Government

Appendix H – Glossary

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

ACRONYMS AND ABBREVIATIONS

AACE	Association for Advancement of Cost Engineering
AAGR	Average Annual Growth Rate
ACI	American Concrete Association
ADD	Average Day Demand
AFF	Available Fire Flow
ASCE	American Society of Civil Engineers
AWWA	American Water Works Association
BS	Booster Station
CCF	One-Hundred Cubic Feet
CCP	Concrete Cylinder Pipe
CCR	Consumer Confidence Reports
CCTV	Closed-Circuit Television
CF	Cubic Feet
CFS	Cubic Feet Per Second
CI	Cast Iron
CIP	Capital Improvement Plan
CMU	Concrete Masonry Unit
CP	Concrete Pipe
CT	Concentration x Time
CWSRF	Clean Water State Revolving Fund
DEQ	Department of Environmental Quality
DI	Ductile Iron
DOGAMI	Department of Geology and Mineral Industries
DSL	Department of State Land
EA	Each
EDU	Equivalent Dwelling Unit
EFVM	Electric Field Vector Mapping
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FF	Fire Flow
FIRM	Flood Insurance Rate Map.
FTE	Full-Time Equivalent
GAL	Galvanized
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
GPM	Gallons per Minute
HDPE	High Density Polyethylene
HP	Horsepower
LED	Light Emitting Diode
LF	Linear Feet
LOS	Level of Service
LS	Lump Sum
LWI	Local Wetlands Inventory
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
MSE	Mechanically Stabilized Earth
NEHRP	National Earthquake Hazard Reduction Program
NOAA	National Oceanic and Atmosphere Administration
NTU	Nephelometric Turbidity Unit
O&M	Operations and Maintenance
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

OHA	Oregon Health Authority
PHD	Peak Hour Demand
PLC	Programmable Logic Controller
PRV	Pressure Reducing Valve
PSI	Pounds per Square Inch
PSU	Portland State University
PUD	Public Utility District
PVC	Polyvinyl Chloride
PW	Public Works
PZ	Pressure Zone
ROW	Right-of-Way
SCADA	Supervisory Control and Data Acquisition
SDC	System Development Charge
SWMP	Stormwater Master Plan
TMDL	Total Maximum Daily Load
VFD	Variable Frequency Drive
WFF	Water Filtration Facility
WMCP	Water Management and Conservation Plan
WMP	Water Master Plan
WWMP	Wastewater Master Plan
WWTP	Wastewater Treatment Plant
UGB	Urban Growth Boundary
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

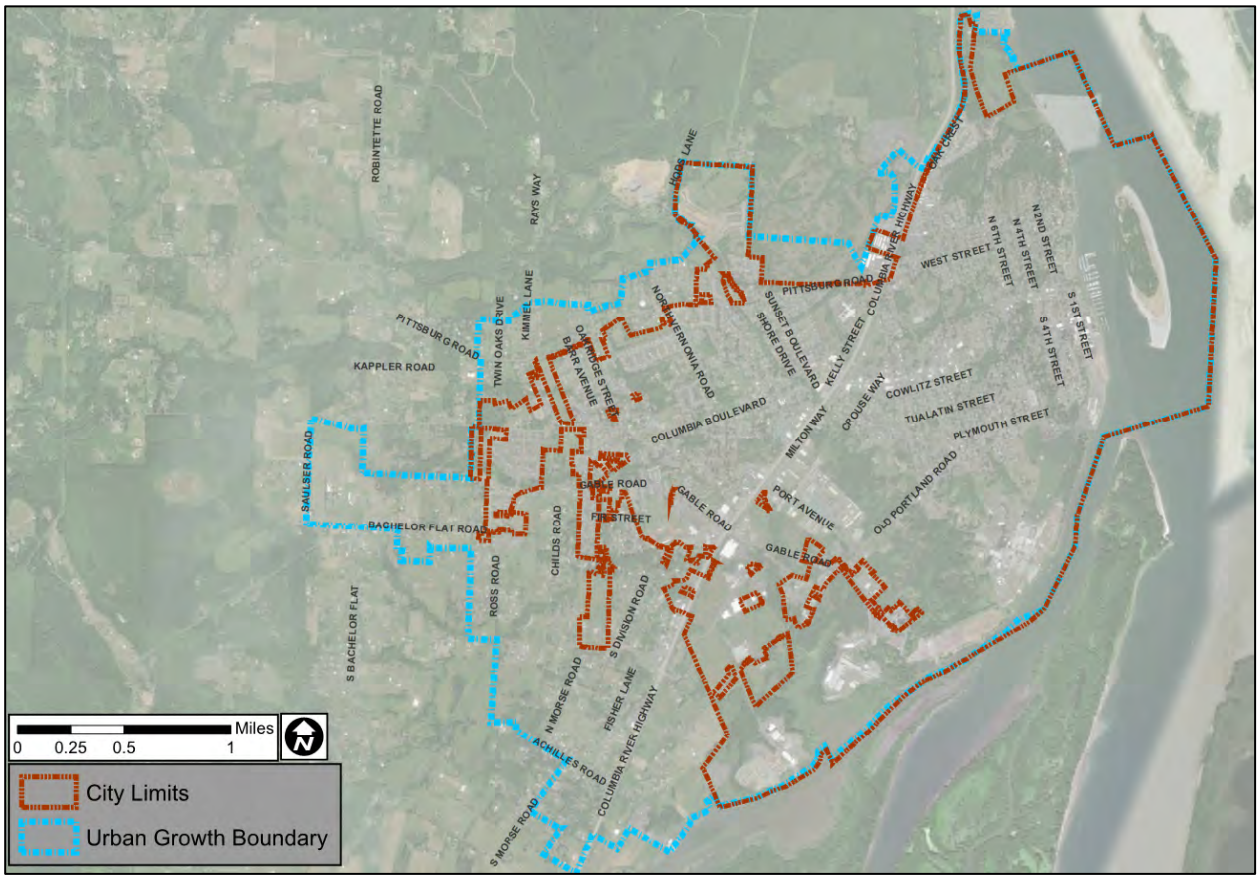
SECTION 1 - EXECUTIVE SUMMARY

The City of St. Helens contracted with Keller Associates, Inc. to update the water master plan (WMP) for the City's municipal water system. This report was commissioned by the City in an effort to assess the current state of the water system and plan for future needs. The following section includes a summary of the study area, planning criteria, existing system evaluation, recommended improvements, and capital improvement plan.

1.1 STUDY AREA

The City of St. Helens, Oregon is located adjacent to the Columbia River, approximately 25-miles northwest of Portland on US Highway 30. The City's potable water service area is located generally within the City limits with some users located outside the City limits. Additional future service areas are located within the urban growth boundary (UGB). Figure 1-1 illustrates the City limits and UGB.

FIGURE 1-1: CITY LIMITS AND UGB



1.2 DEMOGRAPHICS

The City's zoning areas include residential, commercial, industrial, and public zoning within City limits. Approximately half of the zoning within City limits is residential, heavy and light industrial zones are concentrated in the southeastern portion of the City, and most commercial areas surround US Highway 30 or are located in the Houlton Business District or Riverfront District. A zoning map for the study area is shown in Figure 1-2 below.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 1-2: CITY ZONING AND COMP PLAN



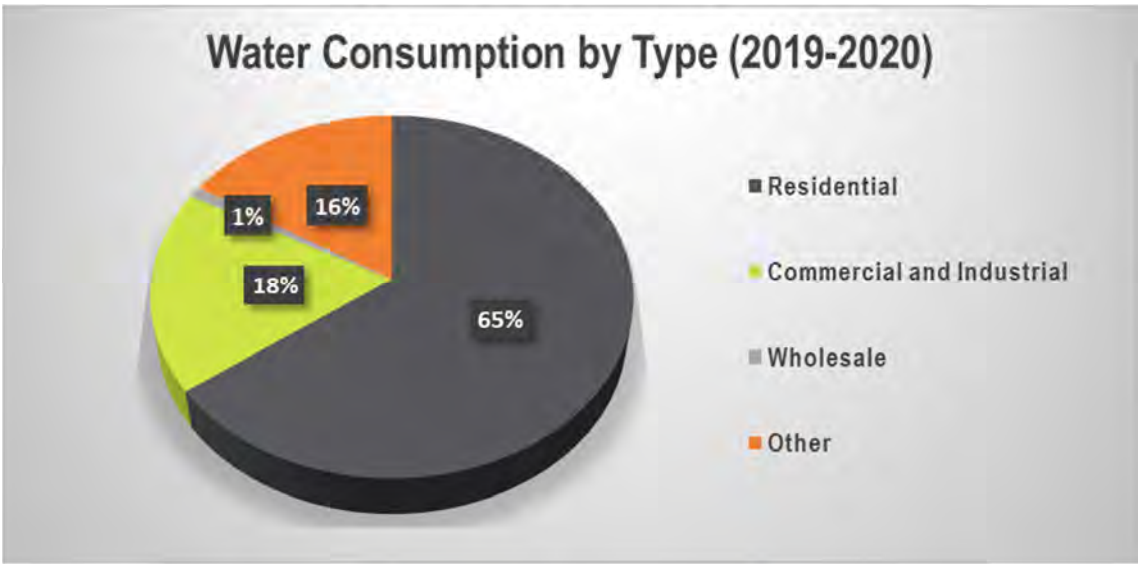
The City's population has been increasing at a steady rate over the past few decades but has leveled out in recent years. Historical populations for the City of St. Helens and Columbia City were obtained from the U.S. Census and Columbia County in cooperation with Portland State University (PSU). PSU analyzes historical trends and anticipates growth patterns to develop growth rates for 5-year increments. The most current population estimate provided by PSU for St. Helens was 13,915 in 2020. The PSU coordinated growth rates provide a population projection for 2041 to be 17,509 for the City. These growth rates were reviewed and approved by the technical advisory committee (TAC) for this planning study. The estimated average annual growth rate from 2019 to 2041 is approximately 1.1%.

1.3 WATER USAGE

The majority of the water produced by the City of St. Helens is consumed by users within the City limits, however, the City's water system does have interties with Columbia City and McNulty Water Public Utility District (PUD). As shown in Figure 1-3 below, over half of the water produced is consumed by residential users while the remainder is consumed by commercial/industrial or other uses. The other uses account for consumption such as City water usage, hydrant flushing, and construction water.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 1-3: WATER CONSUMPTION BY TYPE



Historical production data from 2016 to 2021 was used to estimate the annual average daily demand (ADD) and the maximum day demand (MDD) which involved reviewing daily and monthly production data at the water filtration facility (WFF). Average winter demand (AWD) and average summer demand (ASD) were also summarized to document seasonal fluctuations in water demands. These production volumes are summarized in Table 1-1. Planning criteria, expressed in gallons per capita per day (gpcd), were calculated by using the 2021 population and the identified ADD, MDD, and peak hour demand (PHD). These planning criteria were used to estimate future water system demands and allocate them in the model.

TABLE 1-1: HISTORICAL PRODUCTION RATES (2016-2021) AND PLANNING CRITERIA

Production Summary (MGD)[1]										
	2016	2017	2018	2019	2020	2021 [4]	6-Year Average	6-Year Max	Planning[5]	Planning Criteria (gpcd)
Population	**13,120**	**13,240**	**13,240**	**13,410**	**13,915**	**14,068**	**-**	**-**	**14,068**	
ADD[1]	1.50	1.53	1.49	1.43	1.39	1.48	1.46	1.53	1.46	104
MDD[1,5]	2.62	3.05	2.47	2.81	2.35	2.91	2.67	3.05	3.05	217
Month of Max Day	April	August	July	July	July	June	-	-	-	-
AWD[2]	1.32	1.35	1.32	1.45	1.45	1.23	1.39	1.45	1.39	99
ASD[3]	1.75	1.90	1.82	1.67	1.75	2.00	1.78	1.90	1.78	127
Annual Production (MG)	548	562	544	524	508	-	535	562	-	-

1) MGD = Million gallons per day; ADD = Average day demand; MDD = Maximum Day Demand

2) AWD = Average winter day; includes January, February, and December

3) ASD = Average summer day; includes June, July, August

4) 2021 planning criteria only includes January 2021 - July 2021.

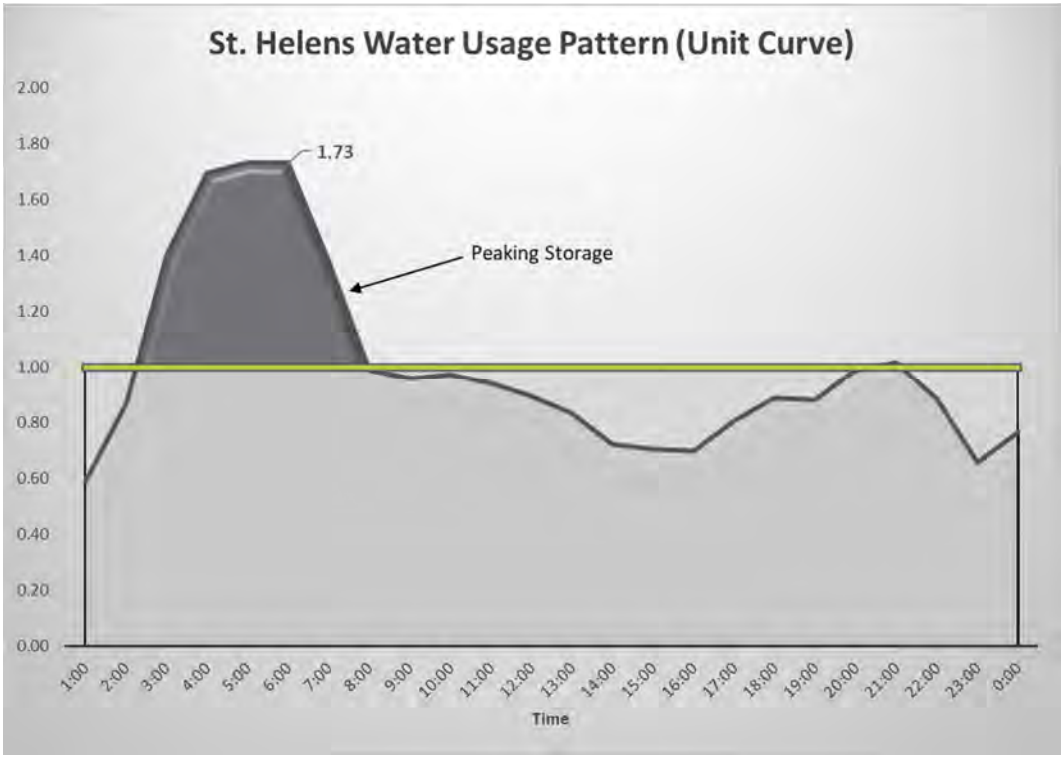
5) Planning criteria is equal to the 6-year average for ADD, AWD, and ASD. Equal to the 6-year max for MDD and PHD.

The PHD is equal to the maximum hourly demand the distribution system will likely experience on the maximum day. Peak hour typically occurs during the morning when water usage is the highest and the demands can range from 1.0 to 2.5 times higher than the MDD depending on the size of the water system. Supervisory Control and Data Acquisition (SCADA) data was used to develop a 24-hour diurnal curve for the City's water system. The water usage pattern was developed based on the maximum day production from 2021 and the water usage curve is illustrated in Figure 1-4. The curve identifies the peak demand

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

occurring at around 6:00 a.m. with a maximum factor of 1.73 times the MDD. This diurnal curve was also used to calculate the volume of peaking storage the system requires on top of the MDD. In addition to using the diurnal curve developed from the peak day in 2021, the peaking factors of municipalities of similar size and location were reviewed to compare the MDD to PHD factor to provide an additional factor of confidence in the selected peaking factor.

FIGURE 1-4: ST. HELENS WATER USAGE DIURNAL CURVE



The annual water production was compared to the metered consumption in order to calculate the percentage of unaccounted for water. As shown in Table 1-2, the 5-year average unaccounted for water is 18.5%. The City does not have any unmetered connections, however, water used for other activities including hydrant flushing, City construction activities, and fire department usage is not accounted for. The City reported the 2.0 MG Reservoir was filled and emptied several times between April 2017 and July 2019 for either rehabilitation and repair efforts or for dive inspections of the liner. The reservoir was filled and refilled a total of six times including the following dates: April 2017, August 2017, April 2018, October 2018, April 2019, and July 2019. This volume accounts for approximately 12 MG of water which was not metered but these volumes are accounted for in Table 1-2 below. Additional unaccounted for water may be attributed to system wide leakage.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-2: UNACCOUNTED FOR WATER FOR 2017-2021

	2017	2018	2019	2020	2021 [1]	5-Year Average Unaccounted for Water
Total Production (MG)	562.1	544.2	523.6	508.1	234.5	18.5%
Total Consumption (MG)[2]	469.3	412.0	389.2	441.5	204.3	
Unaccounted Water (%)	**16.5%**	**24.3%**	**25.7%**	**13.1%**	**12.9%**	

1) 2021 production and consumption is only from January 2021 to June 2021.

2) Includes construction water used from hydrants and volumes used to fill/leak the 2.0 MG tank during repairs/maintenance.

The population projections, growth areas, and flow planning criteria were used to project future demands for the distribution system. The City anticipated growth in residential, commercial/industrial, and wholesale customer usage. The demands were split between residential, commercial/industrial, wholesale, and other based on the percentage of total annual consumption of each user type. The established planning criteria of 104 gpcd (ADD) and 217 gpcd (MDD) and the projected populations were used to calculate the future residential demands. It is assumed any development that occurs within the City's UGB will be supplied by the City's water system. Future commercial and industrial demands were determined based on the 2020 consumption data and the existing land use to develop a demand per acre representative of existing commercial and industrial water usage. The calculated demand was then factored up based on peaking factors systemwide. The anticipated commercial and industrial growth is shown in Table 1-3 below. The wholesale demands were assumed to increase as the population of Columbia City increases which assumes a growth of 203 people by 2041 as recorded in the City's WWMP 2021.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-3: FUTURE WATER DEMAND SUMMARY

Year	2021	2031	2041
Service Connections[1]	6,002	6,696	7,468
Service Area Population	14,068	15,694	17,509
ADD (MGD)	**1.46**	**1.91**	**2.37**
Residential [2]	*0.94*	*1.12*	*1.32*
Commercial and Industrial [3, 5]	*0.27*	*0.53*	*0.78*
Wholesale [4,6]	*0.01*	*0.02*	*0.03*
Other [7]	*0.24*	*0.24*	*0.24*
MDD (MGD)	**3.05**	**3.98**	**4.95**
Residential [2]	*1.97*	*2.34*	*2.76*
Commercial and Industrial [3, 5]	*0.56*	*1.10*	*1.63*
Wholesale [4,6]	*0.03*	*0.05*	*0.07*
Other [7]	*0.49*	*0.49*	*0.49*
PHD (MGD)	**5.28**	**6.89**	**8.57**
Residential [2]	*3.41*	*4.06*	*4.78*
Commercial and Industrial [3, 5]	*0.97*	*1.89*	*2.82*
Wholesale [4,6]	*0.05*	*0.09*	*0.12*
Other [7]	*0.85*	*0.85*	*0.85*

1) Assumes additional residential connections with 2.49 people per household.

2) Based on 2-year average (2019-2020) percent of total consumption and includes residential, duplex, and apartment water users.

3) Based on 2-year average (2019-2020) percent of total consumption and includes commercial and industrial users

4) Equal to 2-year average (2019-2020) percent of annual consumption supplied to Columbia City

5) Assumes gallons per day per acre for commercial and industrial development calculated from 2020 consumption and land use data. Assumes half of the anticipated industrial and commercial development occurs by 2030.

6) Assumes growth of 203 people in Columbia City by 2041. (from St. Helens WWMP 2021)

7) Assumes "other" water use does not increase. Generally includes system flushing, construction, and park irrigation.

1.4 REGULATORY PLANNING CRITERIA

The regulatory planning criteria to be used to evaluate the distribution system included criteria for water storage, system pressures, supply and delivery, and fire flow recommendations. The storage criteria includes various storage components such as operational, peaking, fire protection, and emergency storage. The fire flow requirements and regulatory pressure criteria are shown below in Table 1-4 and Table 1-5 respectively. Additional storage criteria is summarized in Section 1.6.4.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-4: FIRE FLOW DEMAND

Land Use	Recommended Fire Flow (gpm)	Duration (hours)	Volume (gallons)
Residential	1,500	2	180,000
Commercial	3,000	3	540,000
Industrial	3,500	4	840,000

TABLE 1-5: DISTRIBUTION SYSTEM CRITERIA

Criteria	Pressure (psi)
Peak Hour Demand Event (minimum)	40
Maximum Day Demand Plus Fire Flow	25
Maximum Intermitent Pressure	100
Operational Pressures without Pressure Regulator (maximum)	80

1.5 WATER FILTRATION FACILITY EVALUATION

The WFF, which was originally constructed in 2005 and 2006 to treat water sources under the influence of surface water, provides the primary source of potable water to the City's users. The WFF process consists of disinfection, straining, filtering, and storage in the clearwell before being pumped into the distribution system. The scope of this study included a summary of the treatment capacity for the major treatment processes, summary of anticipated deficiencies within the 20-year planning period, completion of concentration x time (CT) calculations with variances in seasonal temperature and pH data, and a summary of short-lived assets and membrane replacement schedules. Deficiencies were not identified in the major treatment process capacities nor the CT calculations; however, additional projects to improve operations and resiliency of the WFF included controls upgrades, installing variable frequency drive (VFD) pumps at Ranney Wells #2 and #3, and installing a redundant supply/distribution transmission pipeline. There are also short-lived assets at the WFF which are reaching the end of their typical useful life and should begin to be replaced. These assets in need of replacement include the membrane filters and chemical feed pumps.

1.6 WATER DISTRIBUTION SYSTEM EVALUATION

The evaluation of the water distribution system included a conditions assessment, supply/delivery evaluation, storage evaluation, and hydraulic model evaluation.

1.6.1 CONDITIONS ASSESSMENT

The water system facilities were visited by Keller Associates in July 2021 to assess the general conditions of the facilities, identify deficiencies, and recommend improvements to the facilities. Several improvements were recommended to the facilities and are summarized in the capital improvement plan (CIP)

1.6.2 SUPPLY ANALYSIS

The City has four active water rights which they can use for municipal water supply. The existing and future MDD were compared to the available water rights from Ranney Wells #2 and #3 because Ranney Well #1 and the Bayport Well are not used in day-to-day operations. These sources could be considered as an additional daily supply if there is a need in the future, however, the City has a projected surplus of 3.1 MGD in 2041. The City has ample available water supply to the WFF to meet the existing and 20-year projected demands.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

1.6.3 DELIVERY ANALYSIS

The pumping capacity of each facility was compared to the water demand to which it must supply, for instance, the WFF was compared to the entire water system demands because it must provide water to all pressure zones (PZs). The Lemont Booster Station (BS) capacity was compared to the demands in the High PZ and Elk Ridge PZ because it must supply water to both of these PZs. The WFF, Lemont BS, and Elk Ridge BS all have an existing and projected future surplus of pumping capacity compared to the MDD.

1.6.4 STORAGE ANALYSIS

The City has a total of four water reservoirs which provide operating, equalization, emergency, and fire storage, but currently, the City's 2.0 MG Reservoir is offline due to unresolved leaks. This evaluation considers scenarios with the 2.0 MG Reservoir being on and offline because the City is currently in the process of addressing the leaks in the reservoir.

The storage analysis for the Main PZ and High PZ are shown in Table 1-6 and Table 1-7. The City has an existing storage deficit in the Main and High PZ with the 2.0 MG Reservoir offline, however, once the reservoir is repaired, the City will have a surplus of 1 MG in the Main PZ which can be used to supplement the High PZ storage needs. There is a projected storage deficit of almost 1 MG by 2041 even with the 2.0 MG Reservoir online, therefore, it is recommended that the City construct additional storage in the future.

TABLE 1-6: MAIN PZ STORAGE ANALYSIS

	2021 - Scenario 1[6]	2021 - Scenario 2[6]	2041 [7]
Operational Storage (gal)[1]	240,000	432,000	432,000
Peaking Storage (gal)[2]	329,000	329,000	533,000
Emergency Storage (gal)[3]	**2,558,000**	**2,558,000**	**4,150,000**
Nested Fire Storage (gal)[4]	840,000	840,000	840,000
Total Storage Required (rounded) (gal)	3,127,000	3,319,000	5,115,000
Total Storage Available (rounded) (gal)	2,398,000	4,320,000	4,320,000
Storage Surplus / (Deficiency) (gal)	**(729,000)**	**1,001,000**	**(795,000)**

1) Assumes operational storage accounts for 10% of the available storage in the zone.

2) Calculated from water system diurnal curve.

3) Equal to storage required to supply the average day demand for 48 hours.

4) Equal to 3,500 gpm fire flow demand for a duration of 4 hours.

5) Assumes fire flow storage is nested within the ermergency storage

6) Scenario 1 assumes 2.0 MG Reservoir is offline. Scenario 2 assumes 2.0 MG Reservoir is online.

7) Assumes 2.0 MG Reservoir is online by 2041.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-7: HIGH PZ STORAGE ANALYSIS

	2021	2041
Operational Storage (gal)[1]	64,000	64,000
Peaking Storage (gal)[2]	49,000	78,000
Emergency Storage (gal)[3,5]	375,000	**609,000**
Fire Storage (gal)[4,5]	**540,000**	540,000
Total Storage Required (rounded) (gal)	653,000	751,000
Total Storage Available (rounded) (gal)	631,500	631,500
Storage Surplus / (Deficiency) (gal)	**(21,500)**	**(119,500)**

1) Assumes operational storage accounts for 10% of the available storage in the zone.

2) Calculated from water system diurnal curve.

3) Equal to storage required to supply the average day demand for 48 hours.

4) Equal to 3,000 gpm fire flow demand for a duration of 3 hours.

5) Assumes emergency storage nested within fire storage in 2021 and fire storage nested within emergency storage in 2041.

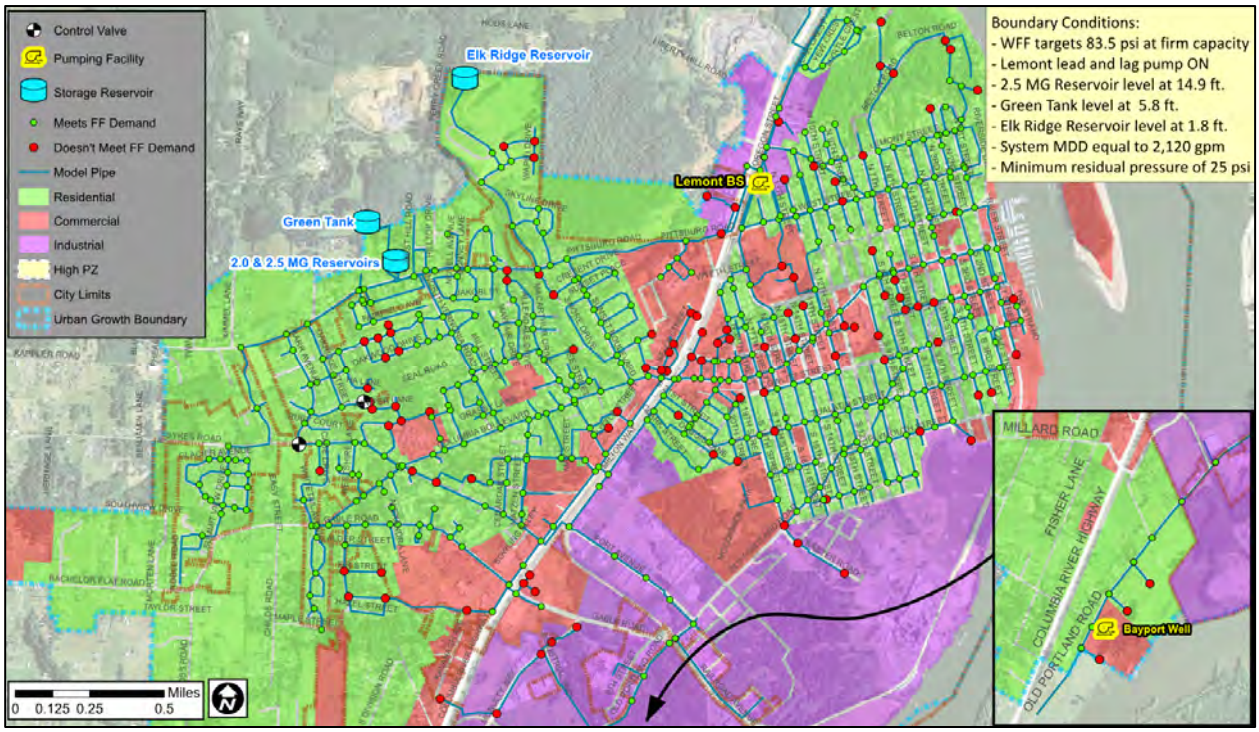
1.6.5 HYDRAULIC MODEL EVALUATION

The City's previous water model was updated with development and capital improvement projects which were completed since the last master plan and water demands were updated. Hydrant flow testing was completed in August 2021 and the observed data was used to calibrate the water model.

ADD and PHD scenarios were exercised to locate areas with operating pressures outside of the regulatory planning criteria. As a result, two general areas were observed with low pressures and included areas north of Pittsburg Road in the High PZ and along Oakwood Drive and Helens Way in the Main PZ. Pressures over 80 psi were observed in a large area of the Main PZ generally east of the Columbia River Highway. The model was also exercised to document the available fire flow throughout the system during MDD, and several areas scattered throughout the water system did not meet the fire flow demand established for each zone. Figure 1-5 below illustrates the areas where the fire flow demands are not met.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

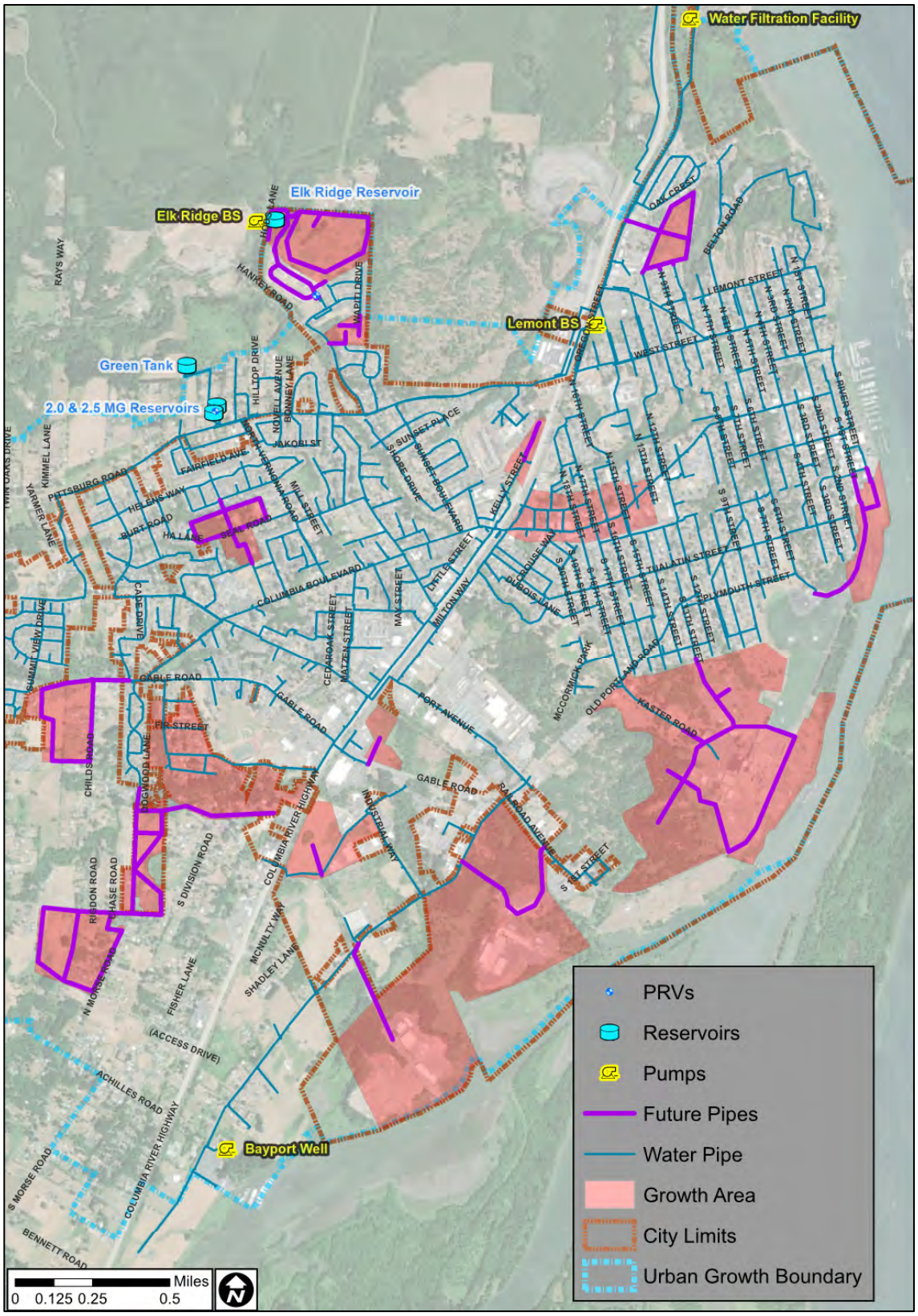
FIGURE 1-5: AVAILABLE FIRE FLOW BELOW FIRE FLOW DEMANDS



Future model demands were assigned based on growth areas identified by the City, and water pipes were modeled within the growth areas as well as connections to the existing system where feasible. See Figure 1-6 below for the illustrated future growth areas and pipe alignments. The future ADD and PHD scenarios were exercised to locate additional deficiencies due to increased water demands. Minimal differences were observed between the existing and future ADD and PHD scenarios and the deficiencies identified in the existing evaluation persisted. MDD plus fire flow scenarios were also exercised to identify what improvements the growth areas should make in order to meet the recommended fire flows. These improvements are included as Priority 4 projects in the CIP.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 1-6: FUTURE GROWTH AREAS AND PIPE ALIGNMENTS



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

1.7 SEISMIC RESILIENCY PLAN

The Oregon Resilience Plan was developed in 2013 and provides the state's road map for earthquake preparedness. The plan consisted of evaluating the likely impacts of a future seismic event in the Cascadia subduction zone, determining acceptable timeframes to restore functions following the seismic event, and changes in practice and policies to prepare the state and reach desired resilience targets. These three tasks were evaluated for a number of utility types, one of which was potable water systems. Potable water systems were identified as "especially vulnerable to damage resulting from a Cascadia subduction zone earthquake." The goal of this plan was to identify critical infrastructure needed to supply water during an emergency and identify projects to be completed in the next 50 years to ensure that potable water can be provided to City residents in the event of a strong earthquake.

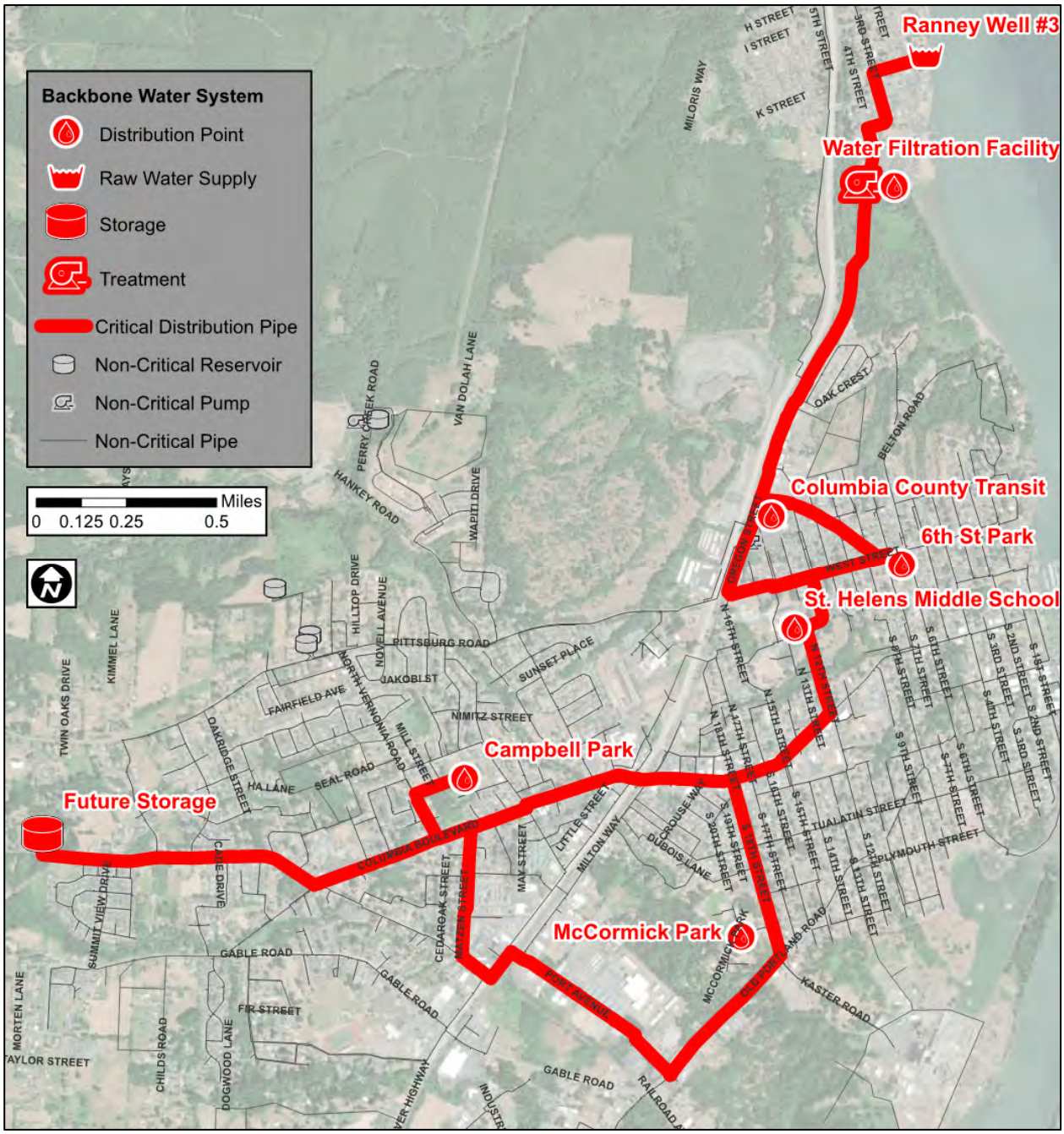
One component of the seismic resiliency plan was to identify a backbone water system which should be improved to withstand a large seismic event and remain in operation to provide the City and residents with a supply of potable water. A backbone water system was identified with input from the City and the components are summarized in Table 1-8 and illustrated in Figure 1-7.

TABLE 1-8: BACKBONE WATER SYSTEM SUMMARY

Facility Name	Type	Backbone System
Ranney Collector Well #1	Inactive Water Supply	No
Ranney Collector Well #2	Active Water Supply	No
Ranney Collector Well #3	**Active Water Supply**	**Yes**
Bayport Well	Inactive Water Supply	No
Water Filtration Facility	**Water Treatment**	**Yes**
Lemont Booster Station	Pumping Facility	No
Elk Ridge Booster Station	Pumping Facility	No
2.0 MG Reservoir	Water Storage	No
2.5 MG Reservoir	Water Storage	No
Green Reservoir	Water Storage	No
Elk Ridge Reservoir	Water Storage	No
Future Reservoir	**Water Storage**	**Yes**

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

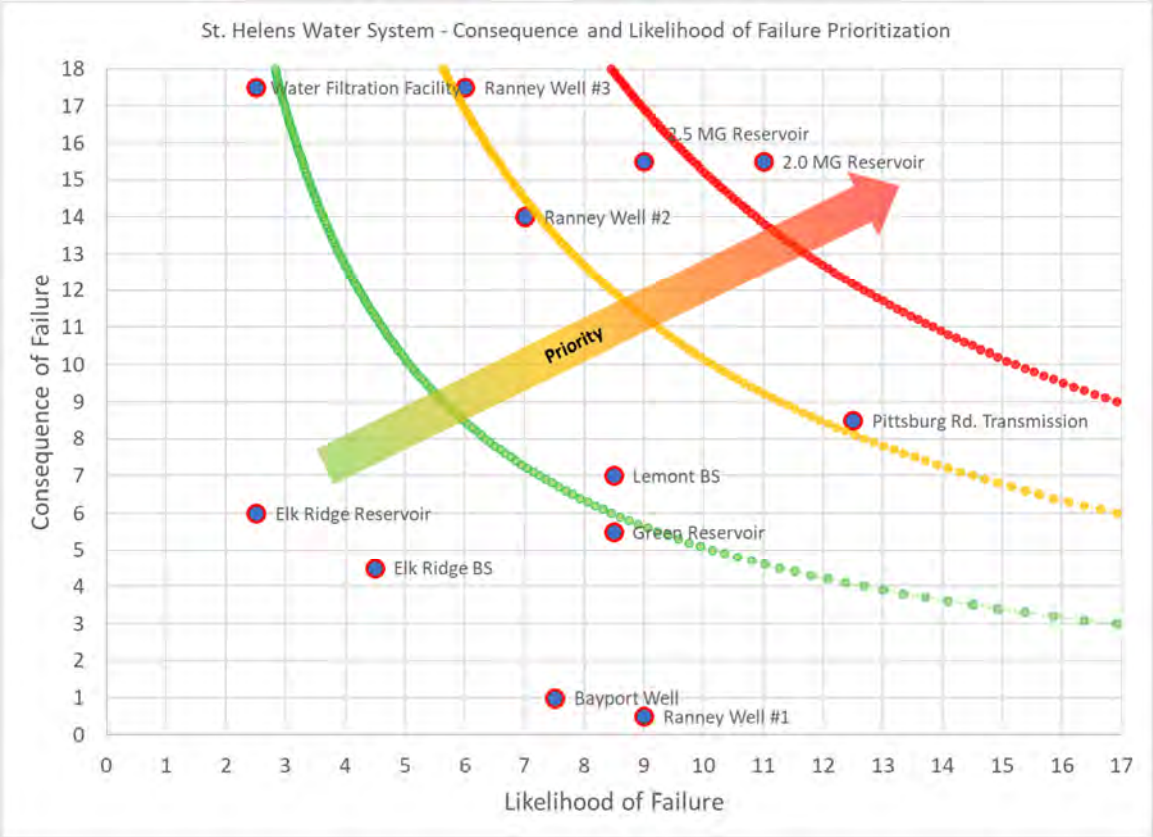
FIGURE 1-7: BACKBONE WATER SYSTEM



Additional components of the seismic resiliency plan were a high-level structural evaluation of the supply, storage, treatment, and booster stations. The evaluation was included as a criterion in a consequence and likelihood of failure analysis. Figure 1-8 below summarizes the results from the likelihood and consequence of failure analysis. As seen, the highest priority facilities are the 2.0 MG Reservoir, 2.5 MG Reservoir, Pittsburg Road transmission pipeline, and Ranney Well #3. Recommended projects to increase seismic resiliency for the water facilities are included in the CIP.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 1-8: LIKELIHOOD AND CONSEQUENCE OF FAILURE PRIORITIZATION



1.8 ALTERNATIVES ANALYSIS

An alternatives analysis was completed to address deficiencies identified in the previous sections. Where improvement projects are not relatively straightforward, up to three alternatives were evaluated to address the targeted deficiency. The analysis generally included significant deficiencies such as undersized booster stations, insufficient storage, operating pressures out of compliance with operating requirements or planning criteria, and insufficient fire flow. Multiple alternatives were also evaluated for growth related improvement projects to find the most effective long-term solution. A full summary of the recommended improvement projects is included in the CIP.

1.9 OPERATIONS AND MAINTENANCE

The City's existing operations and maintenance (O&M) program for the potable water system was discussed with the City's public works (PW) staff to document existing O&M activities currently being completed. Additional O&M activities were recommended in this master plan which included development of unaccounted for water reports annually, valve exercising and pipeline/valve replacement program, leak detection program, reservoir inspections, and continued public education efforts. Additional O&M items discussed included the need for a back-up generator at the PW shop, purchasing a hydrant diffuser with a flow meter, and considering incentives for higher distribution system licensing.

A water system asset replacement program was developed for the water system based on typical useful life of the assets and the total replacement costs. A summary of the water system replacement program is shown in Table 1-9.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-9: ANNUAL REPLACEMENT PROGRAM

Asset[1]	Typical Useful Life	Total Replacement Cost	Annualized Replacement Cost
Distribution Pumps	20	$180,000	$9,000
Water Meter (Full Replacement)	20	$1,200,000	$60,000
Water Meter Register	10	$960,000	$96,000
Distribution Piping	75	$86,000,000	$1,100,000
Booster Station Housing, Valves, and Hydrants	50	$6,700,000	$130,000
Storage Reservoirs	50	$8,000,000	$160,000
	Total	$103,000,000	$1,600,000

1) Costs assume public works contract to perform work.

1.10 STAFFING EVALUATION

The City's PW staff was interviewed in Summer 2021 to assess existing staffing levels and compare to optimal staffing levels needed to achieve the recommended level of service (LOS) and O&M activities. To summarize, the PW operations staff currently has an equivalent of approximately 3.5 full-time employees (FTE) who operate and maintain the water distribution system and 1.0 FTE for O&M at the WFF. Based on this evaluation, the City's current staffing at the WFF appears to be adequate and the water utility staffing is within the recommended range as long as the utility crews focus solely on water utility O&M. Note, the staffing evaluation for this report is a high-level, initial estimate. The City would benefit from tracking the number of hours the PW operations staff spend on various activities and utilities throughout the year to assess how best to budget and allocate resources in order to provide the recommended O&M of the water system. It is also recommended that staffing needs be reevaluated every two to three years.

1.11 CAPITAL IMPROVEMENT PLAN

Improvements recommended throughout the study are included in the CIP. The projects were prioritized based on the criteria shown in Table 1-10 below.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-10: CIP PRIORITIZATION CRITERIA

Priority	Description
1	▶ Address imminent failure of asset (based on physical conditions) ▶ Correct existing or future operational/peaking, emergency, and fire storage deficiencies ▶ High health and safety risks ▶ Complete repairs based on condition assessment within 0-5 years
2	▶ Correct pressures below 40 psi for potable peak hour demands ▶ Complete repairs based on condition assessment within 5-10 years ▶ Complete WTP and distribution system operational improvements ▶ Provide available fire flow above 1,000 gpm in all locations
3	▶ Meet future operational/peaking, emergency, and fire storage deficiencies ▶ Provide available fire flow to meet recommended fire flow demands for each zone type ▶ Complete repairs based on condition assessment within 10-20 years
4	▶ Development driven future projects.
5	▶ Non-critical seismic resiliency plan improvements ▶ Improve overall water system transmission and looping

Priority 1 improvements should be completed within the next 0-6 years as they are critical projects which address imminent failure, storage deficits, emergency preparedness, and conditions related replacements. A summary of these improvements is shown in Table 1-11.

TABLE 1-11: 6-YEAR CIP SUMMARY

ID#	Item	2022 Cost	Opinion of Probable Costs (2022 Dollars)					
			2022	2023	2024	2025	2026	2027
Priority 1 Improvements								
1.1	Repair Existing 2.0 MG Reservoir	$ 700,000	$ 700,000					
1.2	Full-Rate Study	$ 30,000	$ 30,000					
1.3	Bayport Well Activation	$ 10,000		$ 10,000				
1.4	Install Redundant Pittsburg Rd / Milton Creek Crossing	$ 680,000			$ 680,000			
1.5	Back-up Generator for PW Shop	$ 100,000				$ 100,000		
Total (rounded)		**$ 1,600,000**	**$ 730,000**	**$ 10,000**	**$ 680,000**	**$ 100,000**	**$ -**	**$ -**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

The full CIP including costs, priorities, and estimated system development charges (SDC) eligibility is shown in Table 1-12 and illustrated in Figure 1-9 on the following pages. The City of St. Helens establishes water SDCs per Resolution 1796, effective August 2017. The current improvement SDCs for water meter connections vary from $3,400 for a ¾-inch meter to $180,000 for an 8-inch meter.

The proposed improvement projects were allocated a percentage of the total cost that is eligible for funding by collected SDC funds. Each capital improvement project that will benefit areas identified by the City as anticipated growth within the 20-year planning period were reviewed. The SDC improvement amount is based on the percentage of future development demands to the existing water demands benefitted by the improvement.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-12: CIP SUMMARY TABLE

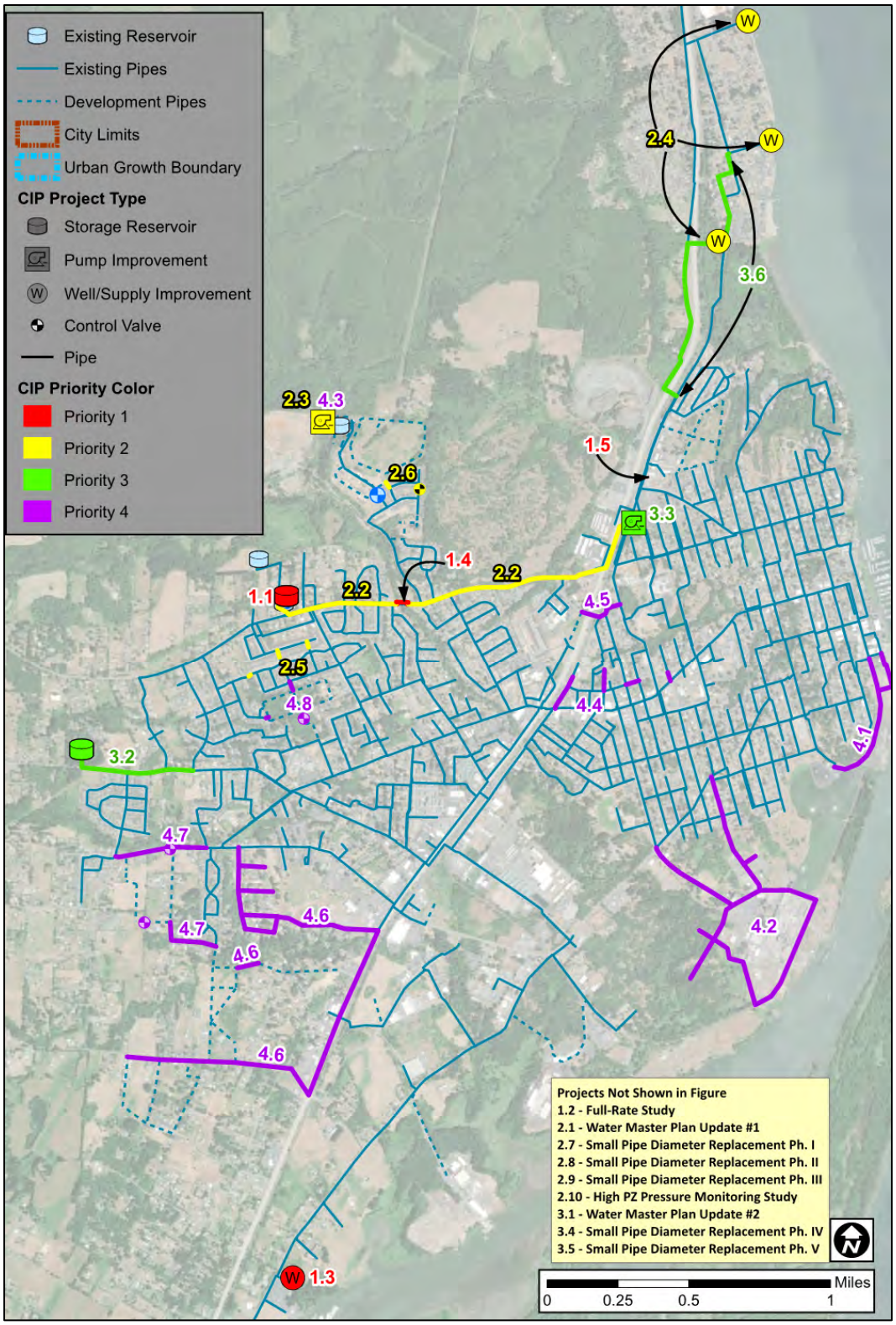
Project ID#	Project Name	Project Trigger	Total Estimated Cost (2022 Dollars)	SDC Eligibility (%)	Cost Allocated to Growth	Cost Allocated to City
Priority 1 Improvements (2022-2027)						
1.1	Repair Existing 2.0 MG Reservoir	Storage Deficit	$700,000	0%	$0	$700,000
1.2	Full-Rate Study	New Capital Improvement Plan	$30,000	100%	$30,000	$0
1.3	Bayport Well Activation	Emergency preparedness	$10,000	40%	$4,000	$6,000
1.4	Install Redundant Pittsburg Rd / Milton Creek Crossing	Condition / Likelihood of Failure	$680,000	20%	$140,000	$540,000
1.5	Back-up Generator for PW Shop	Emergency preparedness	$100,000	40%	$40,000	$60,000
		Total Priority 1 Improvements (rounded)	**$1,600,000**	**-**	**$300,000**	**$1,400,000**
Priority 2 Improvements (2027-2032)						
2.1	Water Master Plan Update #1	Recommended every 5-10 years	$200,000	100%	$200,000	$0
2.2	Lemont BS to Pittsburg Rd Pipeline Replacement	Condition / Likelihood of Failure	$6,000,000	55%	$3,270,000	$2,730,000
2.3	Elk Ridge BS Condition Improvements	Condition and emergency preparedness	$110,000	100%	$110,000	$0
2.4	Ranney Wells Control Upgrades	Operations upgrades	$700,000	40%	$280,000	$420,000
2.5	Helens Way PZ Boundary Modification	Low PHD Pressures	$400,000	56%	$220,000	$180,000
2.6	Spotted Hill and Wapiti Drive PZ Boundary Modification	Low PHD Pressures	$160,000	0%	$0	$160,000
2.7	Small Pipe Diameter Replacement Phase I	Existing AFF less than 1,000 gpm	$6,300,000	0%	$0	$6,300,000
2.8	Small Pipe Diameter Replacement Phase II	Existing AFF less than 1,000 gpm	$5,300,000	0%	$0	$5,300,000
2.9	Small Pipe Diameter Replacement Phase III	Existing AFF less than 1,000 gpm	$3,700,000	0%	$0	$3,700,000
2.10	High PZ Low Pressure Study	Low PHD Pressures	$30,000	0%	$0	$30,000
		Total Priority 2 Improvements (rounded)	**$22,900,000**	**-**	**$4,100,000**	**$18,900,000**
Priority 3 Improvements (2032-2041)						
3.1	Water Master Plan Update #2	Recommended every 5-10 years	$200,000	100%	$200,000	$0
3.2	4.0 MG Reservoir Construction	Future Storage Deficit	$24,800,000	40%	$9,810,000	$14,990,000
3.3	Lemont BS Replacement	Condition improvements	$1,300,000	55%	$710,000	$590,000
3.4	Small Pipe Diameter Replacement Phase IV	AFF below recommended FF demand by zone	$3,700,000	0%	$0	$3,700,000
3.5	Small Pipe Diameter Replacement Phase V	AFF below recommended FF demand by zone	$3,200,000	0%	$0	$3,200,000
3.6	Redundant WFF Supply and Distribution Transmission	Emergency preparedness	$8,400,000	40%	$3,320,000	$5,080,000
		Total Priority 3 Improvements (rounded)	**$41,600,000**	**-**	**$14,100,000**	**$27,600,000**
Priority 4 Improvements (Future / Developer Driven Improvements within Study Period 2022-2041) [1]						
4.1	Riverfront District Development	Development Driven	$3,400,000	100%	$3,400,000	$0
4.2	Industrial Business Park Development	Development Driven	$11,900,000	100%	$11,900,000	$0
4.3	Elk Ridge Upper Development	Meet recommended operating pressures	$1,000,000	100%	$1,000,000	$0
4.4	Houlton Business District Development	Meet recommended fire flow demands	$1,200,000	100%	$1,200,000	$0
4.5	Growth Area 4 Commercial Development	Meet recommended fire flow demands	$900,000	100%	$900,000	$0
4.6	Growth Area 1, 9, 11, and 13 Development	Development Driven and meet fire flow demands	$11,300,000	100%	$11,300,000	$0
4.7	Growth Area 10 Residential Development	Meet recommended operating pressures	$2,600,000	100%	$2,600,000	$0
4.8	Growth Area 8 Residential Development	Meet recommended operating pressures	$400,000	100%	$400,000	$0
		Total Future Improvements (rounded)	**$32,700,000**	**-**	**$32,700,000**	**$0**
Priority 5 Improvements (2041-2071)						
5.1	Ranney Well #3 Structural Evaluation	*Cost Estimates not Developed for Priority 5 Improvements*				
5.2	Backbone Water System Replacement					
		TOTALWATER SYSTEM IMPROVEMENTS COSTS (rounded)	**$98,800,000**	**-**	**$51,200,000**	**$47,900,000**

1) Timing of these capital improvement projects depends on when growth occurs. It is anticipated the future development will participate in capital improvement projects as required.

2) The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 1-9: CAPITAL IMPROVEMENT PLAN



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

1.12 ADDITIONAL CONSIDERATIONS

It is recommended that the City update their planning documents every five years as updates to the planning documents and models allow the City to re-assess needs, priorities, and properly set budgets to address system deficiencies. A master plan update for the water system has been included as a Priority 2 as well as a Priority 3 improvement in the CIP with an estimated cost of $200,000. It is assumed that the Water Management and Conservation Plan will also be updated along with the master plan at each interval.

The City is recommended to complete a full-rate study for the water utility to evaluate the potential user rate and SDC impacts of the recommended CIP. Estimated SDC eligibility for each identified capital improvement is included in Table 1-12 for use in completing a full-rate study. The City is advised to actively pursue opportunities for grant funds, low-interest loans, or principal forgiveness funding sources to mitigate user rate impacts. As the City begins to prepare for and proceed with CIP projects, if outside funding is desired, it is recommended the City participate in a one-stop meeting with Business Oregon to identify and assess potential funding sources for the CIP projects. One example of a funding source that would be at the one-stop meeting is the federal-state partnership Clean Water State Revolving Fund (CWSRF).

1.13 WATER MANAGEMENT AND CONSERVATION PLAN

The City's Water Management and Conservation Plan (WMCP) was updated as a part of this master plan update and several of the components required to be included in the WMCP are addressed throughout the WMP sections. Additional components of the WMCP included an update on previously proposed conservation benchmarks, updated curtailment plan, and evaluation of future supply needs. A summary of the updated 5-year benchmarks, future supply needs, and water curtailment plan are shown in the following tables.

TABLE 1-13: WMCP 5-YEAR BENCHMARKS

Benchmark	Date	Frequency
Annual Water Audit	January 2023	Annually
Fully Metered System	Complete	-
Meter Testing and Maintenance	-	Ongoing
Propose New Rate Structure	2022	10 years
Leak Detection	Summer 2022	Annually
Public Education	-	Ongoing
Leak Repair/Line Replacement	-	Ongoing
Technical Assistance	2022	Continuously
Replacement of Inefficient Fixtures	2022	Continuously
Reuse Recycling, Non-Potable Eval.	None Proposed	None Proposed

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-14: 50-YEAR WATER DEMAND PROJECTIONS

Year	Projected Population[1]	System MDD (MGD)[2,3]	Available Water Supply to WFF (MGD)[4]	Surplus / Deficiency (MGD)
2021	**14,068**	3.05	8.10	5.05
2031	**15,694**	3.98	8.10	4.12
2041	**17,509**	4.95	8.10	3.15
2051	**19,533**	5.77	8.10	2.33
2061	**21,791**	6.41	8.10	1.69
2071	**24,310**	7.12	8.10	0.98

1) Population projections assume an average annual growth rate of 1.1%. See Section 2.3 for additional information

2) 2021-2041 demand projections based on 20-year growth areas identified by the City. 2051-2071 demands projected assuming 282 gallons per capita per day which is based on the 2041 population and demands

3) Water demands from 2051-2071 assume 0.25 MGD of water supplied to City of Columbia City

4) Includes Ranney #2 and #3 water supply

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 1-15: WATER CURTAILMENT PLAN

Stage	Trigger	Notification	Goal	Curtailment Measure
Mild	Determination made by the public works director that a potential for water shortage exists	Provide customers notices on utility bills and news released to media. Notification of "Mild" alert and curtailment measures to City of Columbia City and McNulty Water PUD	Public awareness and 5% reduction in consumption	➢ Institute a voluntary watering schedule based on odd/even address numbers for residential and business customers. Customers ask to restrict watering to early morning and evening hours to avoid loss through evaporation ➢ Disseminate informational brochures on conservation methods ➢ Update conservation hotline with information on current supply situation, voluntary measures, and conservation tips ➢ Develop a combination of media outreach through newspaper, public service announcements, and/or theater slides ➢ Provide specific notification to major water users asking for voluntary reduction in use and/or deferring nonessential use to off-peak hours. For commercial and industrial users that have developed water shortage contingency plans, provide specific notification at each stage of curtailment and ask that they implement a corresponding action ➢ City decorative fountains that do not recirculate water shall cease operating ➢ Parks Department shall operate their irrigation system to achieve maximum efficiency ➢ City uses of water for hydrant and water line flushing shall be limited to essential need
Moderate	Determination made by public works director that a water shortage exists	Customers notified through major media sources of the request to voluntarily curtail all nonessential water use. Updates on water situation shall be provided to media regularly. "Moderate" alert and curtailment measures to City of Columbia City and McNulty Water PUD	10% reduction in consumption	➢ Continue with "Mild" stage measures except where noted below ➢ Customers asked to voluntarily restrict all lawn watering and other nonessential uses of water as specified below ➢ No watering or irrigating of lawns, grass or turf unless it is: o New lawn, grass, or turf that has been seeded or sodded after March 1 of the calendar year o Athletic fields frequently used for organized play o Park and recreation areas of a particular significance and value to the community as approved by the City Manager. No use of City-supplied water shall be allowed to clean, fill, or maintain levels in decorative fountains ➢ No use of City-supplied water to wash sidewalks, walkways, streets, driveways, parking lots, or other hard surfaced areas except where necessary for public health or safety ➢ No use of City-supplied water shall be allowed to wash vehicles ➢ For parks supplied by City water, the Parks Department shall limit nonessential water use and/or irrigate only during off-peak hours as specified by the City Mayor in consultation with the Public Works Director ➢ Hydrant and water main flushing shall be done for emergencies only
Critical	Determination made by the public works director that there is a critical water supply shortage that threatens the City's ability to	If the event is local, the City will distribute information to affected customers. The City Mayor shall immediately submit a report at the next City Council Meeting. All media notified and updated regularly on the water supply status. "Critical" alert and curtailment measures to	25% reduction in consumption	➢ Continue with "Mild" and "Moderate" stage measures except where noted below ➢ No use of City-supplied water shall be allowed to fill swimming pools or other pools with a capacity in excess of 100 gallons, provided, however, that water may be added to swimming pools to replace volume lost due to evaporation and normal loss due to usage ➢ No use of City-supplied water shall be allowed to wash sidewalks, walkways, streets, driveways, parking lots, or other hard surfaces ➢ The Parks and Recreation Department shall use their automated irrigation system to restrict nonessential water use at parks supplied by City water as specified by the City Mayor in consultation with the Community Services City Manager

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

	delivery water supplies	City of Columbia City and McNulty Water PUD		➢ Hydrant and water main flushing shall be done for emergencies only
Emergency	WFF failure or major supply restriction resulting in significant loss of production capacity	Customers notified through major media sources of the mandatory curtailment of all nonessential water use. Updates on water situation shall be provided to media regularly. "Emergency" alert and curtailment measures to City of Columbia City and McNulty Water PUD	50% reduction in consumption	➢ Continue with "Mild", "Moderate", "Critical" stage measures except where noted below ➢ Prohibit all irrigation of residential, commercial, industrial, and City parks ➢ Impose industrial restrictions targeting significant reduction in water usage ➢ Activate Bayport Well as a supplemental water source. Notify public of potential taste/odor changes in water aesthetics specifically highlighting the water meets State and Federal regulations for potable water systems

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 2 - PROJECT PLANNING

The City of St. Helens (City) owns and operates a municipal water distribution system and water filtration facility (WFF). The purpose of this study is to assess the City's water distribution system needs, evaluate if the existing distribution system can meet those needs, and provide a long-term plan to implement improvements so the needs of the City can be met. The following study describes the conditions, demands, and problems in the existing system, analyzes the hydraulic demand data, and provides recommendations for improvements to the water system over the 20-year planning period.

2.1 LOCATION AND STUDY AREA

The City of St. Helens, Oregon is located adjacent to the Columbia River, approximately 25-miles northwest of Portland on US Highway 30. The City's potable water service area is located generally within the City limits with some users outside the City limits, and additional future service areas are located within the urban growth boundary (UGB). Figure 1 in Appendix A illustrates the City limits and UGB.

2.2 ENVIRONMENTAL RESOURCES PRESENT

The section below describes the existing environmental resources present in this area that might be impacted by water facilities. The components analyzed in this section include land use, floodplains, wetlands, cultural resources, coastal resources, and socio-economic conditions. Discussion of environmental impacts on specific alternatives is covered later in the report.

2.2.1 LAND USE

The City's zoning of land use includes residential, commercial, industrial, and public zoning within the City limits. Approximately half of the zoning within the City limits is residential with heavy and light industrial zones concentrated in the southern portion of the City. Most commercial areas surround US Highway 30 or are located in the Houlton Business District or Riverfront District. A zoning map for the study area is shown in Figure 2 in Appendix A.

2.2.2 FLOODPLAINS

Information on the floodplains in the study area is available from the Federal Emergency Management Agency (FEMA) Map Service Center. These maps show portions of the planning area which lie within the 100-year floodplain adjacent to the floodway of the Columbia River and several other small drainages. Figure 3 in Appendix A shows the flood hazard areas within the study area obtained from the FEMA website, and the figure is for display purposes only. For specific projects in these areas, the individual FEMA Flood Insurance Rate Map (FIRM) Panels should be referenced.

2.2.3 WETLANDS

The City completed a Local Wetlands Inventory (LWI) in 1999 that was accepted by the Department of State Lands (DSL) and is referenced in the City's Comprehensive Plan as of May 2020. In the Comprehensive Plan, the City takes inventory and maps their wetlands to assess their functions in order to determine "Locally Significant Wetlands" that contribute to wildlife habitat, fish habitat, water quality, floodwater retention, recreational opportunities, and/or educational opportunities. The Comprehensive Plan lists the following wetlands as Locally Significant Wetlands: Dalton Lake, McNulty Creek, Frogmore Slough, Jackass Canyon, Milton Creek, Unnamed Creek A, and Unnamed Creek B.

Approximately 443 acres of wetlands were identified within the study area and were classified into the wetland types listed below. Figure 4 in Appendix A illustrates the wetlands mapping. Definitions were retrieved from the U.S. Fish and Wildlife Service (USFWS) Classification of Wetlands and Deepwater Habitats of the United States.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- Palustrine Forested Wetland – A wetland with soil that is saturated and often inundated and is dominated by woody plants taller than 20 feet. Water-tolerant shrubs and herbaceous plants are often beneath the forest canopy.
- Palustrine Scrub/Shrub Wetland – A wetland dominated by shrubs and woody plants less than 20 feet tall. Water levels can range from permanent to intermittent flooding.
- Palustrine Emergent Wetland – Wetlands dominated by erect, rooted herbaceous plants that can tolerate flooded soil conditions, but cannot tolerate being submerged for extended periods, e.g., cattails, reeds, and pickerelweeds.
- Palustrine Rock Bottom Wetland – Wetlands with substrates having an areal cover of stones, boulders, or bedrock 75% or greater and vegetative cover less than 30%. Water regimes are restricted to subtidal, permanently flooded, interment exposed, and semipermanent flooded.
- Lacustrine Littoral Wetland – Wetlands situated in a topographic depression or a dammed river channel and lack trees and shrubs. Wetlands are permanently flooded with extensive areas of deep water.
- Riverine Upper Perennial Wetland – Water is flowing throughout the year and includes wetlands contained within a channel unless the wetland is dominated by trees, shrubs, and emergent, or habitats with water containing ocean derived alts in excess of 0.5%. The gradient of the channel is high, and velocity is fast.
- Riverine Intermittent Wetland – Similar to Riverine Upper Perennial Wetland except water only flows for parts of the year.

Additionally, to protect riparian areas of locally significant wetlands, including McNulty and Milton Creek, designated upland protection zones have been established where construction is limited or prohibited.

2.2.4 HISTORIC SITES, STRUCTURES, AND LANDMARKS

The National Register of Historic Places lists one historic site for St. Helens: The St. Helens Downtown Historic District, which is composed of approximately 101 buildings. Additionally, 23 areas and structures within the City limits which hold local significance were identified as “designated landmarks” by City Ordinance Number 3250. A map of the Downtown Historic District and locally designated landmarks can be found in Figure 5 in Appendix A.

2.2.5 BIOLOGICAL RESOURCES

The USFWS produces a database that lists endangered and threatened plants throughout the United States. A database search for Columbia County returned several types of plants and species listed as endangered or threatened. Some of these listed species are shown below, but the full list can be found in Appendix B.

- Bull Trout (Fish)
- Burrington Jumping-Slug (Snails)
- Golden Paintbrush (Flowering Plant)
- Marbeled Murrelet (Bird)
- Willamette Daisy (Flowering Plant)
- Streaked Horned Lark (Bird)
- Bradshaw’s Desert-Parsley (Flowing Plant)
- Water Howellia (Flowering Plant)
- Columbian White-Tailed Deer (Mammal)
- Yellow-Billed Cuckoo (Bird)
- Kincaid’s Lupine (Flowering Plant)
- Red Tree Vole (Mammal)

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- Northern Spotted Owl (Bird)
- Nelson's Checker-Mallow (Flowering Plant)

2.2.6 WATER RESOURCES

The Columbia River, Jackass Canyon, Milton Creek, McNulty Creek, the Frogmore Slough, and two unnamed creeks flow through the study area. The WFF treats groundwater under the influence of surface water from the Columbia River, Jackass Canyon is 303(d) listed for sedimentation and has a total maximum daily load (TMDL) for temperature, and McNulty Creek is 303(d) listed for biological criteria. In addition, the Lower Columbia River is 303(d) listed for arsenic, DDE4, fecal coliforms, and PCBs, and has a TMDL for dioxins and temperature.

2.2.7 COASTAL RESOURCES

There are no coastal areas within the study area.

2.2.8 SOCIO-ECONOMIC CONDITIONS

According to the City's Housing Needs Assessment, completed in May 2019, the City has experienced steady growth and anticipates growth to continue. The median household income is $45,789, which is 33% less than the 2019 national average according to census.gov. 31.7% of the City is considered to be low-income or earning less than $30,000 per year, which the assessment also states that approximately 25% of households are "severely rent burdened", meaning they spend more than 50% of income on rent and utilities. Higher utility rates can be a challenge for economic growth.

All areas of the City have access to the City's water distribution system which delivers the City designated level of service to all users. Recommended improvements in this plan would help achieve the same level of service throughout the distribution system for all users. City Council plans to holds a public meeting to review and adopt the water master plan (WMP).

2.2.9 CLIMATE

St. Helens' climate is characterized by dry temperate summers and cool wet winters. Table 2-1 summarizes the climate data for St. Helens. The National Oceanic and Atmosphere Administration (NOAA) Monthly Normals for St. Helens were used for the mean temperatures, however, NOAA data for precipitation was not available for St. Helens. As such, climate normals were taken from the nearby weather station in Scappoose, Oregon.

TABLE 2-1: CLIMATOLOGICAL DATA (2006-2020)

	Jan.	Feb.	Mar.	Apr	May	Jun	Jul
Precipitation (in.)	6.04	4.27	4.81	2.95	2.23	1.41	0.30
Mean Temp (°F)	40.2	42.2	46.1	50.3	57.6	62.2	68.2
	Aug.	Sep.	Oct	Nov	Dec	Sum / Average	
Precipitation (in.)	0.43	1.78	3.84	6.28	6.70	41.0	
Mean Temp (°F)	68.6	63.1	53.3	45.1	39.2	53.0	

2.2.10 GEOLOGIC HAZARDS AND SOILS

Potential geologic hazards in the St. Helens area include landslides and earthquakes. Volcanoes are excluded because there are no known volcanoes in the direct vicinity of this area to cause a volcanic hazard. The Oregon Department of Geology and Mineral Industries (DOGAMI) categorizes St. Helens in the low-to-high susceptibility range for landslides, which is corroborated by the Multi-Hazard Mitigation Plan for Columbia County. Additionally, City provided GIS reflects the findings of DOGAMI with only a small portion of the system to the north falls within the high susceptibility range for landslides. Figure 6 in Appendix A depicts the landslide hazard zones. The

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Multi-Hazard Mitigation Plan also reveals that in the past, seismic activity was fairly low, but because of more recent earthquakes, awareness of a potential problem has increased. The Plan simulated earthquake damage produced by a magnitude 9 Cascadia Earthquake, and St. Helens fell into the category of light to moderate damage. Local hazard maps show the area within City limits falls within zones A through D, with zone A indicating a very small probability of experiencing damaging earthquake effects and zone D indicating the possibility of very strong shaking that can cause considerable damage in structures lacking in special design. Figure 7 in Appendix A depicts a hazard map for seismic activity. Additional details and discussion of geologic hazards is included in the Geotechnical Planning Report (Shannon & Wilson, 2021) which was completed for the City's Wastewater (WWMP) and Stormwater Master Plans (SWMP) in 2021, which can be found in Appendix B.

In general, the soils within the St. Helens area are either rock complex or silty loam, and the slopes vary from zero to thirty percent, according to the NRCS website. Typically, surface soil is very shallow in St. Helens, and sits on top of unfractured basalt rock, which is often a challenge for utility construction and can be a significant cost factor, particularly in pipeline projects. Figure 8 in Appendix A shows the soil map for the St. Helens area. See Appendix B for more details on the study area geology and geologic hazards completed by Shannon & Wilson Geologic Investigation.

2.2.11 AIR QUALITY

The City does not currently lie within an Environmental Protection Agency (EPA) non-attainment area, and no permanent impacts to air quality are anticipated from the recommended improvements. Best management construction practices should be employed during construction to minimize erosion and sediment control.

2.3 POPULATION PROJECTIONS

The official population projections for the City of St. Helens reflect the collaborative efforts of Columbia County and Portland State University (PSU). These agencies published a document in June 2020, establishing the official coordinated population rates for all the cities in Columbia County. The document is titled "Coordinated Population Forecast for Columbia County, its UGB, and Area Outside UGBs 2020-2070", and includes a summary of historical populations from the U.S. Census. Table 2-2 presents the historical populations from the referenced document.

Each year, PSU establishes a preliminary population estimate in November, which is sent to state and local jurisdictions and community partners, then PSU sends a certified population estimate in December. For this WMP, the same study period was used as was used for the City's WWMP, so the base starting point for population projections is the 2019 PSU certified estimate. The average annual growth rate (AAGR) from the PSU referenced document provided the future population estimates. The overall estimated population growth from 2019 to 2040 (from 13,410 to 17,318) reflects an AAGR of 1.1%, which closely resembles the 1.0% growth rate reported in the Housing Needs Assessment.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 2-2: ST. HELENS POPULATION

Year[1]	St. Helens	Source
1990	7,535	US Census Bureau
2000	11,857	2020-2070 PSU Coordinate Population Forecast: US Census Bureau
2010	14,839	2020-2070 PSU Coordinate Population Forecast: US Census Bureau
2015	13,095	PSU Certified July 1, 2015
2019	13,410	PSU Certified July 1, 2019
2020	13,915	PSU Certified July 1, 2020
2021	14,068	Projected Using AAGR of 1.1% for St. Helens.
2025	14,697	Projected Using AAGR of 1.1% for St. Helens.
2030	15,524	Projected Using AAGR of 1.1% for St. Helens.
2031	15,694	Projected Using AAGR of 1.1% for St. Helens.
2035	16,396	Projected Using AAGR of 1.1% for St. Helens.
2040	17,318	Projected Using AAGR of 1.1% for St. Helens.
2041	17,509	Projected Using AAGR of 1.1% for St. Helens.

1) Coordinated Growth Rates (AAGR) from PSU Coordinated Population Forecast 2020-2070 Columbia County.

2.4 GROWTH AREAS

The 20-year growth shown in Table 2-2 equates to an increase of 3,900 people from 2019 to 2040. In this study, it is assumed that there is 2.49 people per equivalent dwelling unit (EDU) as recorded in the City's Housing Needs Assessment from 2019. The projected growth is anticipated to consist of residential, commercial, and industrial land use. The growth areas that were identified by the City, consist of locations within the existing City limits as well as locations outside the City limits but within the UGB. The residential growth areas are spread throughout the study area, most of the commercial growth is anticipated to take place within the Riverfront District, within the Houlton Business District, and along U.S. Highway 30, and the City's industrial area is located toward the southern UGB boundary, which is anticipated to develop with heavy industrial users. Figure 9 in Appendix A illustrates the identified 20-year growth areas. Table 2-3 below breaks down the anticipated growth with their associated area of commercial/industrial development as well as number of EDUs. Figure 2-1 below shows the locations of anticipated growth in the 20-year planning period.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 2-3: ANTICIPATED GROWTH SUMMARY

Growth Area ID	Site Description/Name	Acres	Zoning Designation	Development Density (EDU/acre)[1]	Percent Right-of-Way[1]	Percent Commercial or Industrial[1]	Commercial Acreage (calculated)	Residential EDUs[5]
1	Residential/Commercial Mix	15	Mixed Use	8	15%	20%	3.0	82
2	Riverfront District (Mixed Use)	23	Riverfront District	14	15%	50%	11.5	**175**
3	Houlton Business District[2]	45	Houlton Business District	-	10%	10%	4.5	0
4	Currently Vacant Commercial Property	6	Highway Commercial	-	15%	100%	5.5	0
5	Residential Growth Area 5	40	Suburban Residential	-	-	0%	-	**125**
6	Residential Growth Area 6	7	Suburban Residential	-	-	0%	-	**20**
7	Residential Growth Area 7	15	Mobile Home Residential	-	-	0%	-	**60**
8	Residential Growth Area 8	20	General Residential	8	20%	0%	-	128
9	Residential Growth Area 9	64	Suburban Residential	6	20%	0%	-	307
10	Residential Growth Area 10	28	Suburban Residential	6	20%	0%	-	134
11	Mobile Home Park	37	Mobile Home Residential	10	15%	0%	-	313
12	Gable Road Apartments[3]	12	General Commercial	-	-	0%	-	**239**
13	Industrial Growth Area 13	27	Heavy Industrial	-	15%	100%	27.0	0
14	Multnomah Industrial Park[4]	98	Heavy Industrial	-	15%	30%	29.8	0
15	Old Armstrong Site	124	Heavy Industrial	-	15%	100%	124.0	0
16	Industrial Business Park	190	Heavy Industrial	-	15%	100%	190.0	0
						Total:	**395.3**	**1,583**

1) Values taken from City of St. Helens Wastewater Master Plan 2021.

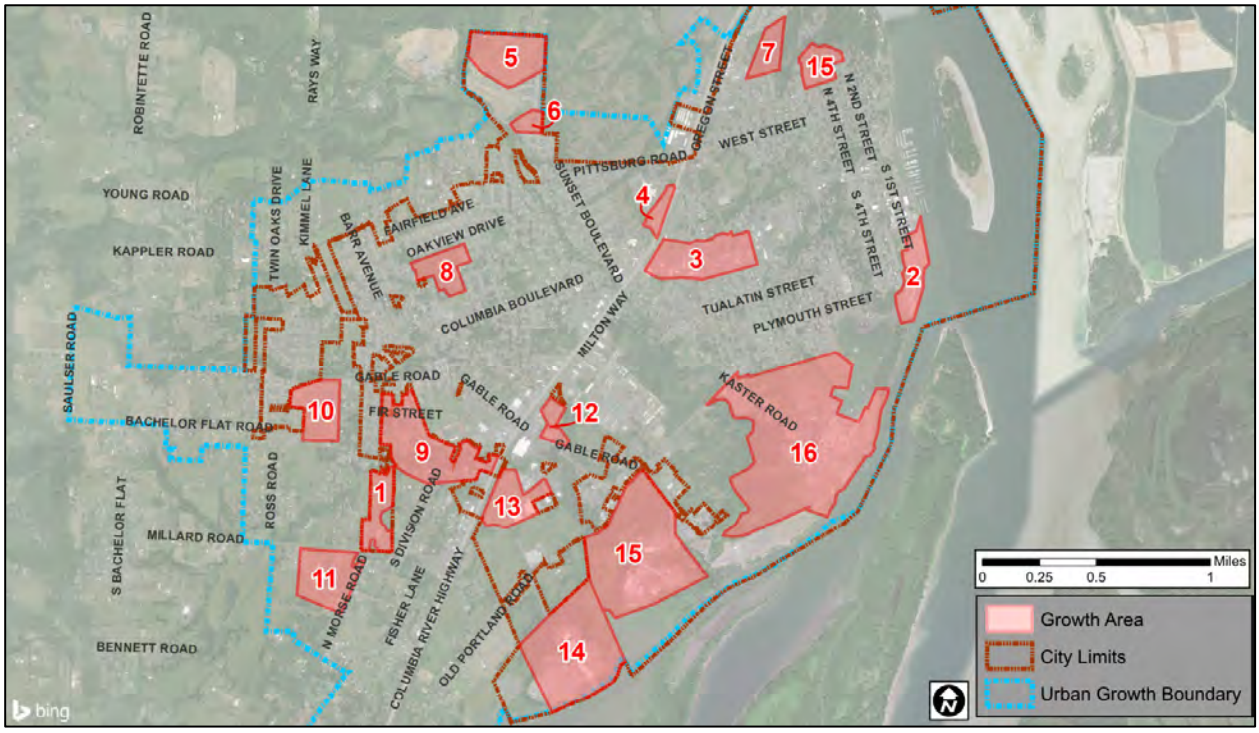
2) Houlton Business District is mostly developed. Assumed 10% infill.

3) Zoning designation labeled as general commercial. Assumed apartment residential density of 14 EDUs/acre.

4) The City anticipates approximately 20-30 acres of this property to develop.

5) Bold EDU values were given directly from the City and were not calculated. The remaining were calculated using areas, percent ROW, percent commercial, and development densities.

FIGURE 2-1: 20-YEAR GROWTH AREAS



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

2.5 SYSTEM CONNECTIONS

The majority of the water produced by the City of St. Helens is consumed by users within the City limits. However, the City's water system does have interties with Columbia City and with McNulty Water Public Utility District (PUD), which agreements are in place for both interties and are included in Appendix B.

An agreement between St. Helens and Columbia City from 1982 states Columbia City may purchase and use up to 1,000,000 cubic feet (CF) or approximately 7.5 million gallons (MG) of water from St. Helens per month. Columbia City intermittently purchases water from St. Helens and is one of the City's top water users accounting for an average of less than one percent of the annual consumption. Table 2-4 shows Columbia City's water consumption from the previous five years.

TABLE 2-4: COLUMBIA CITY WATER CONSUMPTION (2017-2020)

Year	2017	2018	2019	2020	2021 [1]	5-Year Average
Columbia City Consumption (MG)	4.0	9.5	3.8	3.5	0.5	4.3
Total Annual Consumption (MG)	465.3	406.6	385.2	441.5	204.3	380.6
Percent of Annual Consumption	0.9%	2.3%	1.0%	0.8%	0.3%	1.0%

1) Consumption data only includes from January 2021 to June 2021.

The City of St. Helens has an interconnection with McNulty Water PUD, but no records exist indicating water has ever been supplied to the PUD. St. Helens UGB and the McNulty Water PUD overlap in some areas, and the annexation by St. Helens within McNulty Water PUD territory is discussed in the City of St. Helens Resolution No. 1634, which can be found in Appendix B. In general, as residential property is subdivided within the McNulty Water PUD, the City of St. Helens will annex the property and provide water and sewer services to the developed properties. Note, there are also provisions for commercial and industrial users. Additionally, some users within the City limits are supplied by private wells and are not served by the City's water system.

The top 20 water users were summarized from the 2020 consumption data, which is shown below in Table 2-5. Several users in Table 2-5 have multiple account numbers under the same contact name, and as such, the table below includes the total annual consumption for each contact name rather than per account number. The largest user was the City of St. Helens which is not billed for water usage. The total consumption of the top 20 users accounts for approximately 20% of the total annual consumption.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 2-5: TOP 20 WATER CONSUMERS FROM 2020

Contact Name	Annual Consumption (gal)[1]	Percent Annual Consumption
City of St. Helens	22,858,704	5.2%
Cascades Tissue Group	9,144,026	2.1%
School Dist. #502	7,708,048	1.7%
Port Of Columbia County	7,051,044	1.6%
Columbia County Sheriff's Office	5,948,420	1.3%
Hidden Oaks Apts	5,553,977	1.3%
Regency Management Inc	5,125,510	1.2%
Letica Corp.	4,047,296	0.9%
Avamere - St. Helens	3,751,796	0.8%
City Of Columbia City	3,503,076	0.8%
St. Helens Place	2,973,750	0.7%
Best Western Oak Meadow Inn	2,332,673	0.5%
Greater St Helens Aquatic District (Eisenschmidt Pool)	2,185,200	0.5%
Easy Z Car Wash	1,827,137	0.4%
Jesse & Diana Johnstun	1,579,875	0.4%
Spring Meadows	1,577,219	0.4%
St Helens Apts/Woodland Trails	1,504,279	0.3%
Gable Park Apartments	1,441,110	0.3%
St. Helens Partners	1,418,607	0.3%
Total	90,113,141	20%

1) Annual consumption may include the sum of multiple account numbers under the same contact name.

The percent of water usage for user type was summarized from the 2019-2020 annual consumption data and the user types were broken out by the billing rate codes. As shown in Figure 2-2 below, residential rate codes 101, 103, 105, and 111 consumption accounts for more than half of the total consumption and industrial/commercial rate codes 107 and 113 accounts for just less than 20%. “Other” water usage includes City water usage, hydrant flushing, and construction water. The majority of the service connections are residential, accounting for about 80% of all the connections. Table 2-6 below also shows volume of water consumed by each user type and the number of service connections for each. Note, linked meter usage includes properties with two water meters and water usage is added or subtracted based on the meter.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 2-2: 2019-2020 AVERAGE WATER CONSUMPTION BY TYPE

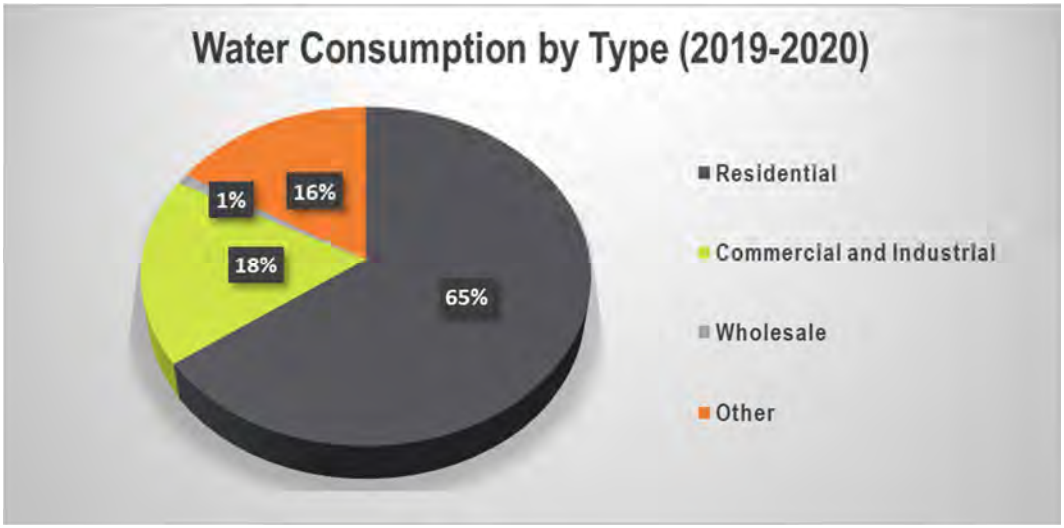


TABLE 2-6: WATER USAGE BY TYPE

Type (Rate Code)	2-Year Average Percent of Annual Consumption	Number of Connections[1]
Residential (101)	53.4%	5,027
Duplex (103)	3.8%	255
Apartment (105)	5.3%	113
Commercial/Industrial (107)	18.3%	362
Pool (109)	0.4%	1
Outside Residential (111)	2.1%	198
Outside Commercial/Industrial (113)	0.1%	4
Outside Wholesale (115)	0.9%	2
No-Charge (120)	8.9%	31
Linked Meter (130)	6.8%	9
Total	100.0%	6,002
1) Based on number of connections from 2020 consumption data.		

2.6 EXISTING AND FUTURE WATER USE

The following section reviews the existing water demands for the existing distribution system, establishes planning criteria for future development, and projects future demands for the 20-year planning period.

2.6.1 EXISTING WATER DEMANDS AND PLANNING CRITERIA

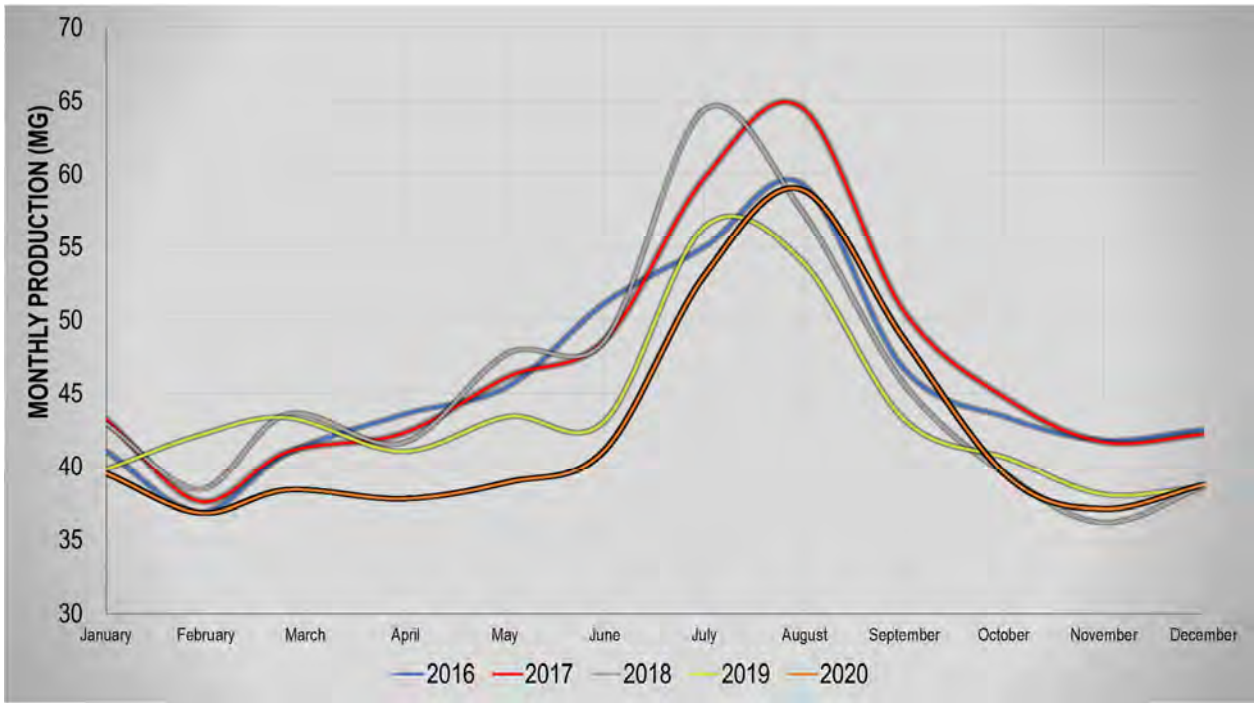
Historical production data from 2016 to 2021 was used to estimate the annual average daily demand (ADD) and the maximum day demand (MDD), which involved reviewing daily and monthly production data at the WFF. Figure 2-3 illustrates the monthly production volumes and Table 2-7 summarizes the ADD, MDD, average summer day (ASD), average winter day (AWD), and annual production from 2016 to 2021.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

The ADD for each year is equal to the annual production volume divided by the total number of days in the year. The planning ADD was established as the 6-year average demand from 2016 to 2021. The MDD is equal to the maximum daily demand on any day within the year. The planning MDD was selected as the highest recorded daily demand from the previous six years and occurred in August 2017. The average winter day and average summer day were also calculated for reference based on the previous six years of production data. The average winter demand is calculated from January, February, and December average daily production volumes, and the average summer demand is calculated from July, August, and September average daily production volumes. The City's production data shows an overall decrease in demands from 2016 to 2021. There is also an overall decrease on production from the previous WMP which had an ADD approximately 29% higher than the ADD established in this study. The decrease can likely be attributed to a number of reasons including replacement of leaking pipes, installation of water efficient fixtures, and an increased awareness of water conservation practices. Additionally, the decreased water production could be due to the City's largest industrial user, Armstrong World Industries, a ceiling tile manufacturing plant halting operation in May 2018, hence reducing overall water production.

Planning criteria, expressed in gallons per capita per day (gpcd), were calculated by using the 2021 population and the identified ADD, MDD, and peak hour demand (PHD). These planning criteria were used to allocate future water system demands and are discussed further in Section 2.7.

FIGURE 2-3: HISTORICAL MONTHLY PRODUCTION (2016-2020)



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 2-7: HISTORICAL PRODUCTION RATES (2016-2021) AND PLANNING CRITERIA

Production Summary (MGD)[1]										
	2016	2017	2018	2019	2020	2021 [4]	6-Year Average	6-Year Max	Planning[5]	Planning Criteria (gpcd)
Population	**13,120**	**13,240**	**13,240**	**13,410**	**13,915**	**14,068**	**-**	**-**	**14,068**	
ADD[1]	1.50	1.53	1.49	1.43	1.39	1.48	1.46	1.53	1.46	104
MDD[1,5]	2.62	3.05	2.47	2.81	2.35	2.91	2.67	3.05	3.05	217
Month of Max Day	April	August	July	July	July	June	-	-	-	-
AWD[2]	1.32	1.35	1.32	1.45	1.45	1.23	1.39	1.45	1.39	99
ASD[3]	1.75	1.90	1.82	1.67	1.75	2.00	1.78	1.90	1.78	127
Annual Production (MG)	548	562	544	524	508	-	535	562	-	-

1) MGD = Million gallons per day; ADD = Average day demand; MDD = Maximum Day Demand

2) AWD = Average winter day; includes January, February, and December

3) ASD = Average summer day; includes June, July, August

4) 2021 planning criteria only includes January 2021 - July 2021.

5) Planning criteria is equal to the 6-year average for ADD, AWD, and ASD. Equal to the 6-year max for MDD and PHD.

The PHD is equal to the maximum hourly demand the distribution system will likely experience on the maximum day. Peak hour typically occurs during the morning when water usage is the highest, and the demands can range from 1.0 to 2.5 times higher than the MDD depending on the size of the water system. Supervisory Control and Data Acquisition (SCADA) data was used to develop a 24-hour diurnal curve for the City's water system and was developed based on the maximum day production from 2021. The water usage curve is shown below in Figure 2-4. The curve identifies the peak demand occurring at around 6:00 a.m. with a maximum factor of 1.73 times the maximum day demand. This diurnal curve was also used to calculate the volume of peaking storage the system requires on top of the maximum day demand. Further details on the storage analysis are provided in Section 4.

In addition to using the diurnal curve developed from the peak day in 2021, the peaking factors of municipalities of similar size and location were reviewed to compare the MDD to PHD factor. As shown in Table 2-8 below, the peaking factor of similar water systems and from the previous WMP range from 1.3 to 1.7. A MDD to PHD peaking factor of 1.73 is recommended to be consistent with the previous WMP and the developed diurnal curve. This peaking factor is conservative when compared to similar sized water systems and their peaking factors.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 2-4: ST. HELENS WATER USAGE DIURNAL CURVE

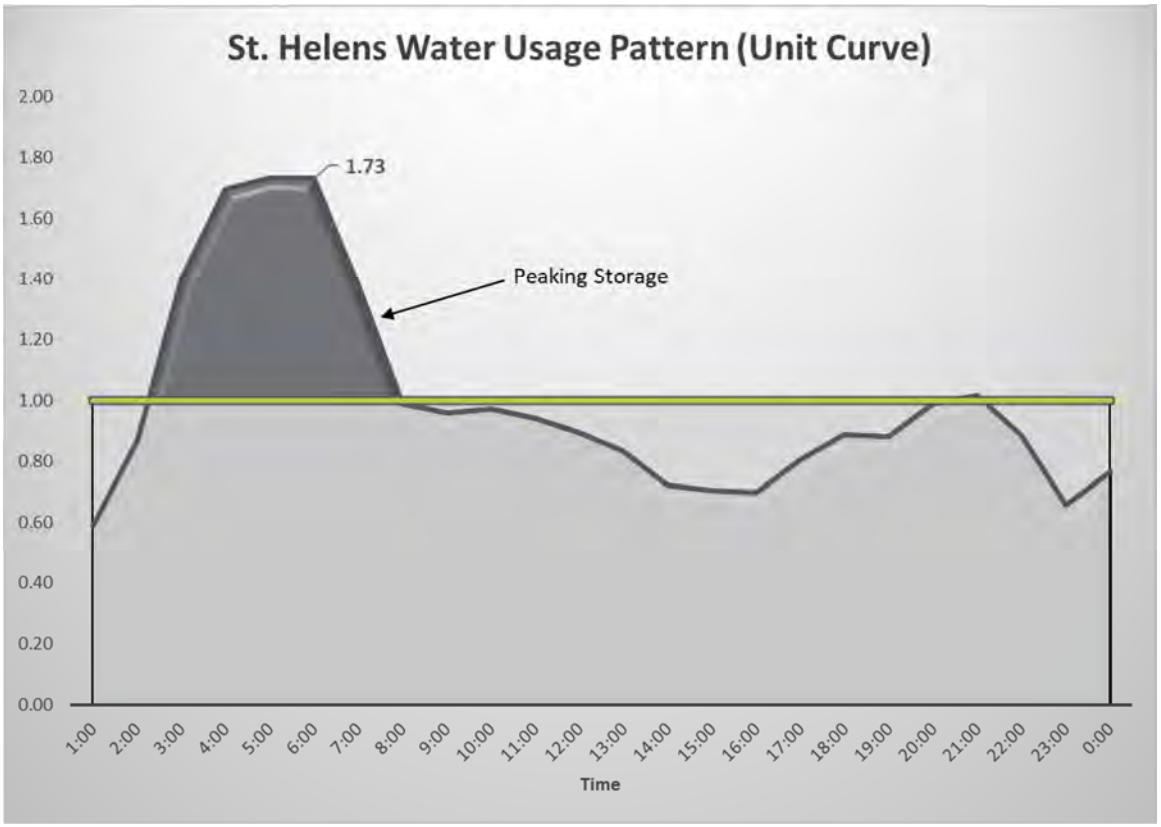


TABLE 2-8: PEAKING FACTORS OF SIMILAR WATER SYSTEMS

	Silverton (2020)	Stayton (2006)	Canby (2009)	Wilsonville (2010)	St. Helens (2012)	St. Helens (2021 Recommended)
Population[1]	10,701	7,300	15,230	19,525	12,883	14,068
ADD (MGD)	1.41	2.61	2.01	3.20	1.89	1.47
MDD (MGD)	3.08	5.97	5.42	6.70	4.46	3.05
PHD (MGD)	3.90	8.96	8.13	11.40	7.69	5.28
ADD to MDD	2.18	2.29	2.70	2.09	2.36	2.08
MDD to PHD	1.26	1.50	1.50	1.70	1.72	1.73

1) Population at the time the planning criteria were developed.

The annual water production was compared to the metered consumption to calculate the percent of unaccounted for water. As shown in Table 2-9 below, the 5-year average unaccounted for water is 18.5%. The City does not have any unmetered connections, however, water used for other activities including hydrant flushing, City construction activities, and fire department flows is not accounted for. The City reported the 2.0 MG Reservoir was filled and emptied several times between April 2017 and July 2019 for either rehabilitation and repair efforts or for dive inspections of the liner. The reservoir was filled and refilled a total of six times (April 2017, August 2017, April 2018, October 2018, April 2019, and July 2019), accounting for approximately 12 MG of water which was not metered; these volumes are accounted for in the table. Additional unaccounted for water may be attributed to system wide leakage, and the City's leak detection program is discussed further in Section 6, Operations and Maintenance (O&M) and Staffing Summary. As outlined in

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Oregon Administrative Rules (OAR) 690-086-0150, additional steps should be taken if a water system's unaccounted for water is greater than 10%. Additional discussion is provided in Section 8, Water Management and Conservation Plan.

TABLE 2-9: UNACCOUNTED WATER FOR 2017-2021

	2017	2018	2019	2020	2021 [1]	5-Year Average Unaccounted for Water
Total Production (MG)	562.1	544.2	523.6	508.1	234.5	
Total Consumption (MG)[2]	469.3	412.0	389.2	441.5	204.3	**18.5%**
Unaccounted Water (%)	**16.5%**	**24.3%**	**25.7%**	**13.1%**	**12.9%**	

1) 2021 production and consumption is only from January 2021 to June 2021.

2) Includes construction water used from hydrants and volumes used to fill/leak the 2.0 MG tank during repairs/maintenance.

2.6.2 FUTURE WATER USE

The population projections, growth areas, and flow planning criteria were used to project future demands for the distribution system, and this section summarizes the anticipated flows throughout the 20-year planning period. As discussed in Section 2.4, the City anticipates growth in residential, commercial/industrial, and wholesale customer usage. The 2021 demands were split between residential, commercial/industrial, wholesale, and other based on the percentage of total annual consumption of each user type (see Table 2-6 on Page 2-9).

The established planning criteria of 104 gpcd (ADD) and 217 gpcd (MDD) and the projected populations were used to calculate the future residential demands. It is assumed any development that occurs within the City's UGB will be supplied by the City's water system. Future commercial and industrial demands were determined based on the 2020 consumption data and the existing land use in order to develop a demand per acre representative of existing commercial and industrial water usage. The calculated demand was then factored up based on peaking factors systemwide. The anticipated commercial and industrial growth is shown in Table 2-3 on Page 2-6. The wholesale demands were assumed to increase as the population of Columbia City increases (assumes a growth of 203 people by 2041 from the WWMP). The gpcd planning criteria were also used to calculate the future wholesale demands.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 2-10: FUTURE DEMANDS SUMMARY

Year	2021	2031	2041
Service Connections[1]	6,002	6,696	7,468
Service Area Population	14,068	15,694	17,509
ADD (MGD)	**1.47**	**1.91**	**2.38**
Residential [2]	*0.95*	*1.13*	*1.33*
Commercial and Industrial [3, 5]	*0.27*	*0.53*	*0.78*
Wholesale [4,6]	*0.01*	*0.02*	*0.03*
Other [7]	*0.24*	*0.24*	*0.24*
MDD (MGD)	**3.05**	**3.98**	**4.95**
Residential [2]	*1.97*	*2.34*	*2.76*
Commercial and Industrial [3, 5]	*0.56*	*1.10*	*1.63*
Wholesale [4,6]	*0.03*	*0.05*	*0.07*
Other [7]	*0.49*	*0.49*	*0.49*
PHD (MGD)	**5.28**	**6.89**	**8.57**
Residential [2]	*3.41*	*4.06*	*4.78*
Commercial and Industrial [3, 5]	*0.97*	*1.89*	*2.82*
Wholesale [4,6]	*0.05*	*0.09*	*0.12*
Other [7]	*0.85*	*0.85*	*0.85*

1) Assumes additional residential connections with 2.49 people per household.

2) Based on 2-year average (2019-2020) percent of total consumption and includes residential, duplex, and apartment water users.

3) Based on 2-year average (2019-2020) percent of total consumption and includes commercial and industrial users

4) Equal to 2-year average (2019-2020) percent of annual consumption supplied to Columbia City

5) Assumes gallons per day per acre for commercial and industrial development calculated from 2020 consumption and land use data. Assumes half of the anticipated industrial and commercial development occurs by 2030.

6) Assumes growth of 203 people in Columbia City by 2041. (from St. Helens WWMP 2021)

7) Assumes "other" water use does not increase. Generally includes system flushing, construction, and park irrigation.

2.7 REGULATORY PLANNING CRITERIA

The section below summarizes the regulatory planning criteria to be used to evaluate the distribution system. The planning criteria establishes criteria for water storage, system pressures, supply and delivery, and fire flow recommendations.

2.7.1 WATER STORAGE CRITERIA

A detailed storage analysis for the City's water system is presented in Section 4 of this report, however general recommendations and definitions for various storage components are presented here:

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- Operational Storage – The volume of water drained from the reservoirs during normal operation before the water sources begin pumping to refill reservoirs. Typically, it is recommended to use approximately 10% of the total storage volume for operational storage to provide appropriate pump runtimes and adequate reservoir mixing.
- Peaking or Equalization Storage – Refers to the storage required to meet peak hour demands in excess of the supply pumping capacity.
- Fire Protection Storage – Provides the volume necessary to meet maximum fire demands for the specified duration.
- Standby Storage – A minimum volume or emergency supply equivalent to 48 hours of average day demand for extended power outages. This storage can be reduced if supply pumps are equipped with standby power.
- Dead Storage – The volume in the reservoir which cannot be used due to physical constraints. Generally, this is the volume of storage below the elevation of the reservoir outlet pipe.

2.7.2 DISTRIBUTION NETWORK CRITERIA

Planning for the distribution network involves establishing performance standards for pressures and flows throughout the system. The design flows through the system are the largest flows reasonably anticipated to occur and, as with most water systems, these flows result from a fire event during the system's maximum day demand.

Based on recommendations from Columbia River Fire and Rescue, the City has elected to use the fire flow planning criteria shown in Table 2-11. These recommendations are consistent with the City's previous water master plan.

TABLE 2-11: FIRE FLOW DEMANDS

Land Use	Recommended Fire Flow (gpm)	Duration (hours)	Volume (gallons)
Residential	1,500	2	180,000
Commercial	3,000	3	540,000
Industrial	3,500	4	840,000

In addition to design standards for the delivery of flow rates, standards for system pressures are necessary for the normal daily operation of the water system. The aim of standards for pressure is to provide safe and reliable service to water users under a variety of system conditions. If pressures are too high, damage and leaks can occur within the distribution system and at points of use. If pressures are too low, a variety of issues arise including higher risks of back flow contamination, and low or no water availability. The recommended distribution pressure standards for new connections are listed in Table 2-12.

TABLE 2-12: DISTRIBUTION SYSTEM CRITERIA

Criteria	Pressure (psi)
Peak Hour Demand Event (minimum)	40
Maximum Day Demand Plus Fire Flow	25
Maximum Intermitent Pressure	100
Operational Pressures without Pressure Regulator (maximum)	80

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 3 - EXISTING SYSTEM CONDITIONS

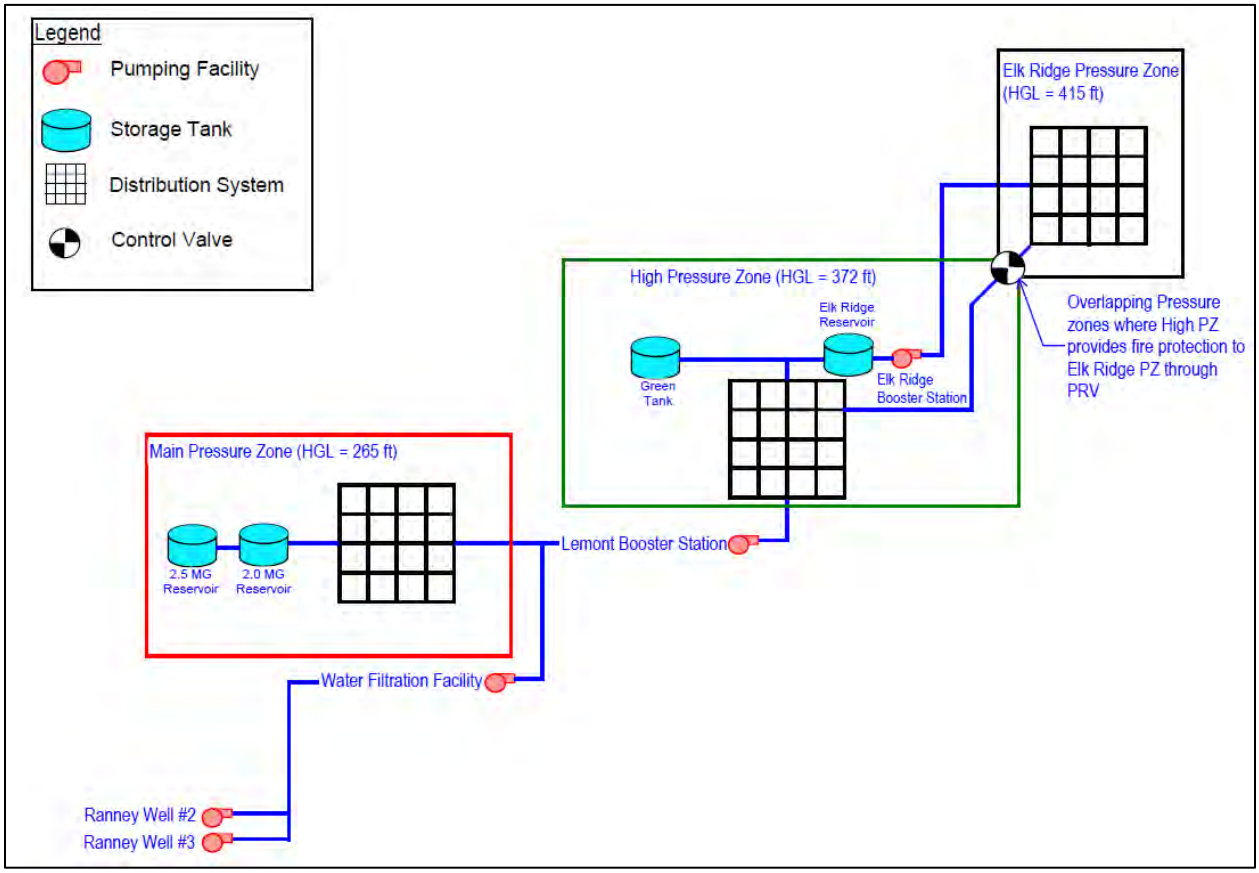
The following section covers a description of the existing water system, evaluation of water supply and delivery, storage evaluation, and hydraulic model results. The City's existing water system is comprised of a total of three Ranney collector wells, one groundwater well, a water filtration facility (WFF), two booster stations (BS), four reservoirs, and approximately 85 miles of distribution pipeline.

The water system facilities were visited by Keller Associates in July 2021, and this section discusses the general condition of each of the facilities, identified deficiencies, and recommended improvements to the facilities. The WFF is discussed in detail in Section 3.3. Individual facility inventory sheets can be found in Appendix C.

3.1 GENERAL WATER SYSTEM OPERATION

A schematic of the City's water system is provided in Figure 3-1. Water is pumped to the water distribution system by Ranney Wells #2 and #3 via the WFF and these wells alternate running and turn on based on the water level in the reservoirs in the Main Pressure Zone (PZ). The WFF filters water from the Ranney Wells and pumps directly into the Main PZ, which is the largest PZ and has two reservoirs. The Lemont BS pumps water from the Main PZ into the High PZ, the second largest PZ in the system, where there are two smaller reservoirs. The Elk Ridge BS serves a single development in the Elk Ridge PZ which is intertied with the High PZ by a pressure reducing valve (PRV) which opens to provide fire flow to the Elk Ridge PZ from the High PZ during a fire flow event.

FIGURE 3-1: WATER SYSTEM SCHEMATIC



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Ranney Well #1 is not operated on a day-to-day basis, and it has not been operated since 2006.The well has since been disconnected from the Ranney #2 transmission line but Ranney Well #1 can be operated in an emergency and is configured to pump directly into the distribution system (i.e., no treatment). Ranney Well #1 is an emergency backup source which would be used to supply Columbia City, if needed. The Bayport Well is not operated on a day-to-day basis either and complaints regarding “cloudy” water have been reported to the City when this well was in operation, although, the Bayport water is treated with sodium hypochlorite for disinfection. The well has not run or been exercised in over 10 years and if the Bayport Well were to be operated, the City would have to notify the State and water quality testing would be required before day-to-day use.

3.2 WATER SUPPLY

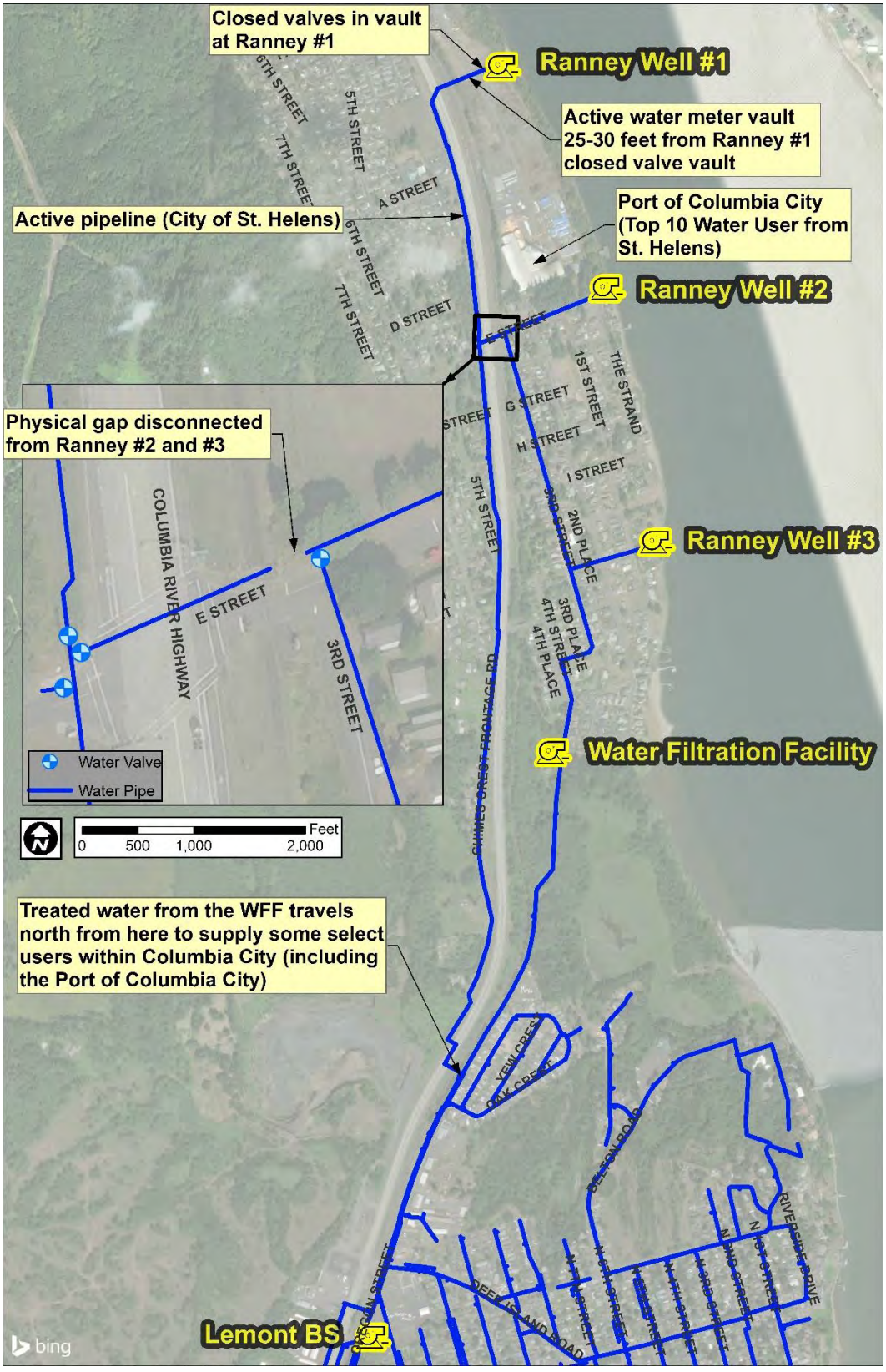
3.2.1 RANNEY COLLECTOR WELL #1

Ranney Well #1 was not visited during the facility tour, therefore the information presented herein was collected via record drawings and through interviews with staff. Ranney Well #1 was originally constructed in 1955, the well has a 13-foot inner diameter concrete caisson and is approximately 72 feet in total length. The caisson extends below the pump house floor which is at an elevation of 33 feet above sea level. The well consists of six separate 10-inch diameter lateral pipes spaced evenly around the circumference of the caisson and extends horizontally at varying lengths through the aquifer to collect water.. The well was originally designed with two 1,050 gpm pumps with a block-out for a third pump. The two pumps each have a control valve downstream before combining and flowing toward the distribution system through a 14-inch diameter concrete pipe.

Ranney Well #1 is not used in day-to-day operations and has been physically disconnected from Ranney Well #2 raw water pipeline to the WFF. The well has a closed valve immediately outside the well house which can be opened under an emergency, however, the yield of this source was reported to be around 300-400 gpm and is unlikely to be used unless the Bayport Well is also out of service. The transmission pipeline outside of Ranney Well #1 is active and serves the Port of Columbia City, whom is one of the City’s top 10 water users, with treated water from the south. The configuration of this well and the distribution piping is shown in Figure 3-2 below. Ranney Well #1 does not have water quality issues and can be used in an emergency by opening a valve and implementing an immediate boil water notice. No significant deficiencies or recommended improvements were developed for this facility.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 3-2: RANNEY WELL #1 PIPING CONFIGURATION



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.2.2 RANNEY COLLECTOR WELL #2

Ranney Well #2 was originally constructed in 1969, has a 13-foot inner diameter concrete caisson, and the caisson is approximately 96 feet in total length. The caisson is located within the channel of the Columbia River and a portion of the caisson exterior is submerged by the Columbia River during part of the year. There is a water level indicator in the well caisson and a river level indicator on the exterior. During the facility tour, the river level was below the level indicator's sensor. The well includes five 6-inch diameter lateral pipes around the circumference of the well caisson extending into the aquifer.

The pump house sits on the top of the caisson and is accessed by a 60-foot-long catwalk from the shores of the Columbia River. The pump house is a circular, 18-foot diameter building which houses three vertical turbine well pumps with Pump IDs #5, #6, and #7. The three pumps are 75 hp each with a capacity of approximately 1,240 gpm. Ranney Well #2 alternates running with Ranney Well #3, and Pumps #6 and #7 alternate running when called on. Pump #7 appears to run most frequently with ten times more runtime hours than Pump #6 and over 100 times more runtime hours than Pump #5 at the time of the facility tour. It is recommended that the supervisory control and data acquisition (SCADA)/Programmable Logic Controller (PLC) programming for the pump rotation be checked to ensure pumps are rotating as desired. All three pumps were replaced in 2007 when the WFF was under construction, however, Pump #6 was recently rebuilt in 2020. Water is pumped from the pump house through a 14-inch diameter steel pipeline to the control and gas chlorine room. The water is no longer treated with gas chlorine; however, the equipment is still onsite. The well can be powered by a portable diesel generator which is dedicated to either Ranney Well #2 or #3.

Significant deficiencies were not identified at this facility, but minor improvements are recommended including installation of energy efficient lighting (e.g., LEDs), installing pump runtime meters to track runtimes on a time scale, checking automatic pump rotation system, and the well caisson should be cleaned on a regular interval. Ranney Well #2 is shown in Figure 3-3.

FIGURE 3-3: RANNEY WELL #2



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.2.3 RANNEY COLLECTOR WELL #3

Ranney Well #3 is the newest well and was constructed in 1999. The well has a 16-foot inner diameter caisson which is approximately 61-feet in total length and is completely below the ground with the top of the caisson at 22 feet above sea level. The well consists of 24 separate, 3.5-inch diameter lateral pipes extending horizontally into the aquifer. The laterals were installed in two tiers with the bottom level consisting of 16 laterals at 35.1 feet below sea level, and the top including 8 laterals at 32.9 feet below sea level. The total length of lateral pipes is approximately 1,700 feet with about 1,570 feet of the pipe being screened and there is a water level indicator in the well caisson.

The pump house sits within the top of the caisson and is accessed through a watertight hatch through the roof. There are three submersible turbine pumps with room for a fourth and Pump IDs #10, #11, and #12. Pump #10 is 200 hp and has a capacity of 1,970 gpm, while Pumps #11 and #12 are each 125 hp and have a capacity of 930 gpm each. Note, Ranney Well #3 generally produces more water than Ranney Well #2. Within Ranney Well #3, Pump #10 has the most runtime hours followed by Pump #11 and then Pump #12 at the time of the facility tour. The operators reported the WFF runs most efficiently when Pump #10 is running rather than when Pumps #11 or #12 are running. The City reported one of the pumps in Ranney Well #2 is typically run in parallel with Ranney Well #3 if Pump #11 and Pump #12 are on. Water is pumped to the control and treatment facility via a 16-inch diameter steel pipeline. The control/treatment house has a basement with a 1,500-gallon hypochlorite reservoir which is no longer in use. Ranney Well #3 can be powered by a portable diesel generator which is dedicated to either this well or Ranney Well #2.

No significant deficiencies were reported or observed at this facility, however, minor improvements are recommended including installation of energy efficient lighting (e.g., LEDs), installing pump runtime meters to track runtimes on a time scale, checking automatic pump rotation system, and the well caisson should be cleaned on a regular interval. Ranney Well #3 is shown in Figure 3-4.

FIGURE 3-4: RANNEY WELL #3



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.2.4 BAYPORT WELL

The Bayport Well was not visited during the facility tour, therefore, the provided information was collected via record drawings and through interviews with staff. The State of Oregon Water Well Report shows the well was drilled in 1987-1988 to a depth of 327 feet. The static water level was reported as 26 feet below ground surface and the well has a 12-inch diameter casing. The well was reported to yield 250 gpm with 23 feet of drawdown within an hour and 750 gallons per minute with 124 feet of drawdown over 48-hours. The well log can be found in Appendix C. Due to repeated complaints regarding taste and odor, the Bayport Well is currently inactive and considered only a supplemental emergency water supply. The complaints were consistently described as an earthy-musty-swampy odor with a taste of salt or sulfur in the water. A taste and odor abatement report was completed for the City around 1991, which concluded the presence of entrained carbon dioxide and elevated levels of sodium and chloride. The report also recommended several abatement methods to remove the carbon dioxide gas including addition of lime or alkali, such as caustic soda, filtration through a neutralizing filter, or aeration through air stripping. The City completed a few of these abatement methods, however, the water quality was not improved permanently, and the water returned to its prior condition within a few days of the operation. The well is not regularly exercised, and the City would need approval from DEQ before operating the well.

The well house has a pump which pumps water to the system through an 8-inch diameter ductile iron (DI) pipe. The well includes a sodium hypochlorite metering pump to inject chlorine before the water enters the distribution system. Other than taste and odor issues, no significant deficiencies were identified in this facility, but it is recommended that this well be activated and regularly exercised to maintain as an emergency water source. The Bayport Well is shown in Figure 3-5.

FIGURE 3-5: BAYPORT WELL HOUSE



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.3 BOOSTER STATIONS

3.3.1 LEMONT BOOSTER STATION

The Lemont BS, constructed in 1965, is located on Oregon Street between Deer Island Road and West Street, and the pump house sits about halfway below grade. The booster station is surrounded by a chain-link fence and the pump house has a metal locking door. The pump house was constructed with reinforced concrete walls and roofing, and has three booster pumps, Pump IDs #3, #4, and #9, which are all 25 hp, 570 gpm capacity pumps. The booster station does not have a flow meter, so only pressure is trended at the facility. There is an existing configuration for a portable back-up generator which can be used if the facility loses power.

It was anticipated to complete a pump test at the booster station to determine an approximate capacity and discharge head of the pumps since pump curves were not available, however, the City expressed concerns with the pump testing method and identified a number of deficiencies in the booster station configuration. The materials for the pipeline into and out of the booster station is concrete cylinder pipe which has a steel interior membrane wrapped in reinforced concrete, which makes the pipeline very difficult to repair quickly and requires the expertise and materials of a third-party contractor. The concrete cylinder pipeline is the only source of water for the High PZ, therefore, damage to this pipeline would eliminate the only water supply to the High PZ. Additionally, the valve intended to isolate the booster station from the High PZ is a butterfly valve and its performance was reported to be questionable with fluctuating pressures on each side of the valve. The existing SCADA does not track pump runtimes on a time scale for each of the pumps, however, it does track the number of starts and overall pump runtimes by manual counters. The counters were last reset on July 15, 2021; however, it is unknown if the counters had been reset since then. Additionally, the manual operation of the pumps out of auto could skew the number of starts and hours of runtime. The Lemont BS is shown in Figure 3-6 below.

Based on the reported information and facility tour of the Lemont BS, several improvements are recommended and include the following:

- Consider a second source of water supply to the High PZ.
- Replace the concrete cylinder pipeline with CL52 cement lined DI pipe and replace the butterfly valves downstream of the BS with gate valves to provide better confidence in isolating the BS.
- Install a flow meter/vault on the discharge line and a pressure transducer on the suction and discharge side of the pumps. Upgrade the existing SCADA to track the flows, discharge and suction pressure, and pump runtimes on a time scale for each of the pumps.
- The vent to the pump housing has been damaged by trespassers and should be repaired or replaced to the original condition.
- The overhead crane does not appear to be able to track over all of the pumps. Adjust the overhead crane to track over each of the pumps.

In addition to the recommended improvements discussed above, the booster station is approaching the end of its useful life, assuming a 50-year useful life, at the time of this study and will be passing the typical useful life by the end of the 20-year study period. The City should consider a full replacement of the booster station due to facility age and deterioration. As discussed in further sections, the booster station may be at risk for failure under seismic loading which would render the High PZ without a water supply. Replacing the booster station would increase resiliency to the High PZ in the event of an emergency.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 3-6: LEMONT BOOSTER STATION



3.3.2 ELK RIDGE BOOSTER STATION

The Elk Ridge BS is the newest pumping facility in the distribution system and was constructed in 2017. During the facility tour in 2021, the booster station was not in use because the connections it serves were still being constructed. The pump house is located next to the Elk Ridge Reservoir and is a concrete masonry unit (CMU) building with wood roofing. The interior walls are lined with plywood, there is no ventilation nor floor drain, and the operators have reported problems with mice.

The booster station consists of two 3 hp pumps, each with a capacity of 50 gpm. The pumps are variable frequency drives (VFD)s and will be operated to maintain a specific pressure in the Elk Ridge BS Zone. The pumps are connected to the SCADA system and trend pressure, flow, and pump runtime. There is no back-up generator on site, nor is the booster station able to be powered by a portable generator. Figure 3-7 below shows the pump configuration.

Several improvements are recommended for this pump station including the following:

- Install proper ventilation within the pump house, which may include roof vents, windows, and floor vents.
- Install a floor drain and drainpipe plumbed into storm sewer north of the property.
- Add connection for portable generator.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 3-7: ELK RIDGE BOOSTER STATION



3.4 STORAGE RESERVOIRS

3.4.1 2.0 MG RESERVOIR

The City's 2.0-million-gallon (MG) Reservoir was originally constructed in the 1920s and is located off Pittsburg Road and Battle Mountain Road. The reservoir is partially buried, has been out of service since 2016, and the reservoir has a leak which was first discovered in 2008; since then, several repairs and rehabilitation efforts have been implemented. In 2017, the City installed a coating membrane system inside the reservoir in an attempt to repair the leak. Once the membrane was installed, the reservoir was filled and within a few hours, a large amount of water was observed draining from the reservoir's footing drain and through certain sections of the reservoir's exterior walls. The City's SCADA indicated a water loss of approximately 74,000 gallons per day. In the first attempt to repair the leak, the reservoirs drainpipe was repaired, and the liner was inspected, however the reservoir has continued to leak. Other efforts to identify the source of the leak have included microscopic and porosity tests, closed-camera television (CCTV) inspections of the reservoir's intake and discharge pipes, leakage and pressure tests at the inlets and outlets, diving inspections, liner spot repairs, and Electric Field Vector Mapping (EFVM).

Despite the rehabilitation effort, the reservoir continues to leak and remains unusable. Recommended alternatives to address the out-of-service reservoir are discussed in Section 5.

The reservoir is 140 feet in diameter, 20 feet deep, and the bottom of the reservoir has a sloped floor at 1V:2H to about 10 feet in depth. Above 10-feet, the sides are vertical. The interior and exterior of the reservoir are concrete, excluding the roof which was replaced several years ago with

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

a new panelized geodesic aluminum roof. When in normal operation, the 2.0 MG Reservoir supplies the Main PZ in combination with the 2.5 MG Reservoir located less than 100 feet to the north. The Reservoir site's perimeter includes a chain link fence and access to the inside of the reservoirs is locked and monitored with intrusion alarms. The reservoir is shown in Figure 3-8.

FIGURE 3-8: 2.0 MG STORAGE RESERVOIR



3.4.2 2.5 MG RESERVOIR

The City's 2.5 MG Reservoir is located at the same site as the 2.0 MG Reservoir and was constructed in the 1970s. The reservoir is also partially buried and has a concrete roof and wall. The reservoir is 136 feet in diameter and the roof is supported by 32 reinforced concrete columns.

The Reservoir is filled through an 18-inch diameter pipeline from the Main PZ. Under normal operation, water enters the 2.5 MG Reservoir and then begins to fill the 2.0 MG Reservoir through an altitude valve which then the water continues on to the distribution system. Currently, the 2.0 MG Reservoir is out of service, therefore the reservoir is filled by the 18-inch diameter pipe and then flows directly to the distribution system through a separate 12-inch diameter outlet pipe. The 2.5 MG Reservoir is shown in Figure 3-9.

FIGURE 3-9: 2.5 MG STORAGE RESERVOIR



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.4.3 GREEN TANK

The City's Green Tank holds approximately 200,000 gallons and serves the High PZ. The Green Tank was constructed in the 1970s and is located northwest of the 2.0 and 2.5 MG Reservoirs, which is just north of Oliver Heights Court. The site is accessed by a dirt road and a fence surrounds the facility. The reservoir has a 33-foot inside diameter and is 32 feet tall. The reservoir levels normally range from 18 to 28 feet and the level is communicated to the Lemont BS through radio telemetry. The reservoir has an overflow on the west side of the reservoir directly above the control valve and sensor vault. The City's only reported problem with the reservoir was a storm event where the reservoir lost communication with the Lemont BS resulting in multiple pumps running at the BS by default and the reservoir overflowing directly onto the valve/sensor vault. The operators had to repair the sensor vault while the reservoir was overflowing over the top of the vault. The original purpose of the control valve in the vault is not known to the operators and the valve settings are set to perform as an open pipe. The reservoir has an exterior level indicator which was within 0.2 feet of what the SCADA level was at the time of the site visit. The Green Tank is shown in Figure 3-10.

FIGURE 3-10: GREEN TANK



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.4.4 ELK RIDGE RESERVOIR

The Elk Ridge Reservoir is the newest storage reservoir in the water system and was installed in 2009. The 500,000-gallon reservoir is made of fiberglass coated bolted steel siding, a geodesic aluminum roof, and has a diameter of 51 feet. The reservoir is filled from the Lemont BS and is located toward the northern edge of the City limits which is accessed by a gravel road north of the Elk Ridge Development. The reservoir levels float off the Green Tank and has a single 8-inch diameter inlet/outlet pipe. There is a 10-inch diameter drainpipe, which also drains the overflow pipe, and outfalls south of the reservoir ultimately draining into Milton Creek. The City did not report any problems with this reservoir other than trespassers vandalizing the reservoir with graffiti. The Elk Ridge Reservoir is shown in Figure 3-11.

FIGURE 3-11: ELK RIDGE STORAGE RESERVOIR



3.5 WATER FILTRATION FACILITY (WFF)

The WFF provides the primary source of potable water to the City's users. The WFF was originally constructed in 2005 and completed in 2006 to treat water sources under the influence of surface water. The WFF process consists of disinfection, straining, filtering, and storage in the clearwell before being pumped into the distribution system. The scope of this study includes a summary of the treatment capacity for the major treatment processes, summary of anticipated deficiencies within the 20-year planning period, completion of concentration x time (CT) calculations with variances in seasonal temperature and pH data, and a summary of short-lived assets and membrane replacement schedules.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.5.1 RAW WATER SUPPLY

The Ranney Wells draw groundwater under the influence of surface water from the Columbia River, which this source is required to be treated prior to distribution. The water temperatures at the WFF vary with season and range from 12 degrees Celsius (°C) to 15 °C (approximately 54 degrees Fahrenheit (°F) to 59°F) and the turbidity of the source water is generally less than 1 Nephelometric Turbidity Units (NTUs). The water level in Ranney Well #2 has a minimum pumping level of 40.5 feet below sea level and Ranney Well #3 has a minimum pumping level of 20 feet below sea level. Both wells are located within the 100-year flood plain, however, the pump house for Ranney Well #2 was constructed above the flood elevation and Ranney Well #3 pumps are within a water-tight well caisson.

Channel erosion in this section of the Columbia River is not a concern, and the wells are considered stable. Ranney Well #2's concrete caisson is partially submerged for part of the year when the river levels are high. As such, the caisson should be visually inspected each year to identify any scour or sediment build-up which may occur during the high-water season.

The Ranney Wells are the City of St. Helens' primary source for potable water which poses a risk if the Columbia River becomes contaminated. Water drawn from a Ranney Well contains low turbidity due to the filtration that occurs by the riverbank, however, pollutants (like hydrocarbons) that can move throughout the riverbank soil profile could contaminate the water. The City's only back-up water source is the Bayport Well which is not currently active. In the event the Columbia River becomes contaminated, the City would have to rely on the Bayport Well as an emergency source of water until the Ranney Wells can be used again, therefore, it is recommended the Bayport Well be exercised regularly in preparation for an emergency event.

3.5.2 WATER TREATMENT PROCESS

Raw water from Ranney Wells #2 and #3 are pumped to the WFF through a single 20-inch diameter pipeline which ends at the 80,000-gallon raw water wet well. The Ranney Wells #2 and #3 are called on based on the 2.5 MG Reservoir and then the WFF is called on once the raw water wet well is filled to a certain level. The operating levels of the raw water wet well are very small causing the WFF to turn on almost immediately after the Ranney Wells start filling the raw water wet well. The controls are likely set up this way because before the WFF was constructed, the Ranney Wells pumped directly into the distribution system. It is recommended that the controls be updated to where the WFF is called on based on the 2.5 MG Reservoir now that the WFF is the primary source of water to the distribution system. The Ranney Wells should then come on based on the raw water wet well levels. By updating the controls, it simplifies the control process and minimizes the potential for controls miscommunications.

Once the WFF is called on, chlorine is injected to the raw water prior to entering the wet well. The raw water wet well has an overflow weir which drains into a 24-inch storm drain and outfalls to the east of the facility. The WFF cannot be operated if the raw water wet well is offline for maintenance or inspection, so it is recommended that the Ranney Wells be improved with VFD controls in order to continue operation of the WFF if the raw water wet well is taken offline. The City should consider installing a second supply pipeline to the WFF from K Street and 3rd Street as well as from the WFF to Oregon Street where the pipes are looped to provide an additional level of redundancy in the event the 20-inch supply line is damaged or needs to be taken offline for an extended period of time.

Water is pumped from the raw water wet well by four VFD membrane feed pumps. Water was designed to be pumped through three strainers before heading to the membrane filter modules, however, the strainers are not currently being utilized and no screens are within the housing because of the low sediment content in the raw water. The WFF contains four primary filtration skids of Pall Microza hollow fiber filtration modules, with each skid containing 52 filtration modules. Additionally, there is a backwash recovery filtration skid containing 18 modules. The filtration skids are backwashed approximately two to four times per hour with backwash water sent to a 7,500-gallon backwash recovery tank. Water from the recovery tank is pumped through a designated

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

backwash filtration skid before flowing into the clearwell. When a clean-in-place cycle occurs, the waste is sent to a 7,500-gallon neutralization tank.

Filtered water flows into the 450,000-gallon baffled clearwell, which was designed to hold a minimum volume of 405,000 gallons to meet the minimum contact time at the build-out flow rates. The WFF does not have a redundant clearwell, however the facility can be operated with the clearwell offline. The operators would need to ensure the minimum contact time is met through the raw water wet well and residence time through the WFF. Note, the capacity of the WFF may be limited in order to achieve the required contact time when the clearwell is offline. Water is pumped from the clearwell by four VFD controlled high service pumps into the distribution system and to the storage reservoirs. The WFF uses a magnetic flowmeter to track the flow to the system and flow is recorded in hourly increments.

The capacity of each of the major processes is summarized in Table 3-1. The firm capacity of the raw water supply is equal to the sum of the firm capacities of Ranney Well #2 and Ranney Well #3 resulting in a firm capacity of 6.2 MGD. As shown in the table, the WFF's firm capacity is governed by the membrane filters with a firm capacity of 5.8 MGD. When compared to the MDD from Section 2, the WFF has an existing surplus of 2.7 MGD and a future (20-year) projected surplus of 0.9 MGD.

TABLE 3-1: WFF PROCESS CAPACITY SUMMARY

Treatment Process	Number of Pumps/Treatment Trains	Capacity per Pump/Treatment Train (gpm)	Total Capacity (MGD)	Firm Capacity (MGD)[1]
Ranney Well #2	3	1,240	5.4	3.6
Ranney Well #3 [2]	3	1,970 & 930	5.5	2.7
Membrane Feed Pumps	4	1,600	9.2	6.9
Strainers	3	2,500	10.8	7.2
Membrane Filters	4	1,340	7.7	5.8
High Service Pumps	4	1,400	8.1	6.0

1) Firm capacity equal to capacity with largest pump/treatment train offline.

2) Ranney Well #3 has one 1,970 gpm pump and two 930 gpm pumps.

The WFF has redundancy in most of its major processes, with the only exception being the raw water wet well. Other WFF components including chemical storage tanks and dosing pumps generally meet the recommended redundancy excluding the caustic soda and citric acid storage tanks which are single tanks for each chemical. Caustic soda is used as a clean-in-place chemical as well as for pH adjustment of the finished water, and it is added to the filtered water prior to being pumped to distribution to raise the pH of the finished water. Citric acid is only used as a chemical during the clean-in-place maintenance process; therefore, the lack of redundancy is not a deficiency. The WFF has two 7.5 gpm and one 30 gpm sodium hypochlorite dosing pumps (30 gpm is part of the clean-in-place process), two 30 gpm and one 120 gpm caustic soda dosing pumps (120 gpm is part of the clean-in-place process), and one 120 gpm citric acid dosing pump.

3.5.3 SCADA AND POWER SUPPLY

The WFF SCADA system at the WFF was recently upgraded and is controlled from a single desktop computer on site at the WFF. The improvements also included the installation of a redundant PLC panel. The original SCADA system was kept online as a back-up meaning the WFF facility can be run by this system if the primary SCADA server is offline. Additionally, the City is developing a procedure to run the WFF manually in the event SCADA and PLCs are both offline. The City is prepared and has implemented appropriate measures for system resiliency with regards to the SCADA and controls system and no additional improvements are recommended. The WFF has a back-up diesel generator onsite which can power the facility at full capacity, and the City is currently

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

in the process of determining the duration of time the back-up generator can power the WFF at full capacity.

3.5.4 CT (CONCENTRATION X TIME) CALCULATIONS

Oregon Administrative Rules (OAR) 333-061-0032 states that surface water or ground water under the influence of surface water must achieve at least 99.9 percent, or 3-log, removal or inactivation of *Giardia lamblia* cysts at the first customer. Additional requirements including 99.99 percent (4-log) removal or inactivation of viruses and 99 (2-log) removal of *Cryptosporidium* must also be achieved before the first customer. The CT calculations in this evaluation are based on achieving a 3-log removal of *Giardia* cysts because this is the constituent that is most difficult to remove or inactivate.

The WFF utilizes hollow fiber membrane filtration modules which, according to the City's surface water quality data forms, earn a removal credit that requires an additional 0.5-log removal through disinfection. The contact time to inactivate *Giardia* is affected by the temperature and pH of the water which can vary with the seasons. The annual average, summer average, and winter average temperatures and pH are summarized in this section. Additionally, the peak flow rates and the volume and baffle factor of the contact chamber can affect the required chlorine contact time to achieve the targeted removal/inactivation.

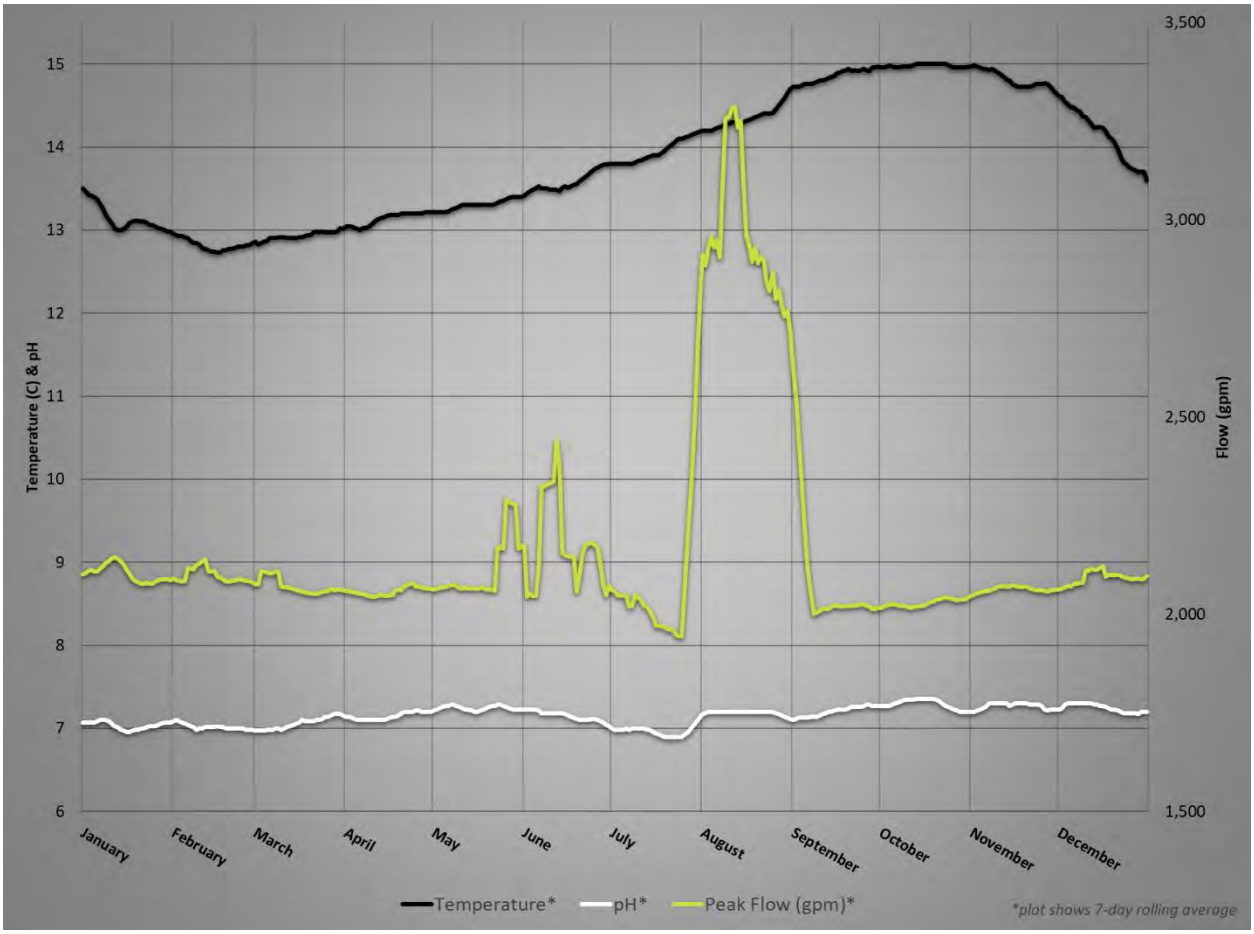
In 2021, peak hour flows ranged from a maximum of 4,100 gpm in the summer to 2,300 gpm during the winter with an annual average peak daily flow of 2,200 gpm. Note, the maximum production rate from 2021 is greater than the PHD from the planning criteria which is likely because the reservoirs were filling during a peak demand period; hence, the user demands were not likely equal to 4,200 gpm. This peak flow however will be used in the CT calculations because regardless of if the WFF is filling the reservoir or supplying water to users, the required CT must still be met. Water temperatures ranged from approximately 12°C to 15°C (54°F to 59°F) with an annual average water temperature of about 13°C (55°F). The pH remains relatively constant throughout the year and generally ranges from 6.9 to 7.3. The WFF saw a minimum chlorine residual of 0.55 mg/L in the summer and 0.46 mg/L in the winter with an average annual chlorine residual of 0.66 mg/L. Table 3-2 summarizes the water quality from 2021 and Figure 3-12 below illustrates the 7-day rolling average trends for temperature, peak flows, and pH.

TABLE 3-2: 2021 WATER QUALITY SUMMARY

Monitoring Summary	Minimum Chlorine Residual, C (mg/L)	Minimum Temperature °C (°F)	Average pH	Maximum Peak Hourly Demand (gpm)
Summer (Jul. - Sept.)	0.55	13.8 (56.8)	7.1	4,152
Winter (Dec. - Feb.)	0.46	12.6 (54.7)	7.0	2,317
Annual Average	0.66	13.4 (56.1)	7.1	2,203
1) Monitoring summary includes from January 2021 to August 2021.				

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

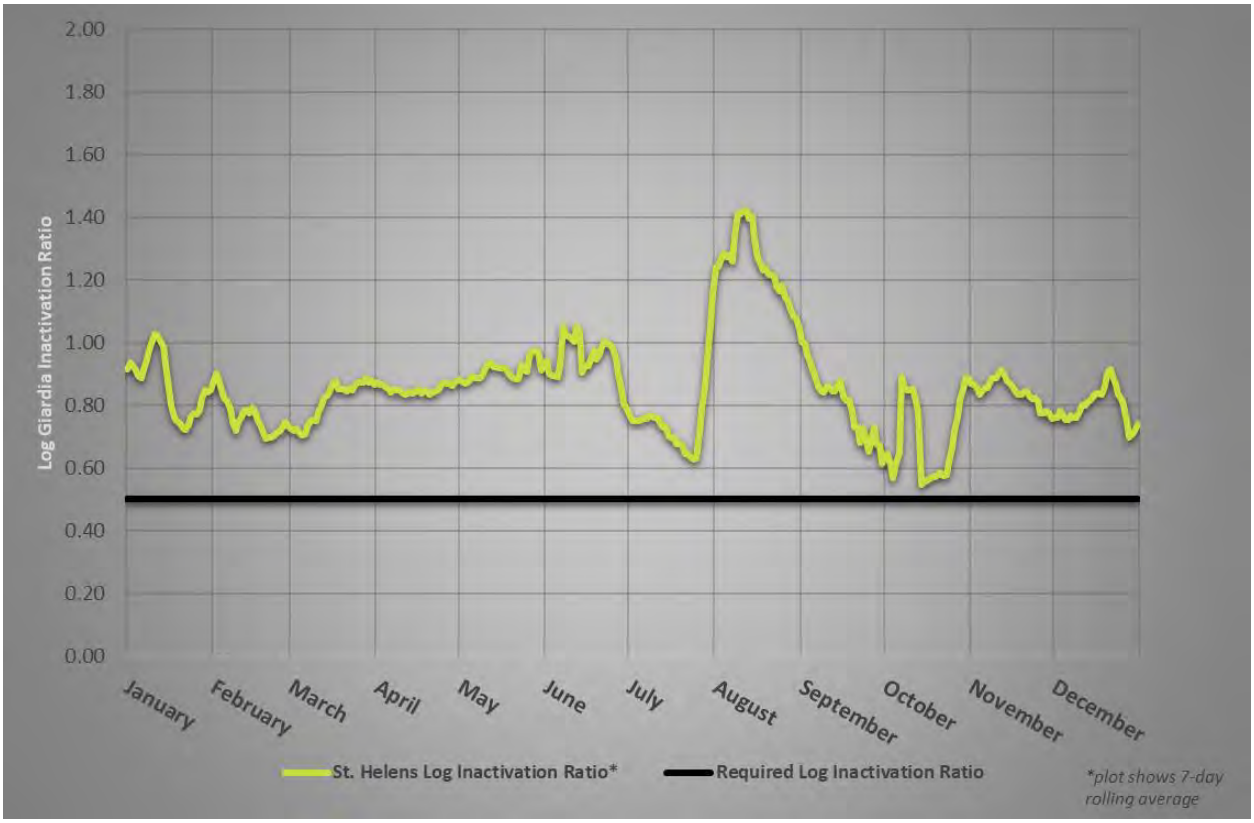
FIGURE 3-12: 2021 WATER QUALITY TRENDS



The log *Giardia* inactivation ratio was plotted for the WFF for the year of 2021, and the WFF is required to achieve 0.5 log inactivation of *Giardia* to remain in compliance. As shown in Figure 3-13 on the following page, the log inactivation ratio does not drop below 0.5 indicating the WFF is achieving sufficient chlorine residual and contact times to comply with state water quality regulations.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 3-13: LOG GIARDIA INACTIVATION PROFILE



The future water system demands were compared with the disinfection capacity of the WFF under a worst-case scenario. It was assumed to be peak hour demand flows, temperature of 10°C (50°F), 7.5 pH, and a chlorine residual of 0.8 mg/L. The required CT from the CT tables is 22 minutes at the above listed parameters for 0.5 log removal of *Giardia*. The WFF has sufficient volume in the clearwell to achieve the required contact time and the chlorine dosing pumps can deliver enough sodium hypochlorite to maintain the chlorine residual. The WFF should not need capacity related improvements to meet the required CT within the next 20 years.

3.5.5 RECOMMENDED IMPROVEMENTS

Based on the high-level planning evaluation of the WFF, several improvements are recommended:

- Activate the Bayport Well and exercise regularly to provide an emergency source of water if the WFF is offline.
- Install a redundant supply pipeline from K Street and 3rd Street to the WFF. Install a redundant supply line to the system from the WFF to Oregon Street.
- Install VFDs at the Ranney Wells to continue operation of the WFF with the raw water wet well offline.
- Update WFF controls process to be called on based on the 2.5 MG Reservoir rather than the raw water wet well levels.

3.5.6 REPLACEMENT SCHEDULE

The WFF was completed in 2005 and began producing drinking water in 2006. Minimal short-lived assets have been replaced since startup, resulting in the majority of components being approximately 16 years old. A short-lived asset inventory was completed for the WFF, and an

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

annual replacement budget was developed for the system. A summary of the inventory and replacement budget is provided below in Table 3-3. The first component which will likely need to be replaced are the membrane filter modules which have a typical useful life of 10 to 15 years. Although the modules are nearing the end of the typical lifecycle for this type of equipment, the membranes have not experienced any increased incidences of failure which would be expected prior to replacing aged modules. The raw water, filtration feed, chemical feed, and high service pumps will likely need to be replaced following the membrane filters as the typical useful life of a pump is 20 years.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 3-3: WFF INVENTORY AND ANNUAL REPLACEMENT BUDGET

Asset Name	Typical Useful Life (yrs)	Replacement Cost (2021, $)	Annualized Replacement Cost ($/yr) [1]	2021 Remaining Life (yrs)[2]	Value of Depreciation to Date	Depreciated Value (2021)
5-Year Replacement Assets						
Membrane Filter Skid #1 (52 Modules per Skid)	15	$114,400	$8,600	0	$114,400	$0
Membrane Filter Skid #2 (52 Modules per Skid)	15	$114,400	$8,600	0	$114,400	$0
Membrane Filter Skid #3 (52 Modules per Skid)	15	$114,400	$8,600	0	$114,400	$0
Membrane Filter Skid #4 (52 Modules per Skid)	15	$114,400	$8,600	0	$114,400	$0
Membrane Filter Skid #5 (18 Modules per Skid)	15	$39,600	$3,000	0	$39,600	$0
Citric Acid Pump (120 gpm)	15	$40,500	$3,100	0	$40,500	$0
Sodium Hypochlorite Metering Pump #1 (7.5 gpm)	15	$27,000	$2,100	0	$27,000	$0
Sodium Hypochlorite Metering Pump #2 (7.5 gpm)	15	$27,000	$2,100	0	$27,000	$0
Sodium Hypochlorite CIP Makeup Pump (30 gpm)	15	$40,500	$3,100	0	$40,500	$0
Neutralization Waste Disposal Pump #1 (10 hp)	15	$32,550	$2,500	0	$32,550	$0
Neutralization Waste Disposal Pump #2 (10 hp)	15	$32,550	$2,500	0	$32,550	$0
5-Year Replacement Assets (ROUNDED)		$700,000	$50,000	-	$700,000	$0
5-Year Replacement Assets						
Ranney Well 2 - Pump No. 5 (75 hp)	20	$55,800	$3,300	5	$41,850	$13,950
Ranney Well 2 - Pump No. 7 (75 hp)	20	$55,800	$3,300	5	$41,850	$13,950
Ranney Well 3 - Pump No. 10 (200 hp)	20	$240,000	$14,000	5	$180,000	$60,000
Ranney Well 3 - Pump No. 11 (75 hp)	20	$55,800	$3,300	5	$41,850	$13,950
Ranney Well 3 - Pump No. 12 (75 hp)	20	$55,800	$3,300	5	$41,850	$13,950
Membrane Feed Pump #1 (75 hp)	20	$65,100	$3,800	5	$48,825	$16,275
Membrane Feed Pump #2 (75 hp)	20	$65,100	$3,800	5	$48,825	$16,275
Membrane Feed Pump #3 (75 hp)	20	$65,100	$3,800	5	$48,825	$16,275
Membrane Feed Pump #4 (75 hp)	20	$65,100	$3,800	5	$48,825	$16,275
High Service Pump #1 (125 hp)	20	$97,650	$5,700	5	$73,238	$24,413
High Service Pump #2 (125 hp)	20	$97,650	$5,700	5	$73,238	$24,413
High Service Pump #3 (125 hp)	20	$97,650	$5,700	5	$73,238	$24,413
High Service Pump #4 (125 hp)	20	$97,650	$5,700	5	$73,238	$24,413
Caustic Soda Metering Pump #1 (30 gpm)	20	$27,000	$1,600	5	$20,250	$6,750
Caustic Soda Metering Pump #2 (30 gpm)	20	$27,000	$1,600	5	$20,250	$6,750
Caustic Soda CIP Makeup Pump (120 gal)	20	$40,500	$2,400	5	$30,375	$10,125
Backwash Pump #1 (25 hp)	20	$43,400	$2,600	5	$32,550	$10,850
Backwash Pump #2 (25 hp)	20	$43,400	$2,600	5	$32,550	$10,850
Backwash Recovery Feed Pump #1 (10 hp)	20	$32,550	$1,900	5	$24,413	$8,138
Backwash Recovery Feed Pump #2 (10 hp)	20	$32,550	$1,900	5	$24,413	$8,138
Sodium Hypochlorite Tank #1 (6,000 gallon, HDPE)	20	$67,200	$4,000	5	$50,400	$16,800
Cuastic Soda Tank (6,000 gallon, HDPE)	20	$67,200	$4,000	5	$50,400	$16,800
Air Compressor (20 hp)	20	$15,000	$900	5	$11,250	$3,750
10-Year Replacement Assets (ROUNDED)		$1,500,000	$90,000	-	$1,130,000	$380,000
20-Year Replacement Assets						
Backwash Recovery Tank (7,500 gallon, Fiberglass Reinforced Plastic)	30	$84,000	$3,500	15	$42,000	$42,000
Neutralization Tank (7,500 gallon, Fiberglass Reinforced Plastic)	30	$84,000	$3,500	15	$42,000	$42,000
CIP Batch Tank (Caustic Soda) (3,500 gallon, Fiberglass Reinforced Plastic)	30	$50,400	$2,100	15	$25,200	$25,200
CIP Batch Tank (Citric Acid) (3,500 gallon, Fiberglass Reinforced Plastic)	30	$50,400	$2,100	15	$25,200	$25,200
Finished Water Flow Meter (Magmeter)	30	$11,250	$500	15	$5,625	$5,625
Ranney Well 2 - Pump No. 6 (75 hp)[3]	20	$55,800	$3,300	19	$2,790	$53,010
20-Year Replacement Assets (ROUNDED)		$340,000	$20,000	-	$140,000	$190,000
Greater than 20-Year Replacement Assets						
Raw Water Wet Well (80,000 gallon, Welded Steel)	50	$240,000	$6,900	35	$72,000	$168,000
Clearwell Tank (450,000 gallon, Welded Steel)	50	$900,000	$25,800	35	$270,000	$630,000
Greater than 20-Year Replacement Assets (ROUNDED)		$1,100,000	$30,000	-	$340,000	$800,000
GRAND TOTAL (ROUNDED)		$3,700,000	$190,000	-	$2,300,000	$1,400,000

1) Assumes a discount rate of 1.5% based on 20-year nominal discount rate (https://www.whitehouse.gov/wp-content/uploads/2020/12/2020_Appendix-C.pdf)

2) Assumes all assets were installed in 2006.

3) Ranney Well 2 - Pump No.6 was rebuilt in 2020.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.6 DISTRIBUTION SYSTEM

The City's distribution system consists of approximately 85 miles of pipe ranging in diameter from less than 1 inch to 20 inches. As shown in Table 3-4, about half of the system is made of DI pipe while the remainder of the system is a combination of materials including concrete, galvanized, steel, polyvinyl chloride, and cast iron. As shown in Table 3-5, approximately half of the systems total length of pipe was installed in the 1990s. A, however, a significant portion (~25%) has an unknown installation date. Figures showing pipeline diameter and pipeline material are included in Figures 11 and 12 in Appendix A.

TABLE 3-4: PIPELINE INVENTORY

Diameter (in)	Concrete Cylinder Pipe (CCP)	Cast Iron (CI)	Concrete Pipe (CP)	Ductile Iron (DI)	Galvanized (GAL)	Polyvinyl Chloride (PVC)	Steel	Unknown	Total	% of Total
<4	0	18,400	0	14,900	25,100	1,300	15,900	4,300	80,200	20%
6	0	31,100	200	95,200	400	2,200	11,500	4,300	144,900	36%
8	0	3,700	0	45,000	0	1,300	1,200	2,200	53,400	13%
10	0	1,300	0	6,200	0	0	0	400	7,900	2%
12	0	0	0	39,200	0	0	0	800	40,000	10%
14	13,900	6,500	6,000	8,600	0	0	200	1,100	36,300	9%
16	0	0	0	15,200	0	0	0	700	15,900	4%
18	0	0	0	2,400	0	0	0	300	2,700	1%
20	0	0	0	14,400	0	0	0	0	14,400	4%
Unknown	0	0	0	1,900	0	0	0	8,000	9,900	2%
Total	13,900	61,000	6,200	243,000	25,500	4,800	28,800	22,100	406,000	100%
% of Total	3%	15%	2%	60%	6%	1%	7%	5%	100%	-

TABLE 3-5: PIPELINE AGE

Decade Installed	Length of Pipe (ft)	% of Total
1940s	2,700	1%
1950s	1,100	0%
1960s	3,200	1%
1970s	51,500	12%
1980s	26,700	6%
1990s	198,000	45%
2000s	37,000	8%
2010s	10,600	2%
Unknown	106,800	24%
Total	438,000	100%

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.7 SEISMIC RESILIENCY PLAN

The Oregon Resilience Plan was developed in 2013 and provides the state's road map for earthquake preparedness. The plan consisted of evaluating the likely impacts of a future seismic event in the Cascadia subduction zone, determining acceptable timeframes to restore functions following the seismic event, and changes in practice and policies to prepare the state and reach desired resilience targets. These three tasks were evaluated for a number of utility types, one of which was potable water systems. Potable water systems were identified as "especially vulnerable to damage resulting from a Cascadia subduction zone earthquake." The goal of this section is to identify critical infrastructure needed to supply water during an emergency and identify projects to be completed in the next 50 years to ensure that potable water can be provided to City residents in the event of a strong earthquake.

3.7.1 SEISMIC HAZARDS

According to the Geotechnical Planning Report completed by Shannon & Wilson, Inc. in 2021, which can be found in Appendix B, a significant portion of the City is located in areas mapped as rock, specifically Grande Ronde Basalt. Several geological hazards were identified in the report including landslides, earthquake shaking, liquefaction, and fault rupture.

Landslide Hazards - Landslide risks vary throughout the City from low to very high, however, most of the water system components are located in areas of low to moderate landslide risk. See Figure 3-14 below or Figure 6 in Appendix A for the locations of landslide hazards.

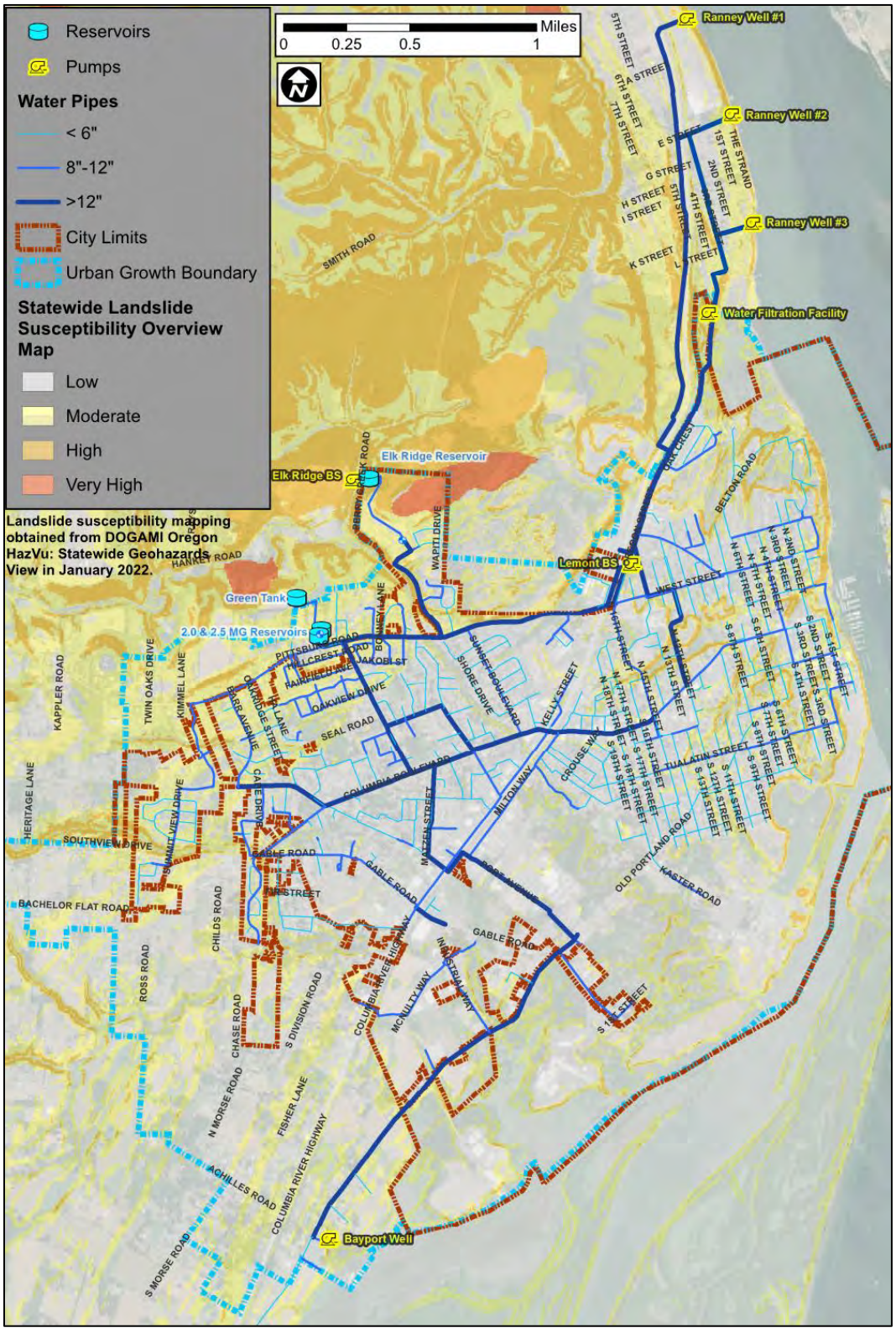
Earthquake Hazards – Earthquake shaking throughout the City varies from "Low Risk" to "Very Strong Shaking". Several critical facilities are located in areas of "Very Strong Shaking" including the 2.0 MG and 2.5 MG Reservoir, Green Tank, Elk Ridge Reservoir, Ranney Wells #1, #2, and #3, and the Lemont BS. In addition, the WFF is located in an area of "Strong Shaking" as well. Figure 3-15 below and Figure 7 in Appendix A illustrate the earthquake shaking intensities throughout the city.

Liquefaction Hazards – The geotechnical report completed by Shannon & Wilson, Inc. did not include liquefaction hazards in Columbia City where the WFF and Ranney Wells are located in the initial report and figures. However, additional liquefaction mapping was provided for this WMP and is illustrated in Appendix B. The majority of the system is located within areas of moderate to low risk for liquefaction hazards.

Fault Rupture – The geotechnical report completed by Shannon & Wilson, Inc. shows the nearest fault to be the Portland Hills Fault, which is located approximately 5 miles to the south of St. Helens. The report classified the risk of fault rupture for the City is low.

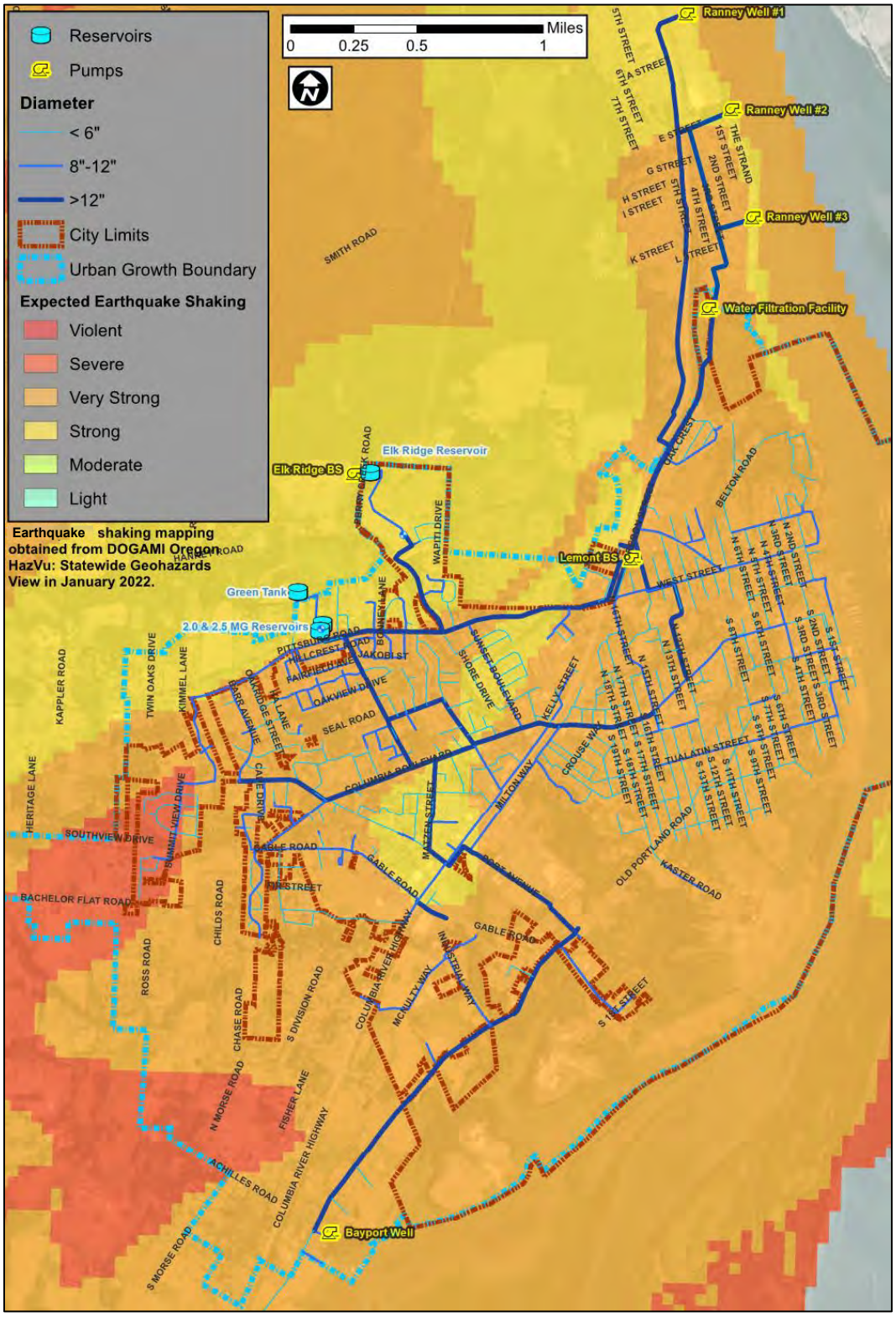
DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 3-14: LANDSLIDE HAZARDS WITH WATER SYSTEM



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 3-15: EARTHQUAKE INTENSITY SHAKING WITH WATER SYSTEM



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.7.2 IDENTIFYING CRITICAL ELEMENTS

The first step in this seismic resilience plan was to identify critical elements in the existing water distribution system. The critical elements considered in this plan include raw water supply, treatment, distribution, and storage.

Improving all the existing water system components to reach desired resilience targets is not likely achievable within the 50-year capital improvement plan (CIP). For this reason, a "backbone" water system was identified to provide the four main elements. Improvement projects to increase resiliency in the backbone water system are included in a 50-year CIP and are more attainable than improving the entire system. A summary of the identified back-bone system is shown in Table 3-6 and Figure 3-16 below.

Raw Water Supply – The City currently has two active raw water supply sources and two inactive raw water supply sources. As discussed in previous sections, Ranney Well #3 is the newest raw water source and was constructed in 1999. Since it was constructed after 1990, it likely was constructed to more stringent lateral force requirements and has a lesser chance of total failure under seismic activity. A negative for these water sources is the threat of polluted source water upstream because the Columbia River runs through numerous large cities upstream of St. Helens and therefore has an increased risk of pollution. For this reason, the Bayport Well was also considered to be the backbone raw water source, however, the Bayport well is significantly older than the Ranney Well #3 and has a much lower capacity. Considering the reasons listed above, it was concluded that Ranney Well #3 was the most critical raw water supply and was included in the backbone water system.

Water Treatment – The City's potable water is filtered at the WFF and is the sole active water source in the distribution system. With some improvements, the City could be supplied by the Bayport Well, however, the capacity of this well is significantly lower than the WFF which was constructed post 1990s. For these reasons, the WFF was identified as the most critical treatment component and was included in the backbone water system.

Water Storage – The City has several storage reservoirs within the system, and the critical storage facility was determined based on meeting the emergency and fire suppression storage volumes (covered in more detail in Section 4) and location within potential liquefaction, landslide, and shaking intensity areas. All four existing reservoirs are located within moderate landslide susceptibility and strong shaking intensity areas. The 2.0 MG and 2.5 MG Reservoirs and Green Tank were not identified to be at risk of liquefaction; however, the Elk Ridge Reservoir is within an area of low risk of liquefaction. The two largest reservoirs in the system, 2.0 MG and 2.5 MG Reservoirs, are both over 40 years old and were not likely designed to the current seismic design standards. Therefore, if these reservoirs were to be included as part of the backbone water system, structural retrofits would be necessary to improve seismic resiliency. Furthermore, in future sections of this study a storage deficit was identified in the water system which means the City will need additional storage to meet the projected water system demands and storage criteria. It is recommended that the future reservoir be included as the backbone water system storage component because it should be designed and constructed with seismic resiliency standards in mind and has a higher chance of remaining operational following a seismic event. It should be noted that this would leave the City without an existing storage component in the backbone system until the future reservoir is constructed; however, improving one of the existing reservoirs in the interim would not likely be financially responsible as it would be a major investment into existing infrastructure rather than allocating that funding toward the future storage reservoir. For these reasons, the future storage reservoir should be considered a high priority for establishing a complete backbone water system. Note, Figure 3-16 below shows this plan's recommended location of the future storage reservoir, and the detailed alternatives analysis for this reservoir is included in Section 5.

Distribution – The critical distribution system elements include pumping facilities at the raw water supply and the WFF as well as the pipeline required to convey water to each of the critical facilities. Additional critical distribution system elements include pipeline to convey water to strategic distribution supply points. It is not realistic to improve the water distribution system to be resilient

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

at every existing customer service connection, therefore, strategic supply points have been identified throughout the City where residents can get potable water after a seismic event. The critical distribution system elements do not include any pipeline in the High PZ because the Lemont BS could be an additional point of failure if not improved to withstand lateral forces. These strategic supply points should be accessible to residents and have adequate area to set up temporary supply stations. The supply stations were chosen based on the location of existing distribution pipe, large open areas, and existing land ownership. St. Helens Middle School, 6th Street Park, Columbia County Transit Center, Campbell Park, Columbia, and McCormick Park were considered as supply stations.

TABLE 3-6: WATER SYSTEM INVENTORY

Facility Name	Type	Backbone System
Ranney Collector Well #1	Inactive Water Supply	No
Ranney Collector Well #2	Active Water Supply	No
Ranney Collector Well #3	Active Water Supply	Yes
Bayport Well	Inactive Water Supply	No
Water Filtration Facility	Water Treatment	Yes
Lemont Booster Station	Pumping Facility	No
Elk Ridge Booster Station	Pumping Facility	No
2.0 MG Reservoir	Water Storage	No
2.5 MG Reservoir	Water Storage	No
Green Reservoir	Water Storage	No
Elk Ridge Reservoir	Water Storage	No
Future Reservoir	Water Storage	Yes

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 3-16: SEISMIC BACKBONE WATER SYSTEM



3.7.3 STRUCTURAL EVALUATION

A high-level structural evaluation of the City's eleven water system facilities was completed as a part of this seismic resiliency plan to recommend facilities which should be considered for in-depth structural evaluation or retrofits. It should be noted that this evaluation was based on limited information including site photos, record drawings, and reported construction date. This evaluation should serve only as guidance on next steps for completing in-depth structural evaluations leading to defined structural retrofit recommendations. The summary of each facility evaluation is included below:

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- 2.0 MG Reservoir: Built in 1924. No seismic detailing, almost all reinforcement appears to be from a hoop-stress analysis. Very small footings, minimal vertical reinforcement. No seismic considerations in design, structure is likely to deteriorate under any sort of cyclic lateral loading.
- 2.5 MG Reservoir: Built in 1974. Reservoir walls are on bearing pads with light shear reinforcement at the base. Has 0.6-inch diameter seismic prestressing cables on the outside face in debonded sleeves with 6-foot min embedment into the wall. Joints are well-detailed with waterstop and sealants. Distribution and layout of reinforcement may not meet modern standards, but there was some consideration in the original design. Interior columns are likely deficient. Columns are square with minimal #3 confinement reinforcement (@ 10-inch typical, @ 4-inch near supports.) Unlikely the reinforcement extends over the plastic hinge region. Lateral loading from the roof may not be such that the columns would fail, but their displacement capacity is minimal. Column retrofit may be a viable solution to this.
- Bayport Well: Built in 1988. Unreinforced masonry building with timber truss roofs. Has some light dowel bars (#5 @ 32-inch) going into the foundations of the walls, and some minimal horizontal reinforcement (2-#5 @ 48-inch). Lateral demands seem very minimal, mainly just the self-weight of the structure. Most risk to this structure seems to be to the equipment inside.
- Elk Ridge BS: Plans provided were for a design-build contract for 2017. Assumed to be adequate due to construction date.
- Elk Ridge Reservoir: Built in 2009. Site has mechanically stabilized earth (MSE) walls that are likely up to current code standards. Reservoir details are unclear, plans refer to a design provided by a third-party manufacturer. Assuming general adequacy based on year built but cannot confirm.
- Green Tank: Steel tank built in 1971. Minimal details provided on the contract drawings. Connection to foundation is not particularly clear, nor is any sort of waterstop or waterproofing apparent in the event of some form of uplift or rocking behavior. There may be corrosion issues with the tank after 50 years but unclear what the level or extent of this is without a structural evaluation or detailed inspection. Risk seems reasonably high that this is not adequately detailed for seismic loading.
- Lemont BS: Partially buried structure built in 1965. Walls have poor detailing for seismic with lap splices and a lack of full height reinforcement on the interior face. Minimal vertical reinforcing (#4 @ 18-inch) so ductility of wall is likely to be nonexistent and a brittle failure mode is likely, especially if bars pull out of foundation as walls are loaded. If site seismicity is low this may not be a problem, but there is cause for concern. Sand separator columns are poorly defined and have no confinement, and small displacement demands may result in significant damage to the columns and the supported structure. Column retrofit may be prudent if this is reconsidered as a critical facility.
- Ranney Well #1: Masonry building with minimal reinforcement built in 1954. Structure has minimal seismic resistance but also appears to have minimal loading beyond its roof weight.
- Ranney Well #2: Large caisson structure with pump station on top and a steel arch bridge built in 1970. Seismic assessment of this structure would be very complicated since it has a multitude of different structural attachments, and the caisson is only partially buried. There are lots of details, such as the anchorage of the main water pipe coming off the arch, that would need individual evaluation. This facility is not necessarily high risk, but certainly would need a more rigorous seismic evaluation to determine the extent of retrofits needed.
- Ranney Well #3: Buried structure built in 1999. No structural details are provided, but the structure is relatively simple and a relatively modern construction. There is a lot of equipment in the building, however, that may be impacted under seismic loading.

In the structural evaluation of each facility, a nonstructural component evaluation was not performed. Nonstructural components include pumps, free-standing electrical cabinets, and other such elements of significant mass which may be subject to damage from seismic excitation or may impart seismic loading, through their attachment to a structural component. Typically, modern seismic credentialing of these systems falls onto manufacturers to be evaluated via shake table

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

testing as laid out in documents like National Earthquake Hazards Reduction Program (NEHRP) 2003 (FEMA 450) seismic provisions, but dates back to around 1994. Formal specifications have been laid out to manufacturers in the form of documents like “AC156 – Acceptance Criteria for Seismic Certification by Shake Table Testing of Nonstructural Components” for the components themselves, and the attachment mechanisms through code documents such as American Concrete Institute (ACI) 355.

Even if the building structure is capable of resisting imposed seismic demands, this is not a guarantee that either the equipment inside the structure, or its attachment mechanism, is capable of resisting design-level loading. Equipment manufactured beyond 1994, it may be reasonably assumed, is more likely to follow an internal structural design compliant with shaking table testing and that its anchorage will be designed through American Society of Civil Engineers (ASCE 7) Chapter 13 guidelines. Evaluation of individual pieces of equipment and the structural load path is beyond the scope of this study, but it is recommended the City identify individual pieces of high-risk equipment that may warrant independent evaluation. For example, a pump which experiences anchorage failure may then “walk” under a seismic event, which would place additional demands on the attached piping systems and/or may result in this equipment colliding with other equipment. It is advised that any seismic retrofitting efforts should also look at the equipment in addition to the facility

3.7.4 LIKELIHOOD AND CONSEQUENCE OF FAILURE

The second part of this seismic resiliency plan was to quantify the likelihood and consequence of failure for each of the water system facilities. The consequence of failure for each facility was calculated based on a scoring system which took into consideration size, type of users served, number of people served, and if the facility has been identified as critical infrastructure. A summary of the criteria is provided below:

- Size of Facility (Score: 0.5 – 1.5) – Assigned based on the capacity of pumping facilities or the volume of storage facilities.
- Facility Services (Score: 0-2 per facility) – Assigned based on the type of service connections the facility services including critical government infrastructure such as emergency services, police, fire stations, etc. or schools/hospitals, commercial/industrial zones, historical sites, or system interties.
- Population Served (Score: 1-3) – Assigned based on size of service population.
- Back-Up Supply/Source (Score: 1-3) – Assigned based on the availability of redundant similar facilities (e.g., multiple storage reservoirs or pumps in a zone).
- Critical Infrastructure Facility (Score: 0-3) – Assigned if the facility was identified as critical infrastructure for the back-bone water system.

Similarly, several criteria were developed to quantify the likelihood of failure and included a number of factors such as seismic hazards, redundant power supply, existing condition, age, and flooding.

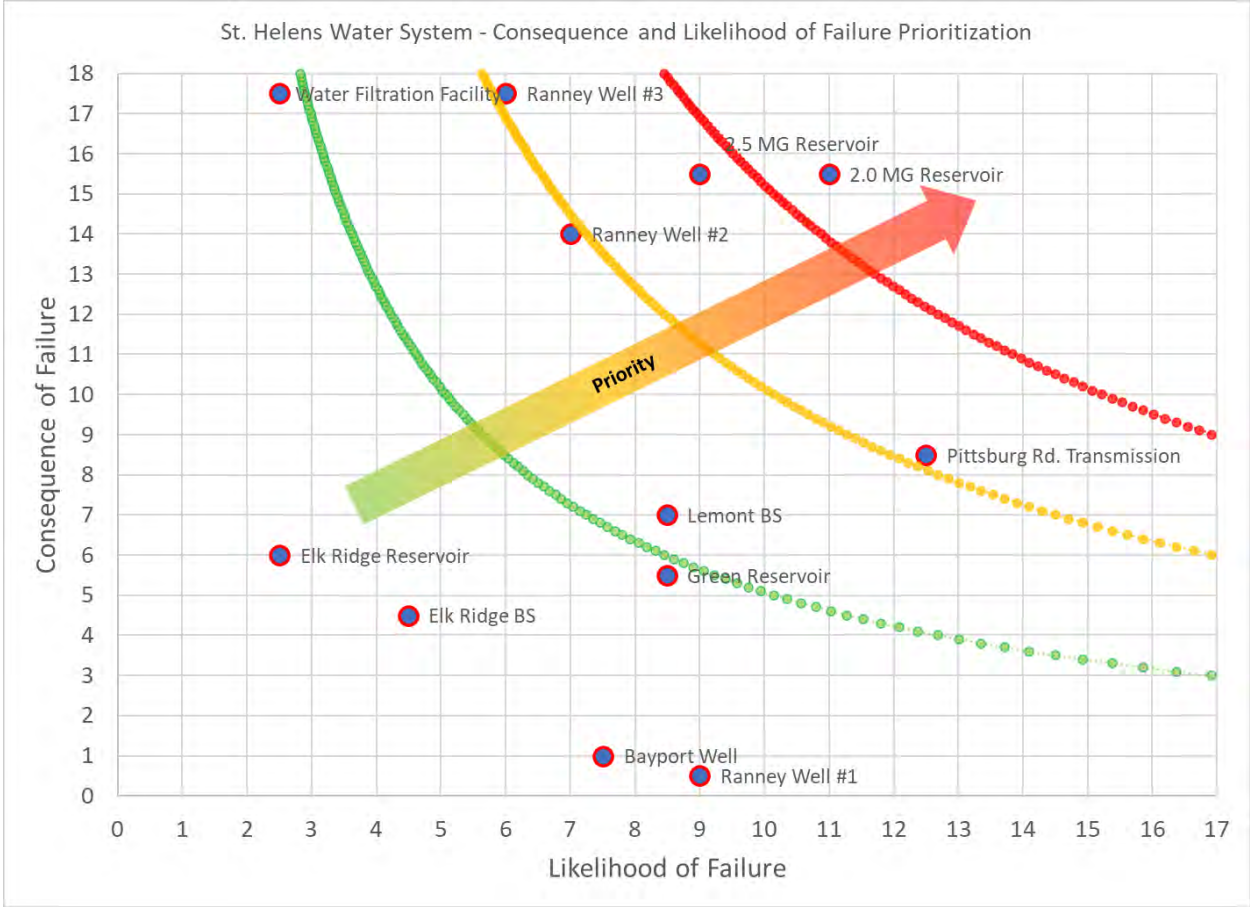
- Liquefaction Hazard (Score 0-3) – Assigned based on the liquefaction hazard mapping discussed above.
- Landslide Susceptibility (Score 0-3) – Assigned based on the landslide susceptibility hazard mapping discussed above.
- Age of Facility (Score 0-3) – Assigned based on the age of the infrastructure referencing benchmark years where structural and mechanical standards have a large influence on likelihood of failure in a seismic event.
- Back-Up Power (Score 0-1) – Assigned based on existence of back-up power.
- Facility Piping Condition (Score 0-2) – Assigned based on inlet/outlet and yard piping age and material. Older materials such as concrete cylinder and cast iron pipes assigned higher scores.
- Sensor and Alarm Redundancy (Score 0-0.5) – Assigned based on existence of back-up alarms and sensors.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- Flooding Susceptibility (Score 0-1) – Assigned based on location of facility in reference to the FEMA 100-year floodplain.
- Structural Condition (Score 0-3) – Assigned based on high-level structural review of facilities and likelihood of failure in seismic event.

Each of the facilities scores were plotted and categorized as low, medium, or high priority based on risk contours as shown in Figure 3-17. The full details of the evaluation and the scoring breakdowns for each of the facilities is included in Appendix D.

FIGURE 3-17: LIKELIHOOD AND CONSEQUENCE OF FAILURE PRIORITIZATION



The highest priority facility is the 2.0 MG Reservoir because this storage facility poses a high likelihood and consequence of failure. The next highest facility is the 2.5 MG Reservoir, and even though this reservoir was built more recently (1970s), it is still at risk for failure. The Pittsburg Road transmission pipeline does not pose the highest consequence of failure; however, it is shown as the highest likelihood of failure and alternatives to address this deficiency are discussed in more detail in Section 5. Ranney Well #3 is the next highest priority facility with a high consequence and moderate likelihood of failure. The WFF is a critical component of the backbone system; however, it is also one of the newest facilities in the water system. Although the consequence of failure is among the highest, the likelihood of failure is much lower because it was constructed to more recent design requirements which consider seismic activity.

3.7.5 SYSTEM IMPROVEMENTS

System improvements to increase system resiliency in the event of the Cascadia subduction earthquake are discussed in this section. In terms of structural resiliency of the critical facilities, it

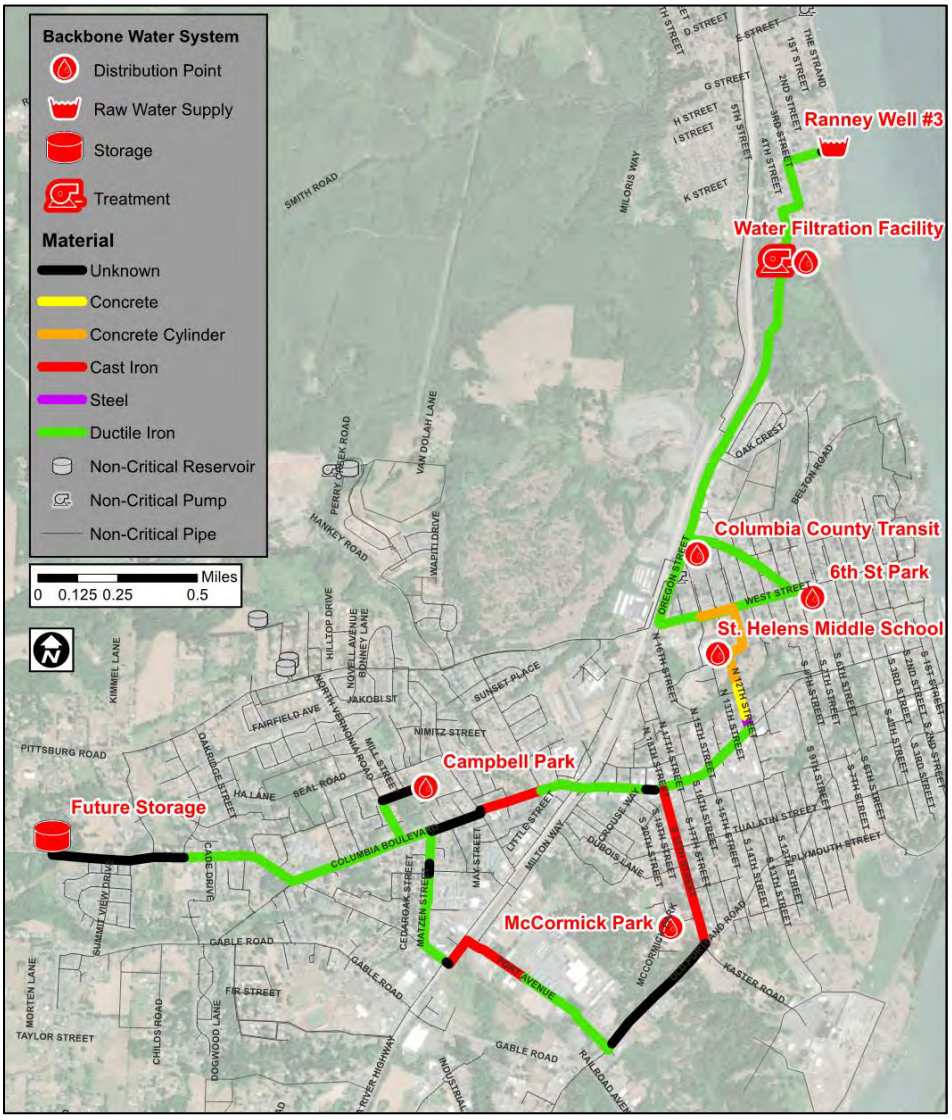
DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

is recommended that the City complete an in-depth structural evaluation of the Ranney Well #3. This facility is included in the back-bone water system and the available information used to complete the structural evaluation in this study was not sufficient to develop specific structural retrofit recommendations. The City is also recommended to install a future storage reservoir which will serve as the water storage component of the backbone water system.

In addition to the structural recommendations, the backbone distribution piping improvements are an additional medium priority project. The project should consist of installing seismically resilient pipeline infrastructure between critical facilities and to distribution supply points.

Figure 3-18 shows the backbone distribution system existing pipe materials. Concrete, concrete-cylinder, cast iron, and steel pipelines should be replaced with more durable pipe materials such as DI with seismically resilient fittings and connections to facilities. The existing DI pipeline over 50 years old should be routinely inspected and replaced when signs of aging occur.

FIGURE 3-18: CRITICAL PIPELINE REPLACEMENT



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Future Improvements could also be considered to improve the backbone water system beyond the system described in the section above. The City could consider incorporating the Lemont BS and High PZ reservoirs into the backbone water system to provide a source of water in the High PZ as well as additional water storage capacity.

3.7.6 SEISMIC RESLIENCY PLAN CONCLUSION

Similar to other water systems in the State of Oregon, the City's potable water system is at risk of significant seismic activity and the City should proactively improve critical infrastructure to the level of resiliency to withstand a Cascadia subduction zone earthquake. The recommended improvement projects discussed in this section are included in the City's CIP which is discussed in full in Section 7. The improvement prioritization method depends on a number of factors; however, the typical improvement time frame for a master plan is approximately 20 years and, in this study, includes Priorities 1, 2, and 3. Additional improvements which are not as high a priority, but still recommended in this seismic resiliency plan are Priority 5 projects which should be completed within the next 20-50 years. Completing the recommended improvements described in this section should increase system resiliency and will likely reduce the recovery time to return to operation after a seismic event. Additional considerations which were not discussed in this section should also be considered as the City continues to develop their seismic resiliency plan. The City should be aware of disruptions in transportation corridors, energy and fuel, supply chain, and work force availability as the improvements are completed.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 4 - CAPACITY ANALYSIS

The following section discusses a summary of the findings from the distribution system evaluation. The evaluation included an analysis on the available water supply, pumping capacities, storage evaluation, peak hour demand (PHD) pressures, and maximum day demand (MDD) plus fire flow.

4.1 SUPPLY ANALYSIS

The City has four active water rights which they can use for municipal water supply. As discussed in previous sections, the water supply sources include three Ranney Collector Wells, and one groundwater well. A summary of the available water rights compared to the existing and future demands is shown in Table 4-1. The existing and future MDD were compared to the available water rights from Ranney Wells #2 and #3 because Ranney Well #1 and the Bayport Well are not used in day-to-day operations. These sources could be considered as an additional daily supply if there is a deficiency in the future, however as seen in the table, the City has a surplus of 3.2 MGD by 2041. The City has ample available water supply to the Water Filtration Facility (WFF) in order to meet the existing and 20-year projected demands.

TABLE 4-1: WATER SUPPLY ANALYSIS (WATER RIGHTS)

Water Right Number	Description	Available Water Rights (MGD)
G-10803	Bayport Well	1.2
GR-282	Ranney Well #1	3.0
S-34529	Ranney Well #2	2.3
S-47234	Ranney Well #3	5.8
	Total Available Water	12.2
	Total Available Water to WFF[1]	8.1
MDD (MGD)		Surplus / Deficiency[2]
2021	3.1	5.0
2031	4.0	4.1
2041	5.0	3.1

1) Water available to the WFF only includes Ranney Wells #2 and #3.

2) Surplus/deficiency compared to available supply to the WFF.

4.2 DELIVERY ANALYSIS

The City has three active pumping facilities which were evaluated in this study. Each pumping facility's firm capacity was compared to MDD which the facility must deliver water to. The firm capacity is equal to the capacity of the facility with the largest pump online. Evaluating the firm capacities of the pumping facilities incorporates system redundancy and resiliency in the event one of the pumps fails or must be taken offline for maintenance. Only the WFF finish pumps, Lemont Booster Station (BS), and Elk Ridge BS are evaluated in this section; refer to Section 3.5.2 for a summary of the firm capacity of the raw water supply and major treatment processes.

4.2.1 MAIN PRESSURE ZONE

Water is pumped into the Main Pressure Zone (PZ) through the WFF. The Main PZ also serves as the water source from which the Lemont BS and ultimately the Elk Ridge BS pump from, therefore, the WFF must be able to meet the MDD of the entire water system. The WFF has four 1,400 gallons

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

per minute (gpm) capacity pumps which are operated with variable frequency drives (VFDs) to maintain a specific pressure at its discharge. The firm capacity of the WFF compared to the existing and future MDDs for the whole system is included in Table 4-2. As shown in the table, the WFF has a firm capacity which can meet both the existing and future MDDs. Additionally, the WFF has a build-out capacity of 10.0 MGD.

TABLE 4-2: WHOLE SYSTEM DELIVERY CAPACITY ANALYSIS

Whole System	(gpm)	
	2021	2041
Finish Pump #1	1,400	
Finish Pump #2	1,400	
Finish Pump #3	1,400	
Finish Pump #4	1,400	
Total Capacity	5,600	
Firm Capacity	4,200	
MDD	2,120	3,440
Surplus / Deficiency	2,080	760

4.2.2 HIGH PRESSURE ZONE

The High PZ is supplied by the Lemont BS which pumps water from the Main PZ and has a total of three pumps, each with a design capacity of 570 gpm. The delivery capacity analysis for the High PZ is shown in Table 4-3. Note, the 2041 demands include the Elk Ridge BS demands because the Lemont BS must deliver water for this zone to draw water from. The Lemont BS has sufficient capacity to meet the existing and projected future water demands.

TABLE 4-3: HIGH PZ DELIVERY CAPACITY ANALYSIS

High PZ	(gpm)	
	2021	2041
Pump #3	570	
Pump #4	570	
Pump #9	570	
Total Capacity	1,710	
Firm Capacity	1,140	
MDD	271	348
Surplus / Deficiency	869	792

4.2.3 ELK RIDGE PRESSURE ZONE

The Elk Ridge PZ consists of the Elk Ridge Development, which is projected to include approximately 60 residential homes. The Elk Ridge BS has two pumps with a capacity of 50 gpm each. The pumps are operated with VFDs and maintain a specific pressure in the zone. The delivery analysis is shown in Table 4-4. It was assumed there was no demand in this zone in the 2021 scenario since the homes were under construction at the time of this evaluation. Since the zone is supplied solely by a booster station and no storage is available, the PHD was compared to the firm capacity of the booster station. The fire storage is met by a pressure sustaining valve between the

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Elk Ridge PZ and the High PZ. The valve is set to open when the pressure in the Elk Ridge PZ drops below the pressure in the High PZ. The booster station has a projected surplus of 11 gpm by 2041 when the current phase is completely developed. It should be noted, future phases of the Elk Ridge Development should be served by a new PZ with a hydraulic grade higher than the current Elk Ridge BS PZ because the future phases are located in areas with higher elevations which cannot be supplied by gravity from the storage reservoirs. A jockey pump should be installed to operate under low flow scenarios such as during winter, duty pumps should be installed to meet PHD, and fire pumps should be installed to meet fire flow demands resulting in a minimum of five new pumps (1 jockey + 2 duty + 2 fire pumps).

TABLE 4-4: ELK RIDGE PZ DELIVERY ANALYSIS

Elk Ridge PZ	(gpm)	
	2021	2041
Pump #13	50	
Pump #14	50	
Total Capacity	100	
Firm Capacity	50	
PHD	0	39
Surplus / Deficiency	50	11

4.3 STORAGE ANALYSIS

The City has a total of four water reservoirs which provide operating, equalization, emergency, and fire storage. Currently, the City's 2.0 MG Reservoir is offline due to unidentified leaks. This evaluation considers scenarios with the 2.0 MG Reservoir being on and offline because the City is currently in the process of addressing the unidentified leaks in the reservoir.

The effective storage was used to compare the storage requirements in this evaluation, which the effective storage is equal to the volume of water that can be supplied to the distribution system. Effective storage volumes account for the "dead" storage in each of the reservoirs, which is water that can be stored within the reservoir but is not available to the distribution system. The dead storage from the top of the reservoir was calculated based on maintaining one foot of freeboard between the maximum operating level and the overflow elevation. The freeboard accounts for errors in the SCADA level reporting, delays in pump off setpoints, and "sloshing" in the reservoir. The dead storage from the bottom is equal to the volume of water between the silt stop and the bottom of the reservoir. Table 4-5 below summarizes the characteristics for each of the four reservoirs within the system.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 4-5: STORAGE RESERVOIR CHARACTERISTICS

Characteristic	2.5 MG Reservoir	2.0 MG Reservoir[2]	Green Tank	Elk Ridge Reservoir
Nominal Volume (gal)	2,500,000	2,000,000	200,000	500,000
Inner Diameter (ft)	136.0	140.0	33.0	56.0
Overflow Depth (ft)	24.0	20.0	31.0	27.0
Max Operating Depth (ft)[3]	23.0	19.0	30.0	26.0
Silt Stop Height (ft)	1.00	1.00	0.5	0.75
Base Elevation (ft)	247.0	243.3	354.0	358.0
Volume per vertical foot (gal)[4]	109,000	115,000	6,000	18,000
Dead Storage Depth from bottom (gal)[1]	109,000	59,000	3,000	13,500
Dead Storage from Freeboard (gal)	109,000	115,000	6,000	18,000
Total Dead Storage (gal)	218,000	174,000	9,000	31,500
Effective Storage Volume (gal)[5]	2,398,000	1,922,000	177,000	454,500

1) For 2.5 MG Reservoir, assumes square bottom with 0% slope.

2) Bottom 10 feet of the 2.0 MG reservoir are sloped 1V:2H toward the center. Base diameter = 100 feet. Dead storage from the bottom is sloped from the edge to the center.

3) Maximum operating depth includes 1 foot of freeboard from the overflow depth.

4) 2.0 MG volume per vertical foot varies once level drops below 8.2 feet. Reservoir walls become sloped 1V:2H.

5) Equal to the volume at overflow minus total dead storage.

The effective storage volumes calculated above were compared to the systems existing and future demands. As discussed in Section 2, the operating storage is the volume of water used during normal operations before water sources begin pumping to refill the reservoirs. The equalization storage is the volume required to meet the system PHD, which was calculated using the diurnal curve that was developed for the water system (Section 2). Fire storage required should be able to meet the maximum fire flow demand for the specified duration and the City's maximum fire demand is equal to 3,500 gpm for a duration of 4 hours. The City has elected to target 48 hours (two days) of average day demand for emergency/standby storage. To prevent overly conservative storage volumes and oversized reservoirs, the fire storage was assumed to be nested within the emergency storage where applicable.

The Main PZ and High PZ were evaluated separately because both systems have independent storage components, however, available surplus in the Main PZ should be considered as additional storage in the High PZ because the Lemont BS has sufficient firm capacity and back-up power. The existing storage analysis for the Main PZ was evaluated under two scenarios: Scenario 1 where the 2.0 MG Reservoir is offline and Scenario 2 where the reservoir is online. A summary of the storage analysis for the Main PZ is shown in Table 4-6 below. As seen in the table, there is an existing storage deficiency of approximately 0.7 MG under Scenario 1 for the existing system. If the 2.0 MG Reservoir is online, the system gains a surplus of approximately 1 MG, although the system has a future (2041) storage deficiency of about 0.7 MG. The majority of the required storage volume is made up of the nested fire demand/emergency storage volumes. The City could consider reducing the duration of target emergency storage from 48 hours to 24 hours because the City has an emergency water source separate from the primary source. The detailed storage calculations are provided in Appendix D.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 4-6: MAIN PZ STORAGE ANALYSIS SUMMARY

	2021 - Scenario 1[6]	2021 - Scenario 2[6]	2041 [7]
Operational Storage (gal)[1]	240,000	432,000	432,000
Peaking Storage (gal)[2]	329,000	329,000	533,000
Emergency Storage (gal)[3]	2,558,000	2,558,000	4,150,000
Nested Fire Storage (gal)[4]	840,000	840,000	840,000
Total Storage Required (rounded) (gal)	3,127,000	3,319,000	5,115,000
Total Storage Available (rounded) (gal)	2,398,000	4,320,000	4,320,000
Storage Surplus / (Deficiency) (gal)	(729,000)	1,001,000	(795,000)

1) Assumes operational storage accounts for 10% of the available storage in the zone.

2) Calculated from water system diurnal curve.

3) Equal to storage required to supply the average day demand for 48 hours.

4) Equal to 3,500 gpm fire flow demand for a duration of 4 hours.

5) Assumes fire flow storage is nested within the ermergency storage

6) Scenario 1 assumes 2.0 MG Reservoir is offline. Scenario 2 assumes 2.0 MG Reservoir is online.

7) Assumes 2.0 MG Reservoir is online by 2041.

The two reservoirs in the High PZ were assumed to float off each other resulting in the same operating depth of 10 feet before the Lemont BS turns on. The Elk Ridge PZ was also included in the High PZ calculations because the Elk Ridge BS pumps directly out of the Elk Ridge Reservoir. A summary of the High PZ storage analysis is shown in Table 4-7 on the following page. It was assumed the operational storage component accounts for 10% of the total storage within the zone but it should be noted that the existing operational levels account for approximately 40% of the overall storage. By operating the reservoirs with a larger operational volume, the volume for emergency and fire storage is reduced and the storage deficiency is larger. It is recommended that the City consider adjusting the High PZ reservoir setpoints to operate with approximately 10% of the storage within the High PZ. For the existing analysis, it was assumed the emergency storage is nested within the fire storage because the fire storage volume is larger. For the future analysis, however, the fire storage was assumed to be nested within the emergency storage since the emergency storage is larger. An additional consideration within the High PZ is to consider surplus storage from the Main PZ. If the Main PZ's 2.0 MG Reservoir is operational, the High PZ can use the surplus storage and eliminate the existing deficiency. It should be noted, however, that the Main PZ does not have a surplus by 2041, even with the 2.0 MG Reservoir online. Similar to the Main PZ, the City could consider reducing the target emergency storage duration to 24 hours, however, the system would still result in a storage deficiency because the fire storage component would become larger than the emergency storage component. Based on this analysis, the High PZ has an existing deficiency of approximately 22,000 gallons and will have a future deficiency of 120,000 gallons.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 4-7: HIGH PZ STORAGE ANALYSIS SUMMARY

	2021	2041
Operational Storage (gal)[1]	64,000	64,000
Peaking Storage (gal)[2]	49,000	78,000
Emergency Storage (gal)[3,5]	375,000	609,000
Fire Storage (gal)[4,5]	540,000	540,000
Total Storage Required (rounded) (gal)	653,000	751,000
Total Storage Available (rounded) (gal)	631,500	631,500
Storage Surplus / (Deficiency) (gal)	(21,500)	(119,500)

1) Assumes operational storage accounts for 10% of the available storage in the zone.

2) Calculated from water system diurnal curve.

3) Equal to storage required to supply the average day demand for 48 hours.

4) Equal to 3,000 gpm fire flow demand for a duration of 3 hours.

5) Assumes emergency storage nested within fire storage in 2021 and fire storage nested within emergency storage in 2041.

4.4 EXISTING HYDRAULIC MODEL ANALYSIS

A hydraulic model was developed to evaluate the water distribution system under several demand scenarios. The prior water system model was updated and calibrated with hydrant testing data completed during Summer 2021. The calibrated model was loaded using a variation of allocation methods and then was utilized to evaluate the water system against the regulatory planning criteria developed in Section 2.

4.4.1 MODEL DEVELOPMENT

The prior water system modeling files were imported into Innovyze's Infowater Pro 3.5, Update #1 water modeling software. Infowater Pro is a complete hydraulic modeling software integrated within Esri's ArcGIS Pro software.

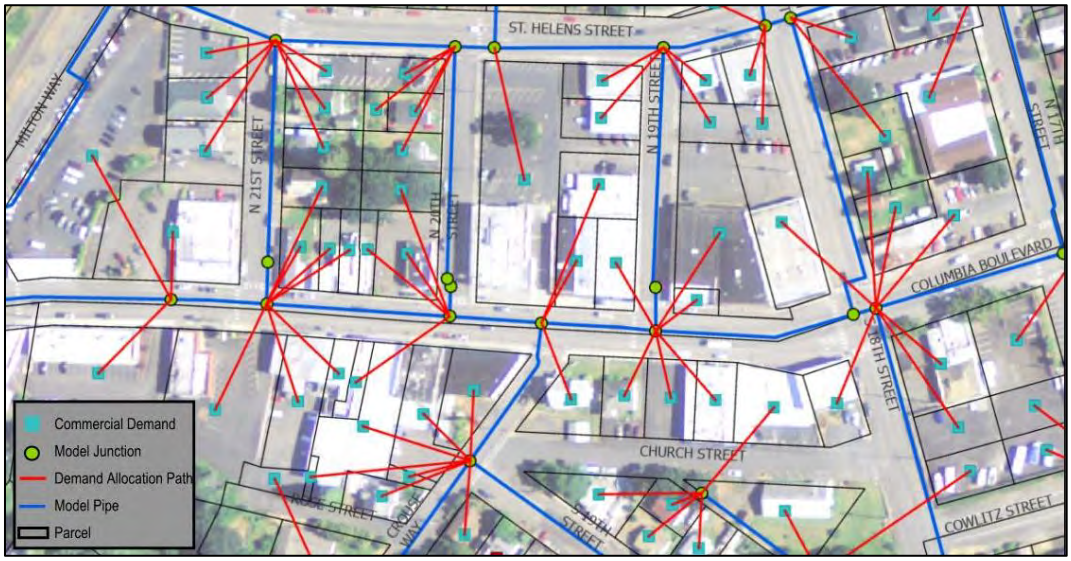
The City's water GIS shapefiles and data were reviewed and compared to the existing water model. Pipeline diameters, materials, and connectivity were updated based on the City's GIS data. The elevations of the model junctions were updated based on light detection and ranging (LiDAR) provided by the City. Elevations for key water facilities such as the WFF, pump stations, and storage reservoirs were assigned based on record drawings. Pumps curves were assigned to the model pumps where available which included the WFF finish water pumps and Elk Ridge BS. Pump curves were not available for the Lemont BS pumps and pump testing was not allowable; therefore, these pumps were modeled with the reported design point. Pump controls were assigned based on the reported reservoir operating levels.

The water system demands developed in Section 2 were allocated to the model using several methods. Due to the water system consisting mainly of residential water users, the residential demands were spread evenly across the existing model junctions located within residential zoned areas. The commercial and industrial water demands, unlike the residential demands, are located in specific areas throughout the City with varying consumption volumes, therefore, spreading the demands across all junctions was not deemed representative. The top ten water users identified in Section 2 were assigned their demands based on their actual 2019 and 2020 water consumption. The remainder of the commercial/industrial demands were allocated by developing a demand per acre of developed commercial/industrial area, which was calculated based on the existing developed commercial/industrial acres and the 2019-2020 commercial/industrial water consumption. The demand/developed acre was then used to assign demands to commercial and

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

industrial zoned parcels. After that, demands for each of the parcels were assigned to the nearest model junction. An example of the commercial demand allocation is included below in Figure 4-1. The water system demand scenarios loaded into the model included average day, maximum day, maximum day plus fire flow, and PHDs.

FIGURE 4-1: COMMERCIAL DEMAND ALLOCATION



4.4.2 MODEL CALIBRATION

Hydrant flow tests were completed in August 2021 to be used in calibrating the water model. The goal of the hydrant testing was to gather data points from field observations during a static condition (no fire flow demands) and during a residual condition (where a fire demand was created) to compare with the model outputs under similar conditions. Where model outputs do not match the observed conditions, it indicates there are discrepancies between the model and the field conditions. A few examples of the discrepancies could include differing pipe diameters or materials, incorrect pipe connectivity, or unknown boundary conditions.

Hydrant flow testing was completed at a total of nine locations throughout the City's distribution system, and the hydrant testing plan can be found in Appendix D. For each test, the static conditions (flow, level, and pressure) were noted at each of the boundary conditions where available (e.g., storage reservoirs, WFF, and booster stations) and at two observation fire hydrants with pressure gauges. Note, the WFF SCADA data was not working on this day, therefore the exact flows are unknown. The on/off settings for the WFF were determined based on the 2.5 MG Reservoir levels and it was assumed the WFF finish pumps target 83.5 pounds per square inch (psi) at the discharge. These conditions represent the static conditions where the water system is under typical day-to-day pressures and operating conditions. A residual condition was created by opening one or two fire hydrants for several minutes until the two observation hydrant pressures converged to a steady pressure. Similar to the static condition, the boundary conditions were observed under the residual demand condition.

Simulating the pressure drop at each of the hydrants in the model to be within 2-3 psi of the observed value was the target calibration value. Based on this criteria Tests #3, #4, #5, and #7 calibrated well and these scenarios were deemed calibrated. Tests #1, #2, #8 and #9 simulated pressure drops within 6 psi or less, which the discrepancies in these tests can likely be attributed to variances in pipe friction factors, model elevations, and unknown flow conditions at the Lemont BS and WFF. Since the pressure drops are within 6 psi and the known boundary conditions are being met, these tests were also deemed calibrated.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

The remaining hydrant Test #6 discrepancy could be attributed to additional factors other than those listed above. Hydrant Test #6 has a pressure drop difference of greater than 10 psi which indicates additional discrepancies and should be investigated further. Based on the model results, a number of considerations could be attributed with the large discrepancy, for instance, if the mainline pipes supplying the flow hydrants demand are smaller in the model than in field conditions, the pressure drop would be greater in the model. Secondly, if there is unknown system looping, the headloss in the model would produce a greater pressure drop in the model. The largest unknown in this scenario is the conditions at the Lemont BS because based on the Green Tank levels at the time of the hydrant test, the Lemont BS should have come on while the two hydrants were flowing. The Green Tank SCADA showed suspicious levels and dropped from 21.6 feet to below 18 feet then back up to 21.2 feet within eight minutes. At the same time, the Elk Ridge Reservoir was filling, therefore based on the Green Tank levels the reservoir would have drained 26,000 gallons and then filled 24,000 gallons within eight minutes. The hydrants were flowing at approximately 2,100 gpm for 4 minutes accounting for only 8,400 gallons which should have been drained from the Green Tank. The drop below 18 feet is likely an instantaneous reading error in the SCADA, however, it did likely result in the Lemont BS pump coming on. For this reason, the static condition was simulated with the Lemont BS off and the residual condition was modeled with the Lemont BS on. With these factors considered, the model shows 16 psi more drop at Hydrant A than was observed in the field and for these reasons, this hydrant test was completed again in January 2022 to assess if the original observed values were repeatable. The results from the re-test calibrated to within 4 psi of the model. It was assumed the observed pressures from the original test were not representative, and because the re-test results calibrated with the model, it was concluded the model was calibrated.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 4-8: MODEL CALIBRATION RESULTS

Test Number		Hydrant A			Hydrant B		
		Field	Model	Difference	Field	Model	Difference
1	Static (psi)	68	67	1	75	74	1
	Residual (psi)	58	53	5	69	70	-1
	Pressure Drop (psi)	10	14	-4	6	4	2
2	Static (psi)	89	89	0	70	70	0
	Residual (psi)	78	76	2	64	66	-2
	Pressure Drop (psi)	11	13	-2	6	4	3
3	Static (psi)	82	82	0	69	69	0
	Residual (psi)	52	49	3	66	68	-2
	Pressure Drop (psi)	30	33	-3	3	1	2
4	Static (psi)	64	62	2	62	63	-1
	Residual (psi)	54	49	5	58	58	0
	Pressure Drop (psi)	10	13	-3	4	5	-1
5	Static (psi)	62	64	-2	61	62	-1
	Residual (psi)	32	35	-3	58	60	-2
	Pressure Drop (psi)	30	29	1	3	2	1
6	Static (psi)	82	84	-2	44	45	-1
	Residual (psi)	58	44	14	31	27	4
	Pressure Drop (psi)	24	40	-16	13	18	-5
6 - Retest	Static (psi)	83	85	-2	48	47	1
	Residual (psi)	70	68	2	38	38	0
	Pressure Drop (psi)	13	17	-4	10	9	1
7	Static (psi)	52	51	1	76	77	-1
	Residual (psi)	50	48	2	74	74	1
	Pressure Drop (psi)	2	3	-1	2	3	-1
8	Static (psi)	98	98	0	86	87	-1
	Residual (psi)	84	78	6	77	77	0
	Pressure Drop (psi)	14	20	-6	9	10	-1
9	Static (psi)	108	112	-4	77	79	-2
	Residual (psi)	90	89	1	63	63	0
	Pressure Drop (psi)	18	23	-5	14	16	-2

4.4.3 2021 OPERATING PRESSURES

A PHD scenario was simulated in the model to evaluate the range of operating pressures service connections throughout the system may experience. Minimum pressures during PHD should be greater than or equal to 40 psi as established in Section 2. The water system boundary conditions were modeled to simulate the lowest pressures the system is likely to experience during a PHD by setting the reservoirs at their lowest setpoints before the associated pumps would turn on (18 ft in both the 2.5 MG Reservoir and Green Tank and 14 ft in the Elk Ridge Reservoir). The system wide PHD pressures are illustrated in Figure 4-2 below and Figure 14 in Appendix A shows a full-sized

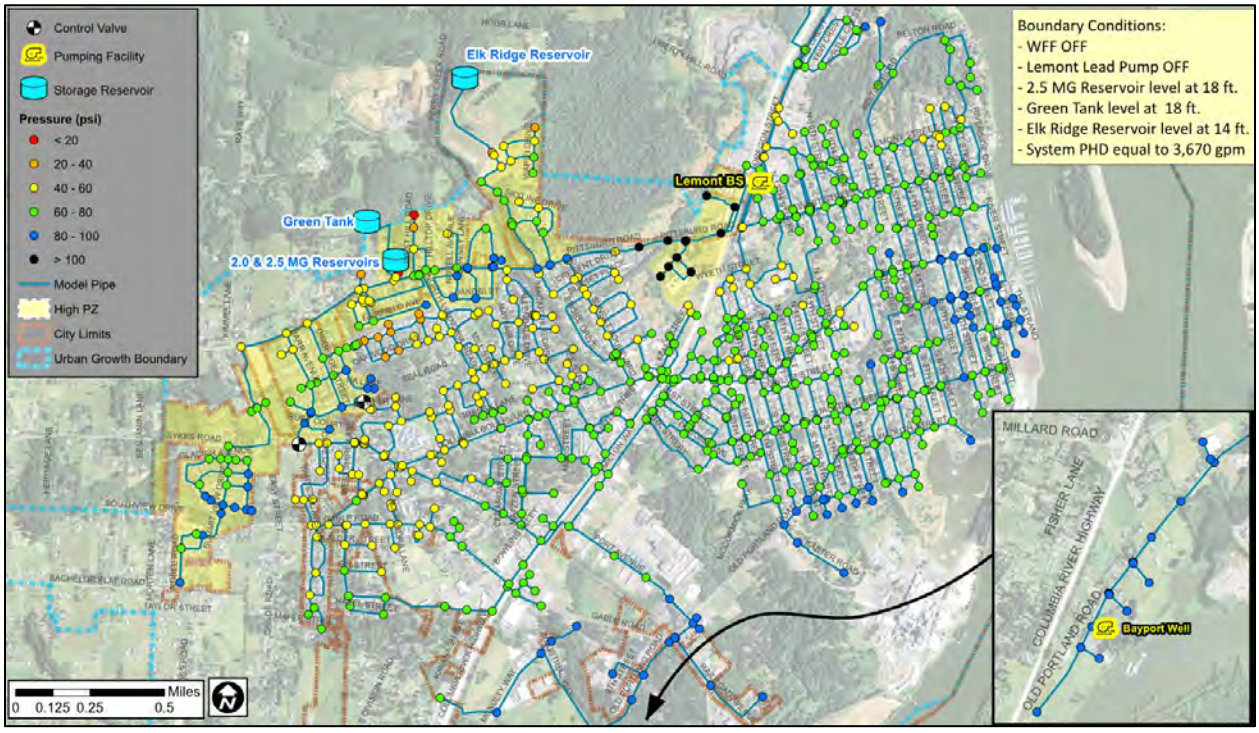
DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

figure. As seen in the figure, there are several areas with pressures below 40 psi (red and orange junctions). A summary of the locations includes:

- North end of West Hill Road (below 30 psi)
- East of Battle Mountain Road
- Along Helens Way and Oakwood Drive
- North end of Wapiti Drive

The lowest pressures occur on the north end of West Hill Road with pressures under 30 psi, and the City reported additional low pressures within both the Elk Ridge Development and Helens Way area. The City reported complaints of low pressures from users within the Elk Ridge Development, which the City staff has recorded pressures in this area to be as low as 28 psi. The City is aware of a number of personal booster pumps throughout the system with several pumps on the north end of West Hill Road, one on Battle Mountain Road, and one north of Oliver Heights Lane (just west of the Green Tank). Excluding the low pressures along Helens Way and within the Elk Ridge development, the City has not received complaints regarding low pressures on the north side of Pittsburg Road. For this reason, it was assumed users have existing personal booster pumps, however, it is recommended that the City confirm the existence of personal booster pumps at any location with PHD pressures below 40 psi. Additional pressures throughout the system are generally above 40 psi.

FIGURE 4-2: 2021 PEAK HOUR DEMAND PRESSURES

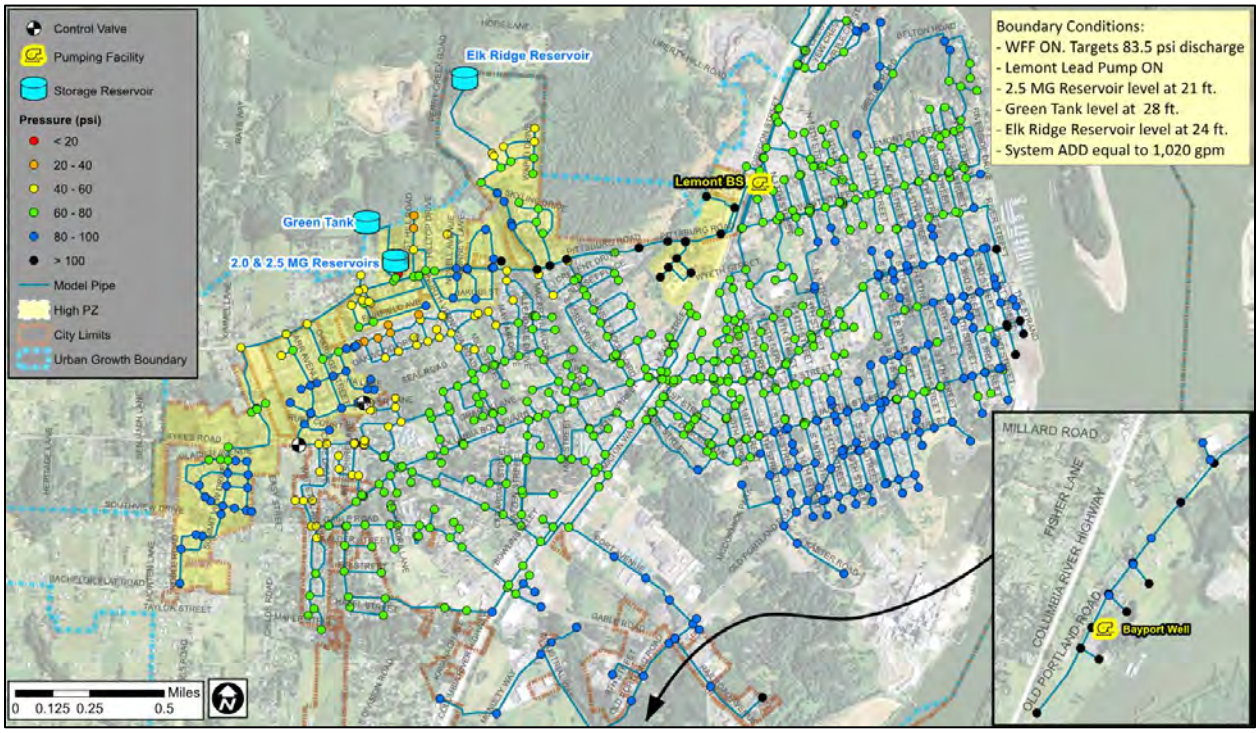


Other criterion for evaluating system pressures was to identify pressures above 80 psi. The State of Oregon Plumbing Specialty Code (as of April 2021) specifies buildings with water pressures over 80 psi shall be equipped with an individual pressure regulator to reduce the pressure to 80 psi or lower. The City has reported that several water users are equipped with individual pressure regulators, however, not every user has one. Unlike evaluating minimum pressures, pressures above 80 psi should be evaluated during an average day demand event and the boundary conditions were modeled to create the highest system pressures a connection may experience

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

under day-to-day operations. To simulate this, the reservoirs were modeled at their highest setpoints, and the pumping facilities were turned on. Figure 4-3 shows the average day demand pressures throughout the system and a full-size figure (Figure 13) can be found in Appendix A. As seen in the figure, several locations throughout the system have operating pressures over 80 psi and even some of the areas show pressures over 100 psi. The City should consider alternatives to reduce systemwide pressures to below 80 psi and additional discussion regarding potential alternatives is included in Section 5.

FIGURE 4-3: 2021 AVERAGE DAY DEMAND PRESSURES



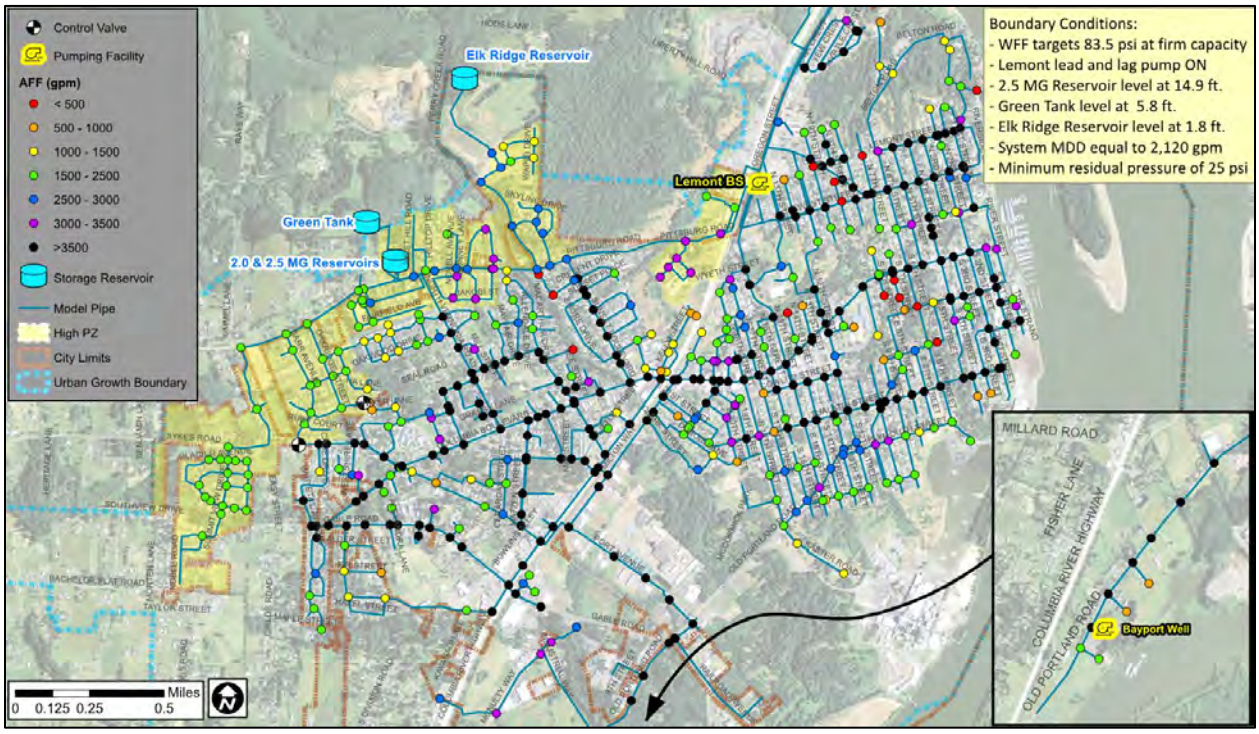
4.4.4 2021 MAXIMUM DAY DEMAND PLUS FIRE FLOW

The system was also evaluated under the MDD plus fire flow because the system should maintain a minimum of 20 psi at all service connections per OAR 33-061-0025. The available fire flow was modeled with a minimum residual pressure of 25 psi to provide an additional buffer to account for modeling accuracies. It should be noted, the transmission line from the 2.5 MG Reservoir to the Main PZ has static pressures below 25 psi, however, this pipeline does not have any service connections where pressures are below 25 psi. Fire flow demands were assigned based on the City's existing and future zoning, and the specific city zones were categorized into three main zones including residential, commercial, and industrial. Several model junctions were not assigned a required fire flow because they are smaller diameter pipelines or dead-end pipes without any fire hydrants. The storage reservoir levels were calculated based on if the largest fire flow demand occurred during MDD. The volume from the storage reservoirs required to meet the fire flow demand was calculated as the difference between the MDD plus the largest fire flow demand and the PZ's firm capacity. This resulted in water levels in the 2.5 MG Reservoir at 14.9 feet, in the Green Tank of 5.8, and in the Elk Ridge Reservoir of 1.8 feet. In addition, the WFF and Lemont BS were modeled at firm capacity.

The available fire flow throughout the system is shown below in Figure 4-4 below. As seen in the figure, there are several areas throughout the system with over 2,500 gpm available fire flow (purple junctions) and several over 3,000 gpm (black junctions). The majority of the residential zoned areas within the High PZ are between 1,500 gpm and 2,500 gpm.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

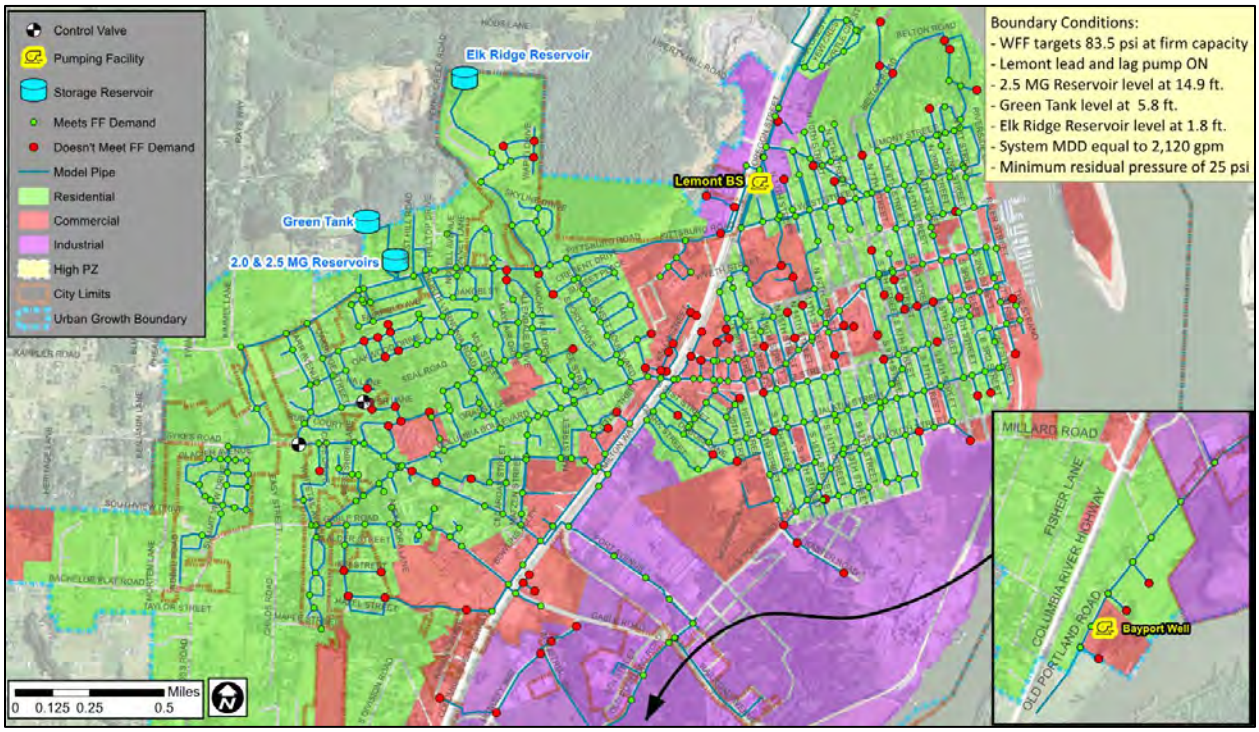
FIGURE 4-4: 2021 AVAILABLE FIRE FLOW



To further assess if the water system can meet the assigned fire flow demand, Figure 4-5 below illustrates where the available fire flow is greater than the fire flow demand and the figure also shows the categorized zoning. In the residential zoned areas, fire flow demands are generally not being met where the PHD pressures were less than 40 psi and where pipelines have either 6-inch or less diameters or if the area is not looped well. Generally, an 8-inch minimum pipe size is needed to serve a residential fire flow demand of 1,500 gpm. The commercial zoned area along the Columbia River Highway has several areas where the fire flow demand is not being met. These areas are where the pipelines stem off the main 16-inch and 12-inch pipeline along Columbia Boulevard and diameters are mostly 8-inches or less. The industrial zoned areas toward the southeast area of the City are being met along the 16-inch and 18-inch pipeline, however, the demands are not met on smaller diameter pipes, specifically, the dead-end pipe leading to the City's anticipated Industrial Business Park is an 8-inch and 6-inch pipe and the industrial fire flow demands cannot be met along Kaster Road.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 4-5: 2021 MEETS FIRE FLOW DEMAND?



4.4.5 ADDITIONAL CONSIDERATIONS

In addition to the operating pressures and available fire flow, the system pipe velocities and head losses were analyzed to identify any additional deficiencies which could be addressed. Pipe velocities under average day demand generally ranged from <1-2 ft/second and <1-7 ft/second under PHD with the higher velocities generally seen in the main transmission pipelines such as from the WFF or the storage reservoirs where flows are higher. It is recommended that pipe velocities should reach a minimum of 2 ft/second to reduce sediment build-up in the pipelines. Additional methods to combat sediment build-up include hydrant flushing which is discussed further in the operations and maintenance section in Section 6. Under the fire flow demand scenario, peak velocities exceeded 10 ft/second in a number of pipes which were generally not well looped and with diameters of 6-inches or smaller. Pipe velocities in excess of 10 ft/second often result in high friction losses, water hammering, and unwanted pipe movement. An 8-inch minimum diameter pipe is generally recommended to provide adequate available fire flow in residential areas without exceeding maximum pipe velocities. Where significant commercial and industrial fire flow demands must be met, a minimum of 12-inches should be considered to prevent excess pipe velocities, where pipes are not looped.

Headlosses throughout the system were reviewed to identify transmission bottlenecks. It was found that under an average day and PHD, the pipelines in the model with the largest headloss are the 8-inch pipes exiting from the Green Tank and from the Elk Ridge Reservoir. These 8-inch pipes are conveying flows of approximately 200-250 gpm each during PHD and only results in about two feet or one psi of headloss. However, during a fire flow event, for example, a 1,500-gpm fire flow demand, where the main water source is from these two reservoirs, there is over 20 feet (> 10 psi) of headloss in each of the reservoir transmission lines. The fire flow demand in the High PZ could be met with significantly less headloss if these 8-inch transmission pipes were larger in diameter. A minimum of 12-inches should be considered where commercial fire flow demands (3,000 gpm) must be met.

Additional pipeline improvement projects include improving system resiliency and redundancy in the pipeline off of Pittsburg Road heading south along Meadow View Drive. This single 12-inch

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

pipeline serves numerous residential homes and looping this system with a secondary pipeline would increase the system resiliency and available fire flow.

As discussed in Section 3, the Lemont BS is the sole source of water to the High PZ. If the Lemont BS is offline or damaged, the High PZ must rely on the storage within the system to meet water demands. The City should consider alternatives to provide secondary source of water into the High PZ to provide additional redundancy and system resiliency. Other system looping projects and replacement of pipelines less than 8-inches in diameters are recommended and the details of the identified projects are discussed in the capital improvement plan (CIP) in Section 7. In general, replacement of pipelines 4-inches and less should be a higher priority, then as the existing 6-inch pipelines reach the end of their useful life, they should be replaced with a minimum pipe size of 8-inches.

4.5 FUTURE HYDRAULIC MODEL EVALUATION

The existing water system was also evaluated under the 2041 demand scenarios to identify any deficiencies which were not present in the 2021 evaluation but become a deficiency as the demands increased.

4.5.1 2041 MODEL DEVELOPMENT

The growth areas identified in Section 2 were used as the basis for loading the future model demands. For instance, each growth area has an estimated number of new EDUs and commercial/industrial acreage. Demands in these areas were allocated using a demand per EDU and demand per developed commercial acreage which were also developed in Section 2. The demands were loaded to new model junctions located within the identified growth areas and loaded 2041 demand scenarios resulted in the following increased demands in each growth area as shown in Table 4-9. Note, the Elk Ridge Phase 6, which was not identified as a growth area by the City since it was currently under construction, was included as an additional growth area. The demands were assigned by the number of parcels shown in the as-built drawings. Additionally, the Columbia City wholesale demand increased based on the population growths.

TABLE 4-9: FUTURE DEMANDS SUMMARY

		GPM					
Site Description/Name	Growth Area ID	2041 Residential ADD	2041 Residential MDD	2041 Residential PHD	2041 Non-Residential ADD	2041 Non-Residential MDD	2041 Non-Residential PHD
Elk Ridge Phase 6	0	10.4	21.8	37.7	0.0	0.0	0.0
Residential/Commercial Mix	1	14.7	30.6	53.0	2.7	5.6	9.7
Riverfront District (Mixed Use)	2	31.5	65.7	113.6	10.4	21.6	37.3
Houlton Business District[2]	3	0.0	0.0	0.0	4.1	8.4	14.6
Currently Vacant Commercial Property	4	0.0	0.0	0.0	5.0	10.3	17.8
Residential Growth Area 5	5	22.5	46.9	81.1	0.0	0.0	0.0
Residential Growth Area 6	6	3.6	7.5	13.0	0.0	0.0	0.0
Residential Growth Area 7	7	10.8	22.5	38.9	0.0	0.0	0.0
Residential Growth Area 8	8	23.0	48.0	83.1	0.0	0.0	0.0
Residential Growth Area 9	9	55.2	115.3	199.4	0.0	0.0	0.0
Residential Growth Area 10	10	24.2	50.4	87.2	0.0	0.0	0.0
Mobile Home Park	11	56.3	117.5	203.3	0.0	0.0	0.0
Gable Road Apartments[3]	12	43.0	89.7	155.1	0.0	0.0	0.0
Industrial Growth Area 13	13	0.0	0.0	0.0	24.4	50.6	87.6
Multnomah Industrial Park[4]	14	0.0	0.0	0.0	26.9	55.9	96.6
Old Armstrong Site	15	0.0	0.0	0.0	111.9	232.5	402.2
Industrial Business Park	16	0.0	0.0	0.0	171.5	356.3	616.3
	Total:	295.2	615.9	1,065.5	356.9	741.2	1,282.2

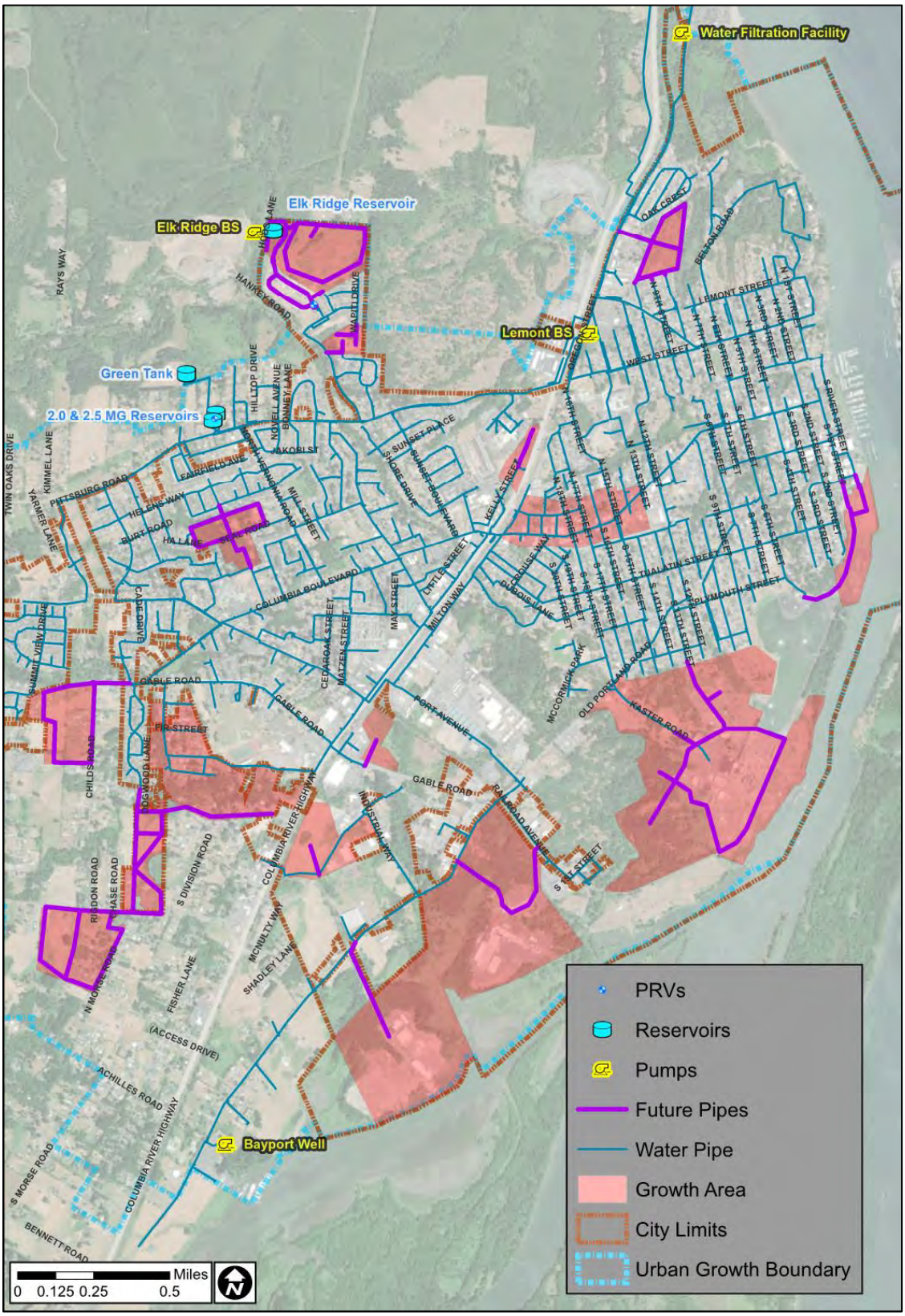
1) Elk Ridge Phase 6 assigned based on EDUs counted from as-built drawings.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Future water pipes were input to the model based on the identified growth areas and the likely locations to connect to the existing water system. Note, no existing pipelines were upsized to accommodate the demands in the growth areas. Existing pipelines recommended to be upsized to accommodate the future growth are discussed in Section 5 and Section 6. The Industrial Business Park and Riverfront District pipes were input based on the preliminary layout of both of these developments. Pipes within residential growth areas were assumed to be 8-inch ductile iron and pipes within commercial or industrial growth areas were assumed to be 10-inch to 12-inch, ductile iron for the future model evaluations. Junctions were generally assigned at the minimum and maximum elevations within the growth area to provide the full range of pressures which may be experienced in the growth area. The majority of the projected growth occurred in the Main PZ, but Elk Ridge BS PZ has significant projected growth compared to the existing conditions. An illustration of the future system piping is provided in Figure 4-6.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 4-6: 2041 WATER SYSTEM PIPELINES



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

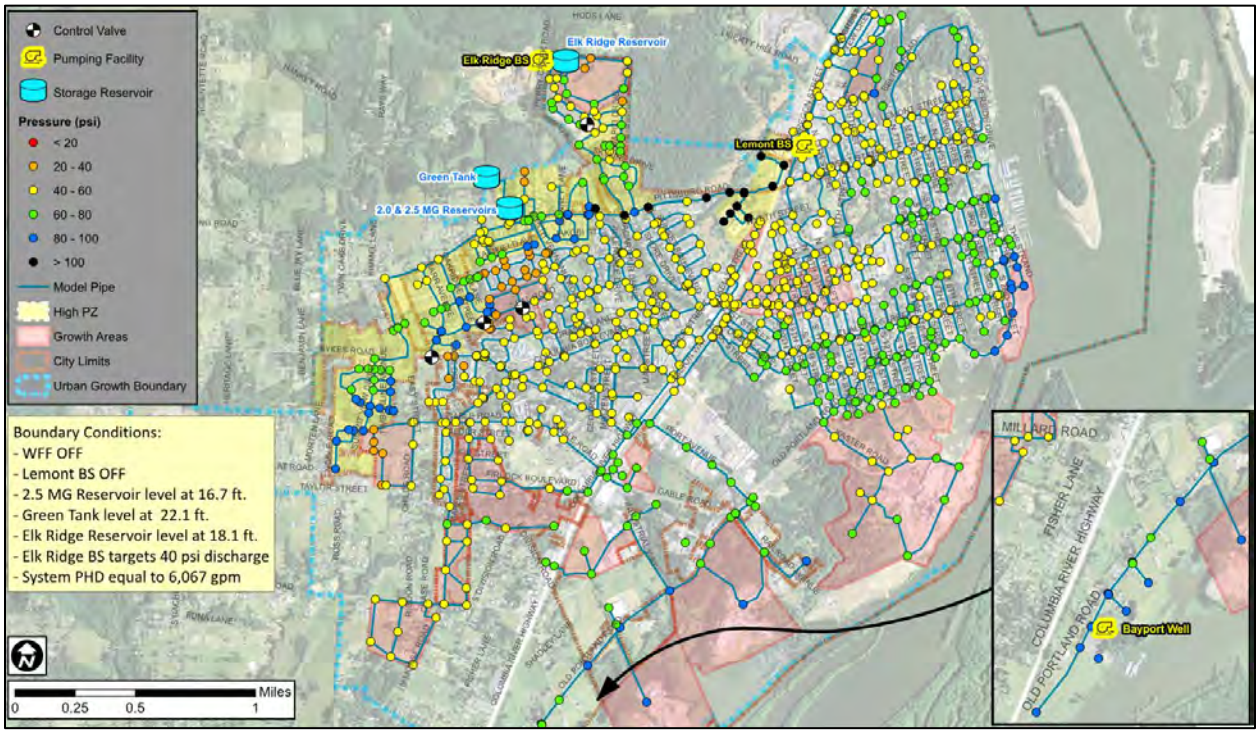
4.5.2 2041 OPERATING PRESSURES

Similar to the existing system scenarios, the PHD pressures and average day demand pressures were evaluated for the 2041 water system. The reservoir operating levels were set to the lowest setpoint, the WFF and Lemont BS were off under PHD, and the Elk Ridge BS was set to maintain 25 psi at the discharge. As shown in Figure 4-7, the overall system pressures in the Main PZ are lower than the 2021 PHD scenario and there are significantly more junctions with pressures between 40-60 psi. These pressures were lowered due to additional headlosses throughout the system with the increased demands. The low pressures discussed in the 2021 PHD scenario are still present as well as some additional pressures below 40 psi within the new growth areas.

Low pressures were seen in the growth area south of Gable Road near Bachelor Flat Road, which is located on the boundary of the High and Main PZ. As development occurs, this growth area could be served by either the Main PZ, High PZ, or both. Individual booster pumps or individual PRVs should be considered depending on which PZ serves this development.

For the average daily demand, the reservoir operating levels were set to the highest setpoint and the WFF, Lemont BS, and Elk Ridge BS were on. The resulting pressures showed similar deficiencies as discussed in the 2021 ADD and 2041 PHD. A full-size figure (Figure 17) of the 2041 ADD is included in Appendix A.

FIGURE 4-7: 2041 PEAK HOUR DEMAND PRESSURES



4.5.3 2041 MAXIMUM DAY DEMAND PLUS FIRE FLOW

The MDD plus fire flow was evaluated under similar boundary conditions and control settings as the 2021 MDD plus fire flow, for instance, the reservoirs were set to the level with depleted fire flow storage. Note, the High PZ reservoirs operational levels were adjusted to account for only 10% of the system storage which resulted in higher reservoir levels under the MDD plus fire flow scenario. Figure 4-8 below illustrates where the fire flow demands are met under the future MDD and with the new growth areas.

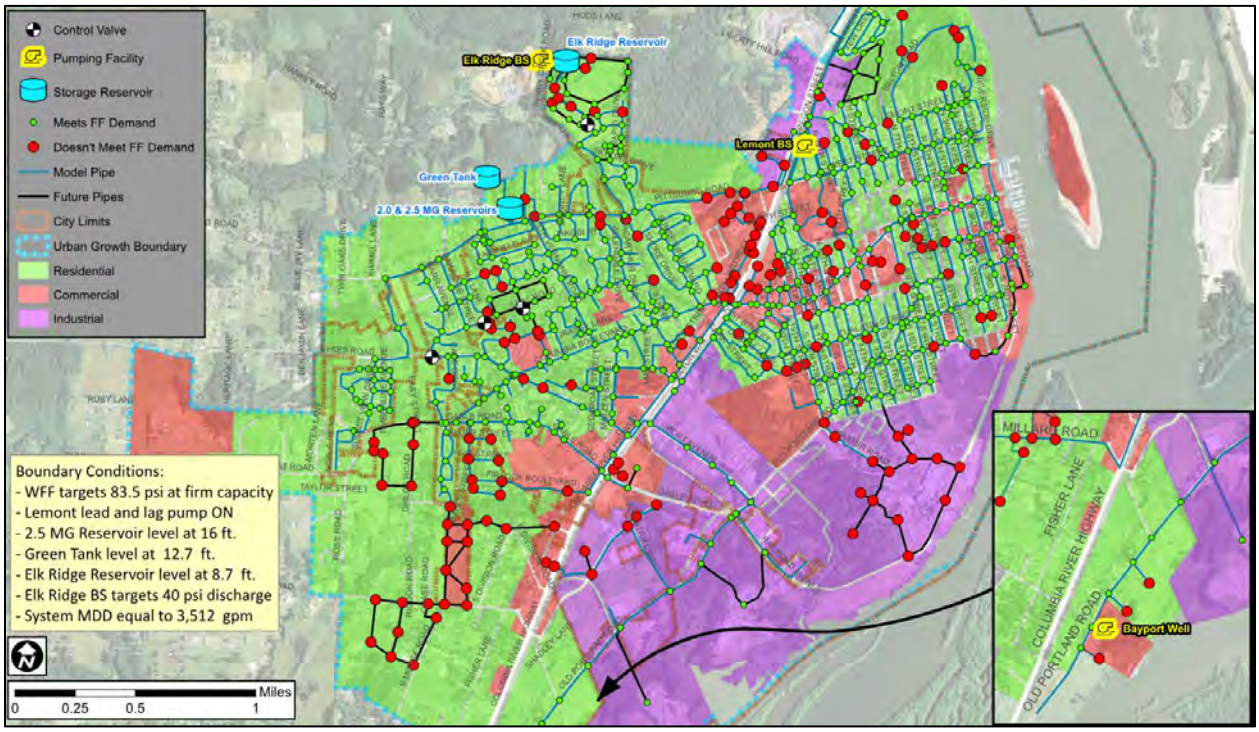
Several deficiencies were observed in addition to the deficiencies discussed in the 2021 MDD plus FF. As seen in the figure, there are several junctions in the Elk Ridge PZ that are not meeting the

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

residential fire flow demand of 1,500 gpm. These junctions, however, are within 100 gpm of the recommended fire flow demand. The junctions are able to meet the 1,500-gpm fire flow demand if the residual pressure is modeled without the 5-psi buffer (e.g., 20 psi residual pressure), and because the available fire flow is within ten percent of the recommended fire flow, no improvements were evaluated to increase the AFF. The City should complete a fire flow test in this PZ once it is operational to document the actual available fire flow in the zone while monitoring residual pressures within the zone.

Several existing pipelines serving new growth areas should be upsized to provide sufficient fire flow including the Industrial Business Park. As seen in the figure, the Industrial Business Park does not meet the industrial fire flow demand without improvements. This area is served by pipes less than 12-inches and these pipes should be upsized to a minimum of 12-inches in order to satisfy the fire flow demand. In addition, the residential growth in the southwest area of the City should be looped in order to meet the fire flow demands. Note, the Riverfront District has sufficient fire flow to meet the commercial demands and is well looped but some of the existing pipes should be upsized to eliminate transmission bottlenecks which are discussed in Section 5. The industrial areas to the south generally have sufficient fire flow with the exception of the growth area directly to the east of the Columbia River Highway, which could be looped across the highway to increase available fire flow. Specific recommended improvements are discussed in Section 5.

FIGURE 4-8: 2041 MDD PLUS FIRE FLOW



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 5 - ALTERNATIVES ANALYSIS

The following section discusses improvement alternatives to address deficiencies identified in the previous sections. Where improvement projects are not relatively straightforward, up to three alternatives were evaluated to address the targeted deficiency. This section generally includes significant deficiencies such as undersized pump stations, insufficient storage, operating pressures out of compliance with operating requirements or planning criteria, and insufficient fire flow. Additionally, this section discusses the improvements recommended to service the identified growth areas. Multiple alternatives were evaluated for several of the identified deficiencies to find the most effective long-term solution. Improvements with only one alternative considered are not included in this section, and a full summary of the recommended improvement projects can be found in the capital improvement plan (CIP).

5.1 STORAGE ALTERNATIVES

This section evaluates potential alternatives for repairing the 2.0 MG Reservoir and addressing the future storage deficit of approximately 1.0 MG by 2041. The goal of this section was to identify the most practical and effective short- and long-term solutions to provide the City with the required storage to meet the criteria outlined in Section 4. Additionally, it should be noted the City would like to plan for additional storage beyond the study period included in this study. The following alternatives were developed to target a storage surplus of 1.0 MG by 2041. Three alternatives are described below as potential options to address the deficiency and the benefits and drawbacks are summarized in Table 5-1 below.

- Alternative 0 – No Action: This alternative, which is a consideration in any alternatives analysis, is the “No Action” alternative. Evaluating this alternative assists in defining the priority of the project and how the system would operate if no improvements were completed to address the leak in the existing reservoir. If the 2.0 MG Reservoir is left offline, the system would have an existing storage deficit of approximately 0.8 MG and a 20-year projected deficit of approximately 2.8 MG. The City would have sufficient storage for day-to-day operational and peaking storage; however, the City would be unprepared in the event of a fire or emergency situation. As growth occurs, the existing storage reservoirs will need to be re-filled more often and the WFF would have to turn on/off more often.

- Alternative 1 – Repair the 2.0 Reservoir and Construct Future 4.0 MG Reservoir: In summary, this alternative consists of repairing the existing 2.0 MG Reservoir and then constructing a new 4.0 MG Reservoir in the future. Once the 4.0 MG Reservoir is operational, the City should consider decommissioning the 2.0 MG Reservoir as it will likely have reached the end of its useful life. The 4.0 MG Reservoir should provide sufficient storage volume in order to replace the volume from the decommissioned 2.0 MG Reservoir, meet the storage needs for 2041, and provide an additional 1.0 MG of storage for future growth beyond the study period included in this plan.

  Specifically, this alternative consists of the ongoing investigation of the source of the leak in the reservoir to repair the reservoir to a useable condition. At the time of this master plan, the City was in the process of completing a forensic engineering investigation as to why the previous reservoir lining project did not resolve the leak. After identifying the source of the leak, the City should repair the reservoir and bring it back online, which is likely the quickest and least costly option for the City to regain the 2.0 MG of water system storage. Following the repair of the 2.0 MG Reservoir, the City should begin a siting and feasibility study to evaluate locations for the future 4.0 MG reservoir. Potential storage locations for this reservoir were developed at a concept level in this plan, which can be seen in Section 5.2.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- Alternative 2 – Replace the 2.0 MG Reservoir and Construct Future 2.0 MG Reservoir: This alternative consists of constructing a new storage reservoir at the same site/footprint as the existing 2.0 MG Reservoir as well as constructing an additional 2.0 MG storage reservoir in the future. By constructing a new storage reservoir, the City is provided with several opportunities to improve the water system. The replacement reservoir can be constructed with seismic resiliency design criteria, increased volume, and results in a longer useful life than repairing the existing 2.0 MG Reservoir. Reservoirs are currently designed to withstand lateral movement from seismic activity and ultimately should remain operational following a large seismic event without additional retrofits. The existing elevation of the 2.0 MG Reservoir is situated approximately 4 feet below the base of the 2.5 MG Reservoir. If this reservoir were to be reconstructed, it could be raised to the same base elevation and may eliminate the need for an altitude control valve between the two reservoirs. Additionally, the current dimensions of the 2.0 MG reservoir include sloped sides which reduce overall storage volume, however, if a new reservoir is constructed, the total volume of the reservoir could be increased by approximately 10%, leading to a smaller storage deficit in the future. The drawbacks to this alternative include the higher capital costs to regain the 2.0 MG of storage, extended period without this system storage (potential), complex construction process because of limited staging area, and there would likely still be a need for future storage.

  Following the replacement of the existing 2.0 MG Reservoir, the City should begin a siting and feasibility study to identify a location for the future 2.0 MG Reservoir which will be needed for future storage demands. The benefits to installing a future 2.0 MG reservoir instead of a 4.0 MG reservoir as discussed in Alternative 1 are the lower capital costs and less overall acreage required for the new reservoir. The size of a 2.0 MG reservoir provides the City with more location flexibility than the larger 4.0 MG Reservoir.

TABLE 5-1: STORAGE ALTERNATIVES BENEFITS AND DRAWBACKS

Alternative	Benefits	Drawbacks
1 - Repair Reservoir and Future 4.0 MG Reservoir	- Quickest solution to regain lost storage - Lower capital costs - Utilize existing infrastructure for short term needs - Prepares the City for future growth	- Poses a risk if cannot be repaired - Structural retrofit needed for seismic resiliency - Additional future storage still needed - Higher capital costs all at once - Limited potential site locations
2 - 2.0 Reservoir Replacement and Future 2.0 MG Reservoir	- Longer useful life - Improve seismic resiliency in new reservoir - Opportunity to increase reservoir volume - More options for future storage site locations	- Higher capital costs - Extended time period without storage - Additional future storage still needed

Based on the benefits and drawbacks summarized for each of the Alternatives described above, it is recommended that the City proceed with Alternative 1. Alternative 1 is consistent with the City's current actions toward addressing the 2.0 MG Reservoir leak and the City has had previous discussions regarding a future 4.0 MG reservoir. Assuming the 2.0 MG Reservoir can be repaired, this alternative results in a minimum duration of time operating the water system with a storage deficit. Once the 2.0 MG Reservoir is back online, the City will have a surplus of storage which provides the necessary buffer to begin the planning and construction of a 4.0 MG reservoir to meet the future storage requirements.

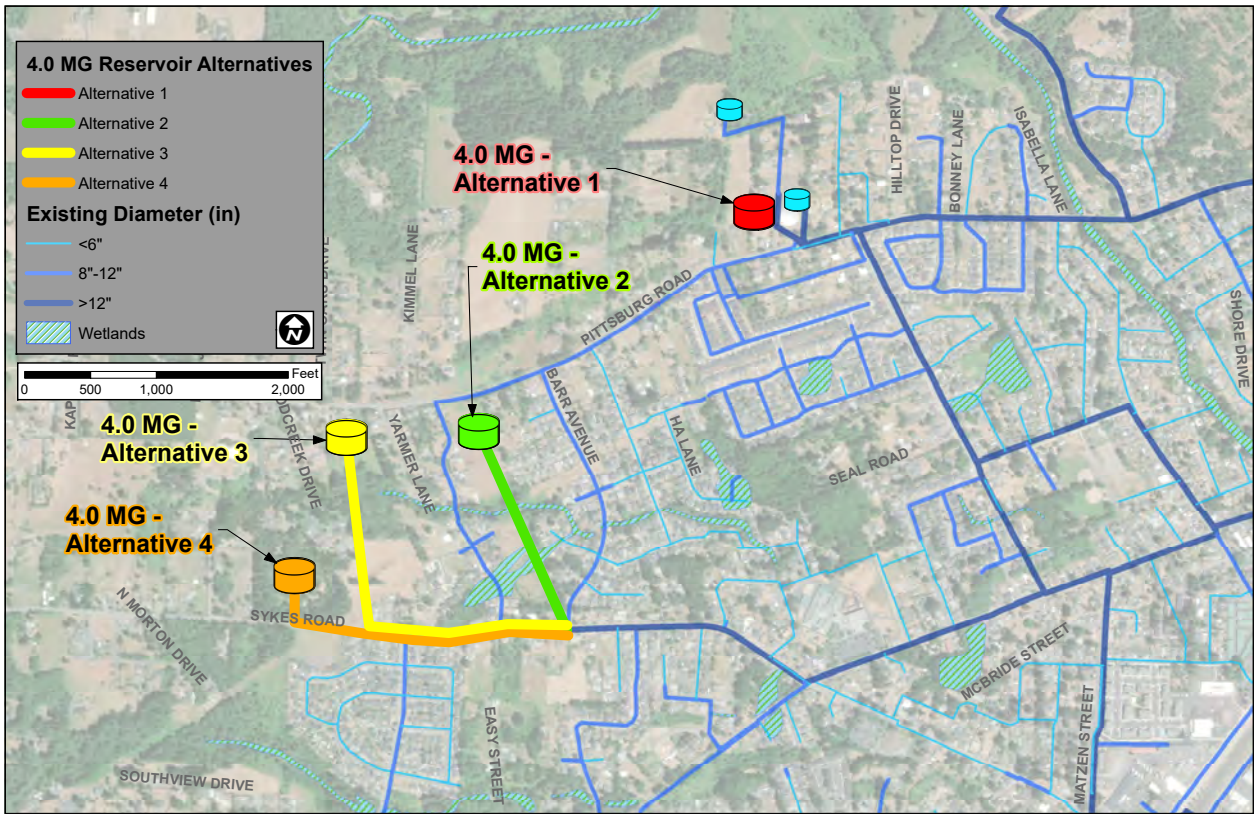
5.2 FUTURE STORAGE LOCATION

The section below evaluates potential locations for the future 4.0 MG storage reservoir which was recommended in the section above. It was assumed the diameter of the new reservoir would be approximately two times the existing 2.0 MG Reservoir resulting in a diameter of 280 feet. The reservoir will require a large site and should be designed at the same hydraulic grade as the existing 2.5 MG Reservoir. Considering these factors, four locations were evaluated for the construction of a new reservoir.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

The four potential locations are illustrated in Figure 5-1 below and the benefits and drawbacks are summarized in Table 5-2 below.

FIGURE 5-1: FUTURE STORAGE LOCATIONS



- Alternative 1 – Battle Mountain Road: For this alternative, the location is strategic in that the reservoirs would fill at a similar rate and the total length of pipe to connect to the Main Pressure Zone (PZ) would be minimal. The drawbacks to this alternative include the need to demolish either the existing 2.0 MG Reservoir and/or numerous residential homes before constructing the new reservoir because there is not sufficient space to install the 4.0 MG Reservoir without removal of existing structures. If this alternative were to be pursued, it is recommended to demolish the existing 2.0 MG Reservoir and reroute Battle Mountain Road through the existing reservoir site, which would provide sufficient room to install the 4.0 MG Reservoir on the southwest side of the Road without demolition of too many existing structures. Another drawback to this alternative would be that all the Main PZ storage would be located at the same location which poses a higher risk if there were a natural disaster or other implications impacting the site. Lastly, by demolishing the existing 2.0 MG Reservoir, the City would have to pursue a new site for any storage needed after the 4.0 MG Reservoir is constructed.
- Alternative 2 – Pittsburg Road and Meadow View Drive: This location is south of Pittsburg Road on the east side of Meadow View Drive and could be beneficial because it has the second least length of pipe to be installed to connect with the Main PZ. Additionally, the City reported, this property is currently in the preliminary stages of development which may result in the land acquisition process being easier than the other alternatives if purchased in the near future. However, this project is not likely to be completed within the next 5-10 years and the property may be developed by then, so the status of this parcel should be evaluated at the time of the feasibility and siting study. Another drawback to this solution would be installation of pipeline through identified wetlands because as

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

shown in the figure, the wetlands between Pittsburg Road and Sykes Road would be impacted by the proposed piping alignment. Additional drawbacks to this location are the increased excavation and grading efforts required to install a reservoir on this slope, which the existing contours show approximately a 7% slope at the proposed site location.

- Alternative 3 – Pittsburg Road and Yarmer Lane: This location has similar benefits and drawbacks as Alternative 2 because they are in similar locations south of Pittsburg Road. This property, however, has a larger open area and provides more room for construction of the reservoir. Drawbacks to this alternative include the large length of pipe to connect to the Main PZ, the need to demolish existing residential structures, pipeline installation through wetlands, and the significant excavation and grading efforts. The slope of this site is steeper than Alternative 2, with a slope of over 10%.
- Alternative 4 – Sykes Road: This location is the farthest south and west location out of the alternatives listed above, and the site's topography is significantly different than the other three alternatives which slope from north to south. This site is located at the top of a relatively flat knoll at an elevation of approximately 250 feet above sea level resulting in less excavation and grading work than the previously mentioned alternatives. This site has the largest open area and may not require demolition of any existing structures. Only one parcel would need to be acquired to construct a reservoir here, however, the existing parcel boundaries would likely need to be adjusted for the existing residents. This alternative has the second longest length of pipe to install, however, the majority of the pipeline is within the right-of-way (ROW) of Sykes Road and does not traverse assumed wetlands. One of the drawbacks to this location is the need for significant tree/vegetation removal from the proposed site, however, surrounding vegetation which can be left as is could improve the aesthetics of the new reservoir and draw less attention from neighbors and motorists.

TABLE 5-2: FUTURE STORAGE LOCATION BENEFITS AND DRAWBACKS

Alternative	Benefits	Drawbacks
1 - Battle Mountain Road	- Similar filling rates with existing reservoirs - Minimal pipe installation	- Demolition of existing 2.0 MG Reservoir before construction can begin. - Rerouting Battle Mountain Road
2 - Pittsburg Road and Meadow View Drive	- 2nd least amount of pipe installation - Current land owner potentially ready to sell	-Acquisition of several properties and demolition of existing residential homes -Property is currently in the preliminary stages of development - Pipe installation through wetlands
3 - Pittsburg Road and Yarmer Lane	- Second largest site area	- Longest length of pipe to install -Pipe installation through wetlands likely
4 - Sykes Road	- Largest site area - Lowest slopes and minimal excavation expected - Majority of pipeline installed within ROW	- Second longest length of pipe to install - Significant tree/vegetation removal

At the conceptual level of reservoir siting that was completed for this plan, any four of the proposed locations could serve as the location for the future reservoir, however, some alternatives had more drawbacks than others. Alternative 1 is not recommended due to the limited site area and the need to demolish existing structures to make room for the new reservoir. Alternatives 2 and 3 could be beneficial locations but require installation of pipeline through wetlands and both would likely require more excavation and grading efforts than Alternative 4. Alternative 4 is recommended as it has the least amount of drawbacks and the most

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

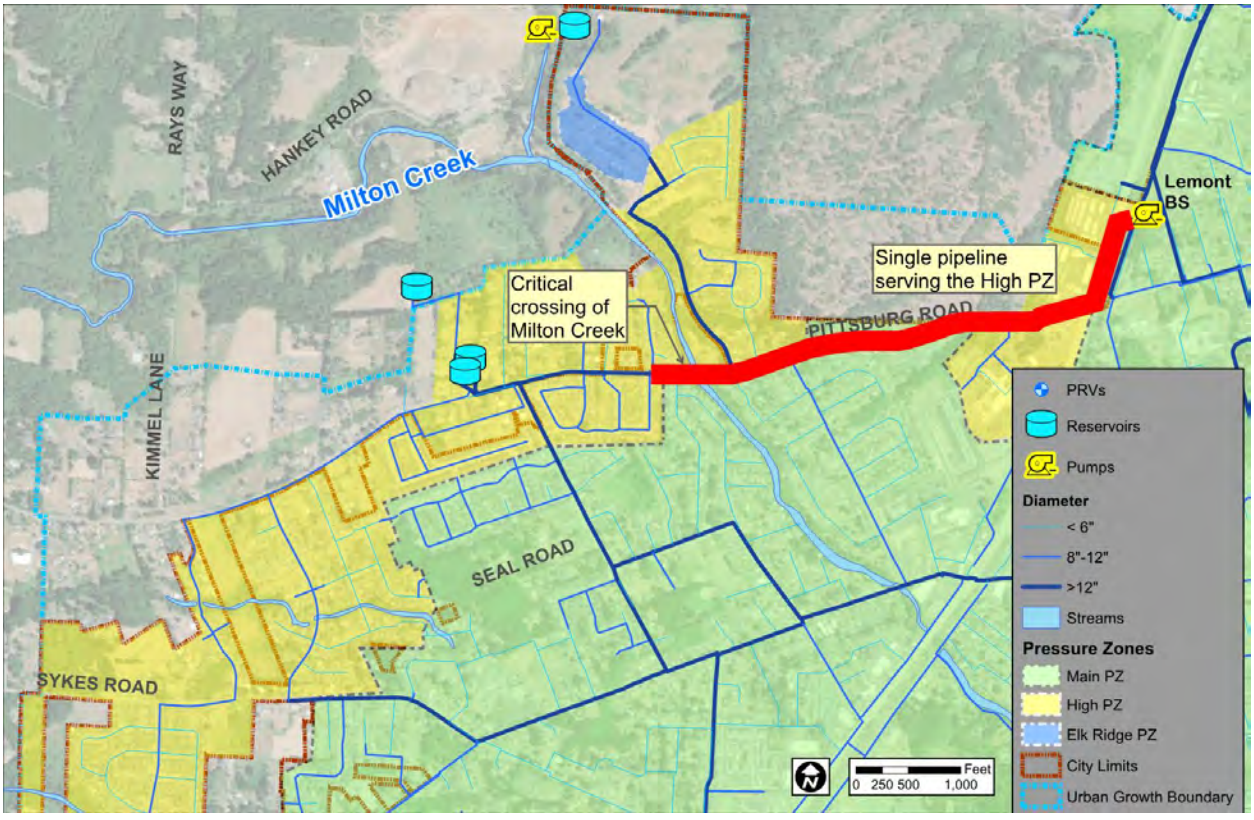
amount of benefits. This site provides the City with a simpler construction process due to the larger site and lower slopes and should not require acquisition of easements for pipeline passing through private property.

While Alternative 4 is recommended in this master plan, there are several key factors which were not taken into consideration due to the lack of information. For this reason, it is recommended that the City complete a site and feasibility study to evaluate additional factors which could change the recommended site location. The site and feasibility study should include geotechnical investigations to determine the extent of bedrock, initial feasibility of property acquisition and structure demolition, and additional environmental considerations such as wetland delineations, evaluation of sensitive species, and existing soil conditions.

5.3 REDUNDANT DELIVERY FACILITY TO HIGH PZ ALTERNATIVES

The Lemont BS is the sole pumping facility to the High PZ and delivers water through a single 5,000 LF pipeline before it reaches additional system looping. The pipeline fills the Elk Ridge Reservoir on the east side of Milton Creek; however, the majority of the service connections are on the west side of the creek. The 14-inch pipeline crosses Milton Creek on the south side of the Pittsburg Road bridge and may be subject to damage from debris draining down the creek. The section below discusses alternatives to improve resiliency of water delivery in the High PZ.

FIGURE 5-2: LEMONT BS DELIVERY, EXISTING CONDITION



- Alternative 0 – No Action: The no action alternative consists of no improvements to the existing booster station and pipeline conditions. The day-to-day operations of the water system would not be affected, however, in the event of a pipeline break, the High PZ would have to rely on the system storage to provide potable water until the pipeline could be repaired. It should be noted that over half of the High PZ system storage is on the east side of Milton Creek and if the pipeline were to break at the Milton Creek Crossing, the west side of the High PZ would only have the Green Tank to rely on for storage.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- Alternative 1 – New Booster Station: This alternative considers the installation of a new booster station to deliver water from the Main PZ to the High PZ. Installing a new booster station would increase system resiliency in the event the Lemont BS or transmission pipeline failed. Depending on the location of the new booster station, localized fire flow improvements could be achieved, however, drawbacks to this alternative include the high capital and operational costs associated with a new booster station. Additionally, there was no existing or future delivery deficiency identified in the High PZ, therefore, the increased capacity from a new booster station is not necessary.

- Alternative 2 – Increase Delivery Resiliency: This alternative is similar to the "no action" alternative in that minimal improvements are recommended; however, it does consist of increasing emergency preparedness of the City. The first step in this alternative is to replace vulnerable pipeline materials around the Lemont BS and in the transmission pipeline along Pittsburg Road, which the most vulnerable point for failure is the crossing of Pittsburg Road over Milton Creek. Several pipeline alignments could be considered to replace this pipe and this alternative would consist of installing a new parallel pipeline underneath Milton Creek on the north side of Pittsburg Road. The alignment may require an easement through private property and would require permitting efforts due to impacting Waters of the State and designated wetlands. Additionally, the existing cast iron pipe into and out of the Lemont BS and the existing CCP pipe along Pittsburg Road should be replaced with new pipe materials such as ductile iron (DI) because DI pipe is more resilient to pipeline breakage and is easier to repair than the existing CCP. After replacing the vulnerable pipeline, the City should assemble an emergency pipeline repair kit in the event the single pipeline is ruptured. The City should also maintain contacts with local pump suppliers to streamline emergency pump replacement if needed. In addition, the City could maintain a supply of replacement parts for the pumps to avoid downtimes and risk of a lower firm capacity when pumps require heavy maintenance. Lastly, the City should operate the High PZ reservoirs to maintain the required emergency storage to provide average day demand for a minimum of 48 hours (as specified in the storage analysis).

Alternative 0 is not recommended because it leaves the City and its water users at risk of having restricted access to potable water. Alternative 1 is not recommended either because the high capital and operational costs are not justified with there being no need for increased pumping capacity within the 20-year study period. It should be noted, as water demands increase past the projections of this study, the City should consider installing a second booster station to the High PZ at the location of the existing 2.0 and 2.5 MG Reservoirs. A booster station at this location could easily be configured to pump into the High PZ and the pressures in the Main PZ are not impacted in a fire flow event because the pumps are drawing directly from the storage reservoirs. Alternative 2 is recommended to increase resiliency in the High PZ, and capital improvement projects to replace the vulnerable pipelines and recommendations to the operations and maintenance plan are included in the following sections.

5.4 MAIN PZ HIGH PRESSURES

Section 4 summarizes areas with pressures over 80 psi observed in the Main PZ, and this section discusses alternatives to address the high pressures in the Main PZ.

- Alternative 0 – No Action: This alternative assesses the benefits and drawbacks of continuing operation of the water system with pressures over 80 psi in the Main PZ, which current Oregon plumbing code states service connections with pressures over 80 psi should be equipped with individual pressure regulating valves. The City's water system has historically operated with pressures over 80 psi and the City has not reported water user complaints. Generally, water pressures over 80 psi are not recommended for new water systems, however, since the system has historically operated this way, the City should consider no action. The drawbacks of high water system pressure include increased risk of breakage in the distribution pipelines and the potential for more system leaks. Additionally, customer water fixtures will have increased risk of leaking and

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

breaking. Today, new water system pipelines are tested to at least 150 psi, therefore, the existing pressures over 80 psi are not encroaching the maximum tested limit unless a water surge event exceeds 150 psi. Overall, the risk of no action to reducing the high pressures in the Main PZ are low and the City has not received any reported concerns with the historical operation.

- Alternative 1 – Lower Pressure Zone Creation: This alternative consists of creating a new pressure zone in the areas with pressures over 80 psi. Creating a new pressure zone would include the installation of several pressure reducing valves (PRVs) and a significant length of new parallel pipeline in order to continue to serve the existing service connections. Creating a new pressure zone would reduce the pressures to within the recommended operating ranges resulting in less stress on the water system and customer fixtures. New developments will not require pressure regulator valves on the new service connections, however, there are significant drawbacks to changing the operating pressures of a large area within a water system. First, the capital costs for PRVs and parallel pipelines are much greater than the no action alternative. Secondly, creating a new pressure zone in the water system increases the complexity and operational costs of the system. Additionally, new PRVs would create a new potential point of failure in the water system and require annual maintenance to continue with successful operation of the valves. Third, creating a new pressure zone in an existing system which is well looped creates new dead-end pipelines, which without the installation of parallel pipelines along the entirety of the new PZ boundary, new dead-end pipes are unavoidable. Lastly, lowering operating pressures will likely result in lowered available fire flow throughout the new pressure zone. Additionally, existing building fire suppression systems were likely designed to the existing high pressures and reducing the pressures may lead to insufficient operation of these individual sprinkler systems.

The drawbacks to the “no action” alternative is minimal when compared to the drawbacks of creating a new pressure zone, and for this reason, it is recommended that the City continue to monitor the situation and address on a case-by-case basis as system leaks occur and customer complaints are filed. Creating a new pressure zone at this time is not practical and creates numerous consequences which negatively affect the operation of the water system.

5.5 GROWTH AREA ALTERNATIVES

Section 4 evaluates the system pressures and available fire flow for anticipated future growth areas. Pressures in the new growth areas are generally within the recommended operating pressures, however, there were several deficiencies identified for meeting the recommended available fire flow. The section below summarizes the improvements necessary to meet the available fire flow recommendations for each of the new development areas.

5.5.1 GROWTH AREA 0 AND 5 – ELK RIDGE DEVELOPMENT

At the time of this study, the Elk Ridge Phase 6 (Growth Area 0) development was currently under construction and the operation of the Elk Ridge BS was not active. The Elk Ridge PZ was designed to be served by two small jockey pumps to maintain day-to-day operating pressures and fire demands were designed to be met by a PRV between the High PZ and the Elk Ridge PZ which should open and maintain a minimum of 20 psi during a fire flow event. The hydraulic model indicates the available fire flow is near the recommended fire flow demand, but the City should complete a hydrant test in this zone once the booster station is programmed and the exact PRV setpoints are assigned to document the actual available fire flow in this zone.

Growth Area 5 is an addition to the existing Elk Ridge Development and improvements to serve this development consist of creating a new pressure zone served from new pumps in the existing Elk Ridge Booster Station. The pumps should include a jockey pump, two duty pumps, and two fire flow pumps to provide for mechanical redundancy. Elevations within this growth area do not allow for maintaining pressures between 40-80 psi, and as a result, it is recommended that the pump setpoints be programmed to maintain a hydraulic grade resulting in minimum pressures of 40 psi in the highest elevation. Any service connections in the lower elevations of the growth area which

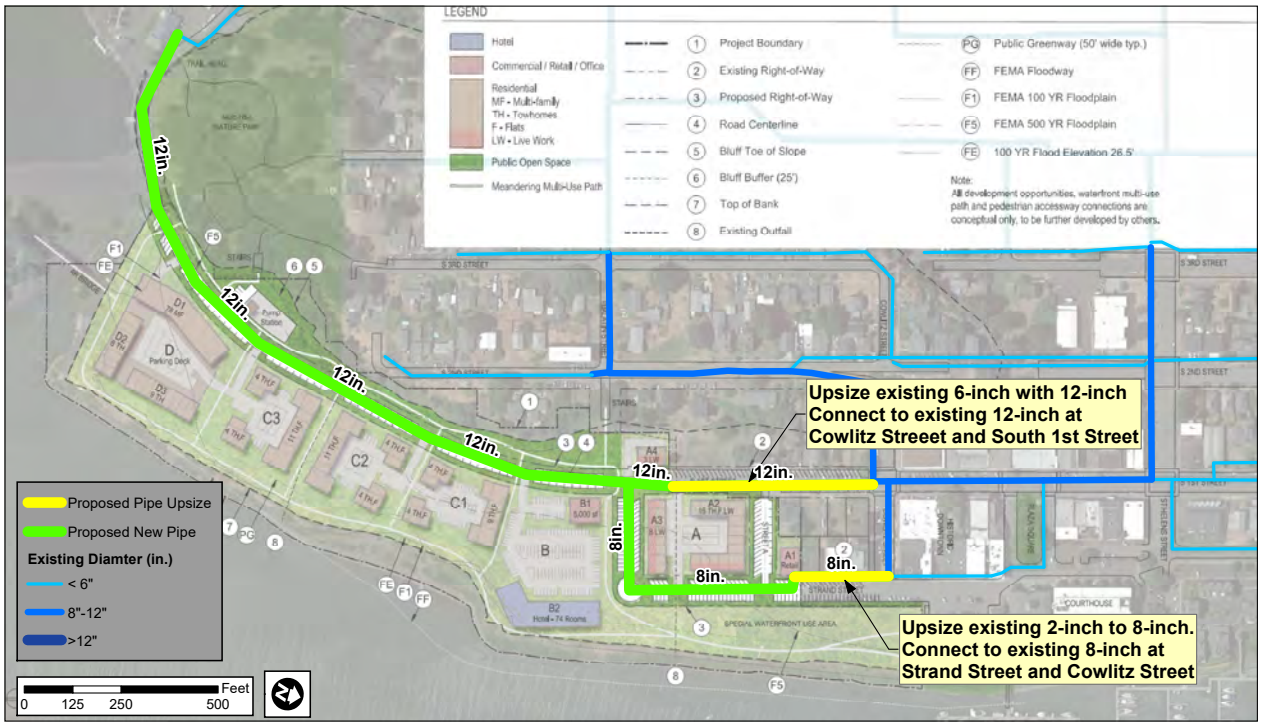
DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

are anticipated to experience over 80 psi should be equipped with individual pressure regulating valves. The jockey pump should be operated with a variable frequency drive (VFD) to provide water in lower demand scenarios such as in the winter. The duty pump should also be operated on a VFD and be able to meet the PHD of the zone. The fire pumps should have a minimum capacity to meet the residential fire flow demand with the capacity of the jockey and duty pumps.

5.5.2 GROWTH AREA 2 – RIVERFRONT DISTRICT

Growth Area 2 is the anticipated Riverfront District development which will consist of a combination of high-density residential and commercial facilities. The City has developed a preliminary layout for ROW and parcels and was used as the basis for the water pipeline configuration. Completion of this development should loop the existing dead-end lines on S 1st Street, Strand Street, and Plymouth Street. Installing a new 12-inch pipe between the existing pipelines along S 1st Street, Plymouth Street, and Strand Street provides sufficient fire flow to meet the commercial demand, however, transmission bottlenecks are created if the 10-inch pipelines are connected directly to the existing pipelines. It is recommended that the City replace the existing 6-inch pipe on S 1st Street and the 2-inch pipe on Strand Street with 12-inch pipes to maintain minimum pipe diameters for this development. The existing pipe upsizing is called out in Figure 5-3. It should be noted operating pressures in this new development are around 100 psi and new service connections should be equipped with individual pressure regulators. The available fire flow in this growth area is sufficient to meet the commercial fire flow demand without any further improvements than those shown in Figure 5-3.

FIGURE 5-3: RIVERFRONT DEVELOPMENT WATER ALIGNMENT

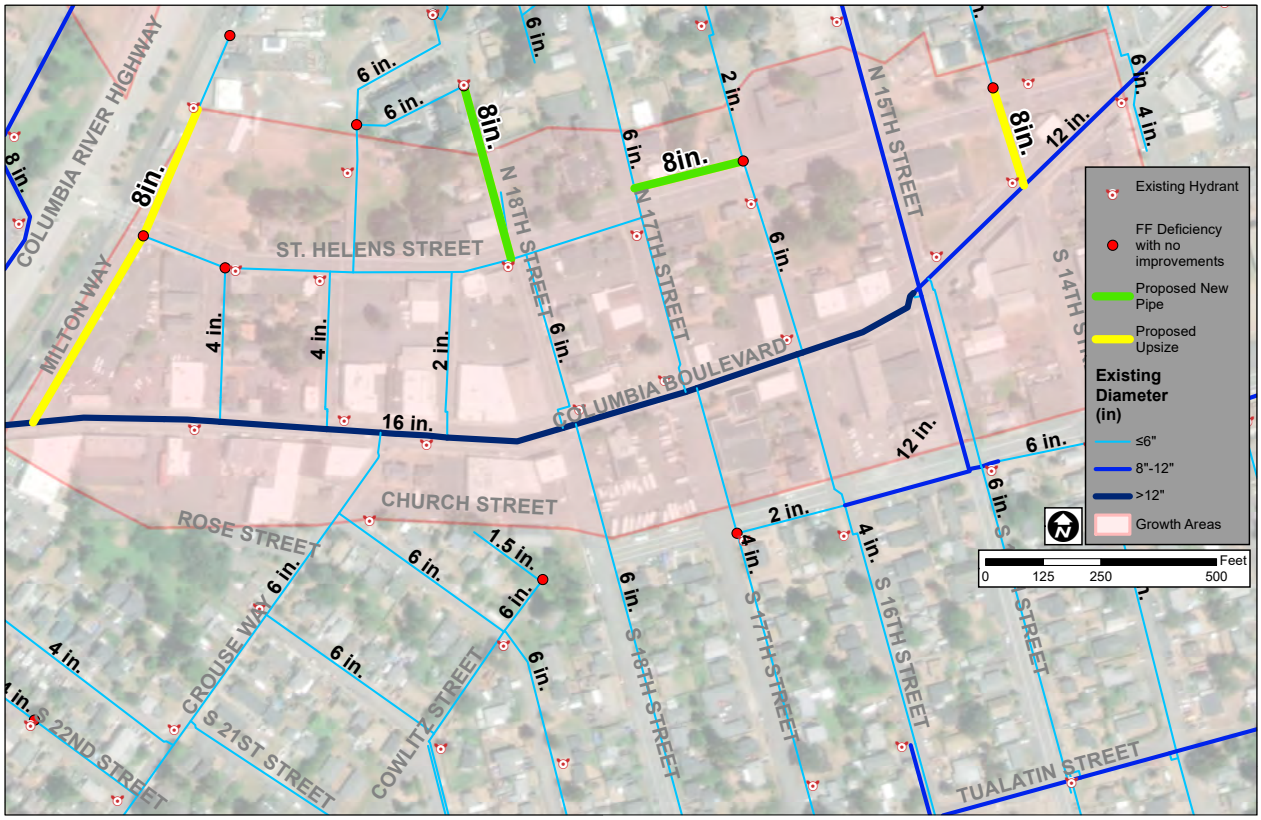


DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

5.5.3 GROWTH AREA 3 – HOULTON BUSINESS DISTRICT

The Houlton Business District has several existing commercial connections, and this growth area is projected to mainly consist of infill of existing parcels. The targeted fire flow demand in this commercially zoned area is a minimum of 3,000 gpm for 3 hours, but the hydraulic model indicates existing and future deficiencies in meeting this fire flow demand. Improvements are recommended to fix these deficiencies such as, upsize smaller pipe diameters and increase looping within the area. Figure 5-4 illustrates the pipelines which are recommended to be upsized or new pipelines installed. The existing 16-inch pipeline along Columbia Boulevard provides significant fire flow, therefore the fire flow demands can be met by upsizing existing pipes to 8-inches. The four pipeline improvements illustrated in the figure increase available fire flow within the growth area to meet the recommended fire flow demands.

FIGURE 5-4: HOULTON BUSINESS DISTRICT FIRE FLOW IMPROVEMENTS

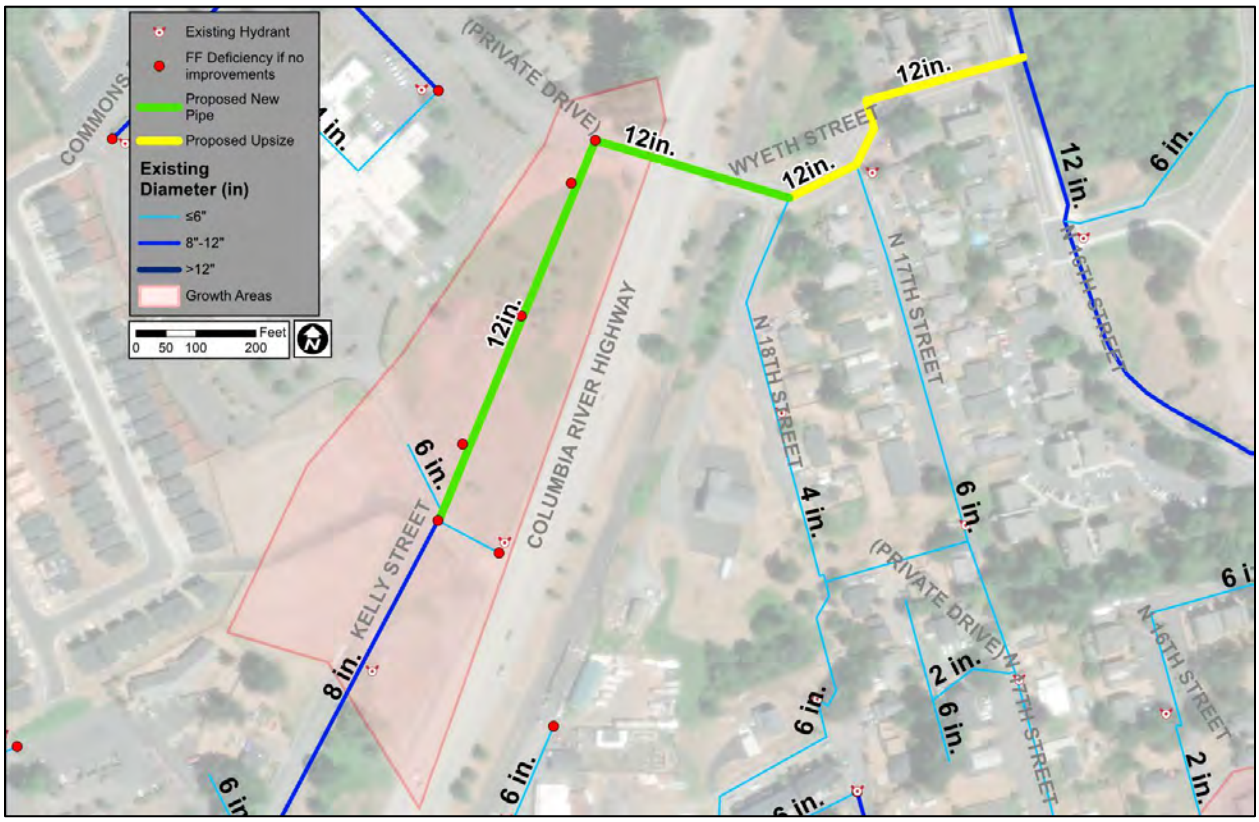


DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

5.5.4 GROWTH AREA 4 – CURRENTLY VACANT COMMERCIAL PROPERTY

Growth area 4 is located on the west side of the Columbia River Highway and will likely tie into the existing system at the end of the 8-inch pipeline at the intersection of Kelly Street and Howard Street. The available fire flow is not sufficient by only connecting to this pipeline; therefore, water system improvements should consist of looping the system to the east side of the Columbia River Highway and upsize the existing 6-inch pipeline along Wyeth Street, connecting to the existing 12-inch pipe along N 16th Street. This recommendation would help improve system looping as well as provide sufficient fire flow to meet the commercial demand. Figure 5-5 illustrates the recommended improvements.

FIGURE 5-5: GROWTH AREA 4 RECOMMENDED IMPROVEMENTS



5.5.5 GROWTH AREA 1, 9, 11, 13

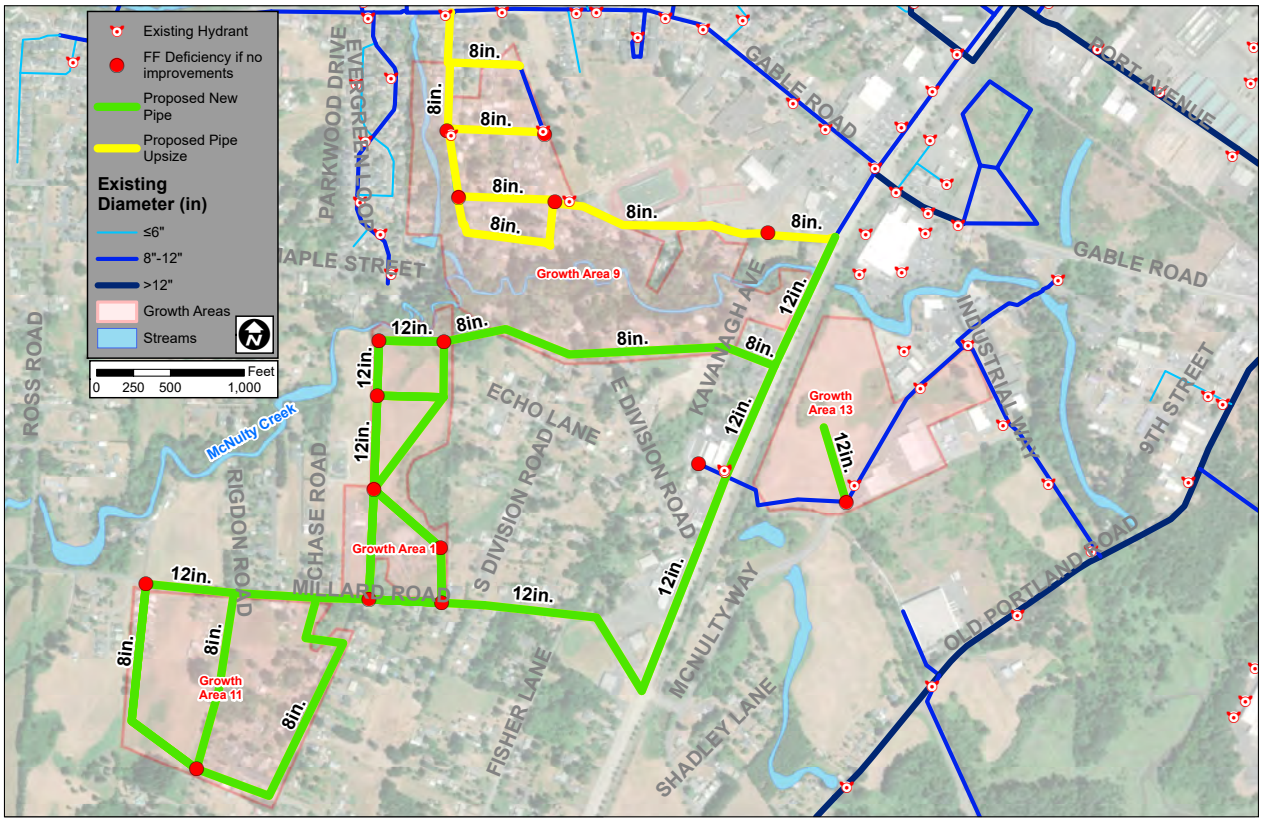
Growth area 9 is partially developed with residential service connections and McNulty Creek runs through the southern section of the growth area essentially splitting the development into two sections. The north portion of the growth area has existing water infrastructure which generally consists of 6-inch steel pipe which does not currently meet the residential fire flow demand and it is recommended that as this area continues to develop, the 6-inch steel pipe be replaced with a minimum diameter of 8-inch DI pipe. Upsizing the existing pipes to a minimum of 8-inches results in available fire flow which meets the fire flow demand criteria.

The area south of McNulty Creek within Growth Area 9 does not have any existing water infrastructure or development, so improvements to meet fire flow demands should be coordinated with Growth Areas 1, 11, and 13 because water system improvements benefit all three growth areas. Pipeline improvements should target improving looping within the existing and future system, and as shown in Figure 5-6 below, a new pipeline should be installed along the Columbia River Highway, looping the water system across McNulty Creek to the existing 12-inch pipe. Additionally, new pipeline should be installed along Millard Road to serve Growth Areas 1 and 11, and Growth

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Areas 1 and 9 should be looped together parallel to McNulty Creek. Growth area 13 was not meeting the industrial fire flow demand, however, by looping the pipeline along the west side of the Columbia River Highway, the available fire flow is increased and meets the recommended demand. Figure 5-6 summarizes the improvements recommended as these growth areas develop.

FIGURE 5-6: GROWTH AREA 1, 9, 11, 13 IMPROVEMENTS

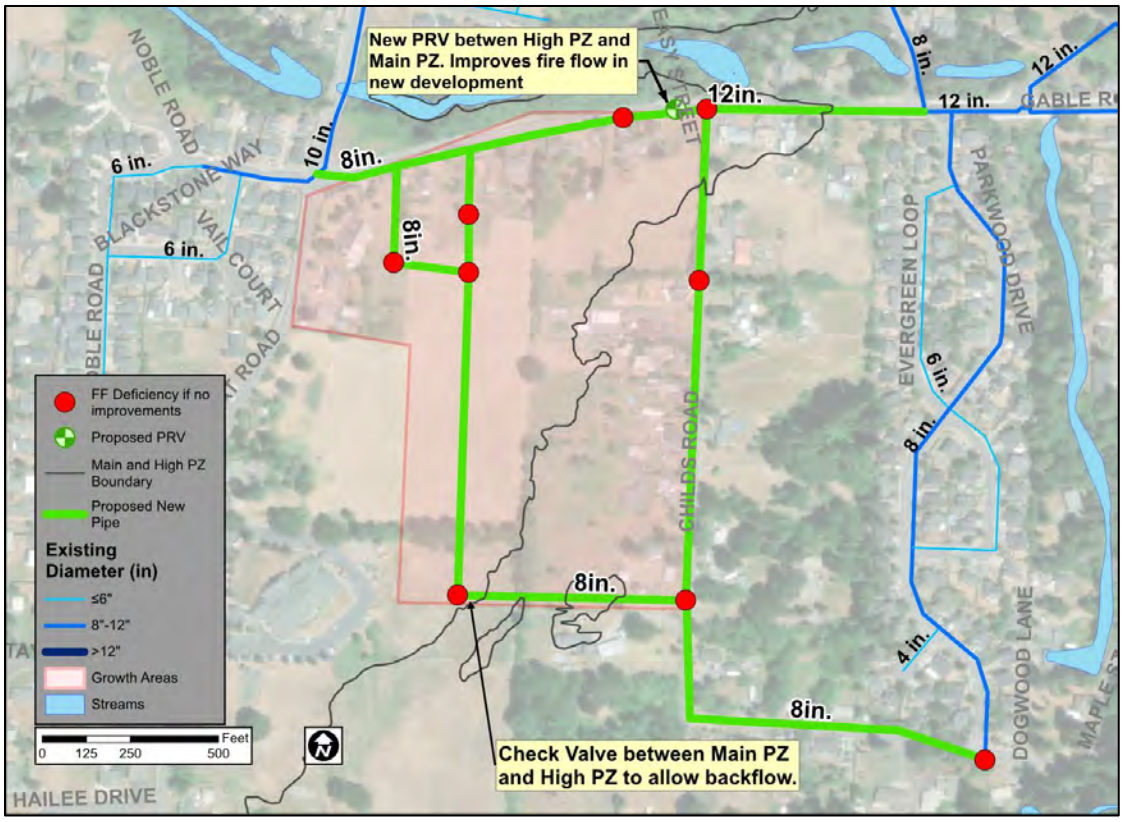


DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

5.5.6 GROWTH AREA 10 – RESIDENTIAL

Growth Area 10 is planned residential development and is located on the boundary of the High PZ and the Low PZ which provides the City with the opportunity to install a system intertie between the two zones. The west side of the growth area should be served from the High PZ to maintain pressures above 40 psi while the east side should be served from the Main PZ. The growth area should connect to the existing water system at the intersection of Bachelor Flat Road and Summit View Drive in the High PZ and at the intersection of Bachelor Flat Road and Whitetail Avenue in the Main PZ. Additionally, a secondary looping point should be along Maple Street and connect to the existing 8-inch pipe along Evergreen Loop. It is recommended an additional system intertie be a check valve to allow for backflow from the Main PZ to the High PZ in an emergency situation. Figure 5-7 illustrates the recommended water system improvements as this growth area develops.

FIGURE 5-7: GROWTH AREA 10 IMPROVEMENTS

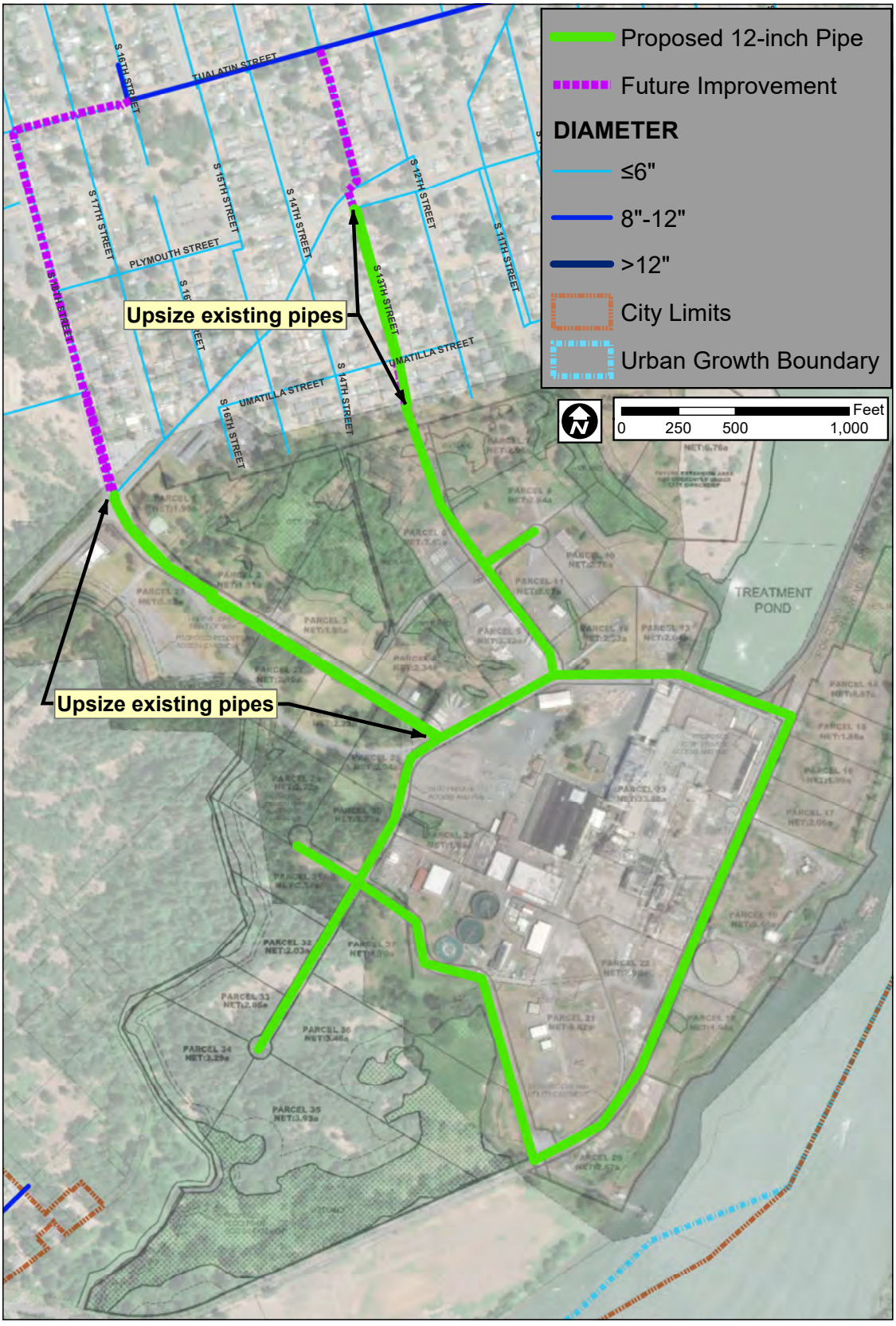


5.5.7 GROWTH AREA 16 – INDUSTRIAL BUSINESS PARK

Growth area 16 consists of the anticipated industrial business park. At the time of this study, the City has completed an initial parcel map of the proposed development. The preliminary parcel layouts were used to align water pipelines throughout the growth area, and it is recommended to install 12-inch pipes throughout the growth area to provide sufficient fire flow to meet the industrial fire flow demands. In addition to the new pipelines within the development, there are several existing pipelines that should be upsized to provide sufficient fire flow which would include upsizing the existing pipelines along S 13th Street from the dead-end on Umatilla Street to Old Portland Road with 12-inch pipes. As the City replaces the existing pipes along S 18th Street and S 13th Street, the pipes should be upsized with 12-inch pipe to improve reduce transmission bottlenecks and complete a full 12-inch loop from Tualatin Street to the industrial business park shown in dashed purple in Figure 5-8 below. The figure illustrates the recommended improvements as the industrial business park develops and Figure 22 in Appendix A includes a full-size version.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 5-8: INDUSTRIAL BUSINESS PARK IMPROVEMENTS



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

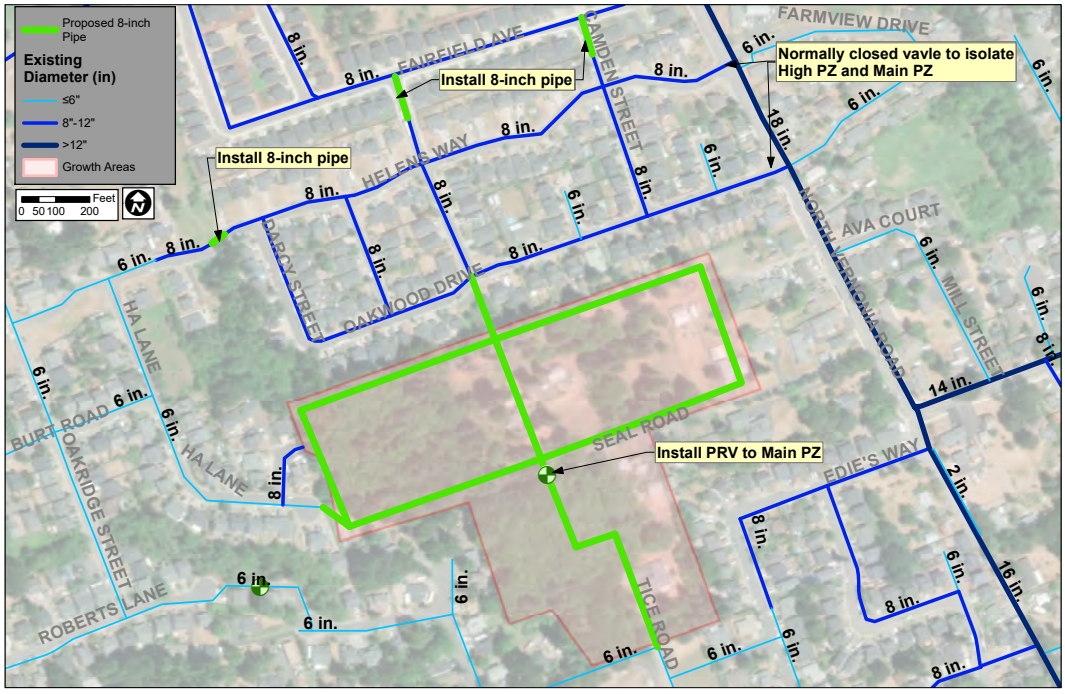
5.5.8 GROWTH AREA 8 - RESIDENTIAL

Growth Area 8 is located just south of Helens Way which was an area identified with low pressures in the existing system evaluation. Elevations in this growth area are relatively similar to the elevations along Helens Way which results in operating pressures below 40 psi. The following section discusses two alternatives to address the low pressures in this growth area and along Helens Way.

- Alternative 1 – New Pressure Zone: This alternative consists of creating a new pressure zone for the service connections along Helens Way and in part of Growth Area 8. The PZ would have a hydraulic grade between the High PZ and the Main PZ, and the new zone would be served by a PRV from the High PZ. The zone should have an additional PRV to the Main PZ with backflow capabilities. Creating a new pressure zone would result in the most desirable operating pressures for the users, however, a new pressure zone ultimately leads to additional operations and maintenance efforts and new potential points of failure within the system.
- Alternative 2 – Incorporate into the High PZ: This alternative consists of serving the low-pressure areas from the High PZ, which would result in operating pressures over 80 psi, and the existing water users would need to be equipped with individual pressure regulator. Note, there are around 100 existing service connections which would need to be equipped with pressure regulators. This alternative provides the City with opportunities to increase looping within the existing High PZ and increase the available fire flow. The growth area should be served by the High PZ where elevations are over 140 ft and from the Main PZ where elevations are below 140 ft. The High and Main PZ could be intertied with a PRV with backflow capabilities at the time of the development or in the future.

Both alternatives serve as potential solutions to address the low pressures within the existing system and within the future growth area. It is recommended that the City pursue Alternative 2 because it results in more simple operations for the water system and the City has several service connections throughout the High PZ and Main PZ with pressures over 80 psi. Generally, high water system pressures are less of a deficiency than low pressures. Figure 5-9 illustrates the recommended improvements associated with Growth Area 8 and the existing low pressures along Helens Way and Oakwood Drive.

FIGURE 5-9: GROWTH AREA 8 RECOMMENDED ALTERNATIVES

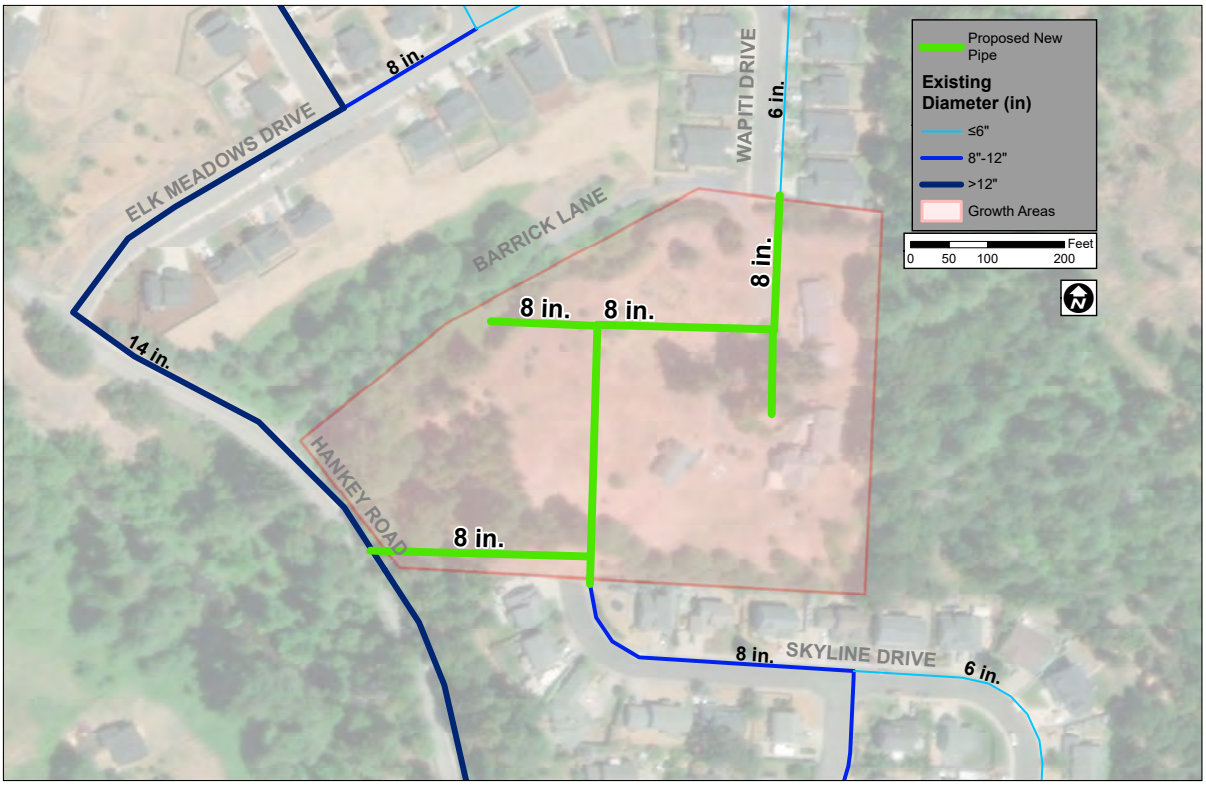


DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

5.5.9 GROWTH AREAS 6, 7, 12, 14, 15 – NO ADDITIONAL IMPROVEMENTS

Growth areas 6, 7, 12, 14, and 15 are able to meet the required fire flow demands simply by connecting to the existing system with the appropriately sized pipe diameters. Growth Areas 6, 7, and 8 should install minimum pipe diameters of 8-inches and loop to the existing system as appropriate. These areas are located in areas where looping with the existing system does not require additional pipe length outside the growth area. Growth Area 14 can meet the industrial fire flow demand as long as it is served by a 12-inch pipe off of the existing 16-inch pipeline along Old Portland Road. Growth Area 15 should be served from the existing 10-inch pipe and a new minimum 8-inch pipe should be installed through the growth area and connect to the existing pipe along Railroad Avenue. Figure 5-10, Figure 5-11, and Figure 5-12 illustrate possible pipe layouts in Growth Areas 6, 7, 12, 15, and 15.

FIGURE 5-10: GROWTH AREA 6 PROPOSED PIPING



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

FIGURE 5-11: GROWTH AREA 7 PROPOSED PIPING

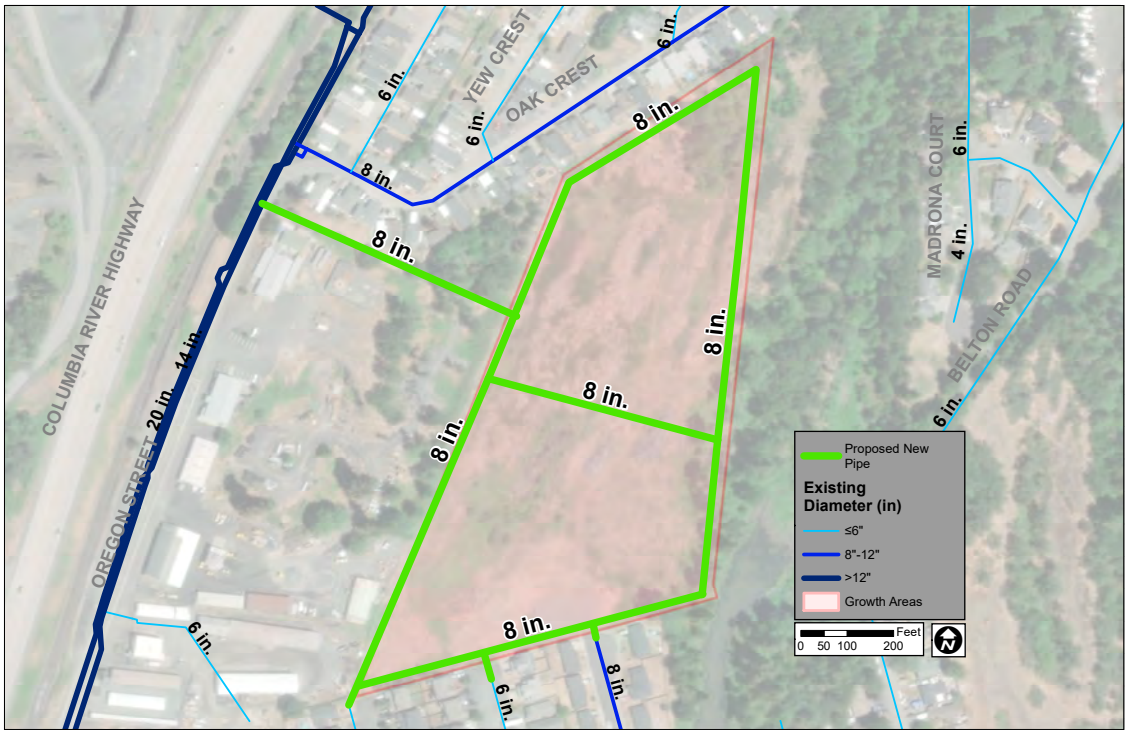
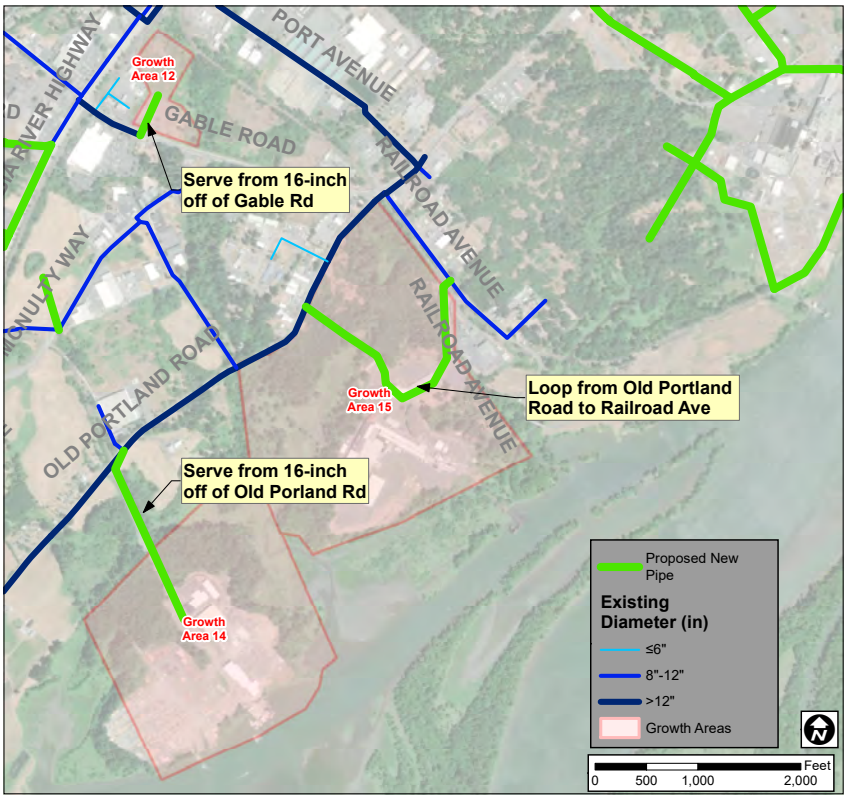


FIGURE 5-12: GROWTH AREA 12, 14, AND 15 PROPOSED PIPING



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 6 - STAFFING AND O&M EVALUATION

The following section discusses the existing operations and maintenance (O&M) activities which are currently completed by the City Public Works (PW) department as well as recommendations to the existing O&M activities in order to achieve the City's desired level-of-service (LOS). Additionally, the existing staffing levels are evaluated and recommendations to staffing levels are developed in order to complete the recommended O&M activities.

6.1 OPERATIONS AND MAINTENANCE ACTIVITIES

6.1.1 WATER FILTRATION FACILITY

Existing - Regular maintenance at the facility includes flushing/washing the filtration racks annually and clean-in-place of the filtration racks annually. Typical clean-in-place intervals are recommended at least four times a year, however, because the facilities raw water comes from the collector wells which are naturally filtered by the Columbia River strata, (rather than from surface water), the City reported the filtration racks only need cleaned once a year. Other regularly scheduled maintenance includes routine backwashing of the filters, greasing motors, and checking air compressors as recommended by the manufacturer of each piece of equipment. Flushing the filtration racks has historically been completed in-house within four days with three to four employees; however, if efficiency is increased and employees are properly trained, this process should only take two days with two employees. The clean-in process takes about four hours per rack (total of 20 hours) and utilizes two employees. The water filtration facility (WFF) regularly monitors pH, turbidity, and chlorine residual, which the historical monitoring of pH, turbidity, and chlorine is tracked in the SCADA system and historical data is held on the City's server. In order for the data to be saved, SCADA forms are printed off and scanned onto the server. Additional monitoring at the WFF and in the distribution system are performed on regularly schedule intervals as required by the Oregon Health Authority (OHA).

Recommendations – There are no additional recommended O&M activities at the WFF.

6.1.2 WATER USE AND MEASUREMENT AND REPORTING PROGRAM

Existing - The City has not completed an annual water audit since 2018 which the most recent audit was completed in-house. Currently, there is not any budget set aside to complete this activity.

Recommendations – It is recommended that the City begin completing an annual water audit to compare the volume of water produced with the recorded consumption volume from metered users, hydrant flushing, and construction activities. The production should be compared to the consumption to develop a percent of unaccounted for water for the reporting year. If this percentage is greater than 10%, the City should work toward identifying the source of the unaccounted for water to reduce the percentage to below 10%. Potential sources for unaccounted water could be from unmetered users, unaccounted for hydrant flushing, fire department activity, and construction activity, or system leaks.

6.1.3 FLUSHING PROGRAM

Existing - The City has an active flushing program and the whole water system is flushed annually. The process takes approximately five months to complete with a single PW worker contributing about 50% of their time toward flushing which indicates flushing the whole system would take about 2.5 months with an employee spending 100% of their time flushing. The City does not have a written protocol for flushing the system but does reference techniques outlined in the American Water Works Association (AWWA), for instance, the system gets flushed from the entry point and then is worked outward. Currently, there is not a specific budget for flushing called out in the PW budget.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Recommendations – There are no recommendations for the City's existing system flushing program at this time. The City should continue with the annual flushing to reduce stagnant water and sediment build-up in the system to improve water quality. If complaints do arise and cannot be specifically resolved, the City should consider developing a uni-directional flushing program.

6.1.4 VALVE EXERCISING AND REPLACEMENT PROGRAM

Existing - The City does not have an active valve exercising or valve replacement program. Valves are tested and repaired on an as-needed basis or as waterline projects are completed.

Recommendations – It is recommended that the City regularly exercise the water system valves to document the condition and check the operability of each valve. Valves should be noted that are in poor condition or in-operable and should be added to an annual replacement program.

6.1.5 RESERVOIR MAINTENANCE

Existing - The City does not have any regularly scheduled maintenance for the reservoirs other than on an as-needed basis. Recent reservoir maintenance has included cleaning the exterior of the WFF raw water reservoir and clearwell tank. The exterior of the 2.5 and 2.0 MG Reservoirs was painted in 2009, however, an interior inspection of the reservoirs has not been completed recently. Historically the inspections are contracted out to a third party and as of now, there is not a specific budget allocated toward tank maintenance in the PW budget.

Recommendations – It is recommended that the City conduct annual maintenance at each of the reservoir sites including washing the exterior of the reservoirs, grounds maintenance, and any other repairs noted during the year. Additionally, the reservoirs interior and exterior should be inspected on a regular interval of every 5-10 years. When the interior is inspected, it should be cleaned at the same time, which is typically completed by a certified diver. It is recommended that the City contract this activity out to a third party who specializes in interior and exterior reservoir inspections. The City should also coat the interior and exterior of the steel reservoirs every 10-15 years depending on results from the inspection because the coating should minimize corrosion of the steel reservoir components.

6.1.6 WATERLINE REPLACEMENT PROGRAM

Existing - The City's waterline replacement program is mainly complaint driven and on an as-needed basis. Generally, the pipes which are replaced are galvanized and consist of smaller diameters (e.g., the older areas of town east of U.S. Highway 30). The City typically completes several water replacement projects annually and approximately $200,000 is allocated toward these improvements. There is not a regularly scheduled replacement of hydrants, but if there are hydrants along the pipelines included in the replacement projects, the hydrants will be replaced, and additional need for replacement of hydrants occurs if the hydrants are damaged. Hydrants throughout the system were painted about 2-years ago but there is no regularly scheduled painting program.

Recommendation – It is recommended that the City continue with their existing waterline replacement program to improve the water system operation. The City should continue to target smaller diameter pipe of older material such as galvanized, cast iron, or concrete. The City should also utilize results from the leak detection activities to prioritize replacement lines and aim to replace leaking or damaged waterlines before they become an immediate problem. Additionally, the replacement program should target the pipelines identified to improve the available fire flow within the system which are identified and discussed in the capital improvement plan (CIP). A more detailed description of the recommended annual replacement budget is included in Section 6.2.

6.1.7 WATER METERS

Existing - The City has an active water meter replacement program and beginning in 2009 the City began replacing the existing meters with radio read meters. As of July 2021, the City estimated they have replaced about 80% of the existing meters. The City has run into several issues with replacing all of the meters with radio read meters. Recently, there have been delays with procuring the radio read water meters and the City has had to wait 6-8 months before receiving a shipment.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Additionally, the meters battery life is about 10-years, therefore, the meters which were replaced around 2009 are now needing new batteries which are also in short supply, and if the batteries are dead, the meters have to be read manually. The City's target number of meters to replace annually is as many as they can order because completing the meter replacements throughout the system is not limited by the City's ability to replace the meters, but rather by the supplier's ability to provide enough meters for the City to install. Assuming a 10-year meter life, and the City's approximately 4,800 connections, the City should target to replace 480 meters annually. The City is not aware of any un-metered connections; City parks have meters and water used in construction is to be metered from the hydrant. There is not an existing meter testing program to calibrate the meters other than the occasional make-shift testing completed in the PW shop. There is also not any specific budget allocated to meter replacement in the PW budget.

Recommendations – There are no recommendations to the City's existing water meter replacement program. As mentioned, the City has sufficient budgeted time to replace the meters, however, they are limited by the supply of new water meters. The City could consider identifying a secondary meter manufacturer which could be incorporated into the existing meter reading system.

6.1.8 LEAK DETECTION PROGRAM

Existing – Historically, the City has completed leak detection testing but not on a specific interval. The leak detection areas typically target areas suspected to leak and when leaks are identified, they are added to a replacement list which are likely to be included in the annual replacement projects. Currently, there is not a specific budget allocated to leak detection in the PW budget.

Recommendations – It is recommended that the City complete regularly scheduled leak detection inspections of the water system and that leak detection be completed systemwide on a 10-year rotation. The City should start the leak detection program with a comprehensive inspection system wide to identify the leaks throughout the entire system. The results from the leak detection inspections should be utilized in the development of the annual waterline replacement projects. The City should then begin a rotational system that targets one-tenth of the system each year and should be prioritized based on the results from the comprehensive inspection. Prioritization criteria may include targeting specific areas of the city, pipe types, or typical age. The City could consider utilizing satellite remote sensing technology for the comprehensive inspection which should identify potential leaks systemwide and then completing "on the ground" methods such as acoustic sensing at the targeted areas. The City could also consider purchasing the equipment to complete annual leak detection in-house or contract out to a third party.

6.1.9 RESPONDING TO REPORTED PROBLEM AREAS

Existing – In general, the City has issues with galvanized pipe throughout the distribution system and has also had issues with isolating pipe segments within the system to perform replacements/maintenance. For example, there is a segment from N 11th Street to Deer Island Road of about 13 blocks with no isolation valves. The City receives alerts about potential leaks on average about 1-2 times a week, but more so in the recent past. In general, the PW crew will address the leaks if possible and then notifies the City Engineer of the situation. It generally takes about three utility workers about half a day (4 hours) per leak.

Recommendation – It is recommended that the City continue to respond to the reported problem areas and address the problem as soon as possible. The preventative O&M activities described in this section including the valve replacement, waterline replacement, and leak detection should result in a decrease in reported problem areas because the areas should have been identified and resolved prior to significant leakage. It is recommended that the City maintain a record of areas with deficient isolation valves and install new mainline valves as a part of the valve exercising and replacement program.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

6.1.10 PUBLIC EDUCATION

Existing – The City's primary education delivery method is through the City website, which includes a description of the existing water system and treatment process, annual consumer confidence reports (CCR), emergency preparedness information, and additional educational links.

Recommendation – It is recommended that the City continue with updating the website to include the same information which is currently provided. In addition to the website, it is also recommended that the City send quarterly newsletters to the water users which can be used to convey important information regarding the water system including but not limited to planned system improvements, water quality reports, interpretations of water quality reports, and water conservation articles. The water conservation articles could include practices to reduce peak demands, system-wide demands, and additional good practices for water users.

6.1.11 LARGE WATER SYSTEM IMPROVEMENTS

Existing – Larger water system improvements such as significant lengths of waterline replacement, replacement along busy streets, or other improvements are generally contracted out to a third party for design and construction.

Recommendation – There are no recommendations to the City's existing water system improvements program.

6.1.12 ADDITIONAL O&M ITEMS

In addition to the O&M activities described above, the City reported the following additional equipment and licensing needs.

- The PW shop does not currently have back-up power. A back-up generator should be installed at the PW shop to maintain operations in the event of an emergency.
- The City's hydrant diffuser does not have a pitot tube or flow meter to document volumes of water used during flushing activities. It is recommended that the City purchase a hydrant diffuser which can be used to document the volume of water used in the annual flushing program.
- The City reported there are only two PW workers who are certified in water distribution that are involved in the valve and waterline replacement program. The City should provide incentives to the existing PW utility workers to pursue additional water distribution licensing to assist with the water system replacement programs.

6.2 WATER SYSTEM REPLACEMENT PROGRAM

An asset inventory and annual replacement budget was developed for the City's water system components including booster station components, pipes, and reservoirs. A detailed breakdown of the asset inventory is included in Appendix D and a summary is included below in Table 6-1. The City should target an annual cost of $1.7 million for water system asset replacements. These costs do not include annual O&M costs and it assumes a PW contract to perform the replacements.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 6-1: ANNUAL REPLACEMENT PROGRAM

Asset[1]	Typical Useful Life	Total Replacement Cost	Annualized Replacement Cost
Distribution Pumps	20	$180,000	$9,000
Water Meter (Full Replacement)	20	$1,200,000	$60,000
Water Meter Register	10	$960,000	$96,000
Distribution Piping	75	$86,000,000	$1,100,000
Booster Station Housing, Valves, and Hydrants	50	$6,700,000	$130,000
Storage Reservoirs	50	$8,000,000	$160,000
	Total	$103,000,000	$1,600,000

1) Costs assume public works contract to perform work.

6.3 STAFFING EVALUATION

The following section summarizes existing water system staffing levels, identifies deficiencies in existing staffing levels, and provides staffing recommendations for the City of St. Helens.

6.3.1 GENERAL

The City PW Operations staff are responsible for the O&M of the water distribution system and water filtration facility in St. Helens. On July 21st, 2021, PW Operations staff were interviewed by Keller Associates to assess existing levels of water staffing and annual O&M activities, identify deficiencies in staffing and equipment, and provide recommendations to assist in the City meeting LOS goals for the water system.

To summarize, the PW operations currently has a total of six utility worker positions assisting with the potable water distribution, sanitary sewer, and stormwater system. Several of the utility worker employees only contribute part of their time to the water distribution system, while the other portion of their time is spent on sanitary sewer and stormwater. With input from the City, it was concluded that an equivalent of approximately 3.0 full-time employees (FTE) operate and maintain the water distribution system.

Additionally, the City has two treatment positions at the WFF and three treatment positions at the wastewater treatment plant (WWTP). The WFF and WWTP operators are in the process of obtaining certification in both water and wastewater treatment so operators can assist at either the WFF or the WWTP. It should also be noted that one of the positions at the WFF was unfilled at the time of this study. The City reported approximately 0.75 to 1.0 FTE at the WFF.

This results in a total of 4.0 FTE contributing to water system operation and maintenance. As of February 2022, one of the full-time positions at the WFF was unfilled. Additionally, a full-time PW utility worker was to start at the time of this study and would contribute part-time (50% contribution) to the water distribution system; hence adding 0.5 FTE to the existing 4.0 FTE. In summary, this staffing evaluation assumed the potable water system consists of 1.0 FTE at the WFF and 3.5 FTE for utility work resulting in a total of 4.5 FTE for the water system.

6.3.2 EXISTING WATER STAFFING

During the staff interviews, the general roles and responsibilities of the PW Operations staff for the water system O&M was reviewed. A list of O&M activities, approximate time, frequency, and size of crew was developed to evaluate the approximate annual labor hours required for the water system O&M. The primary O&M activities include treatment component maintenance and monitoring/reporting at the WFF, and hydrant flushing, water meter replacement, in-house waterline replacement, responding to leaks, and construction permitting and inspections.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

The current budgeted FTE for water system O&M was approximately 5.25 FTE which includes 0.75 FTE from the engineering department for construction, inspection, and permitting support, as well as in-house replacement and extension project support. The PW Operations staff had previously been requested to complete tasks and projects outside of the utility O&M which included but was not limited to building maintenance; building remodels and renovations; City events setup, takedown, and traffic control; park projects and maintenance; and groundwork for City projects. However, the City recently added a new crew which will be dedicated to these tasks so the utility crews can focus on the utility related tasks.

6.3.3 RECOMMENDED WATER STAFFING

LOS goals were discussed with the PW Operations staff for the potable water system. The desired LOS goals are summarized below:

- Maintain recommended operating pressures within the system.
- Address reported problems in a timely manner.
- Provide recommended available fire flows based on zoning designations.
- Complete regular maintenance, repairs, and replacements to minimize interruptions and failures (perform proactive O&M in lieu of reactive O&M).

A summary of recommended general O&M activities described in Section 6.1 to achieve these LOS goals and follow industry good practices are listed below:

- Maintain appropriate monitoring and reporting to comply with State regulations.
- Perform proper equipment maintenance as recommended by the manufacturer at the WFF.
- Replace equipment as age reaches the end of its typical useful life.
- Flush water system annually to discharge stagnant water, reduce sediment build-up, and increase water quality.
- Exercise mainline valves (gate and butterfly) to document condition and proactively replace inoperable valves as identified.
- Wash exterior of reservoirs annually and maintain appropriate groundskeeping at each site (e.g., mowing grass, weed removal, maintain fencing, etc.).
- Inspect interior and exterior of reservoirs every 5-10 years.
- Install in-house water line replacements and extensions to replace pipes 6-inches and smaller and of older pipe material such as concrete cylinder, galvanized, cast iron, or concrete.
- Complete annual water audit documenting annual water production and consumption to develop system-wide unaccounted for water.
- Replace water meters with radio read meters to streamline water meter reading practices. Replace water meter batteries as necessary to utilize the radio read function of the water meters.
- Conduct leak detection inspections to locate damaged or leaking water pipes, fittings, and valves.
- Respond to reported water leaks, assess, and repair as needed.
- Complete construction inspection and permitting.
- Continue to develop public education material regarding the water system, water quality, and conservation practices.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Using similar expected labor hours for activities as the existing staffing evaluation, it is estimated that approximately 1.0 FTE is needed at the WFF, and 3.25 FTE are needed for water utility crews to meet the O&M and LOS goals described above.

Based on this evaluation, the City's current staffing at the WFF appears to be adequate and the water utility staffing is within the recommended range as long as the utility crews focus solely on water utility O&M. The staffing evaluation for this report is a high-level, initial estimate. The City would benefit from tracking the number of hours the PW Operations staff spend on various activities and utilities throughout the year to assess how best to budget and allocate resources in order to provide the recommended O&M of the water system. It is also recommended that staffing needs be reevaluated every two to three years.

In addition to annual O&M discussed above, an annual replacement program should be maintained. Water infrastructure replacement and rehabilitation needs will only increase as the system ages, so it would be beneficial to conduct annual non-destructive leak testing to identify problem areas before they become high-priority problems or critical failures. An annual replacement program is an important part of proactively maintaining the water system.

The City staff reported that the PW budget presented to City officials should remain generalized and specific line items should not be called out. Internally, water budgets should be more specific and include line items for the specific O&M activities recommended in this section.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 7 - CAPITAL IMPROVEMENT PLAN

The following section summarizes recommended capital improvements with associated planning level cost estimates. Recommended improvements are illustrated in Figure 23 in Appendix A, and the details of each improvement are presented in Appendix E. This section also summarizes system development charge (SDC) eligibility of each of the projects and the annual operation and maintenance impacts for the proposed improvements.

7.1 BASIS FOR ESTIMATE

Capital costs developed for the recommended improvements are Class 4 estimates as defined by the Association for the Advancement of Cost Engineering (AACE). Actual construction costs may differ from the estimates presented, depending on specific design requirements and the economic climate when a project is bid. An AACE Class 4 estimate is normally expected to be within -50 and +100 percent of the actual construction cost. As a result, the final project costs will vary from the estimates presented in this document. The range of accuracy for a Class 4 cost estimate is broad, but these are typical accuracy levels for planning work.

The costs are based on experience with similar recent water system improvement projects, and additional design considerations such as environmental permitting, geotechnical investigations, and administrative costs were included in the total project costs. ADA Ramp installations were assumed for project extents within Oregon Department of Transportation (ODOT) right-of-way and for the Riverfront and Industrial Business Park developments. Equipment pricing from manufactures of the flow measuring equipment items was also used to develop the estimates. The total estimated probable project costs include contractor markups and 30% contingencies, which is typical of a planning-level estimate. Overall project costs include total construction costs, costs for engineering design, permitting, construction management services, inspection, as well as administrative costs. For the system projects, the contractor's overhead and profit are worked into the line items.

7.2 PROJECT PRIORITIZATION

The capital improvement plan (CIP) consists of improvements necessary to satisfy the planning criteria established in this study and accommodate the expected growth within the City limits and UGB. Some of the criteria includes correcting pressures outside the recommended range, improving fire flow, meeting existing/future storage requirements, or replacing aged infrastructure. Table 7-1 below summarizes the criteria used to prioritize the projects in the CIP.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 7-1: CIP PRIORITIZATION CRITERIA

Priority	Description
1	► Address imminent failure of asset (based on physical conditions) ► Correct existing or future operational/peaking, emergency, and fire storage deficiencies ► High health and safety risks ► Complete repairs based on condition assessment within 0-5 years
2	► Correct pressures below 40 psi for potable peak hour demands ► Complete repairs based on condition assessment within 5-10 years ► Complete WTP and distribution system operational improvements ► Provide available fire flow above 1,000 gpm in all locations
3	► Meet future operational/peaking, emergency, and fire storage deficiencies ► Provide available fire flow to meet recommended fire flow demands for each zone type ► Complete repairs based on condition assessment within 10-20 years
4	► Development driven future projects.
5	► Non-critical seismic resiliency plan improvements ► Improve overall water system transmission and looping

7.3 PRIORITY 1 IMPROVEMENTS (6-YEAR CIP)

Priority 1 improvement projects are meant to be completed within the next 0-6 years because Priority 1 improvements include critical projects which address imminent failure, storage deficits, critical fire flow deficiencies, and conditions related replacements. A summary of these improvements is shown in Table 7-2.

TABLE 7-2: 6-YEAR CIP SUMMARY

ID#	Item	2022 Cost	Opinion of Probable Costs (2022 Dollars)					
			2022	2023	2024	2025	2026	2027
Priority 1 Improvements								
1.1	Repair Existing 2.0 MG Reservoir	$ 700,000	$ 700,000					
1.2	Full-Rate Study	$ 30,000	$ 30,000					
1.3	Bayport Well Activation	$ 10,000		$ 10,000				
1.4	Install Redundant Pittsburg Rd / Milton Creek Crossing	$ 680,000			$ 680,000			
1.5	Back-up Generator for PW Shop	$ 100,000				$ 100,000		
Total (rounded)		$ 1,600,000	$ 730,000	$ 10,000	$ 680,000	$ 100,000	$ -	$ -

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

1.1 – Repair Existing 2.0 MG Reservoir: The City has already implemented the first step of this improvement project by beginning an investigation as to why the 2.0 MG Reservoir liner did not address the existing leak. Once the source of the leak is identified, the City should repair the reservoir and bring it back online. The 2.0 MG Reservoir is the highest priority project because the water system has an existing storage deficit.

1.2 – Full-Rate Study: Complete a full-rate study for the water utility to evaluate the potential user rate and SDC impacts of the recommended CIP. Estimated SDC eligibility for each identified capital improvement is included in Table 7-3 on Page 7-7 for use in completing a full-rate study.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

1.3 – Bayport Well Activation: The City should begin the process of activating the Bayport Well as an emergency backup water source which would likely consist of contacting OHA and completing the necessary water quality testing to authorize use of the water source. It is anticipated that minimal improvements are needed to bring this source back into operation and the associated costs do not account for well pump replacement, chlorination feed improvements, or control improvements because it was assumed these components were still adequate. Once activated, the City should regularly test and exercise the well and pump to waste.

1.4 – Install Redundant Pittsburg Rd / Milton Creek Crossing: Install a redundant pipeline along Pittsburg Road underneath Milton Creek to increase the resiliency of the High PZ transmission pipeline. It is recommended that the City install a tapping saddle off of the existing 16-inch mainline to minimize the time where the transmission service is out of service. The project should also install a tee and stub out for CIP project 2.2 to connect to minimize disruption to the existing water supply. The existing pipeline along the bridge should be kept in service until CIP project 2.2 is completed and abandons the pipeline along the bridge. Milton Creek is considered Waters of the State and a wetland delineation is likely required as well as additional permitting through Oregon Department of State Lands (DSL) and the United States Army Corps of Engineers (USACE). The final alignment of the pipeline should be determined during the preliminary and final design phase of the project.

1.5 – Back-Up Generator for PW Shop: Install a back-up generator at the City PW shop. The PW shop will serve as a critical facility in the event of an emergency and should remain operational in order to provide appropriate support to the City.

7.4 PRIORITY 2 IMPROVEMENTS (5-10 YEAR)

Priority 2 improvements should replace less critical conditions related deficiencies, improve operations of the water system, and address existing fire flow deficiencies which are below 1,000 gpm. A summary of these improvements is provided below.

2.1 – Water Master Plan Update #1: Update the water master plan every 5-10 years to re-evaluate City priorities, system demands, and budget allocations.

2.2 – Lemont BS to Pittsburg Rd Pipeline Replacement: Replace the existing 14-inch CCP pipe from Lemont BS to the existing 8-inch transmission pipe from the Green Tank. This project could be completed in phases due to the large amount of pipeline which should be replaced. Wetlands were identified adjacent to the project area and additional environmental permitting, or wetland delineation may be required for some segments of the project. Replacing this pipeline disrupts the single supply source to the High PZ and temporary water delivery accommodations may need to be developed prior to construction which may consist of temporary booster pumps drawing water from the Main PZ or installing a bypass system during the construction phase.

2.3 – Elk Ridge BS Condition Improvements: Install proper ventilation within the pump house which may consist of roof vents, windows, floor vents, and fans. Install a floor drain and drainpipe plumbed into the sanitary sewer system. Additionally, the BS should be, at a minimum, equipped with a connection for a portable generator as the PZ pressures are not provided by an elevated storage reservoir.

2.4 – Ranney Wells Control Upgrades: The existing operations at the Ranney Well #2 and #3 are controlled by the storage reservoirs within the distribution system and cannot be operating at varying frequencies. The controls at these two sources should be upgraded in order to be controlled based on the raw water wet well levels rather than distribution system reservoirs. By upgrading the controls, it would simplify the controls as well as reduce the potential for miscommunication between the WFF, the distribution reservoirs, and the collector wells. Additionally, the pump controls should be upgraded to VFDs so the output flows can be ramped up or down giving the City the flexibility to operate the WFF with the raw water wet well offline for inspection or maintenance. The SCADA should also be upgraded in this project to track specific pump runtime and automate pump rotation.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

2.5 – Helens Way PZ Boundary Modification: Intertie the existing service users along Helens Way and Oakwood Drive to the High PZ. The pressure zone boundary should be moved along N Vernonia Road by closing mainline valves. The resulting pressures once intertied into the High PZ should be over 80 psi and service connections may need individual pressure regulators to decrease the chance of damaged or leaking water fixtures for the water users. This project could be completed in conjunction with the development to the south which should also be partially within the High PZ.

2.6 – Spotted Hill Drive and Wapiti Drive PZ Boundary Modification: Intertie the Elk Ridge BS PZ with the High PZ at Spotted Hill Drive and install a new normally closed valve at the intersection of Spotted Hill Drive and Kestrel View Drive. The homes along Spotted Hill Drive and the dead-end cul-de-sac of Wapiti Drive should be served from the Elk Ridge PZ to boost existing pressures below 40 psi. The additional homes in this pressure zone do not create a delivery deficit in the Elk Ridge BS. Approximately 20 new EDUs will be added to the PZ which results in an additional 8 gpm during PHD, and reduces the surplus in this zone to 3 gpm.

2.7, 2.8, and 2.9 – Small Pipe Diameter Replacement Phase I, II, & III: The City has numerous areas where the available fire flow in the existing system model is below 1,000 gpm, and as outlined in the prioritization criteria, the water system should provide a minimum of 1,000 gpm available fire flow at any hydrant within the water system. These CIP projects consist of approximately 25,000 LF of small pipe diameter pipe replacement and the existing pipe diameters proposed to be replaced are generally 6-inches or smaller. The pipes should be replaced with a minimum of 8-inch diameter pipe; however, some areas should be larger in order to meet the recommended fire flow for the respective zone type; these areas are indicated in the individual CIP sheets in Appendix E. Additionally, some of the proposed improvements consist of looping dead-end pipes to the existing system where minimal pipe length is required to make the loop. Figure 23 in Appendix A illustrates the pipelines to be replaced. These replacement projects were grouped into three phases which was based on spatial location of the upsizing.

2.10 – High PZ Low Pressure Study: Conduct a pressure monitoring study of the homes with service connections anticipated to be below 40 psi under peak season demands. The monitoring period should be completed during the peak demand season between July and August. The plan should document existing individual booster stations and service connections with pressures below 40 psi at the connection to the main line and future CIP projects should be considered if numerous service connections are below 40 psi. The future project could consist of creating a new pressure zone to serve these connections or installing additional individual booster pumps. Several users were reported to have existing individual booster pumps, and these locations should be documented for future reference.

7.5 PRIORITY 3 IMPROVEMENTS (5-20 YEAR)

3.1 – Water Master Plan Update #2: Update the water master plan every 5-10 years to re-evaluate City priorities, system demands, and budget allocations.

3.2 – 4.0 MG Reservoir Construction: The City should conduct a siting and feasibility study to identify a potential site for the future 4.0 MG Reservoir which should include geotechnical investigations to determine presence of bedrock, initial feasibility of property acquisition and structure demolition, and additional environmental considerations such as wetland delineations, evaluation of sensitive species, and existing soil conditions. The 4.0 MG Reservoir should be constructed at the most feasible location identified in the study, however, for this plan, it was assumed the reservoir would be installed at the Sykes Road location identified in Section 5.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3.3 – Lemont BS Replacement: Replace the existing Lemont BS structure, pumps, and yard piping as it is reaching the end of its typical useful life. Install a flow meter/vault on the discharge line and a pressure transducer on the suction and discharge side of the pumps. Upgrade the existing SCADA to track the flows, discharge and suction pressure, and pump runtimes on a time scale for each of the pumps. The yard piping into and out of the pump house should be replaced with DI material seismically resilient connections to the building.

3.4 and 3.5 – Small Pipe Diameter Replacement Phase IV & V: Similar to CIP Projects 2.7, 2.8, and 2.9, these projects consist of replacing existing small pipe diameters to improve the available fire flow to meet the recommended fire flow demands for the respective zone type (e.g., residential, commercial, and industrial). The projects consist of approximately 11,000 LF of pipeline to be replaced with either 8-inch or 12-inch diameter pipe as indicated in the individual CIP sheets. The replacement pipes were split into two phases generally based on spatial location.

3.6 – Redundant WFF Supply and Distribution Transmission: Increase the resiliency of the raw water supply to the WFF and treated water supply to the distribution system by installing a redundant raw water supply line from Ranney Well #3 and a redundant potable water transmission from the WFF to the looped distribution system at Oregon Street near Oak Crest Street. Install the new raw water supply transmission from K Street and 3rd Street, north along L Street to 4th Street, and then follow the same alignment along 4th Street and Rutherford Parkway connecting to the existing raw water supply pipeline at the WFF. Make a new connection to the potable water transmission on the south side of the WFF and install new pipeline heading west under the railroad and Columbia River Highway to connect with the existing 14-inch concrete pipe on the west side of the highway. Replace the existing 14-inch pipe with 20-inch DI pipe, following the existing pipe alignment south and then cross the highway at the existing crossing. Consider pipe bursting or boring underneath the railroad and Columbia River Highway. Connect to the existing system near Oak Crest Street where the water system is better looped.

7.6 PRIORITY 4 IMPROVEMENTS (DEVELOPMENT DRIVEN WITHIN 0-20 YEARS)

4.1 – Riverfront District Development: Install a new 12-inch pipe between the existing pipelines along S 1st Street, Plymouth Street, and Strand Street. Upsize the existing 6-inch pipe on S 1st Street to 12-inches and the 2-inch pipe on Strand Street to 8-inches.

4.2 – Industrial Business Park Development: Upsize the existing 6-inch pipe to 12-inches along Kaster Road from Old Portland Road through the development. Install 12-inch pipe throughout the right-of-way in the development. Upsize the existing pipes along S 13th Street to 12-inches from Old Portland Road to the new development pipes.

4.3 – Elk Ridge Upper Development: Install new pumps in the existing Elk Ridge BS to create a new pressure zone. The pumps should include a jockey, two duty, and two fire flow pumps to meet redundancy requirements.

4.4 – Houlton Business District Development: Upsize the existing pipe to 8-inches along Milton Way from Columbia Boulevard to the hydrant north of St. Helens Street. Install a new 8-inch pipe along N 18th Street between St. Helens Street and the existing 6-inch pipe north of St. Helens Street as well as install a new 8-inch pipe along St. Helens Street between N 17th Street and N 16th Street. Upsize the existing pipe along N 14th Street from Columbia Blvd to the hydrant on the north side of St. Helens Street.

4.5 – Growth Area 4 Commercial Development: Connect to the existing 8-inch dead-end pipe along Kelly Street and install 12-inch pipe through the development to the Columbia Commons entrance. Install a new 12-inch pipe to the east side of the Columbia River Highway and upsize the existing pipes along Wyeth Street to the existing 12-inch pipe on N 16th Street.

4.6 – Growth Area 1, 9, 11, and 13 Development: Upsize the existing pipes along Firlock Street, Alder Street, and Fir Street with 8-inch pipes as well as install a new 12-inch pipe along the Columbia River

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Highway from Firlock Blvd to Millard Road, connecting to the existing 12-inch pipe which serves Les Schwab Tire. Install a new 12-inch pipe along Millard Road to serve Growth Areas 1 and 11, and intertie the new pipes in Growth Area 9 and Growth Area 1 to provide adequate fire flow.

4.7 – Growth Area 10 Residential Development: Install a new 8-inch pipe along Gable Road and connect it to the existing pipeline near Evergreen Loop. Install a new 8-inch PRV at Gable Road and Childs Road to intertie the High and Main PZ. Install a new 8-inch pipe along Maple Street and connect to the existing pipe at Dogwood Lane. This growth area should be served by a combination of the Main PZ and the High PZ due to its location on the boundary of the two zones.

4.8 – Growth Area 8 Residential Development: Connect to the existing pipe along Oakwood Drive which should be served by the High PZ (CIP 1.4) and connect to the existing pipe along Ha Lane. Install an 8-inch PRV within the development, intertying the High and Main PZ, and connect to the Main PZ piping at Tice Road.

7.7 PRIORITY 5 IMPROVEMENTS (20-50 YEAR)

Priority 5 improvements are projects outside the general study period of this plan but included in the Seismic Resiliency Plan. These improvements should be completed as the City has funding and as existing pipelines reach the end of their useful life.

5.1 – Ranney Well #3 Structural Evaluation: Conduct a detailed structural evaluation of the Ranney Well #3 to determine the seismic resiliency. This is the critical water supply identified in the Seismic Resiliency Plan and should be retrofitted as needed to withstand the Cascadia subduction earthquake.

5.2 – Backbone Pipeline Replacement: The backbone pipeline system identified in the Seismic Resiliency Plan should be replaced with DI pipe material and seismically resilient fittings. This project should be completed over the next 50 years as a part of the City's annual replacement program. As these pipes reach the end of their useful life, the replacement program should target the backbone distribution system to create a seismically resilient distribution network.

7.8 CAPITAL IMPROVEMENT SUMMARY

Table 7-3 below summarizes the costs, priorities, and estimated SDC eligibility of the projects described above.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 7-3: CIP SUMMARY TABLE

Project ID#	Project Name	Project Trigger	Total Estimated Cost (2022 Dollars)	SDC Eligibility (%)	Cost Allocated to Growth	Cost Allocated to City
Priority 1 Improvements (2022-2027)						
1.1	Repair Existing 2.0 MG Reservoir	Storage Deficit	$700,000	0%	$0	$700,000
1.2	Full-Rate Study	New Capital Improvement Plan	$30,000	100%	$30,000	$0
1.3	Bayport Well Activation	Emergency preparedness	$10,000	40%	$4,000	$6,000
1.4	Install Redundant Pittsburg Rd / Milton Creek Crossing	Condition / Likelihood of Failure	$680,000	20%	$140,000	$540,000
1.5	Back-up Generator for PW Shop	Emergency preparedness	$100,000	40%	$40,000	$60,000
		Total Priority 1 Improvements (rounded)	$1,600,000	-	$300,000	$1,400,000
Priority 2 Improvements (2027-2032)						
2.1	Water Master Plan Update #1	Recommended every 5-10 years	$200,000	100%	$200,000	$0
2.2	Lemont BS to Pittsburg Rd Pipeline Replacement	Condition / Likelihood of Failure	$6,000,000	55%	$3,270,000	$2,730,000
2.3	Elk Ridge BS Condition Improvements	Condition and emergency preparedness	$110,000	100%	$110,000	$0
2.4	Ranney Wells Control Upgrades	Operations upgrades	$700,000	40%	$280,000	$420,000
2.5	Helens Way PZ Boundary Modification	Low PHD Pressures	$400,000	56%	$220,000	$180,000
2.6	Spotted Hill and Wapiti Drive PZ Boundary Modification	Low PHD Pressures	$160,000	0%	$0	$160,000
2.7	Small Pipe Diameter Replacement Phase I	Existing AFF less than 1,000 gpm	$6,300,000	0%	$0	$6,300,000
2.8	Small Pipe Diameter Replacement Phase II	Existing AFF less than 1,000 gpm	$5,300,000	0%	$0	$5,300,000
2.9	Small Pipe Diameter Replacement Phase III	Existing AFF less than 1,000 gpm	$3,700,000	0%	$0	$3,700,000
2.10	High PZ Low Pressure Study	Low PHD Pressures	$30,000	0%	$0	$30,000
		Total Priority 2 Improvements (rounded)	$22,900,000	-	$4,100,000	$18,900,000
Priority 3 Improvements (2032-2041)						
3.1	Water Master Plan Update #2	Recommended every 5-10 years	$200,000	100%	$200,000	$0
3.2	4.0 MG Reservoir Construction	Future Storage Deficit	$24,800,000	40%	$9,810,000	$14,990,000
3.3	Lemont BS Replacement	Condition improvements	$1,300,000	55%	$710,000	$590,000
3.4	Small Pipe Diameter Replacement Phase IV	AFF below recommended FF demand by zone	$3,700,000	0%	$0	$3,700,000
3.5	Small Pipe Diameter Replacement Phase V	AFF below recommended FF demand by zone	$3,200,000	0%	$0	$3,200,000
3.6	Redundant WFF Supply and Distribution Transmission	Emergency preparedness	$8,400,000	40%	$3,320,000	$5,080,000
		Total Priority 3 Improvements (rounded)	$41,600,000	-	$14,100,000	$27,600,000
Priority 4 Improvements (Future / Developer Driven Improvements within Study Period 2022-2041) [1]						
4.1	Riverfront District Development	Development Driven	$3,400,000	100%	$3,400,000	$0
4.2	Industrial Business Park Development	Development Driven	$11,900,000	100%	$11,900,000	$0
4.3	Elk Ridge Upper Development	Meet recommended operating pressures	$1,000,000	100%	$1,000,000	$0
4.4	Houlton Business District Development	Meet recommended fire flow demands	$1,200,000	100%	$1,200,000	$0
4.5	Growth Area 4 Commercial Development	Meet recommended fire flow demands	$900,000	100%	$900,000	$0
4.6	Growth Area 1, 9, 11, and 13 Development	Development Driven and meet fire flow demands	$11,300,000	100%	$11,300,000	$0
4.7	Growth Area 10 Residential Development	Meet recommended operating pressures	$2,600,000	100%	$2,600,000	$0
4.8	Growth Area 8 Residential Development	Meet recommended operating pressures	$400,000	100%	$400,000	$0
		Total Future Improvements (rounded)	$32,700,000	-	$32,700,000	$0
Priority 5 Improvements (2041-2071)						
5.1	Ranney Well #3 Structural Evaluation	*Cost Estimates not Developed for Priority 5 Improvements*				
5.2	Backbone Water System Replacement					
		TOTAL WATER SYSTEM IMPROVEMENTS COSTS (rounded)	$98,800,000	-	$51,200,000	$47,900,000

1) Timing of these capital improvement projects depends on when growth occurs. It is anticipated the future development will participate in capital improvement projects as required.

2) The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

7.9 SYSTEM DEVELOPMENT CHARGES (SDC)

The City of St. Helens establishes water SDCs per Resolution 1796, effective August 2017. The current improvement SDCs for water meter connections vary from $3,400 for a ¾-inch meter to $180,000 for an 8-inch meter.

The proposed improvement projects were allocated a percentage of the total cost that is eligible for funding by collected SDC funds. Each capital improvement project that will benefit areas identified by the City as anticipated growth within the 20-year planning period were reviewed. The SDC improvement amount is based on the percentage of future development demands to the existing water demands benefitted by the improvement. The SDC eligibility is summarized in the previously presented Table 7-3.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

7.10 PLANNING RECOMMENDATIONS

It is recommended that the City update their planning documents every five years as updates to the planning documents and models allow the City to re-assess needs, priorities, and properly allocate budgets to address system deficiencies. A master plan update for the water system has been included as a Priority 2 and Priority 3 improvement in the CIP with an estimated cost of $200,000. It is assumed that the Water Management and Conservation Plan will also be updated along with the master plan at each interval.

7.11 FINANCIAL CONSIDERATIONS

The City is recommended to complete a full-rate study for the water utility to evaluate the potential user rate and SDC impacts of the recommended CIP. Estimated SDC eligibility for each identified capital improvement is included in Table 7-3 above for use in completing a full-rate study. The City is advised to actively pursue opportunities for grant funds, low-interest loans, or principal forgiveness funding sources to mitigate user rate impacts. As the City begins to prepare for and proceed with CIP projects, if outside funding is desired, it is recommended the City participate in a one-stop meeting with Business Oregon to identify and assess potential funding sources for the CIP projects. One example of a funding source that would be at the one-stop meeting is the federal-state partnership Clean Water State Revolving Fund (CWSRF).

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SECTION 8 - WATER MANAGEMENT & CONSERVATION PLAN

The following section of this water master plan (WMP) is meant to serve as an update to the City's existing water management and conservation plan (WMCP) which was last updated in February 2013. This WMCP is intended meet the requirements defined under Oregon Administrative Rule (OAR) 690-086.

Several elements required in OAR 690-086 have been discussed in other sections of this water master plan while others are to be provided in this section. Additionally, an element may refer to a previous report section and provide supplemental information in this report section. Table 8-1 below summarizes the elements included in this WMCP and the report sections where the information regarding the topic can be found. Information covering the extent of the OAR requirements may be spread across numerous sections or appendices within this report and Table 8-1 is meant to streamline the review of the WMCP as well as provide a directory for anyone using the plan to find the desired information efficiently.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 8-1: WMCP DIRECTORY

	Item	OAR Reference	Reference Location
WMCP Plan Elements			
✓	Notice to affected local governments	690-086-0125(5)	Section 8.1.1
✓	Propose WMCP update schedule	690-086-0125(6)	Section 8.1.2
✓	Additional time to implement conservation benchmarks	690-086-0125(7)	Section 8.1.3
Water Supplier Description			
✓	Supplier Source Description	690-086-0140(1)	Section 2.5, 3.1, 3.2, & 3.5.1
✓	Current Service Area and Population	690-086-0140(2)	Section 2.1, 2.3 & 2.5
✓	Adequacy and reliability of water rights/supply	690-086-0140(3)	Section 4.1 & 8.2.3
✓	Water use records	690-086-0140(4)	Section 2.6.1 and Appendix D.1
✓	Inventory of water rights	690-086-0140(5)	Section 4.1 and Appendix F
✓	Customer characteristics and Use Patterns	690-086-0140(6)	Section 2.6.1
✓	Interconnections with other water supply systems	690-086-0140(7)	Section 2.5
✓	Water System Schematic	690-086-0140(8)	Section 3.1 and Appendix A, Figure 10
✓	Water losses and non-revenue water	690-086-0140(9)	Section 2.6.1
Water Conservation Element			
✓	Progress Report	690-086-0150(1)	Section 8.3.1
✓	Water use measurement and reporting program	690-086-0150(2)	Section 2.6.1 and 6.1.7
✓	Currently implemented conservation measures	690-086-0150(3)	Section 8.3.1
✓	Annual water audit	690-086-0150(4)(a)	Section 2.6.1 and 8.3.4
✓	Full metering of system	690-086-0150(4)(b)	Section 8.3.5
✓	Meter testing and maintenance program	690-086-0150(4)(c)	Section 6.1.7 and 8.3.6
✓	Rate structure based on quantity of water metered	690-086-0150(4)(d)	Section 8.3.7
✓	System leakage reduction program <10%	690-086-0150(4)(e)	Section 2.6.1, 6.1.8, and 8.3.8
✓	Public education program	690-086-0150(4)(f)	Section 6.1.10 and 8.3.9
✓	Technical and financial assistance programs	690-086-0150(5)(a)	Section 8.3.10
✓	Retrofit/replacement of inefficient fixtures	690-086-0150(5)(b)	Section 8.3.11
✓	Rate structure and billing practices to encourage conservatio	690-086-0150(5)(c)	Section 8.3.12
✓	Reuse, recycling, and non-potable opportunities	690-086-0150(5)(d)	Section 8.3.13
✓	Other proposed conservation measures	690-086-0150(5)(e)	Section 8.3.14
Water Curtailment Element			
✓	History of supply deficiencies and current capacity limitations	690-086-0160(1)	Section 8.5.1
✓	Stages of alert for water curtailment	690-086-0160(2)	Section 8.5.2
✓	Triggers for water curtailment	690-086-0160(3)	Section 8.5.3
✓	Water curtailment actions	690-086-0160(4)	Section 8.5.4
Water Supply Element			
✓	Service areas and population projections	690-086-0170(1)	Section 2.3 and 2.4
✓	Schedule for fully exercising water use permits	690-086-0170(2)	Section 8.6.2
✓	Water demand forecast	690-086-0170(3)	Section 2.6 and 8.6.3
✓	Comparison of projected needs to other suppliers	690-086-0170(4)	Section 8.6.3
✓	Analysis of alternative	690-086-0170(5)	Section 8.6.4
✓	Expansion of existing water permits	690-086-0170(6)	Section 8.6.5
✓	Mitigation actions under state and federal law	690-086-0170(7)	N/A
✓	Increase diversion of water under extended permits	690-086-0170(8)	N/A

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

8.1 REPORT ELEMENTS

This section provides a summary of the report elements including notices to affected local governments, a plan update schedule, and requests for additional time for metering or benchmarks.

8.1.1 AFFECTED LOCAL GOVERNMENTS

The City provided notice of availability of the draft WMCP for review to all affected local governments listed below. The City did not receive any comments or revisions to the draft plan. The notification letter and correspondence from the affected local governments is provided in Appendix G.

- City of Columbia City
- McNulty Water District Public Utility District (PUD)
- Columbia County
- Port of Columbia County

8.1.2 PLAN UPDATE SCHEDULE

The City proposes to submit an updated WMCP by the end of the 10-year planning period per OAR 690-086-0125(6); resulting in an update to be submitted in 2032. Additionally, the City will submit a progress report five years from the approval of this plan in 2027.

8.1.3 REQUEST FOR ADDITIONAL TIME FOR METERING OR BENCHMARKS

The City is not requesting an extension of time to implement metering, or an established benchmark outlined in a previously approved WMCP.

8.2 WATER SUPPLIER DESCRIPTION

The section below includes supplemental information regarding the City's water sources, service area, population served, existing water rights, and demands for water. It also considers the adequacy and reliability of the City's existing water supply.

8.2.1 SUPPLIER'S SOURCE DESCRIPTION

- Raw Water Supply Sources – Section 3.2
- Booster Stations – Section 3.3
- Storage Reservoirs – Section 3.4
- Water Treatment – Section 3.5
- Distribution System – Section 3.6
- Diversions – Section 4.1
- Exchange / intergovernmental agreements and water supply / delivery contracts – Section 2.5

8.2.2 CURRENT SERVICE AREA AND POPULATION

- Delineation of current service area – Section 2.1 and 2.5
- Population served – Section 2.3 and 2.5

8.2.3 ADEQUACY AND RELIABILITY OF WATER RIGHTS/SUPPLY

The City holds six water rights and no existing or future restrictions on the community water supply are anticipated based on existing and projected water demands. As discussed in Section 4.1, the City has a surplus of available water when compared to the existing and projected future water demands. One of the City's two primary water rights (Permit S-47234) has a completion date of October 1, 2051. In order to receive authorization to divert additional water under Permit S-47234, the City must present evidence of a need for a specific quantity or rate of diversion as a part of a

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

future WMCP. At the time of this study, there is no evidence of additional quantity needed, and the City should re-evaluate the future water demands in the next WMCP to be completed in 2032.

A summary of the water rights application, transfer, and certificate numbers, priority dates, sources, beneficial uses, diversion quantities, authorized completion of development is included in Table 8-2 and in Appendix F. The average monthly diversion for each of the water rights used in the previous 5 years is also summarized in Appendix F.

There are several streamflow-dependent species listed by both the State and federal agencies as sensitive, threatened, or endangered that are present in the source waters and a list of these species is included in Appendix B. Water quality limited sources include the Lower Columbia River which is 303(d) listed for arsenic, DDE4, 4, fecal coliforms, and PCBs and has a TMDL for dioxins, temperature.

TABLE 8-2: WATER RIGHTS INVENTORY

Application No.[1]	Permit No.	Certificate No.	Claim No.	Transfer No.	Priority Date	Source	Use	Allowed Diversion Rate	Maximum Instantaneous Rate Diverted to Date(cfs)[2]	Maximum Annual Quantity Diverted to Date (MG)	5-Year Average Monthly Diversion (MG)	5-Year Average Daily Diversion (MG)	Authorized date for completion	Use Limitations (endangered species, water quality, critical groundwater area
S-5266	S-3211	6085	-	-	Nov. 23, 1916	Milton Creek	Municipal	15 cfs	Unavailable	Unavailable	Unavailable	Unavailable	None	No longer used for muncipal drinking water. Source must be treated prior to distrubtion if used in the future.
S-7228	S-4559	6086	-	-	Apr. 22, 1920	Milton Creek	Municipal	30 cfs	Unavailable	Unavailable	Unavailable	Unavailable	None	
S-9473	S-6307	6084	-	-	Apr. 22, 1924	Six Unnamed Springs	Municipal	0.5 cfs	Unavailable	Unavailable	Unavailable	Unavailable	None	
S1155	S535	2403	-	-	Dec. 21, 1910	Salmon Creek	Municipal	25 cfs	Unavailable	Unavailable	0	0	None	
-	-	-	GR282	-	Sep. 8, 1954	Ranney Well #1 - McBride Creek	Municipal	4.64 cfs	Unavailable	Unavailable	0	0	None	Emergency supply only and must initiate boil water notice if used
S43214	S34529	47166	-	-	Jul. 11, 1969	Ranney Well #2 - Columbia River	Municipal	3.5 cfs	2.8	166	8.6	0.281	None	none
S64529	S47234	-	-	T8426	Nov. 8, 1982	Ranney Well #3 - Columbia River	Municipal	60 cfs	6.02	562	32.6	1.07	Oct. 1, 2051	Limited to 8.9 cfs
G11709	G10803	64879	-	-	Oct. 9, 1987	Bayport Well - Scappoose Bay	Municipal	1.78 cfs	1.8	Unavailable	0	0	None	Taste and odor quality deficiencies
R63272	R11387	-	-	-	Jan. 9, 1991	Salmonberry Creek	Recreation	46.2 acre-feet	Unavailable	Unavailable	0	0	None	Recreation use only

1) Water right application numbers S-5255, S-7228, and S-9473 are reported to be owned by "Saint Helens Water Commission" but included in water rights inventory as reported in the City's 2013 WMCP.

2) Instantaneous diversion rates not available for supply sources which are not used in day-to-day operations. Ranney Well #2, #3, and Bayport Well instantaneous diversions not tracked. Assumes maximum diversion rate is equal to maximum reported pumping capacity at each facility. Ranney Well #2 reported max of one 1,240 gpm capacity pump on. Ranney Well #3 reported max of 2,700 gpm capcity with two pumps on. Bayport Well pump capacity is equal to 800 gpm

8.2.4 CUSTOMER USE CHARACTERISTICS AND USE PATTERNS

Customer use characteristics are summarized in Section 2.6.1. Table 8-3 summarizes the water usage compared to the previous WMCP from 2013.

TABLE 8-3: WATER USAGE COMPARISON WITH PREVIOUS WMCP

Customer Type	Previous WMCP Service Connections	Updated WMCP Service Connections	Percent Growth
Residential	4,689	5,593	19%
Commercial and Industrial	305	366	20%
Columbia City	1	2	100%
No Charge	0	40	>100%

8.2.5 INTERCONNECTIONS WITH OTHER WATER SUPPLY SYSTEMS

Summary of interconnections with other supply systems is described in Section 2.5

8.2.6 WATER SYSTEM SCHEMATIC

Description of the water system as well as a schematic is provided in Section 3.1 and Figure 10 in Appendix A.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

8.2.7 WATER LOSSES AND NON-REVENUE WATER

Description of water losses and non-revenue water is provided in Section 2.6.1.

8.3 WATER CONSERVATION ELEMENT

8.3.1 PROGRESS REPORT

An update on the conservation measures to be implemented from the previously approved WMCP is provided and includes the following: .

- Calibration of Ranney Wells #2 and #3– Ranney Well #2 flow meter is to be replaced in the near future and Ranney Well #3 flow meter has not been calibrated within the last 5-years.
- Replacement of water meters with radio-read meters – See Section 6.1.7
- Calibration of meters 4-inches and greater – The larger meters have not been calibrated within the last couple of years.
- Annual Water Audit – To be completed annually starting 2022
- Formal tracking of authorized unbilled uses – Partially completed. The City should also track hydrant flushing and other unbilled uses.
- Leak detection, pipeline replacement, documentation, and prioritization – Ongoing
- Rate Study – To be completed in 2022
- Incorporate bill history capability into billing system – Completed
- Free leak detections – The City continues to offer free leak detections on a case-by-case basis.
- Annual article in City newsletter on water conservation – Water conservation article and links are provided in the annual consumer confidence reports.
- Conservation section in City's Website for water conservation links and info – The City is continuing to develop the website with conservation links and material.
- Technical and Financial Assistance – None proposed
- Fixture Retrofit/replacement – None proposed
- Reuse, Recycling Non-potable – None proposed

8.3.2 WATER USE MEASUREMENT AND REPORTING PROGRAM

Summary of water use measurement and reporting is included in Sections 2.6.1 and 6.1.7. The program complies with the measurement standards in OAR Chapter 690, Division 85 and the points of diversion are metered.

8.3.3 CURRENTLY IMPLEMENTED CONSERVATION MEASURES

A summary of the currently implemented conservation measures are summarized in Section 8.3.1.

8.3.4 ANNUAL WATER AUDIT

A summary of the previous 5 years water audit is summarized in Section 2.6.1. It is recommended for the City to begin completion of an annual water audit which documents any unmetered usage such as hydrant flushing, construction water, fire department usage, or maintenance usage. The City should purchase a hydrant diffuser with flow measurement capabilities to document hydrant flushing and fire department activities. The City currently meters construction water usage and tracks water used in maintenance such as filling/emptying storage reservoirs for inspection. The usage should be documented, and an annual water audit should be developed at the end of each year which would summarize the water use by category.

- **Five-Year Benchmark: Complete annual water audit tracking usage of hydrant flushing, construction water, fire department usage, and maintenance.**

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

8.3.5 FULL METERING OF SYSTEM

The City's water system is fully metered and does not have any unmetered connections. The City is currently in the process of replacing all water meters with radio-reads.

- **Five-Year Benchmark: Continue with replacement of water meters and target a total of 480-meter replacements per year.**

8.3.6 METER TESTING AND MAINTENANCE

The City does not currently have an active meter testing program and is completed on an as-needed basis. Water users can request their meter be tested by providing a deposit ranging from $100 to $200 depending on the meter size, and the deposit will be refunded if the test results show the meter was faulty. The City has calibrated 4-inch and larger meters every couple of years since the previous WMCP.

- **Five-Year Benchmark: The City will continue to test and maintain meters as described above. The City will also target calibration of 4-inch and larger meters every 3-5 years.**

8.3.7 WATER RATE STRUCTURE

The City currently charges users within the City limits a fixed rate of $11.04 per month plus a volumetric rate per 100 cubic feet (CCF) ranging from $4.46 per CCF for commercial / industrial users and $5.49 per CCF for residential users. Water users outside of the City limits are charged double the fixed rate and double the volumetric rate of users within the City limits. The current billing rates are summarized in Table 8-4.

TABLE 8-4: ST. HELENS WATER UTILITY BILLING RATES

WATER UTILITY RATE COMPONENTS	INSIDE CITY LIMITS Effective 2/1/2019	OUTSIDE CITY LIMITS Effective 2/1/2019
Fixed Rate		
Monthly Billing	11.04	22.08
Volume Rate		
Residential	5.4948	10.9896
Multifamily:		
Duplex	5.3043	10.6086
Apartments	5.1979	10.3958
Commercial / Industrial	4.4558	8.9116
Wholesale		3.3207

8.3.8 SYSTEM LEAKAGE REDUCTION PROGRAM <10%

The previous 5-years water audit indicates the unaccounted-for water to be 18.5%. The recommended improvements to reduce the unaccounted-for water is included in Section 8.3.4 and the recommended leak detection program is summarized in Section 6.1.8.

- **Five-Year Benchmark: The City will complete leak detection throughout the entire system and then begin a rotational schedule to inspect the pipelines every 10 years as well as provide a description of the potential factors for loss and selected actions for remedy.**

8.3.9 PUBLIC EDUCATION

The City's current public education program is summarized in Section 6.1.10.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

- **<u>Five-Year Benchmark:</u> The City will continue to develop its public education program through updating the website, sending quarterly newsletters, and providing water conservation links and articles.**

8.3.10 TECHNICAL AND FINANCIAL ASSISTANCE PROGRAMS

As outlined under OAR 690-085-0150(6), the City is required to evaluate and consider implementing a technical and financial assistance program to encourage and aid users in implementation of conservation measures. The City has historically provided a level of technical and financial assistance programs to water users which included installation of water efficient fixtures; however, this program has not been implemented in the previous 5-years. The City's current assistance program consists of conduction free leak detection testing for water users.

- **<u>Five-Year Benchmark:</u> The City will continue with free leak detection testing as needed. The City will re-start a program to install water fixtures that improve water conservation at service connections on a case-by-case basis.**

8.3.11 RETROFIT / REPLACEMENT OF INEFFICIENT FIXTURES

The City does not currently have a retrofit/replacement program as described under OAR 690-086-510(6)(c). See Section 8.3.10 for description of retrofit/replacement of inefficient fixtures.

8.3.12 RATE STRUCTURE / BILLING PRACTICES FOR CONSERVATION

It is recommended that the City complete a full-rate study to evaluate the impacts of the capital improvement projects outline in this water master plan. The full-rate study should also take into consideration adoption of rate structures, billing schedules, and other programs to encourage water conservation.

- **<u>Five-Year Benchmark:</u> Complete a full-rate study and evaluate the feasibility of rate structures, billing schedules, and other programs to encourage water conservation by 2027**

8.3.13 WATER REUSE, RECYCLING, AND NON-POTABLE WATER OPPORTUNITES

The City has considered opportunities available for water reuse, recycling, and non-potable water. The City does implement recycling of its backwash water and collects and recycles its water for instrumentation to reduce water use in the WFF. The City's largest industrial water user does not utilize the City's potable water supply, therefore reuse/recycling at this site would not improve water conservation within the City's system. Additionally, the City does not have any large irrigation areas (e.g., golf courses) which would benefit from the application of recycled water. For these reasons, no benchmarks were proposed to implement reuse, recycling, or non-potable water opportunities.

8.3.14 OTHER PROPOSED CONSERVATION MEASURES

The City does not have any additional conservation methods to propose at this time.

8.4 SUMMARY OF 5-YEAR BENCHMARKS

A summary of the relevant benchmarks for the City's ongoing and planned conservation activities are outlined in Table 8-5 on the next page.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 8-5: 5-YEAR CONSERVATION BENCHMARKS

Benchmark	Date	Frequency
Annual Water Audit	January 2023	Annually
Fully Metered System	Complete	-
Meter Testing and Maintenance	-	Ongoing
Propose New Rate Structure	2022	10 years
Leak Detection	Summer 2022	Annually
Public Education	-	Ongoing
Leak Repair/Line Replacement	-	Ongoing
Technical Assistance	2022	Continuously
Replacement of Inefficient Fixtures	2022	Continuously
Reuse Recycling, Non-Potable Eval.	None Proposed	None Proposed

8.5 WATER CURTAILMENT ELEMENT

8.5.1 HISTORY OF SUPPLY DEFICIENCIES AND CAPACITY LIMITATIONS

The City has not encountered a supply deficiency that has resulted in curtailment efforts or impacted the delivery of water supply, and the City does not currently have any capacity limitations which would restrict the delivery of water to the service population.

The City's primary water source is under the influence of the Columbia River and drought conditions are not anticipated to impact the water supply to the Ranney Wells. However, the Columbia River is at risk for source contamination from pollutants at any point upstream of the City's diversion point, and in the event of source contamination, the water is naturally filtered through the riverbed strata. This WMP has recommended the activation of the City's back-up water source which is not influenced by the Columbia River even though the back-up well does not have as much capacity as the Ranney Wells; however, it can supply approximately 80% of the existing average day demand. Additionally, the City's storage reservoir criteria is to provide water for three days of the average daily demand. Other potential impacts to the water system include natural disasters such as earthquakes. The City's Seismic Resiliency Plan in Section 3.7 discusses the City's plan for water delivery during a large seismic event.

8.5.2 STAGES OF ALERT FOR WATER CURTAILMENT

The City's mayor is authorized to limit water use in times of shortage per their City Code section 13.04.060. This section further defines the curtailment plan to limit water usage by setting stages of alert and triggers for curtailment. The four stages of curtailment include mild, moderate, critical, and emergency, and the stages are summarized in triggers for water curtailment.

Each of the City's four stages of alert are triggered by a pre-determined level of severity of water shortage, which is based upon the amount of water being pumped from the Ranney Wells and compared to the capacity of the system. The trigger for each stage of alert is described in Section 8.5.3.

8.5.3 WATER CURTAILMENT ACTIONS

The specific water curtailment measures that will be implemented under each stage of alert upon enactment of the water curtailment plan are outlined in the table below.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 8-6: WATER CURTAILMENT PLAN

Stage	Trigger	Notification	Goal	Curtailment Measure
Mild	Determination made by the public works director that a potential for water shortage exists	Provide customers notices on utility bills and news released to media. Notification of "Mild" alert and curtailment measures to City of Columbia City and McNulty Water PUD	Public awareness and 5% reduction in consumption	➢ Institute a voluntary watering schedule based on odd/even address numbers for residential and business customers. Customers ask to restrict watering to early morning and evening hours to avoid loss through evaporation ➢ Disseminate informational brochures on conservation methods ➢ Update conservation hotline with information on current supply situation, voluntary measures, and conservation tips ➢ Develop a combination of media outreach through newspaper, public service announcements, and/or theater slides ➢ Provide specific notification to major water users asking for voluntary reduction in use and/or deferring nonessential use to off-peak hours. For commercial and industrial users that have developed water shortage contingency plans, provide specific notification at each stage of curtailment and ask that they implement a corresponding action ➢ City decorative fountains that do not recirculate water shall cease operating ➢ Parks Department shall operate their irrigation system to achieve maximum efficiency ➢ City uses of water for hydrant and water line flushing shall be limited to essential need
Moderate	Determination made by public works director that a water shortage exists	Customers notified through major media sources of the request to voluntarily curtail all nonessential water use. Updates on water situation shall be provided to media regularly. "Moderate" alert and curtailment measures to City of Columbia City and McNulty Water PUD	10% reduction in consumption	➢ Continue with "Mild" stage measures except where noted below ➢ Customers asked to voluntarily restrict all lawn watering and other nonessential uses of water as specified below ➢ No watering or irrigating of lawns, grass or turf unless it is: o New lawn, grass, or turf that has been seeded or sodded after March 1 of the calendar year o Athletic fields frequently used for organized play o Park and recreation areas of a particular significance and value to the community as approved by the City Manager. No use of City-supplied water shall be allowed to clean, fill, or maintain levels in decorative fountains ➢ No use of City-supplied water to wash sidewalks, walkways, streets, driveways, parking lots, or other hard surfaced areas except where necessary for public health or safety ➢ No use of City-supplied water shall be allowed to wash vehicles ➢ For parks supplied by City water, the Parks Department shall limit nonessential water use and/or irrigate only during off-peak hours as specified by the City Mayor in consultation with the Public Works Director ➢ Hydrant and water main flushing shall be done for emergencies only
Critical	Determination made by the public works director that there is a critical water supply shortage that threatens the City's ability to delivery water supplies	If the event is local, the City will distribute information to affected customers. The City Mayor shall immediately submit a report at the next City Council Meeting. All media notified and updated regularly on the water supply status. "Critical" alert and curtailment measures to	25% reduction in consumption	➢ Continue with "Mild" and "Moderate" stage measures except where noted below ➢ No use of City-supplied water shall be allowed to fill swimming pools or other pools with a capacity in excess of 100 gallons, provided, however, that water may be added to swimming pools to replace volume lost due to evaporation and normal loss due to usage ➢ No use of City-supplied water shall be allowed to wash sidewalks, walkways, streets, driveways, parking lots, or other hard surfaces ➢ The Parks and Recreation Department shall use their automated irrigation system to restrict nonessential water use at parks supplied by City water as specified by the City Mayor in consultation with the Community Services City Manager ➢ Hydrant and water main flushing shall be done for emergencies only

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

		City of Columbia City and McNulty Water PUD		
Emergency	WFF failure or major supply restriction resulting in significant loss of production capacity	Customers notified through major media sources of the mandatory curtailment of all nonessential water use. Updates on water situation shall be provided to media regularly. "Emergency" alert and curtailment measures to City of Columbia City and McNulty Water PUD	50% reduction in consumption	➢ Continue with "Mild", "Moderate", "Critical" stage measures except where noted below ➢ Prohibit all irrigation of residential, commercial, industrial, and City parks ➢ Impose industrial restrictions targeting significant reduction in water usage ➢ Activate Bayport Well as a supplemental water source. Notify public of potential taste/odor changes in water aesthetics specifically highlighting the water meets State and Federal regulations for potable water systems

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

8.6 WATER SUPPLY ELEMENT

This section is written to address requirements of OAR 690-086-0170 and OAR 690-086-0130(7). It provides a description of the City's current and future service area and population projections, details the City's projected 10 and 20 year demands for water, and identifies when the City expects to fully exercise its water rights. The sections below also compare the City's projected water needs against their existing available sources of supply, analyzes potential alternative water sources, and describes required mitigation actions.

8.6.1 SERVICE AREAS AND POPULATION PROJECTIONS

A description of the service areas and 20-year population projections is included in Sections 2.3 and 2.4. Additionally, the City's 50-year population was projected as a part of this WMCP to anticipate water supply needs in the further future. Using the same average annual growth rate of 1.1% (as discussed in Section 2), the City's population by 2071 is projected to be 24,310 people, which is a growth of approximately 10,000 people from the 2021 population. Additionally, it was assumed that the City must provide water supply to the City of Columbia City per the existing agreement of 1,000,00 CF (approximately 7.5 million gallons (MG)) a month, which equates to approximately 0.25 million gallons per day (MGD) on average.

8.6.2 SCHEDULE FOR FULLY EXERCISING WATER USE PERMITS

The projected water demands through the year 2041 do not fully exercise the water use permits and there is a projected surplus of 3.2 MGD of water available to the WFF. An additional 1.2 MGD is available as well from the Bayport Well.

8.6.3 WATER DEMAND FORECAST AND COMPARISON WITH SUPPLY

The water demand forecast for the next 20 years is included in Section 2.6. This section includes the projected 50-year water demands based on the 2071 population projections. Demands could not be projected with the same methodology used for projecting 2041 populations because specific growth areas, estimated EDUs, and commercial/industrial growth was not identified for the 50-year period. For this reason, the gallons per capita per day (gpcd) was calculated based on the 2041 demands and population, which resulted in 282 gpcd and this value was assumed to remain constant through 2071. Additionally, it was assumed the City of St. Helens must provide 0.25 MGD to Columbia City, so by using the established criteria and population, the City's 2071 maximum daily demand (MDD) was projected to be 7.12 MGD. It was also assumed the City's supply from Ranney #2 and Ranney #3 remained the same and when compared to the 2071 MDD, the City has a supply surplus of approximately 1 MGD (Table 8-7). Currently, the City does not demonstrate the need for additional water rights within the next 50-years. The population projections and water demands should be updated every 5-10 years with the water master plan and WMCP update and the need for future supplies should be re-assessed.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TABLE 8-7: 50-YEAR WATER DEMAND PROJECTIONS

Year	Projected Population[1]	System MDD (MGD)[2,3]	Available Water Supply to WFF (MGD)[4]	Surplus / Deficiency (MGD)
2021	**14,068**	3.05	8.10	5.05
2031	**15,694**	3.98	8.10	4.12
2041	**17,509**	4.95	8.10	3.15
2051	**19,533**	5.77	8.10	2.33
2061	**21,791**	6.41	8.10	1.69
2071	**24,310**	7.12	8.10	0.98

1) Population projections assume an average annual growth rate of 1.1%. See Section 2.3 for additional information

2) 2021-2041 demand projections based on 20-year growth areas identified by the City. 2051-2071 demands projected assuming 282 gallons per capita per day which is based on the 2041 population and demands

3) Water demands from 2051-2071 assume 0.25 MGD of water supplied to City of Columbia City

4) Includes Ranney #2 and #3 water supply

8.6.4 ANALYSIS OF ALTERNATIVES

The City is not likely in need of developing a new source of supply within the 20-year study period. A long-term water supply study could be completed to identify potential water supply sources in the future, which could include the following:

- Increase capacity of existing Ranney Wells #2 and #3
- Enhanced water conservation
- New Ranney Collector Well
- Re-develop supply sources from surface water rights (Salmon Creek)

8.6.5 EXPANSION OF WATER PERMITS UNDER EXISTING PERMITS

No expansion of existing water permits are requested within this WMCP.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

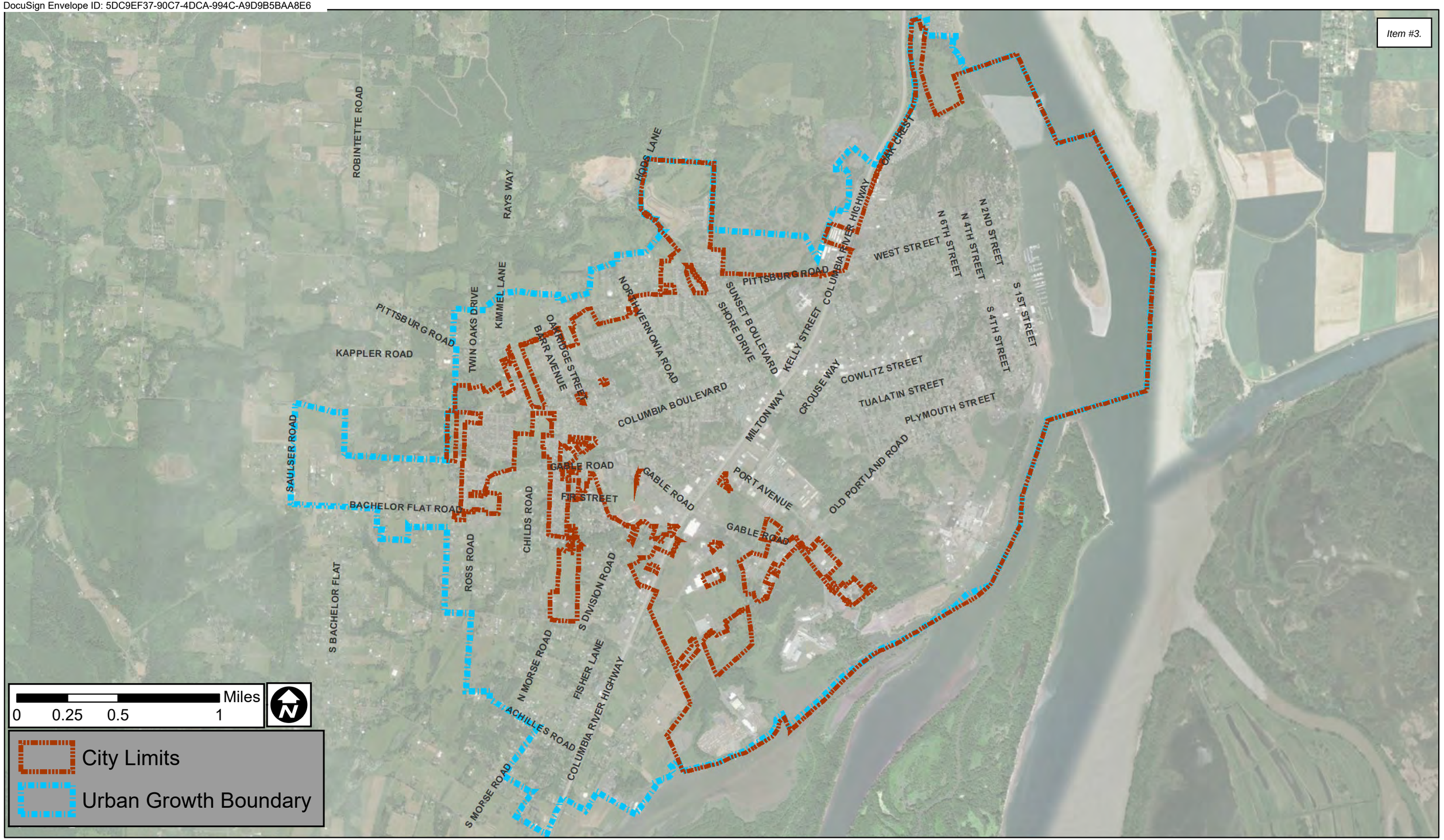
APPENDIX A

Figures

Figure 1 – Study Area
Figure 2 – Existing and Future Zoning
Figure 3 – Flood Hazard Zones
Figure 4 – Wetlands
Figure 5 – Designated Landmarks and Downtown Historic District
Figure 6 – Landslide Hazards
Figure 7 – Earthquake Hazards
Figure 8 – NRCS Hydrologic Soil Categories
Figure 9 – 20-Year Growth Areas
Figure 10 – Water System Map
Figure 11 – Pipelines by Size
Figure 12 – Pipelines by Age
Figure 13 – 2021 Average Day Demand – Pressures
Figure 14 – 2021 Peak Hour Demand – Pressures
Figure 15 – 2021 Maximum Day Demand Plus Fire Flow
Figure 16 – 2021 Meets Fire Flow Demand?
Figure 17 – 2041 Average Day Demand – No Improvements
Figure 18 – 2041 Peak Hour Demand – No Improvements
Figure 19 – 2041 MDD + FF – No Improvements
Figure 20 – 2041 Meets Fire Flow Demand?
Figure 21 – Riverfront Development Proposed Water Alignment
Figure 22 – Industrial Business Park Alignment
Figure 23 – Capital Improvement Plan
Figure 24 – Small Pipe Replacement Program

KELLER ASSOCIATES

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



KELLER ASSOCIATES

Study Area

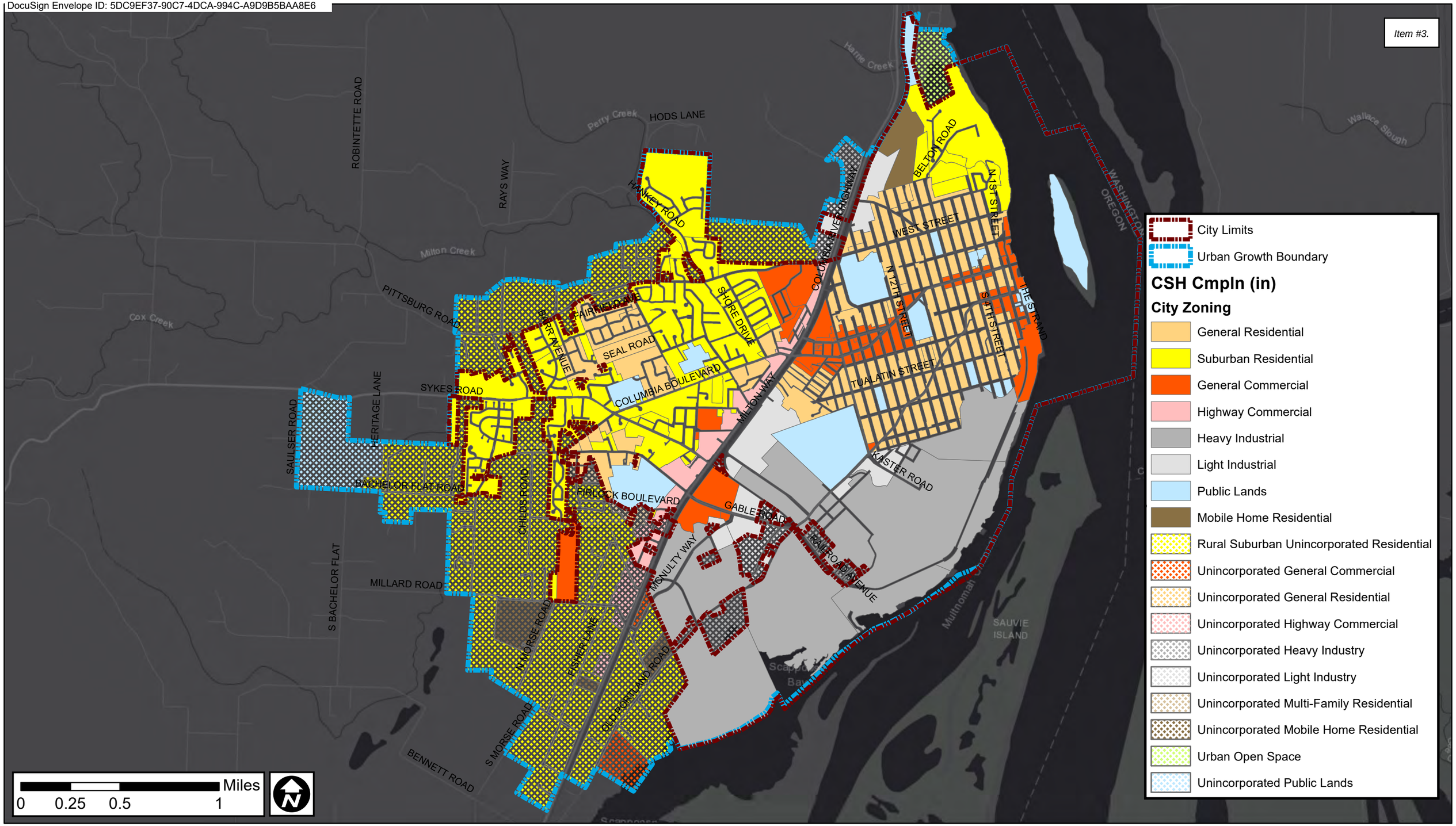
Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 1

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



KELLER ASSOCIATES

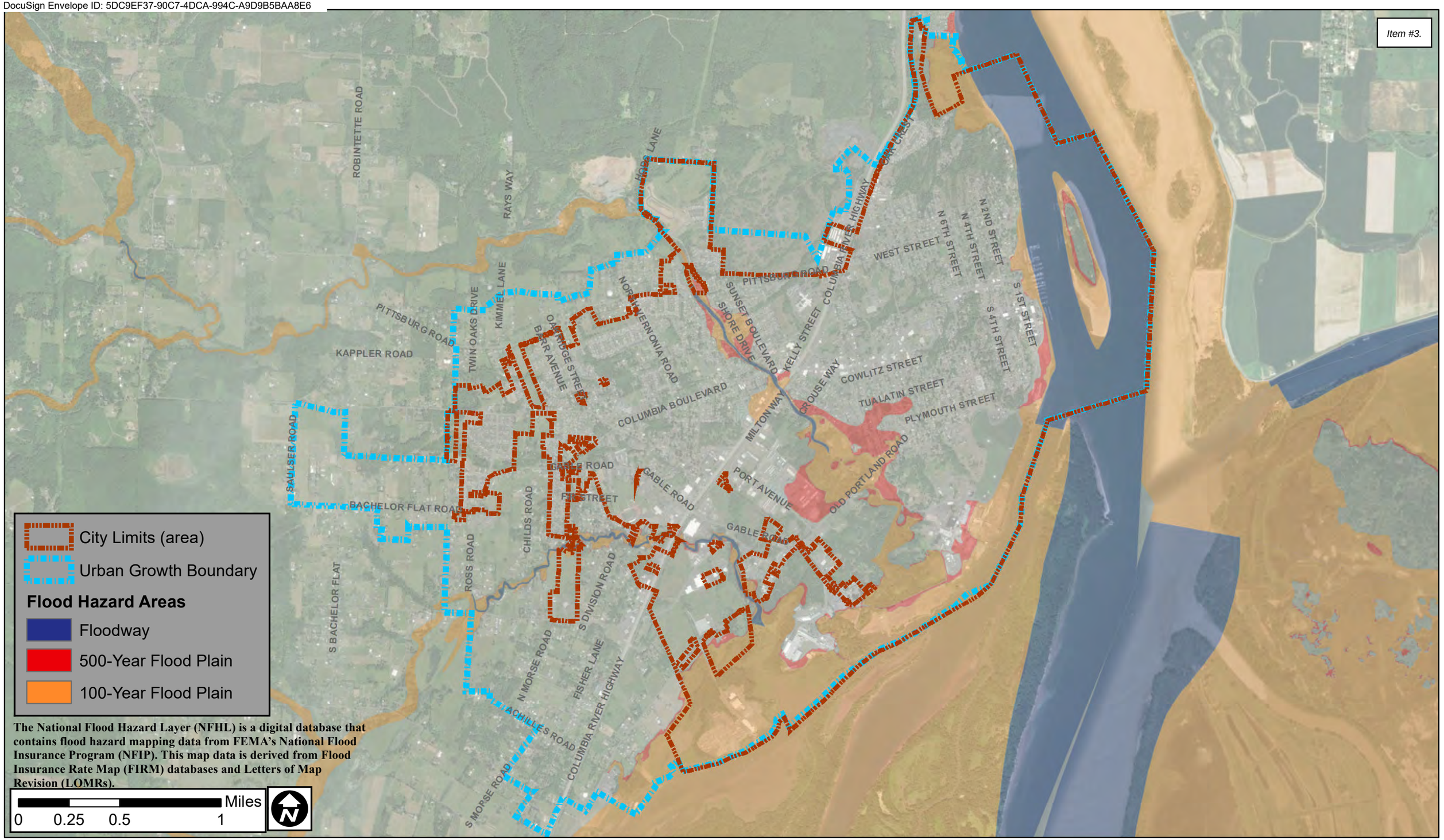
Existing and Future Zoning

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 2

City of St. He



KELLER ASSOCIATES

Flood Hazard Zones

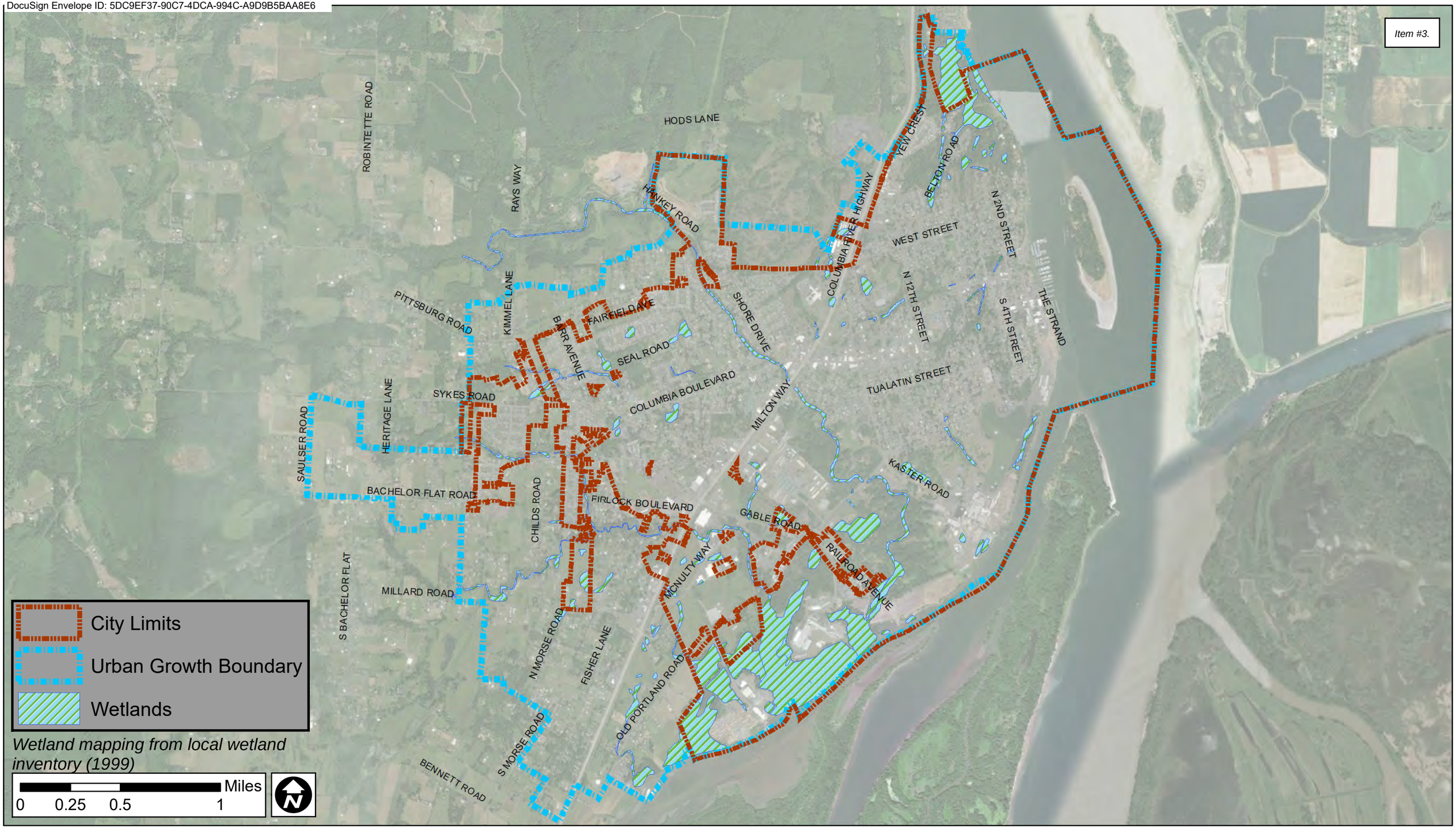
Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 3

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



KELLER ASSOCIATES

Wetlands

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 4

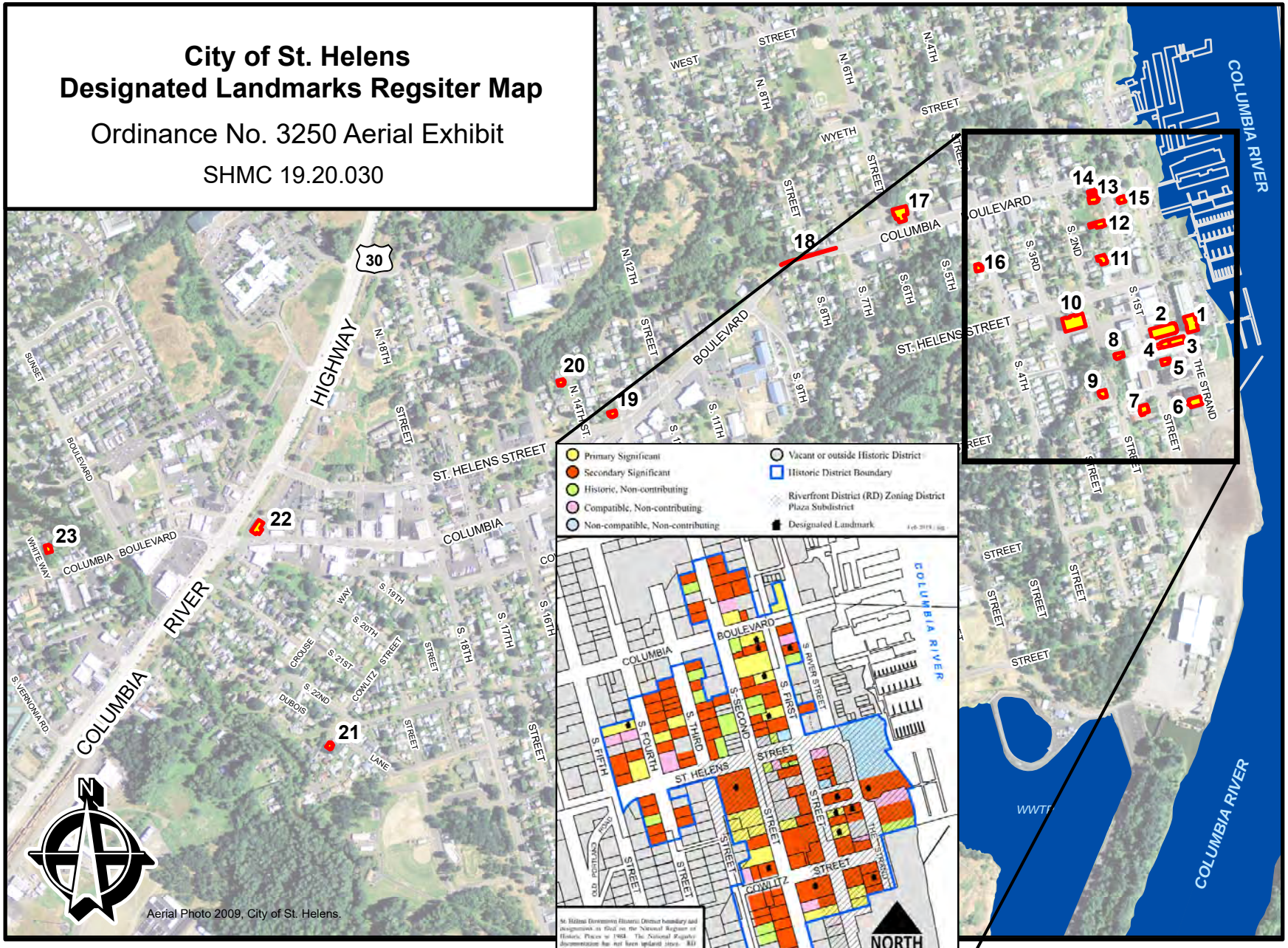
City of St. Hel

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

City of St. Helens
Designated Landmarks Regsiter Map

Ordinance No. 3250 Aerial Exhibit

SHMC 19.20.030



KELLER ASSOCIATES

Designated Landmarks and Downtown Historic District

Water Master Plan

Figure 5

City of St. Helen

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Reservoirs

Pumps

Water Pipes

< 6"

8"-12"

>12"

City Limits

Urban Growth Boundary

Statewide Landslide Susceptibility Overview Map

Low

Moderate

High

Very High

Landslide susceptibility mapping obtained from DOGAMI Oregon HazVu: Statewide Geohazards Viewer in January 2022.

Miles

0 0.25 0.5 1

Ranney Well #1

Ranney Well #2

Ranney Well #3

Water Filtration Facility

Elk Ridge Reservoir

Elk Ridge BS

Green Tank

2.0 & 2.5 MG Reservoirs

Lemont BS

Bayport Well

5TH STREET

6TH STREET

7TH STREET

A STREET

E STREET

G STREET

H STREET

I STREET

K STREET

L STREET

1ST STREET

2ND STREET

3RD STREET

4TH STREET

5TH STREET

THE STRAND

SMITH ROAD

HANKEY ROAD

PITTSBURG ROAD

HILLCREST ROAD

FAIRFIELD AVE

JAKOBI ST

OAKVIEW DRIVE

SEAL ROAD

COLUMBIA BOULEVARD

BONNEY LANE

WAPITI DRIVE

PERRY CREEK ROAD

OAK CREST

BELTON ROAD

WEST STREET

SUNSET BOULEVARD

SHORE DRIVE

KELLY STREET

CROUSE WAY

MILTON WAY

MATZEN STREET

PORT AVENUE

OLD PORTLAND ROAD

KASTER ROAD

GABLE ROAD

FIR STREET

BACHELOR FLAT ROAD

SOUTHVIEW DRIVE

HERITAGE LANE

KAPPLER ROAD

TWIN OAKS DRIVE

KIMMEL LANE

SUMMIT VIEW DRIVE

OAKRIDGE STREET

BARR AVENUE

HA LANE

CABLE DRIVE

CHILDS ROAD

ROSS ROAD

CHASE ROAD

S DIVISION ROAD

N MORSE ROAD

FISHER LANE

ACHILLES ROAD

S MORSE ROAD

COLUMBIA RIVER HIGHWAY

MCNULTY WAY

INDUSTRIAL WAY

S 1ST STREET

N 2ND STREET

N 3RD STREET

N 4TH STREET

N 5TH STREET

N 6TH STREET

S 2ND STREET

S 3RD STREET

S 4TH STREET

S 6TH STREET

S 7TH STREET

S 8TH STREET

S 9TH STREET

S 11TH STREET

S 12TH STREET

S 13TH STREET

N 12TH STREET

N 13TH STREET

N 15TH STREET

N 16TH STREET

N 17TH STREET

N 18TH STREET

S 16TH STREET

S 17TH STREET

S 18TH STREET

S 19TH STREET

TUALATIN STREET

KELLER ASSOCIATES

Landslide Hazards

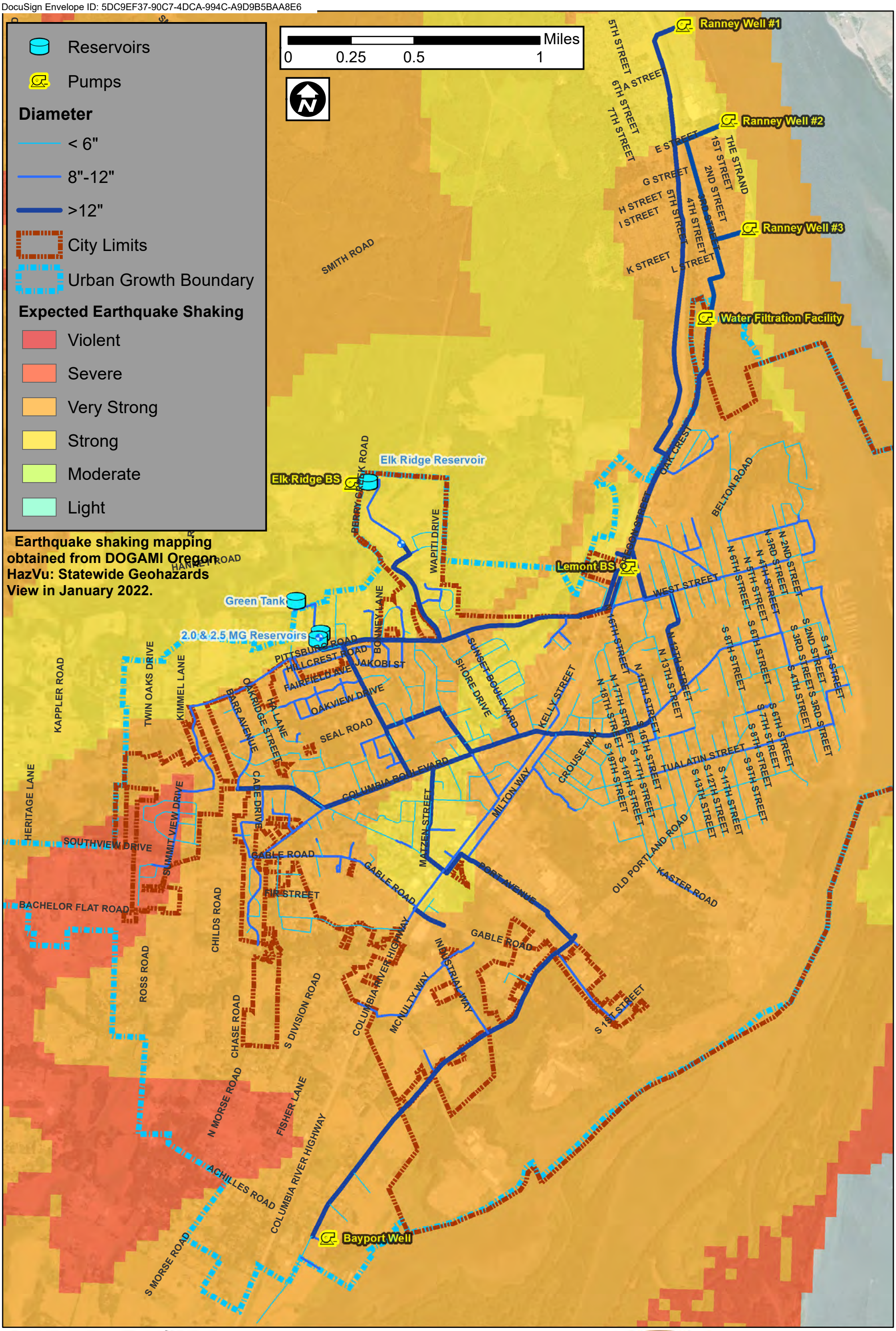
Water Master Plan

City of St. Helens Founded 1850 Oregon

Figure 6

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



KELLER ASSOCIATES

Earthquake Hazards

Water Master Plan

Figure 7

City of St. Helens

City Limits
Urban Growth Boundary

NRCS Hydrologic Soil Group

A (Well Drained)
B (Moderately Drained)
C (Poorly Drained)
C/D (Poorley Drained)
Assumed C/D
D (Very Poorly Drained)

Miles
0 0.25 0.5 1

ROBINETTE ROAD
RAYS WAY
HORSE LANE
KIMMEL LANE
TWIN OAKS DRIVE
OAK RIDGE STREET
BARR AVENUE
NORTHERN LIGHTS ROAD
PITTSBURG ROAD
KAPPLER ROAD
SUNSET BOULEVARD
SHORE DRIVE
COLUMBIA BOULEVARD
KELLY STREET
COLUMBIA RIVER HIGHWAY
OAK CREST
WEST STREET
N 6TH STREET
N 4TH STREET
N 2ND STREET
S 1ST STREET
S 4TH STREET
MILTON WAY
CROUSE WAY
COWLITZ STREET
TUALATIN STREET
PLYMOUTH STREET
OLD PORTLAND ROAD
PORT AVENUE
GABLE ROAD
GABLE ROAD
FIR STREET
SAULSER ROAD
BACHELOR FLAT ROAD
S BACHELOR FLAT
ROSS ROAD
CHILDS ROAD
S DIVISION ROAD
N MORSE ROAD
FISHER LANE
ACHILLES ROAD
COLUMBIA RIVER HIGHWAY
S MORSE ROAD

bing

KELLER ASSOCIATES

NRCS Hydrologic Soil Categories

Water Master Plan

City of St. Helens Oregon

Figure 8

City of St. Helens

ROBINTETTE ROAD
RAYS WAY
YOUNG ROAD
KAPPLER ROAD
TWIN OAKS DRIVE
KIMMEL LANE
BARR AVENUE
FAIRFIELD AVE
OAKVIEW DRIVE
SUNSET BOULEVARD
PITTSBURG ROAD
OREGON STREET
WEST STREET
N 4TH STREET
N 2ND STREET
S 4TH STREET
S 1ST STREET
COLUMBIA BOULEVARD
MILTON WAY
TUALATIN STREET
PLYMOUTH STREET
SAULSER ROAD
BACHELOR FLAT ROAD
GABLE ROAD
FIR STREET
KASTER ROAD
S BACHELOR FLAT
ROSS ROAD
MILLARD ROAD
N MORSE ROAD
S DIVISION ROAD
FISHER LANE
COLUMBIA RIVER HIGHWAY
OLD PORTLAND ROAD
BENNETT ROAD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

bing

Miles
0 0.25 0.5 1

Growth Area
City Limits
Urban Growth Boundary

KELLER ASSOCIATES

20-Year Growth Areas

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 9

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

PRVs
Reservoirs
Pumps

Diameter

< 6"
8"-12"
>12"

Pressure Zones

Main PZ
High PZ
Elk Ridge PZ
City Limits
Urban Growth Boundary

Miles
0 0.25 0.5 1

Ranney Well #1
Ranney Well #2
Ranney Well #3
Water Filtration Facility
Elk Ridge Reservoir
Elk Ridge BS
Lemont BS
Green Tank
2.0 & 2.5 MG Reservoirs
Bayport Well

5TH STREET
6TH STREET
7TH STREET
A STREET
E STREET
G STREET
H STREET
I STREET
K STREET
L STREET
1ST STREET
2ND STREET
3RD STREET
4TH STREET
THE STRAND
SMITH ROAD
OAK CREST
BELTON ROAD
RAYS WAY
HANKEY ROAD
BERRY CREEK ROAD
WAPITI DRIVE
BONNEY LANE
PITTSBURG ROAD
HILLCREST ROAD
FAIRFIELD AVE
JAKOBI ST
OAKVIEW DRIVE
SEAL ROAD
OAKRIDGE STREET
BARR AVENUE
HA LANE
CARE DRIVE
COLUMBIA BOULEVARD
SUNSET BOULEVARD
SHORE DRIVE
KELLY STREET
MILTON WAY
CROUSE WAY
MATZEN STREET
GABLE ROAD
FIR STREET
PORT AVENUE
OLD PORTLAND ROAD
KASTER ROAD
WEST STREET
N 2ND STREET
N 3RD STREET
N 4TH STREET
N 5TH STREET
N 6TH STREET
S 1ST STREET
S 2ND STREET
S 3RD STREET
S 4TH STREET
S 6TH STREET
S 7TH STREET
S 8TH STREET
S 9TH STREET
S 11TH STREET
S 12TH STREET
S 13TH STREET
S 16TH STREET
S 17TH STREET
S 18TH STREET
S 19TH STREET
N 12TH STREET
N 13TH STREET
N 15TH STREET
N 16TH STREET
N 17TH STREET
N 18TH STREET
HUALATIN STREET
KAPPLER ROAD
TWIN OAKS DRIVE
KIMMEL LANE
HERITAGE LANE
SOUTHVIEW DRIVE
SUMMIT VIEW DRIVE
BACHELOR FLAT ROAD
ROSS ROAD
CHILDS ROAD
CHASE ROAD
S DIVISION ROAD
N MORSE ROAD
FISHER LANE
ACHILLES ROAD
S MORSE ROAD
COLUMBIA RIVER HIGHWAY
MCNULTY WAY
INDUSTRIAL WAY

bing

KELLER ASSOCIATES

Water System Map

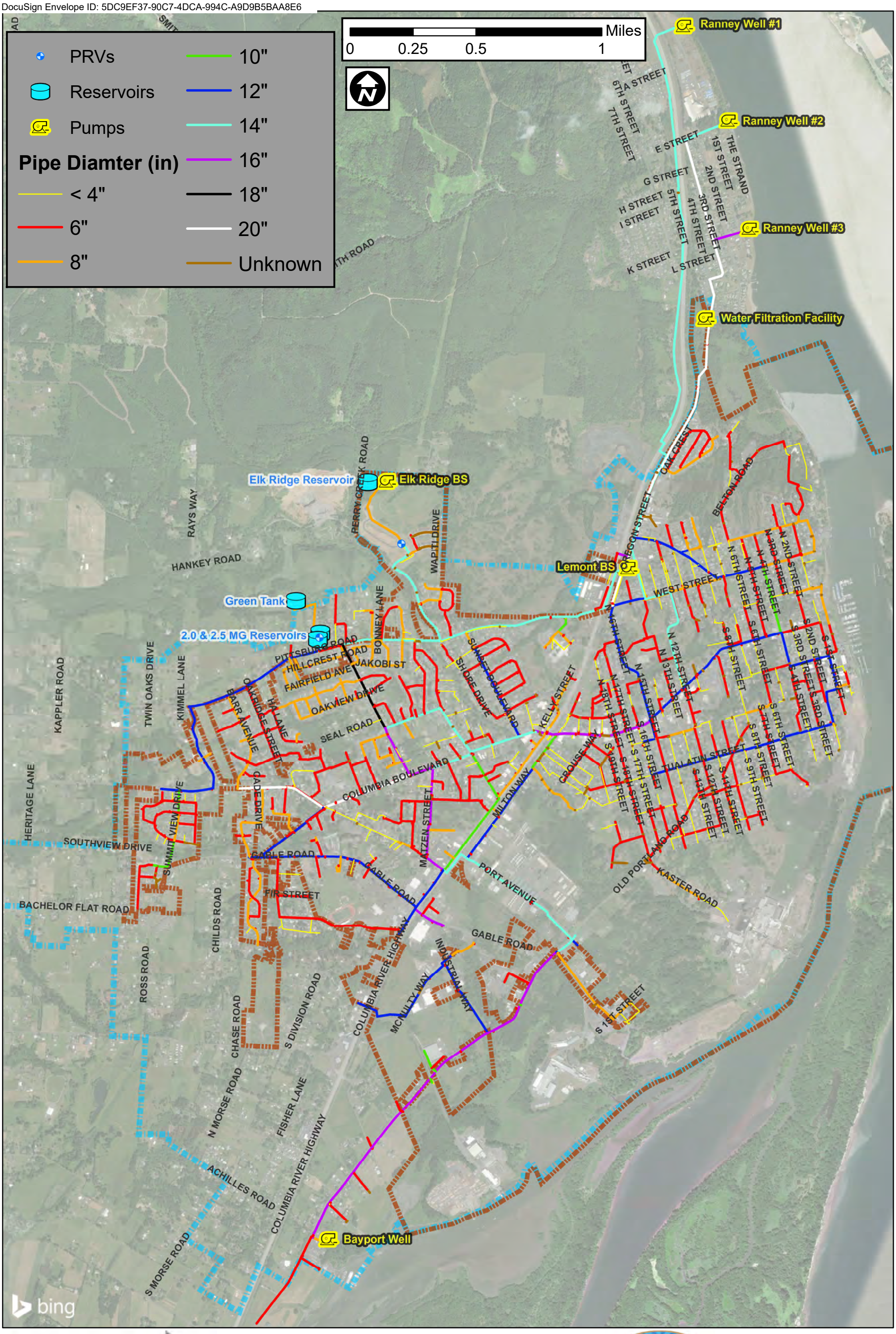
Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 10

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



KELLER ASSOCIATES

Pipelines by Size

Water Master Plan

City of St. Helens
FOUNDED 1850
Oregon

Figure 11

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

PRVs
Reservoirs
Pumps

Year of Installation

Unknown
1940s
1950s
1960s
1970s
1980s
1990s
2000s
2010s

Miles
0 0.25 0.5 1

Ranney Well #1
Ranney Well #2
Ranney Well #3
Water Filtration Facility
Elk Ridge Reservoir
Elk Ridge BS
Green Tank
2.0 & 2.5 MG Reservoirs
Lemont BS
Bayport Well

SMITH ROAD
HANKEY ROAD
PERRY CREEK ROAD
WAPITI DRIVE
BONNEY LANE
PITTSBURG ROAD
FALCREST ROAD
JAKOBI ST
OAKVIEW DRIVE
SEAL ROAD
COLUMBIA BOULEVARD
GABLE ROAD
FIR STREET
SUNSET BOULEVARD
SHORE DRIVE
KELLY STREET
MATZEN STREET
MILTON WAY
CROUSE WAY
PORT AVENUE
OLD PORTLAND ROAD
KASTER ROAD
OAK CREST
BELTON ROAD
OREGON STREET
WEST STREET
TUALATIN STREET
INDUSTRIAL WAY
MCNULTY WAY
COLUMBIA RIVER HIGHWAY
S 1ST STREET
KAPPLER ROAD
TWIN OAKS DRIVE
KIMMEL LANE
BARR AVENUE
OAKRIDGE STREET
HALLANE
GADE DRIVE
HERITAGE LANE
SOUTHVIEW DRIVE
SUMMIT VIEW DRIVE
BACHELOR FLAT ROAD
ROSS ROAD
CHILDS ROAD
CHASE ROAD
S DIVISION ROAD
N MORSE ROAD
FISHER LANE
ACHILLES ROAD
S MORSE ROAD
6TH STREET
7TH STREET
A STREET
E STREET
G STREET
H STREET
I STREET
K STREET
L STREET
5TH STREET
4TH STREET
3RD STREET
2ND STREET
1ST STREET
THE STRAND
N 2ND STREET
N 3RD STREET
N 4TH STREET
N 5TH STREET
N 6TH STREET
S 2ND STREET
S 3RD STREET
S 4TH STREET
S 6TH STREET
S 7TH STREET
S 8TH STREET
S 9TH STREET
N 12TH STREET
N 13TH STREET
N 15TH STREET
N 16TH STREET
N 17TH STREET
N 18TH STREET
S 12TH STREET
S 13TH STREET
S 16TH STREET
S 17TH STREET
S 18TH STREET
S 19TH STREET

bing

KELLER ASSOCIATES

Pipelines by Age

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 12

City of St. Helens

Boundary Conditions:
- WFF ON. Targets 83.5 psi discharge
- Lemont Lead Pump ON
- 2.5 MG Reservoir level at 21 ft.
- Green Tank level at 28 ft.
- Elk Ridge Reservoir level at 24 ft.
- System ADD equal to 1,020 gpm

Control Valve
Pumping Facility
Storage Reservoir

Pressure (psi)
- < 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- > 100

Model Pipe
High PZ
City Limits
Urban Growth Boundary

Elk Ridge Reservoir
Green Tank
2.0 & 2.5 MG Reservoirs
Lemont BS
Bayport Well

HODS LANE
PERRY CREEK ROAD
LIBERTY HILL ROAD
BELTON ROAD
RAYS WAY
WAPITI DRIVE
SKYLINE DRIVE
OREGON STREET
RIVERSIDE DRIVE
LEMONT STREET
WEST STREET
RIVER STREET
THE STRAND
PITTSBURG ROAD
WYETH STREET
CRESCENT DRIVE
SUNSET PLACE
WEST BOULEVARD
KIMMEL LANE
NOVELL AVENUE
CONNEY LANE
WEST HILL ROAD
HILLTOP DRIVE
JAKOBI ST
EVERGREEN ROAD
NORTH VERNONIA ROAD
EVERGREEN AVENUE
FAIRFIELD AVE
OAKWOOD DRIVE
SEAL ROAD
MAYFAIR DRIVE
ALLENDALE DRIVE
MACARTHUR DRIVE
MILL STREET
SOUTH SHORE DRIVE
BARR AVENUE
OAKRIDGE STREET
RIA LANE
RUBY COURT
COLUMBIA BOULEVARD
GRADY LANE
MAIN STREET
MILTON WAY
PARK STREET
DEER ISLAND ROAD
BENJAMIN LANE
HERITAGE LANE
SOUTHVIEW DRIVE
SUMMIT VIEW DRIVE
EASY STREET
WESTSHIRE DRIVE
GLACIER AVENUE
SYKES ROAD
GABLE ROAD
ALDER STREET
FIR STREET
HAZEL STREET
MAPLE STREET
CEDAR ST
CEDAR LANE
MATZEN STREET
BOWLING ALLEY
PORT AVENUE
MCCORMICK PARK
OLD PORTLAND ROAD
KASTER ROAD
BACHELOR FLAT ROAD
MORTEN LANE
NOBLE ROAD
TAYLOR STREET
CHILDS ROAD
S DIVISION ROAD
KAVANAGH AVE
COLUMBIA RIVER HIGHWAY
MCNULTY WAY
INDUSTRIAL WAY
9TH STREET
RAILROAD AVENUE
N 10TH STREET
N 9TH STREET
N 7TH STREET
N 6TH STREET
N 5TH STREET
N 4TH STREET
N 3RD STREET
N 2ND STREET
S 2ND STREET
S 3RD STREET
S 4TH STREET
S 5TH STREET
S 6TH STREET
S 7TH STREET
S 8TH STREET
S 9TH STREET
N 12TH STREET
N 13TH STREET
N 14TH STREET
N 15TH STREET
N 16TH STREET
S 12TH STREET
S 13TH STREET
S 14TH STREET
S 15TH STREET
S 16TH STREET
S 17TH STREET
S 18TH STREET
S 19TH STREET
S 20TH STREET
YAMHILL STREET
YOUNGS AVENUE
MILLARD ROAD
FISHER LANE
COLUMBIA RIVER HIGHWAY
OLD PORTLAND ROAD

0 0.125 0.25 0.5 Miles

2021 Average Day Demand - Pressures

Water Master Plan

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

Figure 13

City of St. Helens

Boundary Conditions:
- WFF OFF
- Lemont Lead Pump OFF
- 2.5 MG Reservoir level at 18 ft.
- Green Tank level at 18 ft.
- Elk Ridge Reservoir level at 14 ft.
- System PHD equal to 3,670 gpm

Control Valve
Pumping Facility
Storage Reservoir

Pressure (psi)
- < 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- > 100

Model Pipe
High PZ
City Limits
Urban Growth Boundary

Elk Ridge Reservoir
Green Tank
2.0 & 2.5 MG Reservoirs
Lemont BS
Bayport Well

HODS LANE
PERRY CREEK ROAD
LIBERTY HILL ROAD
BELTON ROAD
RAYS WAY
WAPITI DRIVE
SKYLINE DRIVE
WEST HILL ROAD
HILLTOP DRIVE
NORTH VERNONIA ROAD
KIMMEL LANE
JAKOBI ST
EVERGREEN AVENUE
CONNEY LANE
CRESCENT DRIVE
SUNSET PLACE
PITTSBURG ROAD
WYETH STREET
OREGON STREET
LEMONT STREET
RIVERSIDE DRIVE
RIVER STREET
THE STRAND
MILLARD ROAD
FISHER LANE
COLUMBIA RIVER HIGHWAY
OLD PORTLAND ROAD
EVERGREEN AVENUE
FAIRFIELD AVE
OAKWOOD DRIVE
SEAL ROAD
BARR AVENUE
OAKRIDGE STREET
RUBY COURT
SYKES ROAD
GLACIER AVENUE
SUMMIT VIEW DRIVE
EASY STREET
SOUTHVIEW DRIVE
HERITAGE LANE
BENJAMIN LANE
MORTEN LANE
NOBLE ROAD
BACHELOR FLAT ROAD
TAYLOR STREET
CHILDS ROAD
MAPLE STREET
GABLE ROAD
ALDER STREET
FIR STREET
HAZEL STREET
WESTSHIRE LANE
CEDAR ROAD
CEDAR STREET
WATZEK STREET
BOWLING ALLEY
PORT AVENUE
MILTON WAY
MILL STREET
MACARTHUR DRIVE
MAYFAIR DRIVE
ALLENDALE DRIVE
ELM STREET
COLUMBIA BOULEVARD
GRAND AVENUE
OAK STREET
MCCORMICK PARK
KASTER ROAD
S DIVISION ROAD
KAVANAGH AVE
MCNULTY WAY
INDUSTRIAL WAY
9TH STREET
RAILROAD AVENUE

0 0.125 0.25 0.5 Miles

Boundary Conditions:
- WFF targets 83.5 psi at firm capacity
- Lemont lead and lag pump ON
- 2.5 MG Reservoir level at 14.9 ft.
- Green Tank level at 5.8 ft.
- Elk Ridge Reservoir level at 1.8 ft.
- System MDD equal to 2,120 gpm
- Minimum residual pressure of 25 psi

Control Valve
Pumping Facility

AFF (gpm)
- < 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2500
- 2500 - 3000
- 3000 - 3500
- >3500

Storage Reservoir
Model Pipe
High PZ
City Limits
Urban Growth Boundary

Elk Ridge Reservoir
Green Tank
2.0 & 2.5 MG Reservoirs
Lemont BS
Bayport Well

HODS LANE
PERRY CREEK ROAD
LIBERTY HILL ROAD
BELTON ROAD
RAYS WAY
WAPITI DRIVE
SKYLINE DRIVE
OREGON STREET
LEMONT STREET
PITTSBURG ROAD
WYETH STREET
RIVER STREET
THE STRAND
KIMMEL LANE
WEST HILL ROAD
HILLTOP DRIVE
NORTH VERNONIA ROAD
CONNEY LANE
JAKOBI ST
CRESCENT DRIVE
SUNSET PLACE
SUNSET BOULEVARD
SHORE DRIVE
MACARTHUR DRIVE
ALLENDALE DRIVE
MAYFAIR DRIVE
MILL STREET
FAIRFIELD AVE
OAKWOOD DRIVE
OAKRIDGE STREET
BARR AVENUE
SEAL ROAD
RUBY COURT
GRASSY LANE
COLUMBIA BOULEVARD
KELLY STREET
MILTON WAY
BENJAMIN LANE
HERITAGE LANE
SYKES ROAD
GLACIER AVENUE
SOUTHVIEW DRIVE
SUMMIT VIEW DRIVE
EASY STREET
WHITETAIL LANE
WESTSHIRE LANE
CABLE ROAD
ALDER STREET
ALEXANDRA LANE
CEDAR ROAD
WATZEN STREET
BOWLING ALLEY
PORT AVENUE
MCCORMICK PARK
OLD PORTLAND ROAD
KASTER ROAD
BACHELOR FLAT ROAD
MORTEN LANE
NOBLE ROAD
TAYLOR STREET
FIR STREET
HAZEL STREET
MAPLE STREET
CHILDS ROAD
S DIVISION ROAD
KAVANAGH AVE
COLUMBIA RIVER HIGHWAY
MCNULTY WAY
INDUSTRIAL WAY
9TH STREET
RAILROAD AVENUE
GABLE ROAD

MILLARD ROAD
FISHER LANE
COLUMBIA RIVER HIGHWAY
OLD PORTLAND ROAD

0 0.125 0.25 0.5 Miles

KELLER ASSOCIATES

2021 Maximum Day Demand Plus Fire Flow

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 15

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Boundary Conditions:
- WFF targets 83.5 psi at firm capacity
- Lemont lead and lag pump ON
- 2.5 MG Reservoir level at 14.9 ft.
- Green Tank level at 5.8 ft.
- Elk Ridge Reservoir level at 1.8 ft.
- System MDD equal to 2,120 gpm
- Minimum residual pressure of 25 psi

Control Valve
Pumping Facility
Storage Reservoir
Meets FF Demand
Doesn't Meet FF Demand
Model Pipe
Residential
Commercial
Industrial
High PZ
City Limits
Urban Growth Boundary

Elk Ridge Reservoir
Green Tank
2.0 & 2.5 MG Reservoirs
Lemont BS
Bayport Well

HODS LANE
PERRY CREEK ROAD
LIBERTY HILL ROAD
BELTON ROAD
RAYS WAY
WAPITI DRIVE
SKYLINE DRIVE
LEMONT STREET
OREGON STREET
PITTSBURG ROAD
WYETH STREET
KELLY STREET
RIVER STREET
THE STRAND
KIMMEL LANE
KAPPLER ROAD
FAIRFIELD AVE
OAKWOOD DRIVE
SEAL ROAD
MILL STREET
MACARTHUR DRIVE
ALLENDALE DRIVE
SUNSET BOULEVARD
SUNSET PLACE
CRESCENT DRIVE
JAKOBI ST
NORTH VERNONIA ROAD
HILLTOP DRIVE
WEST HILL ROAD
RUBY COURT
GRASSY LANE
COLUMBIA BOULEVARD
SYKES ROAD
GLACIER AVENUE
BENJAMIN LANE
HERITAGE LANE
SOUTHVIEW DRIVE
SUMMIT VIEW DRIVE
EASY STREET
WHITETAIL LANE
GABLE ROAD
ALDER STREET
FIR STREET
HAZEL STREET
MAPLE STREET
BACHELOR FLAT ROAD
MORTEN LANE
NOBLE ROAD
TAYLOR STREET
CHILDS ROAD
S DIVISION ROAD
CEDAR STREET
MATZEN STREET
BOWLING ALLEY
MILTON WAY
PORT AVENUE
MCCORMICK PARK
OLD PORTLAND ROAD
KASTER ROAD
KAVANAGH AVE
COLUMBIA RIVER HIGHWAY
MCNULTY WAY
INDUSTRIAL WAY
9TH STREET
RAILROAD AVENUE
MILLARD ROAD
FISHER LANE

0 0.125 0.25 0.5 Miles

2021 Meets Fire Flow Demand?

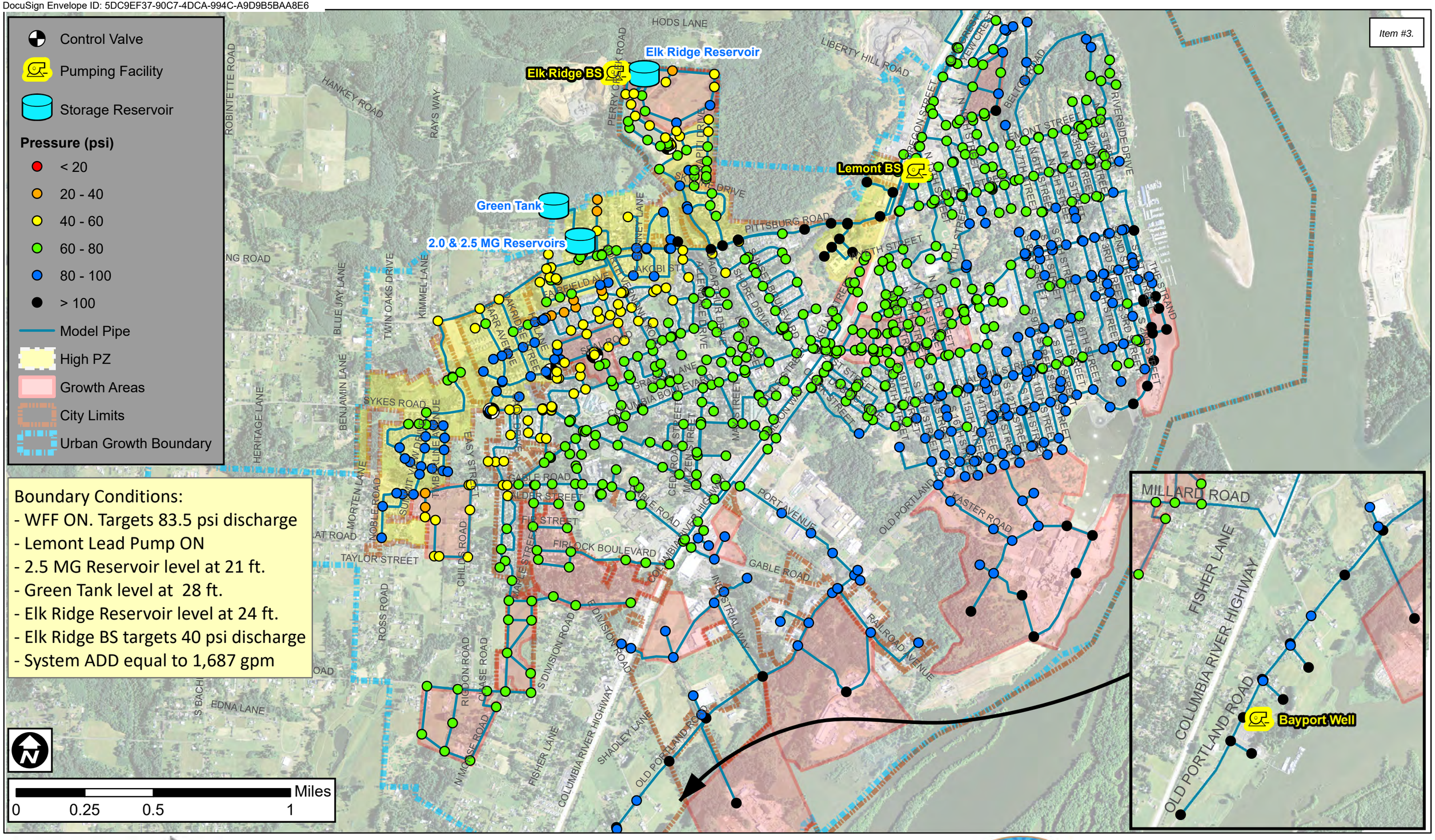
Water Master Plan

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

Figure 16

City of St. Helens



2041 Average Day Demand - No Improvements

Water Master Plan

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

Figure 17

City of St. Helens

- Control Valve
- Pumping Facility
- Storage Reservoir

Pressure (psi)

- < 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- > 100
- Model Pipe
- High PZ
- Growth Areas
- City Limits
- Urban Growth Boundary

Boundary Conditions:
- WFF OFF
- Lemont BS OFF
- 2.5 MG Reservoir level at 16.7 ft.
- Green Tank level at 22.1 ft.
- Elk Ridge Reservoir level at 18.1 ft.
- Elk Ridge BS targets 40 psi discharge
- System PHD equal to 6,067 gpm

Elk Ridge Reservoir
Elk Ridge BS
Lemont BS
Green Tank
2.0 & 2.5 MG Reservoirs
Bayport Well

HODS LANE
LIBERTY HILL ROAD
HANKEY ROAD
RAYS WAY
ROBINTETTE ROAD
PERRY CREEK ROAD
SKYLINE DRIVE
PITTSBURG ROAD
KIMMEL LANE
BLUE JAY LANE
TWIN OAKS DRIVE
BENJAMIN LANE
HERITAGE LANE
SYKES ROAD
EASY STREET
GABLE ROAD
ELDER STREET
FIR STREET
FIRLOCK BOULEVARD
TAYLOR STREET
NOBLE ROAD
CHILDS ROAD
ROSS ROAD
RIGDON ROAD
CASE ROAD
N MOOSE ROAD
EDNA LANE
S DIVISION ROAD
F DIVISION ROAD
MAPLE STREET
CEDAR STREET
COLUMBIA BOULEVARD
COLUMBIA RIVER HIGHWAY
PORT AVENUE
INDUSTRIAL WAY
RAILROAD AVENUE
OLD PORTLAND ROAD
SHADLEY LANE
FISHER LANE
KASTER ROAD
MILLARD ROAD
OREGON STREET
BELTON ROAD
RIVERSIDE DRIVE
THE STRAND
MAIN STREET
N 1ST STREET
N 2ND STREET
N 3RD STREET
N 4TH STREET
N 6TH STREET
N 7TH STREET
S 1ST STREET
S 2ND STREET
S 3RD STREET
S 4TH STREET
S 5TH STREET
S 6TH STREET
S 7TH STREET
S 8TH STREET
S 9TH STREET
S 10TH STREET
S 11TH STREET
S 12TH STREET
S 13TH STREET
S 14TH STREET
S 15TH STREET
S 16TH STREET
S 17TH STREET
S 18TH STREET
S 19TH STREET
S 20TH STREET
S 21ST STREET
S 22ND STREET
S 23RD STREET
S 24TH STREET
S 25TH STREET
S 26TH STREET
S 27TH STREET
S 28TH STREET
S 29TH STREET
S 30TH STREET
S 31ST STREET
S 32ND STREET
S 33RD STREET
S 34TH STREET
S 35TH STREET
S 36TH STREET
S 37TH STREET
S 38TH STREET
S 39TH STREET
S 40TH STREET
S 41ST STREET
S 42ND STREET
S 43RD STREET
S 44TH STREET
S 45TH STREET
S 46TH STREET
S 47TH STREET
S 48TH STREET
S 49TH STREET
S 50TH STREET
S 51ST STREET
S 52ND STREET
S 53RD STREET
S 54TH STREET
S 55TH STREET
S 56TH STREET
S 57TH STREET
S 58TH STREET
S 59TH STREET
S 60TH STREET
S 61ST STREET
S 62ND STREET
S 63RD STREET
S 64TH STREET
S 65TH STREET
S 66TH STREET
S 67TH STREET
S 68TH STREET
S 69TH STREET
S 70TH STREET
S 71ST STREET
S 72ND STREET
S 73RD STREET
S 74TH STREET
S 75TH STREET
S 76TH STREET
S 77TH STREET
S 78TH STREET
S 79TH STREET
S 80TH STREET
S 81ST STREET
S 82ND STREET
S 83RD STREET
S 84TH STREET
S 85TH STREET
S 86TH STREET
S 87TH STREET
S 88TH STREET
S 89TH STREET
S 90TH STREET
S 91ST STREET
S 92ND STREET
S 93RD STREET
S 94TH STREET
S 95TH STREET
S 96TH STREET
S 97TH STREET
S 98TH STREET
S 99TH STREET
S 100TH STREET
S 101ST STREET
S 102ND STREET
S 103RD STREET
S 104TH STREET
S 105TH STREET
S 106TH STREET
S 107TH STREET
S 108TH STREET
S 109TH STREET
S 110TH STREET
S 111TH STREET
S 112TH STREET
S 113TH STREET
S 114TH STREET
S 115TH STREET
S 116TH STREET
S 117TH STREET
S 118TH STREET
S 119TH STREET
S 120TH STREET
S 121ST STREET
S 122ND STREET
S 123RD STREET
S 124TH STREET
S 125TH STREET
S 126TH STREET
S 127TH STREET
S 128TH STREET
S 129TH STREET
S 130TH STREET
S 131ST STREET
S 132ND STREET
S 133RD STREET
S 134TH STREET
S 135TH STREET
S 136TH STREET
S 137TH STREET
S 138TH STREET
S 139TH STREET
S 140TH STREET
S 141ST STREET
S 142ND STREET
S 143RD STREET
S 144TH STREET
S 145TH STREET
S 146TH STREET
S 147TH STREET
S 148TH STREET
S 149TH STREET
S 150TH STREET
S 151ST STREET
S 152ND STREET
S 153RD STREET
S 154TH STREET
S 155TH STREET
S 156TH STREET
S 157TH STREET
S 158TH STREET
S 159TH STREET
S 160TH STREET
S 161ST STREET
S 162ND STREET
S 163RD STREET
S 164TH STREET
S 165TH STREET
S 166TH STREET
S 167TH STREET
S 168TH STREET
S 169TH STREET
S 170TH STREET
S 171ST STREET
S 172ND STREET
S 173RD STREET
S 174TH STREET
S 175TH STREET
S 176TH STREET
S 177TH STREET
S 178TH STREET
S 179TH STREET
S 180TH STREET
S 181ST STREET
S 182ND STREET
S 183RD STREET
S 184TH STREET
S 185TH STREET
S 186TH STREET
S 187TH STREET
S 188TH STREET
S 189TH STREET
S 190TH STREET
S 191ST STREET
S 192ND STREET
S 193RD STREET
S 194TH STREET
S 195TH STREET
S 196TH STREET
S 197TH STREET
S 198TH STREET
S 199TH STREET
S 200TH STREET
S 201ST STREET
S 202ND STREET
S 203RD STREET
S 204TH STREET
S 205TH STREET
S 206TH STREET
S 207TH STREET
S 208TH STREET
S 209TH STREET
S 210TH STREET
S 211TH STREET
S 212TH STREET
S 213TH STREET
S 214TH STREET
S 215TH STREET
S 216TH STREET
S 217TH STREET
S 218TH STREET
S 219TH STREET
S 220TH STREET
S 221ST STREET
S 222ND STREET
S 223RD STREET
S 224TH STREET
S 225TH STREET
S 226TH STREET
S 227TH STREET
S 228TH STREET
S 229TH STREET
S 230TH STREET
S 231ST STREET
S 232ND STREET
S 233RD STREET
S 234TH STREET
S 235TH STREET
S 236TH STREET
S 237TH STREET
S 238TH STREET
S 239TH STREET
S 240TH STREET
S 241ST STREET
S 242ND STREET
S 243RD STREET
S 244TH STREET
S 245TH STREET
S 246TH STREET
S 247TH STREET
S 248TH STREET
S 249TH STREET
S 250TH STREET
S 251ST STREET
S 252ND STREET
S 253RD STREET
S 254TH STREET
S 255TH STREET
S 256TH STREET
S 257TH STREET
S 258TH STREET
S 259TH STREET
S 260TH STREET
S 261ST STREET
S 262ND STREET
S 263RD STREET
S 264TH STREET
S 265TH STREET
S 266TH STREET
S 267TH STREET
S 268TH STREET
S 269TH STREET
S 270TH STREET
S 271ST STREET
S 272ND STREET
S 273RD STREET
S 274TH STREET
S 275TH STREET
S 276TH STREET
S 277TH STREET
S 278TH STREET
S 279TH STREET
S 280TH STREET
S 281ST STREET
S 282ND STREET
S 283RD STREET
S 284TH STREET
S 285TH STREET
S 286TH STREET
S 287TH STREET
S 288TH STREET
S 289TH STREET
S 290TH STREET
S 291ST STREET
S 292ND STREET
S 293RD STREET
S 294TH STREET
S 295TH STREET
S 296TH STREET
S 297TH STREET
S 298TH STREET
S 299TH STREET
S 300TH STREET
S 301ST STREET
S 302ND STREET
S 303RD STREET
S 304TH STREET
S 305TH STREET
S 306TH STREET
S 307TH STREET
S 308TH STREET
S 309TH STREET
S 310TH STREET
S 311TH STREET
S 312TH STREET
S 313TH STREET
S 314TH STREET
S 315TH STREET
S 316TH STREET
S 317TH STREET
S 318TH STREET
S 319TH STREET
S 320TH STREET
S 321ST STREET
S 322ND STREET
S 323RD STREET
S 324TH STREET
S 325TH STREET
S 326TH STREET
S 327TH STREET
S 328TH STREET
S 329TH STREET
S 330TH STREET
S 331ST STREET
S 332ND STREET
S 333RD STREET
S 334TH STREET
S 335TH STREET
S 336TH STREET
S 337TH STREET
S 338TH STREET
S 339TH STREET
S 340TH STREET
S 341ST STREET
S 342ND STREET
S 343RD STREET
S 344TH STREET
S 345TH STREET
S 346TH STREET
S 347TH STREET
S 348TH STREET
S 349TH STREET
S 350TH STREET
S 351ST STREET
S 352ND STREET
S 353RD STREET
S 354TH STREET
S 355TH STREET
S 356TH STREET
S 357TH STREET
S 358TH STREET
S 359TH STREET
S 360TH STREET
S 361ST STREET
S 362ND STREET
S 363RD STREET
S 364TH STREET
S 365TH STREET
S 366TH STREET
S 367TH STREET
S 368TH STREET
S 369TH STREET
S 370TH STREET
S 371ST STREET
S 372ND STREET
S 373RD STREET
S 374TH STREET
S 375TH STREET
S 376TH STREET
S 377TH STREET
S 378TH STREET
S 379TH STREET
S 380TH STREET
S 381ST STREET
S 382ND STREET
S 383RD STREET
S 384TH STREET
S 385TH STREET
S 386TH STREET
S 387TH STREET
S 388TH STREET
S 389TH STREET
S 390TH STREET
S 391ST STREET
S 392ND STREET
S 393RD STREET
S 394TH STREET
S 395TH STREET
S 396TH STREET
S 397TH STREET
S 398TH STREET
S 399TH STREET
S 400TH STREET
S 401ST STREET
S 402ND STREET
S 403RD STREET
S 404TH STREET
S 405TH STREET
S 406TH STREET
S 407TH STREET
S 408TH STREET
S 409TH STREET
S 410TH STREET
S 411TH STREET
S 412TH STREET
S 413TH STREET
S 414TH STREET
S 415TH STREET
S 416TH STREET
S 417TH STREET
S 418TH STREET
S 419TH STREET
S 420TH STREET
S 421ST STREET
S 422ND STREET
S 423RD STREET
S 424TH STREET
S 425TH STREET
S 426TH STREET
S 427TH STREET
S 428TH STREET
S 429TH STREET
S 430TH STREET
S 431ST STREET
S 432ND STREET
S 433RD STREET
S 434TH STREET
S 435TH STREET
S 436TH STREET
S 437TH STREET
S 438TH STREET
S 439TH STREET
S 440TH STREET
S 441ST STREET
S 442ND STREET
S 443RD STREET
S 444TH STREET
S 445TH STREET
S 446TH STREET
S 447TH STREET
S 448TH STREET
S 449TH STREET
S 450TH STREET
S 451ST STREET
S 452ND STREET
S 453RD STREET
S 454TH STREET
S 455TH STREET
S 456TH STREET
S 457TH STREET
S 458TH STREET
S 459TH STREET
S 460TH STREET
S 461ST STREET
S 462ND STREET
S 463RD STREET
S 464TH STREET
S 465TH STREET
S 466TH STREET
S 467TH STREET
S 468TH STREET
S 469TH STREET
S 470TH STREET
S 471ST STREET
S 472ND STREET
S 473RD STREET
S 474TH STREET
S 475TH STREET
S 476TH STREET
S 477TH STREET
S 478TH STREET
S 479TH STREET
S 480TH STREET
S 481ST STREET
S 482ND STREET
S 483RD STREET
S 484TH STREET
S 485TH STREET
S 486TH STREET
S 487TH STREET
S 488TH STREET
S 489TH STREET
S 490TH STREET
S 491ST STREET
S 492ND STREET
S 493RD STREET
S 494TH STREET
S 495TH STREET
S 496TH STREET
S 497TH STREET
S 498TH STREET
S 499TH STREET
S 500TH STREET
S 501ST STREET
S 502ND STREET
S 503RD STREET
S 504TH STREET
S 505TH STREET
S 506TH STREET
S 507TH STREET
S 508TH STREET
S 509TH STREET
S 510TH STREET
S 511TH STREET
S 512TH STREET
S 513TH STREET
S 514TH STREET
S 515TH STREET
S 516TH STREET
S 517TH STREET
S 518TH STREET
S 519TH STREET
S 520TH STREET
S 521ST STREET
S 522ND STREET
S 523RD STREET
S 524TH STREET
S 525TH STREET
S 526TH STREET
S 527TH STREET
S 528TH STREET
S 529TH STREET
S 530TH STREET
S 531ST STREET
S 532ND STREET
S 533RD STREET
S 534TH STREET
S 535TH STREET
S 536TH STREET
S 537TH STREET
S 538TH STREET
S 539TH STREET
S 540TH STREET
S 541ST STREET
S 542ND STREET
S 543RD STREET
S 544TH STREET
S 545TH STREET
S 546TH STREET
S 547TH STREET
S 548TH STREET
S 549TH STREET
S 550TH STREET
S 551ST STREET
S 552ND STREET
S 553RD STREET
S 554TH STREET
S 555TH STREET
S 556TH STREET
S 557TH STREET
S 558TH STREET
S 559TH STREET
S 560TH STREET
S 561ST STREET
S 562ND STREET
S 563RD STREET
S 564TH STREET
S 565TH STREET
S 566TH STREET
S 567TH STREET
S 568TH STREET
S 569TH STREET
S 570TH STREET
S 571ST STREET
S 572ND STREET
S 573RD STREET
S 574TH STREET
S 575TH STREET
S 576TH STREET
S 577TH STREET
S 578TH STREET
S 579TH STREET
S 580TH STREET
S 581ST STREET
S 582ND STREET
S 583RD STREET
S 584TH STREET
S 585TH STREET
S 586TH STREET
S 587TH STREET
S 588TH STREET
S 589TH STREET
S 590TH STREET
S 591ST STREET
S 592ND STREET
S 593RD STREET
S 594TH STREET
S 595TH STREET
S 596TH STREET
S 597TH STREET
S 598TH STREET
S 599TH STREET
S 600TH STREET
S 601ST STREET
S 602ND STREET
S 603RD STREET
S 604TH STREET
S 605TH STREET
S 606TH STREET
S 607TH STREET
S 608TH STREET
S 609TH STREET
S 610TH STREET
S 611TH STREET
S 612TH STREET
S 613TH STREET
S 614TH STREET
S 615TH STREET
S 616TH STREET
S 617TH STREET
S 618TH STREET
S 619TH STREET
S 620TH STREET
S 621ST STREET
S 622ND STREET
S 623RD STREET
S 624TH STREET
S 625TH STREET
S 626TH STREET
S 627TH STREET
S 628TH STREET
S 629TH STREET
S 630TH STREET
S 631ST STREET
S 632ND STREET
S 633RD STREET
S 634TH STREET
S 635TH STREET
S 636TH STREET
S 637TH STREET
S 638TH STREET
S 639TH STREET
S 640TH STREET
S 641ST STREET
S 642ND STREET
S 643RD STREET
S 644TH STREET
S 645TH STREET
S 646TH STREET
S 647TH STREET
S 648TH STREET
S 649TH STREET
S 650TH STREET
S 651ST STREET
S 652ND STREET
S 653RD STREET
S 654TH STREET
S 655TH STREET
S 656TH STREET
S 657TH STREET
S 658TH STREET
S 659TH STREET
S 660TH STREET
S 661ST STREET
S 662ND STREET
S 663RD STREET
S 664TH STREET
S 665TH STREET
S 666TH STREET
S 667TH STREET
S 668TH STREET
S 669TH STREET
S 670TH STREET
S 671ST STREET
S 672ND STREET
S 673RD STREET
S 674TH STREET
S 675TH STREET
S 676TH STREET
S 677TH STREET
S 678TH STREET
S 679TH STREET
S 680TH STREET
S 681ST STREET
S 682ND STREET
S 683RD STREET
S 684TH STREET
S 685TH STREET
S 686TH STREET
S 687TH STREET
S 688TH STREET
S 689TH STREET
S 690TH STREET
S 691ST STREET
S 692ND STREET
S 693RD STREET
S 694TH STREET
S 695TH STREET
S 696TH STREET
S 697TH STREET
S 698TH STREET
S 699TH STREET
S 700TH STREET
S 701ST STREET
S 702ND STREET
S 703RD STREET
S 704TH STREET
S 705TH STREET
S 706TH STREET
S 707TH STREET
S 708TH STREET
S 709TH STREET
S 710TH STREET
S 711TH STREET
S 712TH STREET
S 713TH STREET
S 714TH STREET
S 715TH STREET
S 716TH STREET
S 717TH STREET
S 718TH STREET
S 719TH STREET
S 720TH STREET
S 721ST STREET
S 722ND STREET
S 723RD STREET
S 724TH STREET
S 725TH STREET
S 726TH STREET
S 727TH STREET
S 728TH STREET
S 729TH STREET
S 730TH STREET
S 731ST STREET
S 732ND STREET
S 733RD STREET
S 734TH STREET
S 735TH STREET
S 736TH STREET
S 737TH STREET
S 738TH STREET
S 739TH STREET
S 740TH STREET
S 741ST STREET
S 742ND STREET
S 743RD STREET
S 744TH STREET
S 745TH STREET
S 746TH STREET
S 747TH STREET
S 748TH STREET
S 749TH STREET
S 750TH STREET
S 751ST STREET
S 752ND STREET
S 753RD STREET
S 754TH STREET
S 755TH STREET
S 756TH STREET
S 757TH STREET
S 758TH STREET
S 759TH STREET
S 760TH STREET
S 761ST STREET
S 762ND STREET
S 763RD STREET
S 764TH STREET
S 765TH STREET
S 766TH STREET
S 767TH STREET
S 768TH STREET
S 769TH STREET
S 770TH STREET
S 771ST STREET
S 772ND STREET
S 773RD STREET
S 774TH STREET
S 775TH STREET
S 776TH STREET
S 777TH STREET
S 778TH STREET
S 779TH STREET
S 780TH STREET
S 781ST STREET
S 782ND STREET
S 783RD STREET
S 784TH STREET
S 785TH STREET
S 786TH STREET
S 787TH STREET
S 788TH STREET
S 789TH STREET
S 790TH STREET
S 791ST STREET
S 792ND STREET
S 793RD STREET
S 794TH STREET
S 795TH STREET
S 796TH STREET
S 797TH STREET
S 798TH STREET
S 799TH STREET
S 800TH STREET
S 801ST STREET
S 802ND STREET
S 803RD STREET
S 804TH STREET
S 805TH STREET
S 806TH STREET
S 807TH STREET
S 808TH STREET
S 809TH STREET
S 810TH STREET
S 811TH STREET
S 812TH STREET
S 813TH STREET
S 814TH STREET
S 815TH STREET
S 816TH STREET
S 817TH STREET
S 818TH STREET
S 819TH STREET
S 820TH STREET
S 821ST STREET
S 822ND STREET
S 823RD STREET
S 824TH STREET
S 825TH STREET
S 826TH STREET
S 827TH STREET
S 828TH STREET
S 829TH STREET
S 830TH STREET
S 831ST STREET
S 832ND STREET
S 833RD STREET
S 834TH STREET
S 835TH STREET
S 836TH STREET
S 837TH STREET
S 838TH STREET
S 839TH STREET
S 840TH STREET
S 841ST STREET
S 842ND STREET
S 843RD STREET
S 844TH STREET
S 845TH STREET
S 846TH STREET
S 847TH STREET
S 848TH STREET
S 849TH STREET
S 850TH STREET
S 851ST STREET
S 852ND STREET
S 853RD STREET
S 854TH STREET
S 855TH STREET
S 856TH STREET
S 857TH STREET
S 858TH STREET
S 859TH STREET
S 860TH STREET
S 861ST STREET
S 862ND STREET
S 863RD STREET
S 864TH STREET
S 865TH STREET
S 866TH STREET
S 867TH STREET
S 868TH STREET
S 869TH STREET
S 870TH STREET
S 871ST STREET
S 872ND STREET
S 873RD STREET
S 874TH STREET
S 875TH STREET
S 876TH STREET
S 877TH STREET
S 878TH STREET
S 879TH STREET
S 880TH STREET
S 881ST STREET
S 882ND STREET
S 883RD STREET
S 884TH STREET
S 885TH STREET
S 886TH STREET
S 887TH STREET
S 888TH STREET
S 889TH STREET
S 890TH STREET
S 891ST STREET
S 892ND STREET
S 893RD STREET
S 894TH STREET
S 895TH STREET
S 896TH STREET
S 897TH STREET
S 898TH STREET
S 899TH STREET
S 900TH STREET
S 901ST STREET
S 902ND STREET
S 903RD STREET
S 904TH STREET
S 905TH STREET
S 906TH STREET
S 907TH STREET
S 908TH STREET
S 909TH STREET
S 910TH STREET
S 911TH STREET
S 912TH STREET
S 913TH STREET
S 914TH STREET
S 915TH STREET
S 916TH STREET
S 917TH STREET
S 918TH STREET
S 919TH STREET
S 920TH STREET
S 921ST STREET
S 922ND STREET
S 923RD STREET
S 924TH STREET
S 925TH STREET
S 926TH STREET
S 927TH STREET
S 928TH STREET
S 929TH STREET
S 930TH STREET
S 931ST STREET
S 932ND STREET
S 933RD STREET
S 934TH STREET
S 935TH STREET
S 936TH STREET
S 937TH STREET
S 938TH STREET
S 939TH STREET
S 940TH STREET
S 941ST STREET
S 942ND STREET
S 943RD STREET
S 944TH STREET
S 945TH STREET
S 946TH STREET
S 947TH STREET
S 948TH STREET
S 949TH STREET
S 950TH STREET
S 951ST STREET
S 952ND STREET
S 953RD STREET
S 954TH STREET
S 955TH STREET
S 956TH STREET
S 957TH STREET
S 958TH STREET
S 959TH STREET
S 960TH STREET
S 961ST STREET
S 962ND STREET
S 963RD STREET
S 964TH STREET
S 965TH STREET
S 966TH STREET
S 967TH STREET
S 968TH STREET
S 969TH STREET
S 970TH STREET
S 971ST STREET
S 972ND STREET
S 973RD STREET
S 974TH STREET
S 975TH STREET
S 976TH STREET
S 977TH STREET
S 978TH STREET
S 979TH STREET
S 980TH STREET
S 981ST STREET
S 982ND STREET
S 983RD STREET
S 984TH STREET
S 985TH STREET
S 986TH STREET
S 987TH STREET
S 988TH STREET
S 989TH STREET
S 990TH STREET
S 991ST STREET
S 992ND STREET
S 993RD STREET
S 994TH STREET
S 995TH STREET
S 996TH STREET
S 997TH STREET
S 998TH STREET
S 999TH STREET
S 1000TH STREET

N

0 0.25 0.5 1 Miles

KELLER ASSOCIATES

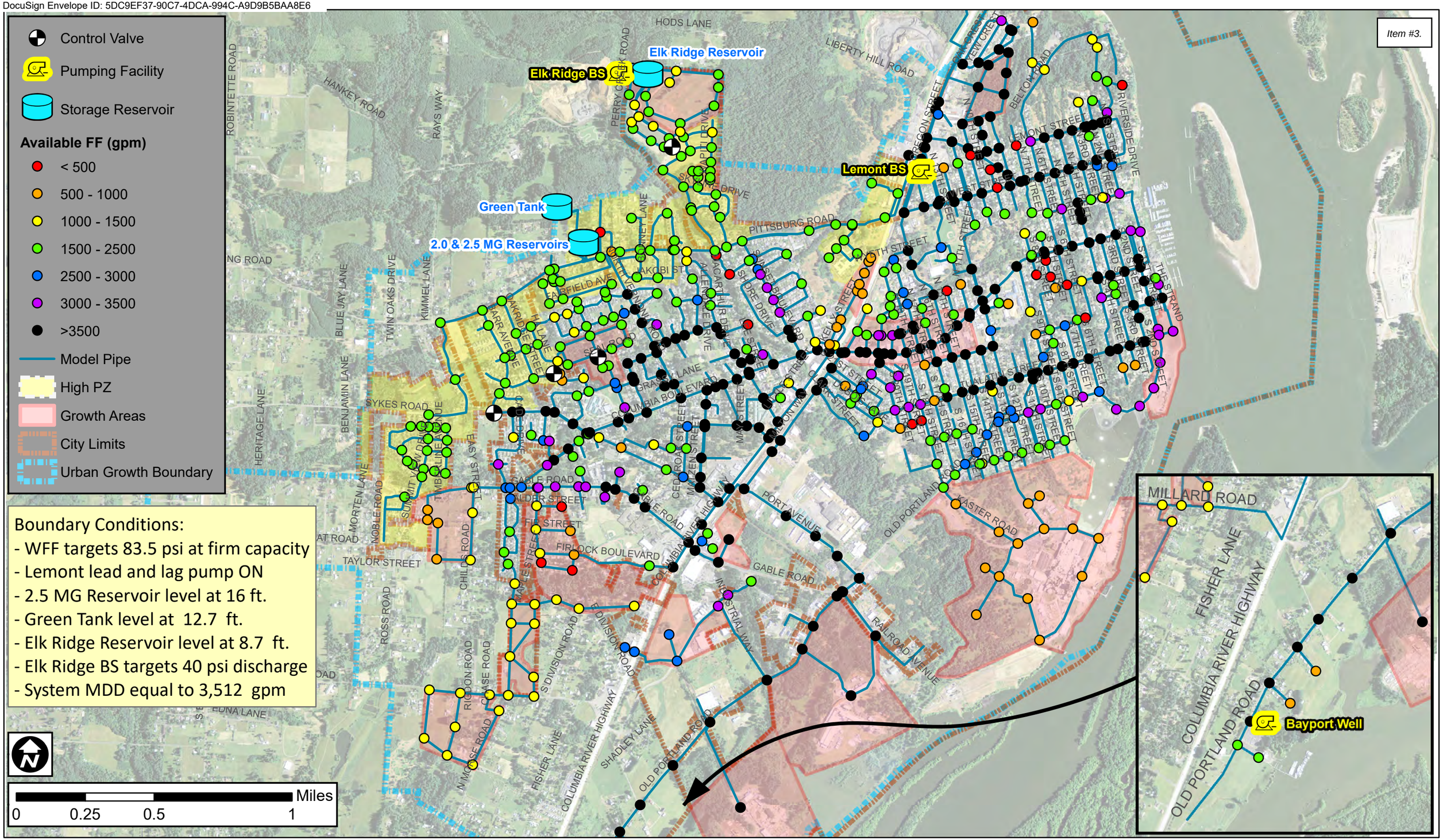
2041 Peak Hour Demand - No Improvements

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 18

City of St. Helens



2041 MDD + FF - No Improvements

Water Master Plan

Figure 19

City of St. Helens

Control Valve
Pumping Facility
Storage Reservoir
Meets FF Demand
Doesn't Meet FF Demand
Model Pipe
Future Pipes
City Limits
Urban Growth Boundary
Residential
Commercial
Industrial

Elk Ridge BS
Elk Ridge Reservoir
Green Tank
2.0 & 2.5 MG Reservoirs
Lemont BS
Bayport Well

Boundary Conditions:
- WFF targets 83.5 psi at firm capacity
- Lemont lead and lag pump ON
- 2.5 MG Reservoir level at 16 ft.
- Green Tank level at 12.7 ft.
- Elk Ridge Reservoir level at 8.7 ft.
- Elk Ridge BS targets 40 psi discharge
- System MDD equal to 3,512 gpm

0 0.25 0.5 1 Miles

KELLER ASSOCIATES

2041 Meets Fire Flow Demand?

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 20

City of St. Helens

LEGEND

- Hotel
- Commercial / Retail / Office
- Residential
  - MF - Multi-family
  - TH - Towhomes
  - F - Flats
  - LW - Live Work
- Public Open Space
- Meandering Multi-Use Path

1. Project Boundary
2. Existing Right-of-Way
3. Proposed Right-of-Way
4. Road Centerline
5. Bluff Toe of Slope
6. Bluff Buffer (25')
7. Top of Bank
8. Existing Outfall

PG Public Greenway (50' wide typ.)
FF FEMA Floodway
F1 FEMA 100 YR Floodplain
F5 FEMA 500 YR Floodplain
FE 100 YR Flood Elevation 26.5'

Note:
All development opportunities, waterfront multi-use path and pedestrian accessway connections are conceptual only, to be further developed by others.

TRAIL HEAD
NOB HILL NATURE PARK
STAIRS
RR BRIDGE
Pump Station
D1 78 MF
D2 8 TH
D Parking Deck
D3 9 TH
C3 4 TH,F
C2 11 TH,F
C1 9 TH,F
B B1 5,000 sf
B2 Hotel - 74 Rooms
A A1 Retail, A2 16 TH,F,LW, A3 8 LW, A4 3 LW
STREET A
STRAND STREET
SPECIAL WATERFRONT USE AREA
COURTHOUSE
HISTORIC DOWNTOWN
PLAZA SQUARE
S 3RD STREET
S 2ND STREET
S 1ST STREET
COLUMBIA STREET
COWLITZ STREET
ST HELENS STREET

12in.
12in.
12in.
12in.
12in.
8in.
8in.
8in.

Upsize existing 6-inch with 12-inch
Connect to existing 12-inch at Cowlitz Streeet and South 1st Street

Upsize existing 2-inch to 8-inch.
Connect to existing 8-inch at Strand Street and Cowlitz Street

- Proposed Pipe Upsize
- Proposed New Pipe

Existing Diamter (in.)

- < 6"
- 8"-12"
- >12"

0 125 250 500 Feet

KELLER ASSOCIATES

Riverfront Development Proposed Water Alignment

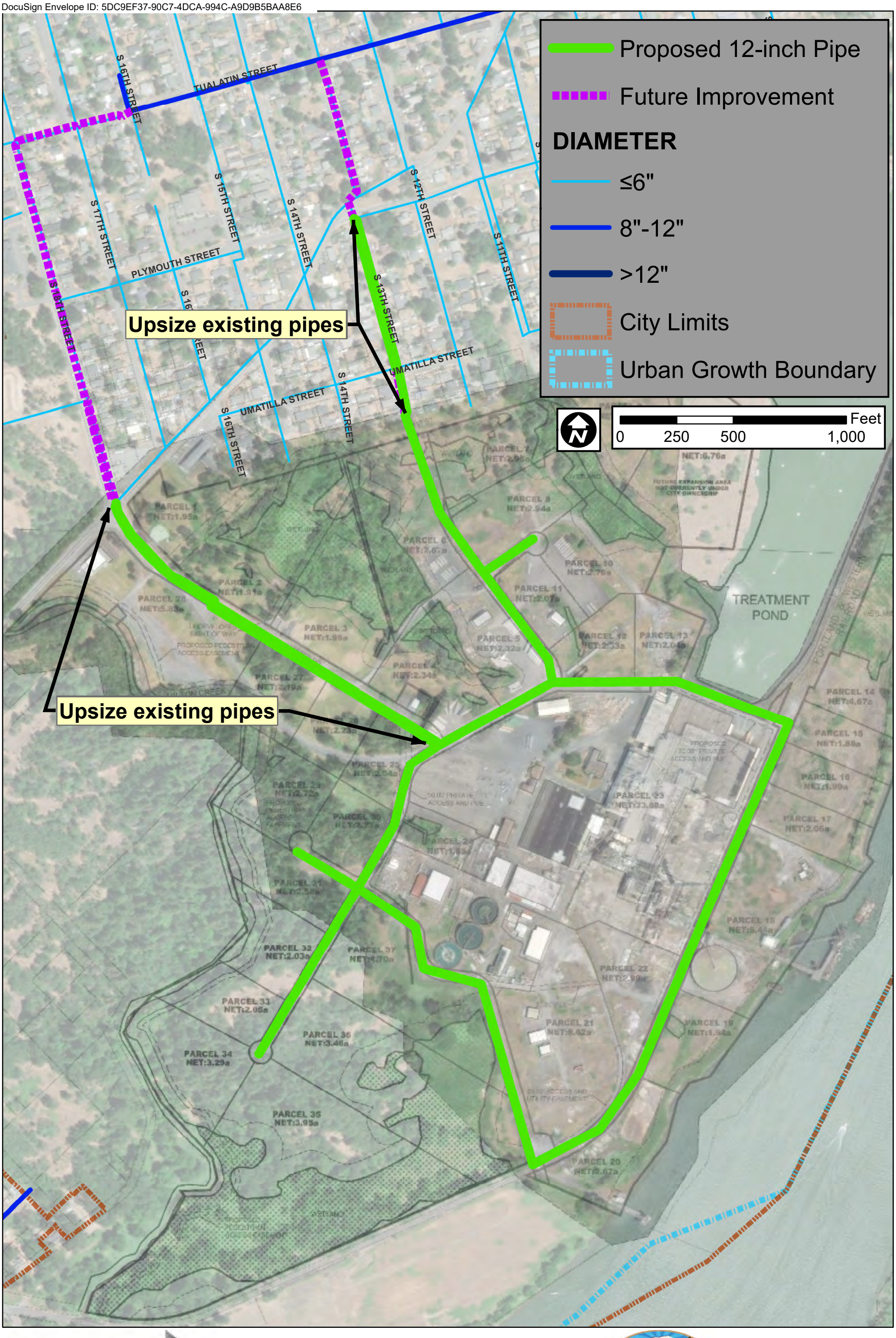
Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 21

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



KELLER ASSOCIATES

Industrial Business Park Alignment

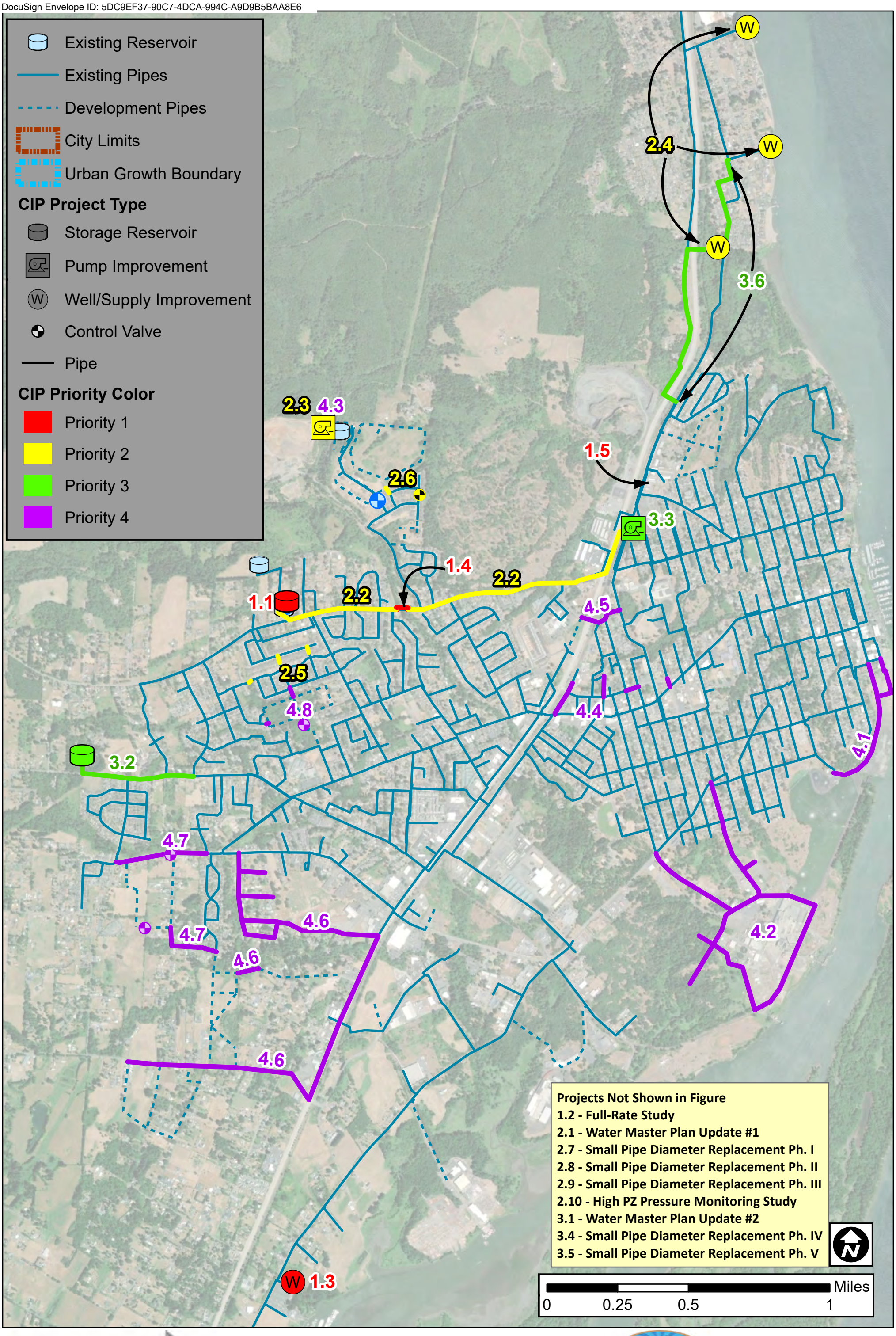
Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 22

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



KELLER ASSOCIATES

Capital Improvement Plan

Water Master Plan

City of St. Helens FOUNDED 1850 Oregon

Figure 23

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Pumping Facility
Well / Supply Source
Storage Reservoir
Phase I
Phase II
Phase III
Phase IV
Phase V
Model Pipe
Development Pipe
City Limits
Urban Growth Boundary

Feet
0 500 1,000 2,000

HODS LANE
LIBERTY HILL ROAD
PERRY CREEK ROAD
WAPITI DRIVE
SKYLINE DRIVE
PITTSBURG ROAD
WEST HILL ROAD
HILLTOP DRIVE
NOVELL AVENUE
RONNEY LANE
JAKOBI ST
CRESCENT DRIVE
SUNSET PLACE
COMMONS DRIVE
WYETH STREET
OREGON STREET
DEER ISLAND ROAD
BELTON ROAD
OAK CREST
YEW CREST
MYRTLE CREST
BELFOREST
N 9TH STREET
N 8TH STREET
N 7TH STREET
N 6TH STREET
N 5TH STREET
N 4TH STREET
N 3RD STREET
N 2ND STREET
N 1ST STREET
N 13TH STREET
N 12TH STREET
N 17TH STREET
N 16TH STREET
N 15TH STREET
VERNONIA ROAD
FAIRFIELD AVE
HELENS WAY
OAKWOOD DRIVE
MAYFAIR DRIVE
IVY LANE
MILL STREET
ALLENDALE DRIVE
MACARTHUR DRIVE
STORE DRIVE
SUNSET BOULEVARD
LEE STREET
WHITE WAY
OGAN LANE
MIKAYLA LANE
TICE ROAD
GRASSY LANE
COLUMBIA BOULEVARD
KELLY STREET
MILTON WAY
CLARK STREET
CROUSE WAY
DUBOIS LANE
S 20TH STREET
S 19TH STREET
S 18TH STREET
S 17TH STREET
S 16TH STREET
S 15TH STREET
S 14TH STREET
TUALATIN STREET
PLYMOUTH STREET
S 12TH STREET
S 9TH STREET
S 8TH STREET
S 7TH STREET
S 6TH STREET
S 5TH STREET
S 4TH STREET
S 3RD STREET
S 2ND STREET
S 1ST STREET
RIVERSIDE DRIVE
RIVER STREET
THE STRAND
MCCORMICK PARK
OLD PORTLAND ROAD
KASTER ROAD
PORT AVENUE
COLUMBIA RIVER HIGHWAY
BOWLING ALLEY
MILTON WAY
CEDAROAK STREET
MATZEN STREET
MCBRIDE STREET
SYKES ROAD
GABLE ROAD
ALDER STREET
FIR STREET
HAZEL STREET
MAPLE STREET
BACHELOR FLAT ROAD
SUMMIT VIEW DRIVE
GLACIER AVENUE
WESTSHIRE LANE
ELIZABETH LANE
CHILDS ROAD
NOBLE ROAD
ROSS ROAD
MORTEN LANE
COLE VALLEY
ROBERTS LANE
JUNIPER LANE
OAKRIDGE STREET
OAKRIDGE DRIVE
SEAL ROAD
EDIE'S WAY
MCNULTY WAY

MILLARD ROAD
FISHER LANE
COLUMBIA RIVER HIGHWAY
OLD PORTLAND ROAD
W

KELLER ASSOCIATES

Small Pipe Replacement Program

Water Master Plan

City of St. Helens
FOUNDED 1850
Oregon

Figure 24

City of St. Helens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APPENDIX B

Project Planning

KELLER ASSOCIATES

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

WATER AGREEMENT

The CITY OF COLUMBIA CITY, hereinafter called "Columbia City," and the CITY OF ST. HELENS, hereinafter called "St. Helens," agree as follows:

1. This agreement completely supercedes all provisions relating to the sale and puchase of water between the parties in an agreement titled "City of Columbia City Pipeline Permit" dated June 16, 1976.

2. St. Helens presently owns and operates two Raney Collector water wells within the Columbia City area, as well as pump stations, chlorinators, and pipelines; and presently supplies Columbia City with potable water. Columbia City presently owns and operates its own transmission system from the point of connection with St. Helens' pipelines at a master meter.

3. The anticipated future needs of the St. Helens water system, including Columbia City, require St. Helens to obtain additional water within the forseeable future. The most appropriate potential source of water for the system is one or more water intake and treatment facilities such as additional wells in the Columbia City area on lands not owned by Columbia City.

4. DURATION: St. Helens agrees to furnish Columbia City water until Columbia City secures sufficient water from another source, at which time either party may terminate the agreement on the giving of the other party 180 days written notice. The parties may agree in such event that St. Helens will sell Columbia City surplus water.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

In the event St. Helens obtains its water from a source outside of Columbia City and discontinues the use of the Raney Collectors in Columbia City, St. Helens may lease or offer for sale the wells and its distribution system to Columbia City for a price set by an appraisal of the system, made by an independent appraiser agreed upon by both parties.

5. AMOUNT OF WATER: Columbia City may purchase and use up to 1,000,000 cubic feet of water per month. In the event one or more additional water intake and treatment facilities yielding sufficient quantities are put in operation within the Columbia City limits, the monthly amount will increase by 500,000 cubic feet per month per well, provided Columbia City complies with the following paragraph.

Columbia City shall pay a percentage representing its share of all water sold by St. Helens, of the cost of the additional water intake and treatment facilities and transmission lines to the point the water is delivered to Columbia City if Columbia City desires the additional 500,000 cubic feet from an additional well. No direct charge for capital costs of the additional water intake and treatment facilities will be made to Columbia City if they do not desire the additional water and remain at the 1,000,000 cubic feet level.

a. If any additional water intake and treatment facilities are financed by general obligation bonds, percentage above mentioned, shall be amortized over the life of the bonds at the same rate of interest paid on the bonds and added to Columbia City's monthly water charge.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

b. If any additional water intake and treatment facilities are financed by revenue bonds, the general increase in water rates of the entire St. Helens water system, including Columbia City, will pay the proportionate share of water used by Columbia City mentioned above.

No users outside the Columbia City current urban growth boundry shall be furnished water unless presently connected to the system, or unless Columbia City is required by governmental regulation, present obligation or litigation to furnish outside users.

In the event an industry locates in Columbia City, a contract with the industry will be negotiated between the industry and the parties hereto based on surplus water. If that is not satisfactory to the industry, it will have to obtain its water elsewhere.

If unavoidable and unforseeable events make it impossible to furnish the amount of water provided for in this agreement, the parties to this agreement shall share the available water on a pro rata basis, using the average monthly quantities used by each city during the preceding twelve months in calculating each party's respective pro rata share.

If unforeseen events require St. Helens to supply part or all of its customers by an alternative water intake and treatment facility to the wells in Columbia City, such as a surface water system, Columbia City shall receive its pro rate share at the same rate per cubic foot as customers within St. Helens to include charges for capital costs of the system and any costs of maintaining water transmission

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

lines, beyond the St. Helens city limits especially for Columbia City.

Columbia City agrees to enforce St. Helens water usage curtailment orders for temporary supply shortages.

6. CHARGES: Columbia City shall pay the estimated cost for St. Helens to provide water to its tie in. St. Helens shall determine the cost annually based on construction, operating maintenance, administration, depreciation and interest on general obligation bonds, of that portion of the St. Helens system including, but not limited to, water wells or inlet structures, transmission lines, reservoirs and treatment facilities that directly benefits Columbia City. The total costs above mentioned shall be divided by the total water sold. Columbia City will pay that price per cubic foot. Columbia City has the right to review the costs and calculatations annually for accuracy. Both cities shall cooperate in establishing the annual rate.

The water will be delivered to Columbia City through a master meter.

Water charges shall be paid within 10 days from the billing date.

Columbia City shall be responsible for its own water quality and distribution system, including installation, repair, maintenance, the billing and collecting of water bills from its own customers, but St. Helens shall maintain the system up to the Columbia City's tie-in in good condition and repair.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

7a. MUTUAL COOPERATION: The parties shall cooperate with each other with respect to the existing system and the exploration and development of additional water intake and treatment facilities within the city limits of Columbia City, provided however, the cooperation shall be at no expense to Columbia City.

7b. In the event conditional use permits, street vacations, or other land use actions are needed for the installation of additional collectors or distribution systems, Columbia City shall not unreasonably withhold approval. This agreement shall in no manner be construed as limiting any rights of the citizens of Columbia City to follow their usual and legal recourses in objecting to conditional uses, street vacations or any other land use actions.

7c. St. Helens shall have the right to explore and develop water sources, including wells and underground surface water infiltration systems, within Columbia City during the term of this agreement.

7d. St. Helens shall be granted all necessary easements and/or permits, and free access to Columbia City streets for the installation, replacement, repair and maintenance of waterlines reasonably necessary to deliver water from any water intake and treatment facilities to St. Helens' distribution system. Such easements and permits shall be in writing and in the form attached hereto as Exhibit A.

7e. At the execution of this agreement, the parties shall execute a separate water pipeline permit with the same date as this agreement.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

7f. The cost of engineering, legal fees and testing, as well as the cost of the water intake and treatment facilities, including water lines to the present system, shall be included in well construction costs in the event Columbia City desires to obtain a share of the water in excess of 1,000,000 cubic feet from the facility.

8. ARBITRATION: In the event injury, damage, costs or financial liability shall hereafter arise to or be suffered or incurred by Columbia City as the result of the exercise of the privileges herein granted to St. Helens, St. Helens does hereby promise and agree to pay the same in full to Columbia City expeditiously and without unreasonable delay.

In the event of a dispute between the parties to this agreement over any matter arising as a result of this agreement, either party shall have a right to have the dispute determined and settled by arbitration. One arbitrator shall be appointed by each party within ten days of notice by either body that an agreement cannot be mutually reached. Preferably, the arbitrators so selected should have some specific knowledge in the field that is in dispute, and the arbitrator, or any member of his family, shall not be an employee or public official of the City which selects him. Within ten days of their employment, the two arbitrators so selected by each City shall meet for the purpose of selecting a third independent and unbiased arbitrator to sit with them as a board of arbitration. The board of arbitration shall then hear a full representation from each municipality upon the matter in controversy, and the decision of

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

two members of the said board, to be arrived at within 30 days of the hearing, shall be binding upon each municipality. The cost of the arbitrator's service and any other necessary costs of the arbitration shall be split equally between the parties to this agreement.

9. ATTORNEY FEES: In the event legal action is filed to enforce the terms of this agreement, the prevailing party shall be awarded a reasonable attorney fee in both trial and appellate courts.

DATED this 20th day of May, 1982.

CITY OF COLUMBIA CITY

By William F. Lewis
Mayor

CITY OF ST. HELENS

By _____
Mayor

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Columbia County Endangered Species List

Group	Name	Population	Status	Lead Office	Recovery Plan	Recovery Plan Action Status
Snails	Burrington jumping-slug (Hemphillia burringtoni)	Wherever found	Under Review	1		
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, (lower 48 states)	Threatened	1	Coastal Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)	Implementation Progress
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, (lower 48 states)	Threatened	1	Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)	Implementation Progress
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, (lower 48 states)	Threatened	1	Klamath Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)	Implementation Progress
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, (lower 48 states)	Threatened	1	Mid-Columbia Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)	Implementation Progress
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, (lower 48 states)	Threatened	1	Recovery Plan for the Coterminous United States Population of Bull Trout (Salvelinus confluentus)	Implementation Progress
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, (lower 48 states)	Threatened	1	St. Mary Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)	Implementation Progress
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, (lower 48 states)	Threatened	1	Upper Snake Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)	Implementation Progress
Mammals	red tree vole (Arborimus longicaudus)	North Oregon Coast population	Resolved Taxon	1		
Birds	Northern spotted owl (Strix occidentalis caurina)	Wherever found	Threatened	1	Revised Recovery Plan for the Northern Spotted Owl	Implementation Progress
Flowering Plants	Nelson's checker-mallow (Sidalcea nelsoniana)	Wherever found	Threatened	1	Final Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington	Implementation Progress
Flowering Plants	Kincaid's Lupine (Lupinus sulphureus ssp. kincaidii)	Wherever found	Threatened	1	Final Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington	Implementation Progress
Flowering Plants	golden paintbrush (Castilleja levisecta)	Wherever found	Threatened	1	Recovery Plan for the Golden Paintbrush (Castilleja levisecta)	Implementation Progress
Birds	Marbled murrelet (Brachyramphus marmoratus)	U.S.A. (CA, OR, WA)	Threatened	1	Recovery Plan for the Threatened Marbled Murrelet (Brachyramphus marmoratus) in Washington, Oregon, and California	Implementation Progress
Flowering Plants	Willamette daisy (Erigeron decumbens)	Wherever found	Endangered	1	Final Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington	Implementation Progress
Birds	Streaked Horned lark (Eremophila alpestris strigata)	Wherever found	Threatened	1	Draft Recovery Plan for the Streaked Horned Lark	Implementation Progress
Flowering Plants	Bradshaw's desert-parsley (Lomatium bradshawii)	Wherever found	Endangered	1	Final Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington	Implementation Progress
Flowering Plants	Water howellia (Howellia aquatilis)		Threatened	6	Water Howellia (Howellia aquatilis) Recovery Plan, Public and Agency Review Draft	Implementation Progress
Mammals	Columbian white-tailed deer (Odocoileus virginianus leucurus)	Columbia River (Clark, Cowliz, Pacific, Skamania, and Wahkiakum Counties, WA., and Clatsop, Columbia, and Multnomah Counties, OR.)	Threatened	1	Columbian White-tailed Deer Revised Recovery Plan	Implementation Progress
Birds	Yellow-billed Cuckoo (Coccyzus americanus)	Western DPS: U.S.A. (AZ, CA, CO (western), ID, MT (western), NM (western), NV, OR, TX (western), UT, WA, WY (western)); Canada (British Columbia (southwestern); Mexico (Baja California, Baja California Sur, Chihuahua, Durango (western), Sinaloa, Sonora)	Threatened	2		

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

City of St. Helens
RESOLUTION NO. 1634

A RESOLUTION TO APPROVE THE URBAN SERVICE AGREEMENT BETWEEN THE CITY OF ST. HELENS AND MCNULTY PEOPLE'S UTILITY DISTRICT RELATING TO PROVISION OF WATER SERVICE

WHEREAS, the City of St. Helens ("City") and McNulty People's Utility District ("McNulty") provide water service in the area designated as the St. Helens' Urban Growth Area ("UGA"); and

WHEREAS, the City and McNulty, in an effort to delineate the roles and responsibilities with regard to the provision of future water service within the UGA have negotiated an Urban Service Agreement Relating to Provision of Water Service ("Urban Service Agreement"); and

WHEREAS, the St. Helens Charter, ORS 195.060 through ORS 195.085 and ORS 190.003 through ORS 190.030 authorize the City to enter into the Urban Service Agreement; and

WHEREAS, the St. Helens City Council finds it in the best interest of the City to enter into the Urban Service Agreement.

NOW, THEREFORE, THE CITY OF ST. HELENS RESOLVES AS FOLLOWS:

Section 1. The City of St. Helens City Council approves and adopts the Urban Service Agreement attached and incorporated as Exhibit A.

Approved and adopted by the City Council on August 21, 2013, by the following vote:

Ayes: Locke, Carlson, Conn, Morten, Peterson

Nays: None

Randy Peterson, Mayor

ATTEST:

Kathy Payne, City Recorder

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

URBAN SERVICE AGREEMENT

RELATING TO PROVISION OF WATER SERVICE

This Urban Service Agreement is hereby entered into by and between the City of St. Helens ("City"), an Oregon municipal corporation and McNulty Water People's Utility District ("McNulty"), a People's Utility District formed under ORS Chapter 261 (collectively, the "Parties").

RECITALS

A. The Parties have the authority to enter into this Agreement pursuant to their respective Charter, Principal Acts, ORS 195.060 to 195.085, and ORS 190.003 through 190.030;

B. The Parties desire to enter into an agreement for the provision of water service by the City and McNulty within current City boundaries and eligible to be annexed by the City in the City's Urban Growth Boundary that are within McNulty's boundary ("Service Area");

C. The Parties undertook an extensive analysis of the water systems including current and forecasted demand, system capacity and capital improvements, financial and rate considerations, customer equity, governance, management, quantity and quality of service, physical characteristics of the Service Area, economic development, economies of scale and service related issues. The document containing the analysis is entitled "ORS 195 Criteria Review, Analysis and Work Product" dated May 10, 2012 as amended on October 11, 2012, all as set forth on Exhibit 1, attached hereto and incorporated by reference ("Study");

D. The City and McNulty have conducted public meeting processes regarding the Study described above and the adoption of this Agreement. The Parties agree that designating how water service will be provided under this Agreement is in the best interest of the citizens and customers served by the respective entities;

E. The Parties have a common interest in coordinating the planning, permitting, construction, operation and maintenance of necessary water infrastructure within the Service Area. The Parties further recognize the need to establish coordinated water service in the Service Area so as to prevent fragmented and duplicative service in the Service Area and to assign responsibility for service in such areas where the City's boundary and McNulty's boundary overlap;

F. City and McNulty have sufficient resources and facilities, either currently in place or that may be constructed, to provide urban level water service within the Service Area, both as the City now exists and as the City may expand its boundaries through future annexations, consistent with the Comprehensive Plan and land uses regulations of the City and Columbia County ("County"); and

G. The Parties have considered the factors required of an urban services agreement as prescribed by ORS 195.070 as set forth in the Study and are satisfied, in the reasonable exercise of their discretion, that all associated requirements are met by this Agreement.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

NOW, THEREFORE, IN CONSIDERATION OF THE MUTUAL COVENANTS AND AGREEMENTS CONTAINED HEREIN, THE PARTIES AGREE AS FOLLOWS:

1. **SERVICES PROVIDED**. Except as otherwise provided, during the term of this Agreement, City and McNulty shall be the exclusive providers of water service within their jurisdictional boundaries. All water service will be provided to properties by City or McNulty subject to the respective Rules and Regulations for Service adopted by either, moreover, such rules may be amended from time to time by the respective governing bodies of City or McNulty. Furthermore, City and McNulty shall be wholly responsible for the construction, operation, repair and maintenance of all related infrastructure and facilities, including any labor and materials, required to provide service under this Agreement.

2. **ANNEXATION BY CITY WITHIN MCNULTY TERRITORY**. McNulty agrees not to contest or oppose annexation by the City of territory within the Service Area so long as such annexation and provision of water service is consistent with the terms of this Agreement.

2.1 Property Owner Consent. The Parties agree that City annexation of property within the Service Area shall occur only by consent of the property owner of the parcel to be annexed except as provided in Section 2.2 below.

2.2 Health Hazard Abatement Exception. In the event an involuntary annexation becomes necessary under ORS 222.120(4)(c) to address a finding of a danger to public health issued by the Oregon Health Authority, the affected property owners may elect to remain customers of McNulty, provided the condition causing the danger to public health is not impure or inadequate domestic water.

2.3 Property East of Highway 30. The Parties agree that all properties within McNulty's boundaries lying east of Highway 30 and set forth on Exhibit 2, attached hereto and incorporated by reference, shall be served by the City following annexation and upon City water service availability. Upon annexation, the City shall have sole responsibility to provide service to the parcels when City water service is available.

2.4 Properties Zoned Commercial and Industrial West of Highway 30. The Parties agree that those properties within McNulty's boundaries lying west of Highway 30 zoned commercial or industrial at the time of annexation, (depicted on Exhibit 2 as of the date of this Agreement) shall be served by the City upon annexation and availability of City water. Upon annexation City shall have sole responsibility to provide water service to those commercial and industrial properties following annexation and City water service availability.

2.5 North of Pittsburg Road and West of Battle Mountain Road. McNulty shall be responsible to serve the area north of Pittsburg Road and west of Battle Mountain Road as shown on Exhibit 2.

2.6 Residential Properties. Existing or new residential properties within McNulty's boundaries meeting existing County zoning and density may continue as McNulty customers until the property is subdivided. Existing or new residential property owners within McNulty's boundaries who do not subdivide may request to connect the property

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

to the City's sanitary sewer system and apply to the City for sewer service. At the time the property owner requests sanitary sewer service, the property owner may elect to receive water service from McNulty or from the City. The election for water service and the provision of City sanitary service require all of the following:

2.6.1 The property owner agrees to pay all charges, fees and costs to McNulty or City and comply with all system requirements depending upon which water system service is chosen.

2.6.2 The property owner executes a non-revocable consent to annexation effective only if the property is subdivided such that the density or number of dwellings exceeds the County's zoning allowance for the property. If the property is not subdivided, then no annexation will occur unless the property owner requests it.

2.6.3 The property owner executes an agreement to connect the new properties created by subdivision to the City's water system when the City system is available following subdivision approval and annexation.

2.6.4 The property owner executes an agreement to construct the improvements to connect to the City's sanitary sewer system.

2.7 System Development Charges. When the property is subdivided, the new parcels created by subdivision will be required to pay all applicable City Water system development charges and other applicable connection fees. If there is an existing dwelling that was connected to the McNulty system that is part of the subdivided parcel, then that lot and dwelling may connect to the City system without payment of the City system development charge, or any tap or connection fee associated with the connection to the City system.

2.8 Fees and Changes. City and McNulty may assess and collect all legally permissible fees and charges for services provided to any existing or future property they serve within the Service Area under this Agreement.

3. FINANCIAL IMPACT. The execution of this Agreement shall not require any financial remuneration among the City and McNulty initially. The Parties enter into this Agreement upon the assumption that the annexation by City of McNulty territory will occur over an extended period as housing demands increase causing subdivision of land and development. The Parties believe the City's Urban Growth boundary will provide land for City growth through 2060. McNulty and City recognize that water utilities have both fixed and variable costs and that financial analysis is required to assess the impact of annexation on McNulty over time. Given the supply and storage capacity of McNulty, the overall state of its water system and its ability to control costs, neither party expects any significant adverse impact on McNulty water customers in the near term. Financial impacts will be considered and analyzed as part of Review, Section 8, below.

4. COMPENSATION. If the City and McNulty agree, then the City may take and incorporate McNulty water distribution infrastructure (not including the source waters, storage or transmission mains) (collectively "Distribution System Assets") into the City system following annexation by the City and transfer of customers to the City system. The City will compensate McNulty for the

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

depreciated book value of the Distribution System Assets based upon their remaining useful life determined by asset management standards developed by the American Water Works Association. It is anticipated the City would take and incorporate Distribution System Assets if they meet City design and construction standards. If the City and McNulty agree that City will take Distribution System Assets that are not designed and constructed to City standards, then City must pay McNulty if those Distribution System Assets remain in service after two (2) years. The Parties agree to execute a mutual use agreement if a Distribution System Asset is used to serve both City and McNulty customers.

5. COORDINATION. The Parties hereby agree to engage in a cooperative, coordinated approach to data sharing, meter and usage information, infrastructure planning, land use permitting, development review, and capital planning, especially as those activities relate to existing and future water service or associated utility corridor or right of way development. City and McNulty are responsible for the development and amendment of any needed facilities to ensure continued service within their boundaries. City and McNulty will consult with each other and provide opportunity for review and comment on any plans or amendments to such facilities that would affect water service within the Service Area.

The Parties further agree to share data and information relevant to such planning, including (but not limited to) economic growth; demographics, housing and building details, land use and zoning; development applications, planned annexations, building activity and planned transportation improvements; major capital improvements, opportunities for joint development of sites; and other information that may be relevant to conduct or complete the necessary planning by all Parties.

6. SPECIAL CONDITIONS. City and McNulty also agree to comply with the following special conditions:

6.1 Use of City Right of Way. Subject to the City's permitting process and engineering coordination of location within the City's right of way, McNulty shall be entitled to locate, maintain and relocate necessary facilities within the City right of ways during the term of this Agreement upon payment of a five percent (5%) privilege tax for use of the right of way in accordance with ORS 221.450. The 5% privilege tax shall be calculated on revenue generated on water sales to McNulty customers within the City boundaries, and will be payable by McNulty on a quarterly basis, each payment due thirty (30) days after the date McNulty sends out quarterly billing statements to its customers. Wherever technically feasible and according to prudent utility practices, facilities installed by McNulty within the City after the date of this Agreement shall be so located as to cause minimum interference with the proper use or development of streets, alleys and other public ways and places, and to cause minimum interference with the rights or reasonable convenience of property owners who adjoin any of the streets, alleys or other public ways or places. McNulty shall obtain street opening permits for all street cuts and shall comply with the provisions of City's street cut ordinance.

6.2 Restoration. In case of any disturbance of pavement, sidewalk, driveway or other existing surfacing by McNulty as caused by normal operations (including but not limited to pipeline repair, main line extensions, or other access to buried facilities) McNulty shall, at its own cost and expense and in a manner approved by City, replace and restore all paving, sidewalk, driveway or surface of any street or alley disturbed, in

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

as near as practicable condition as before the disturbance. If McNulty fails to make restoration as required, City shall cause the repairs to be made at the expense of McNulty. Such restoration will meet all existing material specifications required by the City.

7. APPROVAL; AMENDMENT. This Agreement, and any amendments thereto, must be approved by resolution of the governing body of each Party, and signed by an authorized representative of each Party. This Agreement shall be reviewed by the parties under the Review Section below or if legislative or court decisions so require but any amendment must be approved as provided in this Section.

8. REVIEW. McNulty and City agree to meet upon request of any Party but at least once every five years to review the terms of this Agreement and provision of service in the Service Area. The Parties shall meet within 30 days of written notice by McNulty to City if it appears City annexation will result in (i) a ten percent (10%) reduction in McNulty customers in the Service Area; or (ii) a five percent (5%) reduction in total McNulty customers as a result. In all circumstances, City and McNulty will use good faith efforts to mitigate those impacts which includes, but is not limited to, financial remuneration for negative impacts, loss of revenue payment of proportionate shares of debt and other mutually agreed amendments to this Agreement.

9. TERM OF AGREEMENT. This Agreement shall continue in full force and effect unless terminated under mutual agreement in writing by all Parties. The Parties agree that at the expiration of each twenty (20) year term, they will re-open, revise, and extend the Agreement as necessary for an additional twenty (20) year term.

10. DISPUTE RESOLUTION. The Parties hereby agree that resolution of any and all disputes arising out of the terms of this Agreement or interpretation thereof shall follow a prescribed process beginning with negotiation and subsequently moving to mediation, provided the dispute remains unresolved.

10.1 Negotiations. Within thirty (30) days following receipt of written notice regarding a dispute ("Dispute Notice"), the parties to the dispute ("Disputing Parties") shall assign a representative to participate in good faith negotiations for a period not to exceed sixty (60) days after appointment of the representatives.

10.2 Mediation. If after the sixty (60) day period of negotiation (or a period not to exceed ninety (90) days following the receipt date of the Dispute Notice), the dispute(s) cannot be resolved, the Disputing Parties agree to submit the matter to non-binding mediation. The Disputing Parties shall attempt to agree on a mediator in a period not to exceed thirty (30) days (or a period not to exceed one hundred twenty (120) days following the receipt date of the Dispute Notice) and proceed accordingly.

10.3 Litigation. If the Parties cannot agree on a mediator within the allocated time, or if the mediator cannot resolve the dispute(s) within one hundred eighty (180) days following the receipt date of the Dispute Notice, either of the Disputing Parties may initiate litigation in the Circuit Court of the State of Oregon for Columbia County and seek all available remedies. Moreover, each of the Disputing Parties shall bear its own legal and expert witness fees at all stages of the dispute resolution process, including at trial or on

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

any appeals. In addition, nothing shall prevent the Disputing Parties from waiving any of the steps by mutual consent.

11. ADDITIONAL PROVISIONS.

11.1 Other Necessary Acts. Each Party shall execute and deliver to the others all such further instruments and documents as may be reasonably necessary to carry out this Agreement.

11.2 Severability. If one or more of the provisions contained in this Agreement is determined by a court of competent jurisdiction to be invalid, illegal, or unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions contained herein shall continue in full force and effect.

11.3 Notices. Any notice herein required or permitted to be given shall be given in writing, shall be effective when actually received, and may be given by hand delivery or by United States mail, first class postage prepaid, addressed to the parties as follows:

City Administrator	Chair, Board of Directors
City of St. Helens	McNulty Water PUD
P.O. Box 278	P.O. Box 260
St. Helens, Oregon 97051	St. Helens, Oregon 97051

These addresses may be changed by written notice to the other Parties.

11.4 No Third-Party Beneficiaries. The Parties to this Agreement are the only Parties entitled to enforce its terms. Nothing in this Agreement gives, is intended to give, or shall be construed to give or provide, any benefit or right, whether directly or indirectly or otherwise, to third persons.

11.5 Nonwaiver. Failure by any Party at any time to require performance by any other Party or Parties of any of the provisions of this Agreement shall in no way affect such Party's rights hereunder to enforce the same, nor shall any waiver by any Party or Parties of the breach of this Agreement be held to be a waiver of any succeeding breach or a waiver of this nonwaiver clause.

11.6 Applicable Law. The Agreement shall be governed by and construed in accordance with the laws of the State of Oregon.

11.7 Compliance with Laws. In connection with their activities under this Agreement, all Parties shall comply with all federal, state, and local laws, comprehensive plans and ordinances applicable to this Agreement, or any work performed pursuant to this Agreement.

11.8 Assignment. No Party shall assign this Agreement, in whole or in part, or any right or obligation hereunder, without written approval of the other Party, which shall not be unreasonably withheld.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

11.9 Binding Effect. The covenants, conditions, and terms of this Agreement shall extend to and be binding upon and inure to the benefit of the successors of the parties hereto.

IN WITNESS WHEREOF, the parties have, pursuant to official action, duly authorized their respective officers to execute this Agreement on their behalf.

Dated this _____ day of _____, 2013.

CITY OF ST. HELENS	**MCNULTY WATER PEOPLE'S UTILITY DISTRICT**
By: _____ Mayor	By: _____ Chair
Attest: _____ City Recorder	Attest: _____ Secretary
APPROVED AS TO FORM	APPROVED AS TO FORM
_____ City Attorney	_____ Legal Counsel

4822-8786-9972, v. 1

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

CITY OF ST HELENS AND MCNULTY PUD
URBAN SERVICE AGREEMENT
ORS 195 CRITERIA REVIEW, ANALYSIS & WORK PRODUCT

DATE: MAY 10, 2012

TO: ORS 195 McNulty PUD- City of St. Helens Working Group*

FROM: ORS 195 McNulty PUD-City of St. Helens Technical Group**

INTRODUCTION

It is the intent of the Working Group to develop a 195 Agreement between McNulty PUD and St. Helens to delineate roles and responsibilities of each party with regard to provision of future water service within St. Helens' Urban Growth Area (UGA).

At its meeting of November 15, 2011, the Working Group formed the Technical Group and charged it with analyzing water service provision within the UGA and providing information and analysis to the Working Group. The Technical Group was directed to undertake its analysis using the structured methodology contained in the relevant sections of ORS 195.

The work of the Technical Group was facilitated and supported by Glen Higgins, Columbia County Planning Manager and Deborah Jacob, Columbia County Planner II, and Michael Rosenberger, an independent consultant.

Included in this memorandum is the analysis and information requested. It is organized by Criterion, as delineated in ORS 195.

ORS 195 CRITERIA

There are 11 criteria and they are assessed individually.
They are these (Note that the first five are the ones that were identified by the Working Group as highest priority, although they are all important):

1. Quantity and Quality of Service
2. Financial Capacity (There is one document related to data and one related to analysis.)
3. Customer Financial Impact, Rates, Equity and Bills
4. Operational Capacity
5. Duplication of Facilities
6. Management Capacity
7. Customer Accountability
8. Economies of Scale
9. Cost Allocation of Future Services
10. Physical Factors Associated with Service Provision
11. Demographic and Sociological Trends

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

*Chad Olsen – City Administrator (former)
Randy Peterson – Mayor
Doug Morten – City Councilor
Bob Nicklaus – Board Member
Andy Tinkess – General Manager
Dick Lager – Board Member

**Andy Tinkess – General Manager
Jon Borden – Consulting Engineer
Fred Bolton – Consulting Engineer
Jon Ellis – Finance Director
Sue Nelson – Engineering Supervisor
Neal Sheppeard – Public Works supervisor

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SUMMARY AND OVERVIEW

The criteria-based approach provides a structured and comprehensive basis for comparing relative attributes and performance indicators of each entity.
Without repeating everything that is covered in this document, a few items of note are these:

Both entities adequately meet current supply capacity needs; meet all drinking water quality standards; meet pressure and fire flow requirements;

Based on 2030 demands projected by HDR, St. Helens can meet them with a relatively small investment at the water treatment plant; McNulty would need to invest substantial (although not yet quantified) amounts of money to expand supply capacity;

Customer bills are higher in St. Helens than in McNulty at all levels of consumption;

Both entities have well-documented policies and procedures;

Both entities have comprehensive customer communications programs;

Both entities have experienced declining per capita water consumption levels, increasing levels of late payments as a growing number of customers have difficulty paying bills on time, and very slow rates of growth;

There is little duplication of facilities;

Both entities address the issue of equity between current and new customers via System Development Charges (SDCs); an equity issue that has been identified by the Technical Group relates to costs borne by current St. Helens customers to upsize components of the water system in anticipation of growth;

Both systems appear to be "tight" with reasonable levels of unaccounted for water, even though the systems are very different in terms of materials (primarily Ductile and Cast Iron in the City; PVC and Asbestos Cement in the PUD); and both have ongoing leak detection programs;

Financial viability is a major concern of the PUD should the number of PUD customers be significantly reduced. The City has the same concern should planned expansion of the customer base not occur.

The staffing level (ratio of personnel to customers) is more than twice as high in the City than in the PUD.

CONCLUSION

The Technical Group is presenting this information and analysis to the Working Group pursuant to its direction.

We are available to meet and discuss this content, and provide additional information as needed.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

ORS 195 CRITERIA: COMPARISON OF MCNULTY PUD AND CITY OF ST. HELENS

TABLE OF CONTENTS

I. Quantity and Quality of Service

II. Financial Capacity (**narrative**)
Financial Capacity (**data**)

III.. Customer Financial Impact, Rates, Equity and Bills

IV. Operational Capacity

V. Duplication of Facilities

VI. Management Capacity

VII. Customer Accountability

VIII. Economies of Scale

IX. Cost allocation of Future Services

X. Physical Factors Associated with Service Provision

XI. Demographic and Sociological Trends

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

I. ORS Criterion - Quantity and Quality of Service

Performance Indicator	McNulty PUD	City of St. Helens
Water Supply Availability	1.93milliongallons/day (mgd)	7.15 mgd
(NOTE: A critical piece of this analysis relates to the ability of each entity to meet projected growth in the Urban Growth Area. Demand estimates were generated by HDR, the consulting engineer developing the City's Water Master Plan. McNulty has expressed its belief that the demand forecasts are overstated with regard to commercial and industrial growth. Both HDR and the City stand by the forecasts, so they are the basis of this demand/capacity analysis.)	At 2030 Maximum Daily Demand (MDD) McNulty has a supply deficit of 1.1 mgd, 1.8 mgd, and 3.1mgd at low, medium and high growth scenarios. To meet projected growth under any scenario McNulty would have to add considerable supply capacity of to-be-determined cost.	At 2030 MDD St. Helens has a surplus of 1.75 mgd at low growth scenario; a surplus of . 0.95 mgd at medium growth scenario; and a deficit of 0.45 mgd high growth scenario. St. Helens can add required supply capacity at a cost of approximately $185,000 (per City) at the water treatment plant.
	McNulty is consistently looking for new water supplies as part of routine system upgrade aimed at providing pressure-zone independence	
	McNulty's excess capacity is approximately 1.63 mgd	The City has approximately 5.15 mgd excess capacity

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Water Quality	Does not treat or chlorinate its water	Filters, treats and chlorinates its water at the treatment plant; chlorinates but does not treat its well water
Both entities meet all water quality standards and regulations of the Safe Drinking Water Act	16 Violation Points per the State's website (Oregon Health) over the past 5 years	2 Violation Points per the State's (Oregon Health) website over the past 5 years
Water Pressure	All connections comply with the minimum 20 psi requirement for residential customers.	All connections comply with the minimum 20 psi requirement for residential customers.
	Four pressure zones	Two pressure zones
Fire Flow (NOTE: The next ISO evaluation and rating will take place in April, 2012)	ISO Rating of 4 and 8 system-wide; Primarily 4 within UGA with adequate volume & pressure. Commercial fire flows in the UGB along Highway 30 are based on 1,500 gallons per minute at the minimum of 20 psi.	Fire flow design standards for commercial and industrial land uses is 3,000 and 3,500 gallons per minute, respectively.
	Majority of connections are within 1000 feet of a fire hydrant and within 5 miles of a fire station	All connections are within 500 feet of a hydrant; majority are within 250 feet; all customers are within three miles of a fire station.
Storage	Has designed its system to meet routine demand plus fire flow	Has designed its system to meet routine demand plus fire flow
	Additional storage requirements will be determined using the data generated by the three scenario demand analysis. This will be ongoing work and not identified at this time.	Additional storage requirements will be determined using the data generated by the three scenario demand analysis. These requirements should be identified in the City's currently under-development

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

		Water Master Plan.
	McNulty is in the process of testing an Aquifer Storage and Recovery (ASR) development that to date shows storage of 5 million gallons which obviates the need to build an above-ground storage tank. Results will be known, and a possible license obtained, in 2014.	
Security	Completed federally mandated Vulnerability Assessment (VA) and has no open reservoirs	Completed federally mandated Vulnerability Assessment Completed federally mandated Vulnerability Assessment (VA) and has no open reservoirs
	Numerous facility alarms and fencing Hatch alarms exist at all reservoir and tank sites	Numerous alarms but not on all sites/facilities. Hatch alarms will be installed during FY 2012-13
	Alarms are integrated with SCADA	Alarms are integrated with SCADA and/or telemetry
Leak Detection	In-house annual acoustic survey of areas the PUD has identified	Contractors provide annual acoustic survey of areas identified by City.
		City conducts surveys in-house as part of ongoing O&M
Backflow	Program meets State Standards	Program meets State Standards
	DCVA on all new customers including residential PUD provides initial device	Customers at risk install backflow at their own expense. City determines risk level and need for BF.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

	10% of customers have Backflow and the PUD has a multi-year program to cover all customers	All costs are borne by customers including acquisition, testing (after year one which is covered by the City) and replacement. Single check device is installed by the City at its cost on non-risky residential customers at the time of initial installation or replacement
Unaccounted for Water	12.03 % (PUD-generated figure)	12.11 % (HDR figure from the master plan)
Engineering Systems & Standards	9.43 miles (53%) of PUD within the UGA is PVC and 8.52 miles (47%) is AC.	80% of the City's system is Ductile and Cast Iron; 14% is steel; 5% is concrete cylinder; 1% is PVC. In the UGA all piping is or will be DI.
	Has written Policies and Manuals	Has Written Policies and Manuals
Conservation	Has a Water Conservation & Management Plan dated 2000	Is close to finalizing its Water Management and Conservation Plan as part of the Water Master Plan, which will be completed in 2012

	Has a tiered rate structure, but a water usage allowance within fixed rate.	Sewer bills are based on water usage; most of water bill is based on usage.

	Telemetry and meter calibration and replacement are ongoing O&M activities	Telemetry and meter calibration and replacement are ongoing O&M activities
	Usage exception, account flagging, and leak detection surveys and program	Shower head and faucet aerator give-away as well as leak detection surveys and programs
	Public information and	Public information and

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

	educational programs	educational program

II. ORS Criterion-Financial Capacity (Analysis)

Performance Indicator	McNulty PUD	City of St. Helens
Funding Operations and Maintenance (O&M)	Funds ongoing O&M expenditures with current operating revenue	Funds ongoing O&M expenditures with current operating revenues and cash balances. Will fund O&M with current revenue in FY 2012-13.
Financial Plan	Does not have a long term financial plan; Multi-year Capital Improvement Plan (CIP) is included in its Master Plan; Assesses financial situation annually as part of budget development, including identification of budget year CIP and rate requirements.	Has a 20 year Financial Plan with focus on first five years (It includes capital plan and expected rate increases); Annual budget process
	Analyzes rates annually to ensure financial needs are met	Projected rate increases are included in the Financial Plan and reviewed annually
Treasury Functions	Local Government Investment Pool (LGIP)	LGIP primarily but some local investment outside of LGIP, primarily in highly rated (AAA) bonds
Bad Debt Policies	Water User Agreements tie water bill to property (as an alternative to liens, which PUDs cannot assess)	
	Notifies Realtors of all delinquent customers so outstanding bills can be paid at time of sale of property	A collection process enables the use of collections agencies. Liens are not used but the City has the authority to impose them.
	Has seldom used collection agencies	

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

	Write-offs for bad debt / uncollectible bills are low	Write-offs for bad debt / uncollectible bills are low
Reserve Policy	No set target; Cash and cash equivalents on 6/30/10 were $605,266. This includes operating surpluses and all other cash.	Target is 20% of O&M—60-90 days of operating cash requirements

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

II. ORS Criterion-Financial Capacity (Data)

Data		McNulty	St Helens
FY 09-10 Revenue		434,200	2,106,846
FY 09-10 O&M expenses		347,093	2,529,447
Change to Fund balance		31,107	-1,088,438
Net Assets		2,162,952	14,499,542
# of Customers		2,451	12,050
# of Connections		923	4,700
Revenue per Capita		177.07	174.84
O & M Expense per Capita		141.55	209.91
Assets per Capita		882.12	1,203.28
Bonded Debt	6/30/2010	0	6,882,188
FY 11-12 Debt Service		0	541,860
FY 09-10 Operating Ratio		0.8	
O & M Expenses/revenue			
Debt -equity ratio		na	
Debt Coverage Ratio		na	FY 10-11: 0.34 FY 11-12: 0.7 FY 12-13: 1.2-1.5

DATA SOURCES St Helens Annual Financial Report FY 09-10

McNulty Audited Financial Statements FY 09-10

St Helens Budget FY 11-12

St Helens Finance Director

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

III. ORS Criterion-Customer Financial Impact, Rates, Equity and Bills

Performance Indicator	McMcNulty PUD	City of St. Helens
Monthly Residential Rates	Current rates have been in place since second Quarter of 2007 The PUD has no plans to increase rates in the foreseeable future. Additional facilities to meet growth will put upward pressure on rates.	Current rates have been in place since 12/15/11 The current Financial Plan calls for rates to increase 15% on 12/15/12; 12/15/13; and 12/15/14. At each of those times, the financial projections will be reviewed and rates may or may not increase the planned 15%
Current Residential Bill Comparison	5.5 ccf $25.00 7.5 ccf $28.54 10 ccf $34.44	5.5 ccf $30.88 (+23%) 7.5 ccf $39.11(+37%) 10 ccf $49.38 (+43%)
Bill Relief	No current program for low income customers	Current senior discount program will expand to a low income program in FY 2011-12 (i.e. The discount will be based on income rather than age.)

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Rate Structure	Universal Automated Meter Reading (AMR) and no estimated bills Three inclining block rates; Base charge includes a water usage allowance; One customer class since almost all customers are residential quarterly	AMR in process (will be completed in 3-4 years); bills are based on actual use Base charge with no water usage allowance, so bills are a function primarily of individual water consumption; No block rates; Three retail customer classes and one wholesale (Columbia City) Bill most customers bi-monthly; a few large users are billed monthly
System Development Charges to promote equity among new and existing customers	The SDC is established by subtracting the cost of material and installation (labor) from the connection fee. This methodology does not conform to ORS 223.	The SDC's are a combination of a reimbursement fee and **an** improvement fee per ORS 223. The fees are calculated/updated periodically by the City's Financial Advisor.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

IV. ORS Criterion-Operational Capacity

Performance Indicator	McNulty PUD	City of St. Helens
Targeted Service Levels	Immediate to one hour response for emergency and non-emergency calls depending on whether they are received during working hours or outside of them	Immediate response to all calls during working hours: maximum one hour response to all calls during non working hours.
Standard Operating Procedures	Yes	Yes
Technology	SCADA and Telemetry	SCADA and Telemetry
Staff (The ratio of staff to customers is twice as high in St. Helens as it is in McNulty.) (NOTE: These figures represent staff dedicated to water operations and maintenance. In the case of St. Helens as many as 12 additional Public Works staff can be deployed to assist in times of need (floods, main breaks, etc.).	0.9 FTE contract Manager/Operator; Two part-time, on-call field persons; 0.5 FTE office staff Contracts for field work as needed (e.g. repairs, hydrant installation, backflow); contractors add capacity to Manager as needed. 2,452 customers/0.9 FTE equals 1 FTE per 2,724 customers	8 FTE field staff 2 FTE water treatment plant operators 1.5 FTE office staff 12,050 customers/10 FTE equals 1 FTE per 1,205 customers.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

V. ORS Criterion-Duplication of Facilities

Performance Indicator	McNulty PUD	City of St. Helens
Duplication was noted in Meadow View (main line) and at Gable near Columbia Blvd. (3 services)		
Coordination of City Service Provision		Urban services associated with stormwater, drainage, street cleaning, hydrant flushing, and water system maintenance in the right of way need to be coordinated with provision of water services.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

VI. ORS Criterion-Management Capacity

Performance Indicator	McNulty PUD	City of St. Helens
Planning Functions	Water Master Plan, including Capital Improvement Plan, and a Water Conservation/ Management Plan exist. Financial planning is done year to year.	Water Master Plan is in process and includes Water Conservation/Management Plan. Multi-year CIP exists. St. Helens has a multi-year Financial Plan updated annually.
Policy Making	Policy making is the responsibility of an elected Board, which holds regularly scheduled meetings open to the public.	Policy making is the responsibility of an elected City Council, which holds regularly scheduled meetings open to the public.
Organization Admin/Mgmt	The PUD is managed by a contract operator.	The water utility is managed by the Public Works Director, and operated by a Public Works Supervisor.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

VII. ORS Criterion-Customer Accountability

Performance Indicator	McNulty PUD	City of St. Helens
Communications	Newsletter – mailed to customers twice per year. Utility billings – quarterly Consumer Confidence Report – mailed to customers annually. PUD Board – monthly meeting open to the public; special meetings as needed. Customer satisfaction survey in 2011 and planned for every few years.	City Website - Several water specific pages updated on an ongoing basis City E-newsletter - Monthly Utility Billings - every other month Gazette - (City printed newsletter) mailed to all water customers - quarterly Consumer Confidence Report - mailed to all water customers - annually City Council - meets twice on both the first and third Wednesday of each month. All four meetings are open to the public. Budget Committee, consisting of the City Council and five City residents - meets approximately six times over 3 months at budget time. Rate forums - several per year at budget time.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

VIII. ORS Criterion-Economies of Scale

Performance Indicator	McNulty PUD	City of St. Helens
Scale	Growth will enable the PUD to allocate fixed costs over a broader customer base.	Growth will enable the City to allocate fixed costs over a broader customer base.
Oversizing assets		The City has made the point that it has oversized components of the system in order to serve projected growth within the UGA.
Financial Viability	This is a concern to the PUD should the number of customers be significantly reduced.	The City is concerned about the financial impact of not annexing and serving planned growth.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

IX. ORS Criterion-Cost Allocation of Future Services

Performance Indicator	McNulty PUD	City of St. Helens
Equity between New and Current Customers	System Development Charges address the equity issue.	System Development Charges address the equity issue.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

X. ORS Criterion- Physical Factors Associated with Service Provision

Performance Criteria	McNulty PUD	City of St. Helens
Elevation	McNulty has existing infrastructure in a higher elevation area off Pittsburg Rd. named the "Robinette" and " Smith" pressure zones	
Highway 30	This is a physical factor affecting water system design and service provision.	This is a physical factor affecting water system design and service provision.
McNulty Customers east of Highway 30	These customers are essentially a pocket surrounded by St. Helens city limits and customers.	

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

XI. ORS Criterion-Demographic and Sociological Trends

Performance Indicator	McNulty PUD	City of St. Helens
Reduction in per capita/per household water consumption	This is occurring.	This is occurring.
A trend demonstrating more difficulty on the part of a growing number of customers to pay bills on time	This is occurring.	This is occurring.
A slow rate of growth and development in both the PUD and City service areas		

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

ORS 195 CRITERIA REVIEW, ANALYSIS AND WORK PRODUCT

Adopted by Working Group May 10, 2012

ADDENDUM #1

OCTOBER 11, 2012

INTRODUCTION:

On May 10, 2012, the City of St. Helens and the McNulty Water People's Utility District adopted the ORS 195 Work Product that it commissioned on November 15, 2011.

That Work Product is the basis of the negotiations currently underway between the entities to develop and adopt an Urban Services Agreement related to provision of water service within the Urban Growth Area. It will continue to be the basis for modifications to the Agreement in the future.

It is the intent of the parties to update (via addendum) the Work Product as changes occur over time within each water system. All addenda will be appended to the original Work Product and incorporated by reference.

ADDENDUM #1 CONTENT:

1. ORS Criterion- Customer Financial Impact, Rates, Equity and Bills

With regard to the System Development Charge content on page 9 in the McNulty PUD column, the following language is added to reflect the current situation:

McNulty PUD has contracted with a financial consultant to undertake an analysis of its retail and wholesale rates, and its System Development Charge methodology and amount. McNulty intends to adopt the analysis by December 31, 2012.

2. ORS Criterion-Management Capacity

With regard to the Planning Functions content on page 12 in the St. Helens column, the following language is added to reflect the current situation:

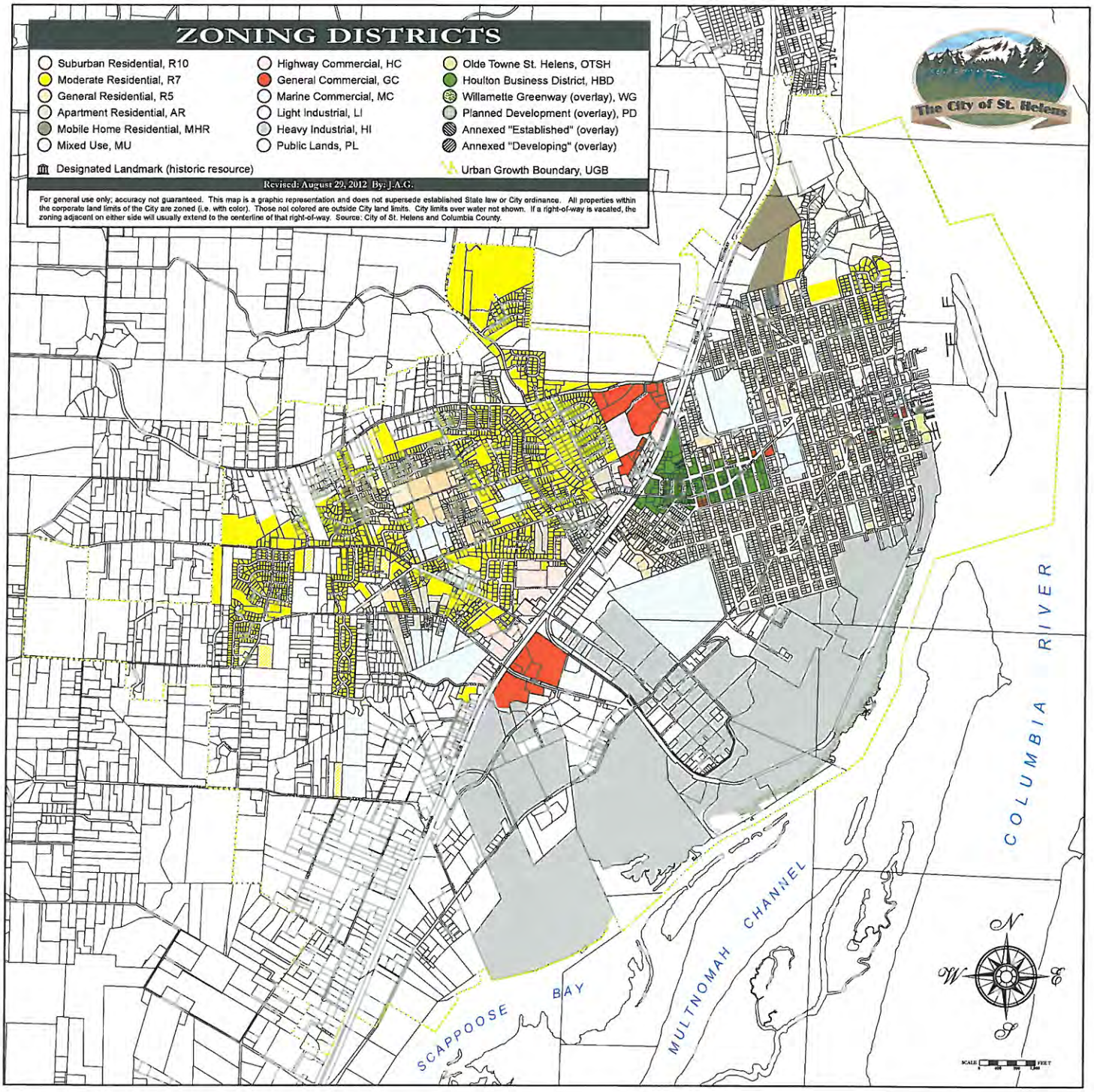
The City of St. Helens is reviewing and finalizing its multi-year Master Plan. It will be discussed and adopted by the City Council by December 31, 2012. At that time it will be available for public dissemination.

CONCLUSION:

The next Addendum will be puhlished as circumstances warrant.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

EXHIBIT 2



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

St. Helens Soils

Source: USDA Web Soil Survey (WSS)

Columbia County, Oregon (OR009)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	738.2	12.50%
1B	Aloha silt loam, 3 to 8 percent slopes	388.9	6.60%
2	Aloha variant silt loam	200.9	3.40%
6D	Bacona silt loam, 3 to 30 percent slopes	27.1	0.50%
10B	Cascade silt loam, 3 to 8 percent slopes	43.2	0.70%
10C	Cascade silt loam, 8 to 15 percent slopes	95.4	1.60%
10D	Cascade silt loam, 15 to 30 percent slopes	46	0.80%
14C	Cornelius silt loam, 8 to 15 percent slopes	114.8	1.90%
14D	Cornelius silt loam, 15 to 30 percent slopes	73.5	1.20%
16	Dayton silt loam	46.3	0.80%
18E	Dowde silt loam, 30 to 60 percent north slopes	22.8	0.40%
19E	Dowde silt loam, 30 to 60 percent south slopes	38.2	0.60%
27B	Latourell silt loam, 3 to 8 percent slopes	12.2	0.20%
31	McBee silt loam	6.6	0.10%

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

39B	Quafeno loam, 3 to 8 percent slopes	71.5	1.20%
40A	Quatama silt loam, 0 to 3 percent slopes	59.4	1.00%
40B	Quatama silt loam, 3 to 8 percent slopes	272	4.60%
40C	Quatama silt loam, 8 to 15 percent slopes	95.1	1.60%
45	Rock outcrop-Xerumbrepts complex, undulating	2,015.60	34.20%
46	Sauvie silt loam	417.8	7.10%
63	Wapato silt loam	10.9	0.20%
69	Wollent silt loam	404.2	6.90%
70E	Xerochrepts, steep	139	2.40%
71	Xeropsamments, nearly level	56.8	1.00%
W	Water	501.5	8.50%
Totals for Area of Interest		**5,897.80**	**100.00%**

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SUBMITTED TO:
Keller Associates
245 Commercial St SE,
Suite 210
Salem, Oregon, 97301

BY:
Shannon & Wilson, Inc.
3990 SW Collins Way, Ste 100
Portland, Oregon,

503-210-4764
www.shannonwilson.com

GEOTECHNICAL PLANNING REPORT

St. Helens Wastewater and Stormwater Master Plan Update

ST. HELENS, OREGON

SHANNON & WILSON

November 2021

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Submitted To: Keller Associates
245 Commercial St SE,
Suite 210
Salem, Oregon, 97301
Attn: Peter Olsen, PE

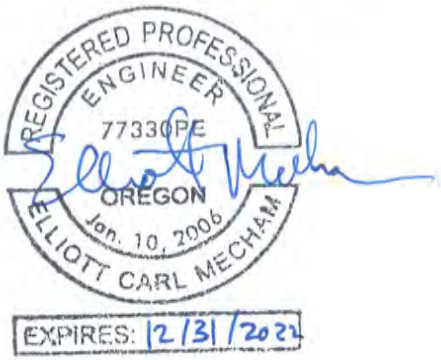
Subject: GEOTECHNICAL PLANNING REPORT, ST. HELENS WASTEWATER AND STORMWATER MASTER PLAN UPDATE, ST. HELENS, OREGON

Shannon & Wilson prepared this report and participated in this project as a subconsultant to Keller Associates. Our scope of services was specified in our contracted dated March 18, 2021 for Keller project number 220060. This report presents the geotechnical planning-related findings based on a review of publicly available documents and was prepared by the undersigned.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or if we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON, INC.



Elliott Mecham, PE
Senior Associate

DSJ:ECM:JLJ/:myw

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

CONTENTS

1 General 1
2 Scope of Services 1
3 Description of Provided Maps 2
3.1 Provided Data 2
3.2 Available Mapping 2
3.3 Geology 2
3.3.1 Regional Seismological Setting 3
3.4 Liquefaction Hazard 4
3.5 Landslide Hazard 4
4 Summary of Findings 5
4.1 Landslides 5
4.2 Liquefaction and Lateral Spread 5
4.2.1 Liquefaction Induced Post-Seismic Settlement 6
4.2.2 Fault Rupture 6
4.3 Rock Excavation 7
5 Limitations 7
6 References 9

Figures

Figure 1: Vicinity Map
Figure 2: Site Plan
Figure 3: Pipeline Vulnerabilities
Figure 4: Geologic Map
Figure 5: Liquefaction Hazard
Figure 6: Landslide Susceptibility
Figure 7: Fault Map

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

1 GENERAL

The City of St. Helens provides sanitary sewer collection services to businesses and residences within the City limits. The sanitary sewer collection system is a combination of 60 miles of gravity and force mains, 9 lift stations, and over 1,700 sanitary sewer manholes, vaults, and cleanouts. All sewage flows are conveyed to the City's wastewater treatment facility. The last complete update to the City's sanitary sewer master plan was in 1989.

The intent of the sanitary sewer master plan is to perform an assessment of the existing sewer system; evaluate the sewer system for its capacity to convey existing and future waste discharges; identify deficiencies, capacity issues, areas for improvement, and identify resiliency issues for critical facilities; and determine and propose solutions.

2 SCOPE OF SERVICES

The purpose of Shannon & Wilson's task is to prepare and provide GIS maps of the service area with the mapped site geology and the State of Oregon Department of Geology and Mineral Industries' (DOGAMI) mapped seismic hazards, and document the findings in a brief report. The backbone wastewater and stormwater facilities selected and digitized into GIS format by others will be shown on the maps. Our specific scope of work includes the following:

- Mapped site geology;
- Mapped landslides included in DOGAMI's landslide inventory (if any) along the proposed pipeline alignments or at the treatment plant sites;
- Mapped United States Geology Survey (USGS) Class A or Class B faults that cross pipeline alignments or are located within a 5-mile radius of treatment plant locations;
- Mapped relative earthquake liquefaction hazard based on DOGAMI maps (high, medium, or low hazard);
- Mapped relative landslide risk based on DOGAMI maps (very high, high, moderate, or low hazard); and
- Submitting a brief memo or letter report presenting the geologic maps and a brief discussion summarizing our findings, including a discussion on probable areas where rock excavation could be required, and the potential need to mitigate seismic hazards. The discussions will be limited by the uncertainties and assumptions made during the development of the geologic maps and DOGAMI hazard layers.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

3 DESCRIPTION OF PROVIDED MAPS

3.1 Provided Data

Shannon & Wilson was provided GIS files for the City of St. Helens stormwater and wastewater facilities. An overview map of these facilities can be found on Figure 2, Site Plan. Within the files provided were attributes which allowed for the identification of vulnerable assets. The vulnerable pipelines can be found on Figure 3, Pipeline Vulnerabilities.

3.2 Available Mapping

DOGAMI has developed several publications which were used in our assessments related to the stormwater and wastewater facilities. These included site geology, landslide hazard, and peak ground accelerations associated with a Cascadia Subduction Zone earthquake. Datasets of interest for this project include the following:

- Geology: Oregon Geologic Data Compilation release 6 (OGDC-6);
- Landslide Hazard: DOGAMI Open-File Report O-16-02; and
- Cascadia Peak Ground Accelerations: DOGAMI Open-File Report O-13-06.

3.3 Geology

The City of St. Helens is at the northern end of the Portland Basin, a structural depression created by complex folding and faulting of the basement rocks. The most prevalent basement rock of the Portland Basin is a sequence of lava flows called the Columbia River Basalt Group (CRBG), which flowed into the area between about 17 million and 6 million years ago (Beeson and others, 1991). Due to the wet and mild climate of the Pacific Northwest, intense chemical weathering of the geologic units has taken place (Evarts, 2004). This has resulted in the development of soil horizons as thick as 10 m. In some instances, the rocks of the CRBG have been completely converted to soil, destroying all primary rock textures.

The Columbia and Willamette Rivers converge within the Portland Basin and, with their tributaries, have contributed to an extensive sedimentary fill which overlies the basement rock formations. Beeson and others (1991) mapped the local Portland Basin fill sediments as Sandy River Mudstone, overlain by Troutdale Formation. The Troutdale Formation locally consists of well-consolidated friable to moderately well-cemented conglomerate and sandstone, deposited in the Miocene to Pliocene epochs (about 12.5 million to 1.6 million years ago).

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

The Troutdale Formation is locally overlain by sediments deposited during a series of catastrophic glacial outburst floods. During the late stages of the last great ice age, between about 18,000 and 15,000 years ago, a lobe of the continental ice sheet repeatedly blocked and dammed the Clark Fork River in western Montana, which then formed an immense glacial lake called Lake Missoula. The lake grew until its depth was sufficient to buoyantly lift and rupture the ice dam, which allowed the entire massive lake to empty catastrophically. Once the lake had emptied, the ice sheet again gradually dammed the Clark Fork Valley and the lake refilled, leading to 40 or more repetitive outburst floods at intervals of decades (Allen and others, 2009). During each short-lived episode, floodwaters washed across the Idaho panhandle, through the eastern Washington scablands, and through the Columbia River Gorge. When the floodwater emerged from the western end of the gorge, it spread out over the Portland Basin and up the Willamette Valley as far south as Junction City, depositing a tremendous load of sediment (O'Conner and others, 2001).

The geologic map presented on Figure 4 comes directly from the Oregon Geologic Data Compilation release 6 (OGDC-6).

3.3.1 Regional Seismological Setting

Earthquakes in the Pacific Northwest occur largely as a result of the subduction of the Juan de Fuca plate beneath the North American plate along the Cascadia Subduction Zone (CSZ). The CSZ is located approximately parallel to the coastline from northern California to southern British Columbia. The compressional forces that exist between these two colliding plates cause the oceanic Juan de Fuca plate to descend, or subduct, beneath the continental plate at a rate of about 1.5-inches per year (DeMets and others, 1990). This process leads to volcanism in the North American plate and stresses and faulting in both plates throughout much of the western regions of southern British Columbia, Washington, Oregon, and northern California. Stress between the colliding plates is periodically relieved through great earthquakes at the CSZ plate interface.

Within the regional tectonic framework and historical seismicity, three broad earthquake sources are identified:

- Subduction Zone Interface Earthquakes originate along the CSZ, which is located 25 miles beneath the coastline. Paleoseismic evidence and historic tsunami records from Japan indicate that the most recent subduction zone interface event was in 1700 AD and was an approximately magnitude 9 earthquake that likely ruptured the full length of the CSZ.
- Deep-Focus, Intraplate Earthquakes originate from within the subducting Juan de Fuca oceanic plate as a result of the downward bending and tension in the subducted plate. These earthquakes typically occur 28 to 38 miles beneath the surface. Such events on the

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

CSZ are estimated to be as large as magnitude 7.5. Historic earthquakes include the 1949 magnitude 7.1 Olympia earthquake, the 1965 magnitude 6.5 earthquake between Tacoma and Seattle, and the magnitude 6.8 2001 Nisqually earthquake. The highest rate of CSZ intraslab activity is beneath the Puget Sound area, with much lower rates observed beneath western Oregon.

- Shallow-Focus Crustal Earthquakes are typically located within the upper 12 miles of the earth's surface. The relative plate movements along the CSZ cause not only east-west compressive strain but dextral shear, clockwise rotation, and north-south compression of the leading edge of the North American Plate (Wells and others, 1998), which is the cause of much of the shallow crustal seismicity of engineering significance in the region. The largest known crustal earthquake in the Pacific Northwest is the 1872 North Cascades earthquake with an estimated magnitude of about 7. Other examples include the 1993 magnitude 5.6 Scotts Mill earthquake and magnitudes 5.9 and 6.0 Klamath Falls earthquakes. According to the USGS Quaternary Fault and Fold database (USGS, 2021), there are no Class A features within approximately 5 miles of the project site.

3.4 Liquefaction Hazard

The statewide liquefaction map of the state is a compilation of liquefaction susceptibility maps from other DOGAMI publications. Within the St. Helens area, this is IMS-7 (Madin and Wang, 1999). While this is a purpose-made liquefaction hazard map for the area, it was based primarily on aerial photo interpretation, geologic mapping from 1946, and water well data. Since the development of IMS-7, new geologic mapping was conducted (Evarts, 2004). In order to allow for a liquefaction hazard map based on the updated geologic mapping, we employed the Youd and Perkins 1978 methodology to convert the mapped geology to liquefaction susceptibility. The resulting map can be seen on Figure 5.

3.5 Landslide Hazard

The landslide hazard map presented on Figure 6 comes from the DOGAMI Open-File Report O-16-02. This overview map encompasses the entire state of Oregon and was designed to be used for regional planning. Susceptibility categories are broken into four categories (low, moderate, high, and very high), where very high denotes areas of mapped landslides.

The relative landslide hazard risk was developed by DOGAMI by creating a generalized geology-landslide intersect map and a percent slope map. Spatial statistics were then used to determine the mean and standard deviation of slope angles within landslides per geologic unit. Thirty percent of the area within the statewide hazard map consists of High or Very High hazard slopes and 80 percent of the landslides are located within this area.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Limitations of the input and modeling mean that the map should only be used for general planning purposes, and the map cannot be used as a substitute for geotechnical explorations, laboratory testing, and detailed site-specific analyses.

4 SUMMARY OF FINDINGS

The majority of the pipelines in need of replacement are located in areas mapped as rock. However, pipeline assets on the western portion of the basin are also mapped in Missoula Flood Deposits with small areas of alluvium. Assets within approximately 500 to 600 feet of the Willamette River pipeline, are located in recent alluvium and fill. The primary geologic hazard in the areas mapped as rock is strong ground motions.

Potential seismic hazards outside of the areas mapped as rock are expected to be related to liquefaction, and liquefaction-related phenomena such as settlement, lateral spreading, and post-seismic soil strength reduction. The risk of other seismic hazards, such as fault rupture, is low within the study area. Additionally, the potential need for rock excavation will be discussed in the following sections.

4.1 Landslides

According to the Department of Geology and Mineral Industries (DOGAMI), the existing pipelines are located within zones of low to high landslide hazard. While none of the mapped facilities are located within a mapped landslide, select stormwater facilities at the northernmost extent of the project area are adjacent to areas of very high landslide hazard indicating there are existing landslides.

4.2 Liquefaction and Lateral Spread

Soil liquefaction occurs in susceptible subsurface soils below the groundwater level. It is a phenomenon in which excess pore water pressure of loose to medium dense, saturated, granular soils increases during ground shaking to a level near the initial effective stress. The increased excess pore pressure results in a reduction of soil shear strength. Given that sands were observed at the ground surface and likely underlie a large portion of the project area, liquefaction is a potential hazard within the project area. A map of liquefaction susceptibility prepared using the Oregon Geologic Data Compilation release 6 (OGDC-6) and the Youd and Perkins, 1978 methodology, and included as Figure 5, indicates that much of the project area has no liquefaction hazard as the area is mapped as rock. However, select pipelines at the westernmost extent of the project area and on the eastern outfalls have moderate to high liquefaction risks. Again, the effects of liquefaction typically include

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

lateral spreading, slope instability, ground settlement, and strength reductions, such as lower allowable soil bearing.

We note that this hazard assessment is based solely on soil type and does not consider ground water presence or the absence of groundwater. If groundwater is not present at the site, the DOGAMI hazard map is likely overestimating the liquefaction potential. The relative density also impacts the liquefaction potential of the sands. Obtaining site specific borings or Cone Penetrometer Tests (CPTs) and laboratory tests on collected soil samples to assess the density of the sand was outside the scope of this study, but we recommend that they be performed during design to further assess the extent of the liquefaction hazard.

Lateral spreading hazards can exist in areas with mild slopes adjacent to a much steeper slope or vertical face. Lateral spreading failure can occur if soil liquefaction develops during a seismic event and the ground acceleration (inertial force) briefly surpasses the yield acceleration (shear strength) of the liquefied soil. This can cause both the liquefied soil and an overlying non-liquefied crust of soil to displace laterally down mild slopes towards an embankment face, or the banks of streams, rivers, and other bodies of water. The displacements are cumulative and permanent in nature. If liquefaction occurs there is risk of post seismic slope instability and potential lateral displacement towards the existing slope to the northeast.

4.2.1 Liquefaction Induced Post-Seismic Settlement

Settlement will likely occur in cohesionless soil below the groundwater table that undergo liquefaction and pore pressure development during ground shaking. The settlement is related to densification and rearrangement of particles during ground shaking, as well as volume change, as the excess pore pressure dissipates after ground shaking. Seismic ground settlement does not typically occur uniformly over an area, and differential settlement may impact existing or proposed structures and infrastructure supported by liquefied soil and/or within the liquified zones. Differential settlement is often estimated to range between 50 and 80 percent of the total settlement. Consequences of seismic-induced settlement would be subsequent settlement of shallow foundations overlying the liquefied soil.

4.2.2 Fault Rupture

Quaternary crustal faults and folds throughout Oregon and Washington have been located and characterized by the United States Geological Survey (USGS). The USGS provides approximate fault locations and a detailed summary of available fault information in the USGS Quaternary Fault and Fold Database. The database defines four categories of faults, Class A through D, based on evidence of tectonic movement known or presumed to be

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

associated with large earthquakes during Quaternary time (within the last 2.58 million years). For Class A faults, geologic evidence demonstrates that a tectonic fault exists and that it has likely been active within the Quaternary period. For Class B faults, there is equivocal geologic evidence of Quaternary tectonic deformation, or the fault may not extend deep enough to be considered a source of significant earthquakes. Class C and D faults lack convincing geologic evidence of Quaternary tectonic deformation or have been studied carefully enough to determine that they are not likely to generate significant earthquakes.

The closest Class A or Class B fault to the site is the Portland Hills Fault, mapped more than 5 miles from the project location, and is shown on the Fault Vicinity Map, Figure 7. In our opinion the risk of fault rupture at the site is low.

4.3 Rock Excavation

Rock excavation may be necessary where buried improvements are located outside or deeper than the existing utility trenches that are planned in areas mapped as rock. In the past, the City of St. Helen's has successfully used pipe bursting. However, the effectiveness and ease of pipe bursting has been a function of the existing trench width, pipe upsize, and depth of cover. We understand the City does not recommend pipe bursting for any pipes with less than 5-6 feet of cover. The City's historical experience with pipe bursting has been successful for increases of 1 to 2 pipe size diameters. The City has also reported successfully using Horizontal Directional Drilling (HDD) in solid basalt rock at depths over 16 feet below ground surface.

Pipe bursting to replace existing pipe where sewer lines are constructed over the top of shallow rock may not be feasible if adequate cover is not present. Additionally, rock or decomposed rock is relatively incompressible. If pipe bursting is performed in areas where pipes are buried in rock, any change in the density of the material surrounding the pipe that is required for upsizing will need to occur within the trench backfill. As was presented in Figure 4, Geologic Map, the majority of city assets are constructed within areas mapped as basalt. Where pipe bursting is considered as a possible remediation or where new sewers will be constructed outside of the existing trench, a review of as-built construction information, historic geotechnical information, or new geotechnical explorations should be considered to identify and mitigate the potential risk of rock related constructability issues in areas mapped as rock.

5 LIMITATIONS

This letter report was prepared for the exclusive use of the Keller and the City of St. Helens and their representatives for the purpose of planning-related geotechnical site evaluation for

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

wastewater facilities. The assessments contained in this letter are based on the information and data provided to us, and information that is publicly available. This letter report should not be viewed as a warranty of conditions described in this report, such as those interpreted from published maps. The maps should be used for planning level purposes only and not a substitute for geotechnical explorations and laboratory testing that will be required for design. Our findings are based on the limitations of our approved scope, schedule, and budget; and our understanding of the project and information provided by Keller Associates.

For any site located on or near a slope, there are slope instability risks that are present and future owners have to accept, including, but not limited to:

- Natural factors: soil and groundwater conditions, steep topography, heavy rainfall events, erosion, and vegetation conditions; and
- Human-related factors: water leaks, pipe breaks, improper drainage, lack of maintenance of vegetation or drainage facilities, fill or debris placement, excavation and/or removal of trees/vegetation.

Similar circumstances or other unknown conditions may also affect slope stability. Our evaluation and planning level assessments described herein are not a guarantee or warranty of slope stability conditions, nor current and future risks.

Please note that our scope of services did not include any environmental assessment or evaluation regarding the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below the site.

Shannon & Wilson has prepared the attached, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our reports.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

6 REFERENCES

Allen, J.E., Burns, M., and Burns, S., 2009, Cataclysms on the Columbia: The Great Missoula Floods (2nd ed.): Portland, Oregon, Ooligan Press, 204 p.

Beeson, M.H., Tolan, T.L., and Madin, I.P., 1991, Geologic Map of the Portland Quadrangle, Multnomah and Washington Counties, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries, Geological Map Series GMS-75, scale 1:24,000.

DeMets, C., Gordon R.G.; Argus, D.F.; and Stein, S., 1990, Current plate motions: Geophysics Journal International, v. 101, p. 425-478.

Evarts, R., 2004, Geologic Map of the Saint Helens Quadrangle, Columbia County, Oregon, and Clark and Cowlitz Counties, Washington: U.S. Geological Survey Scientific Investigations Map 2834.

Madin, I.P., and Wang, Z., 1999, Relative Earthquake Hazard Maps for Selected Urban Areas in Western Oregon: Dallas, Hood River, McMinnville-Dayton-Lafayette, Monmouth-Independence, Newburg-Dundee, Sandy, Sheridan-Willamina, St. Helens-Columbia City-Scappoose: Oregon Department of Geology and Mineral Industries, Interpretive Map Series GMS-75

O'Connor, J.E., Sarna-Wojcicki, A., Wozniak, K.C., Polette, D.J., and Fleck, R.J., 2001, Origin, Extent, and Thickness of Quaternary Geologic Units in the Willamette Valley, Oregon: U.S. Geological Survey Professional Paper 1620.

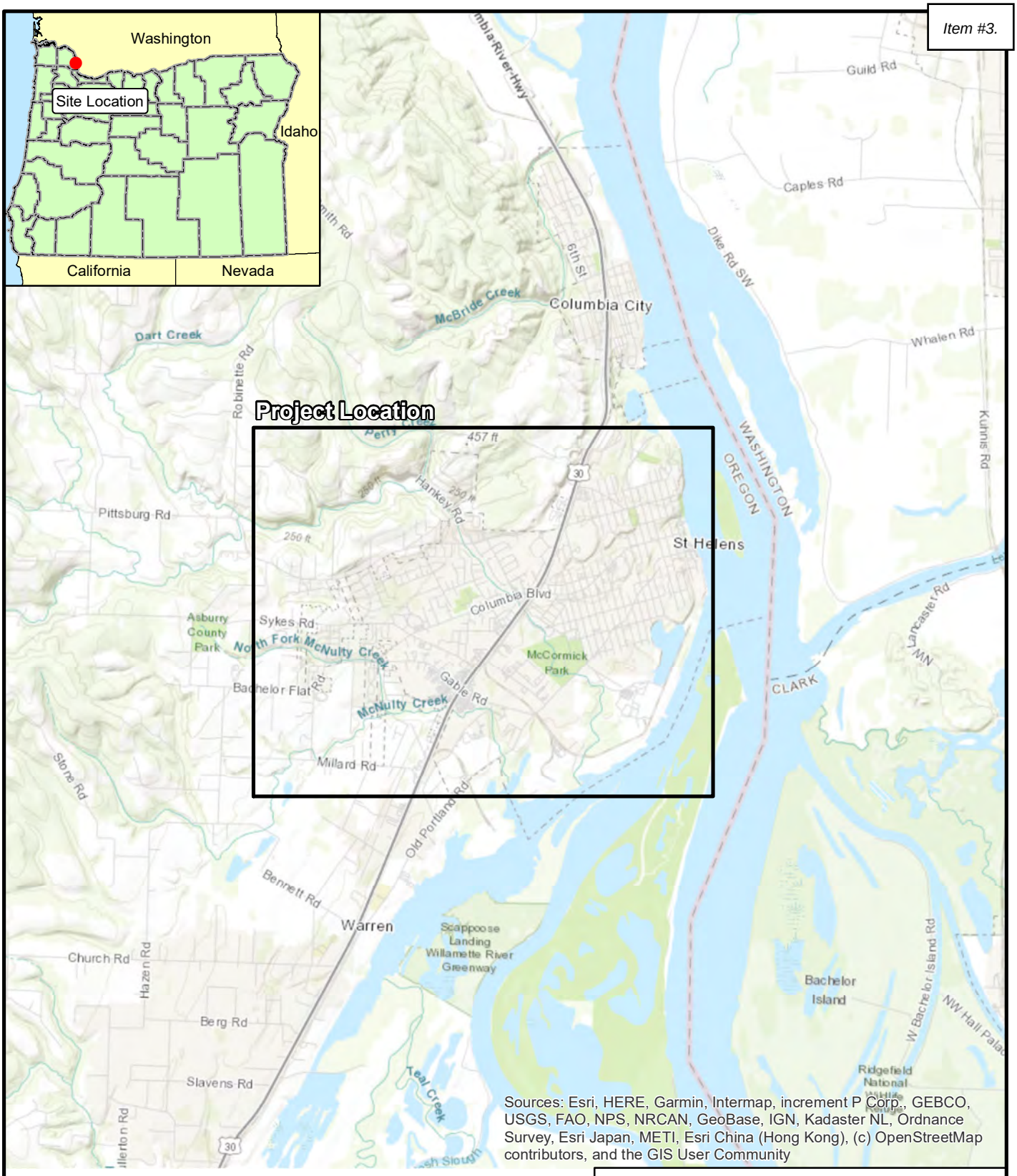
Smith, R.L., and Roe, W.P., 2015, Oregon Geologic Data Compilation, Release 6: Oregon Department of Geology and Mineral Industries, OGDC-6.

United States Geological Survey, 2021, Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquake.usgs.gov/hazards/qfaults/, accessed 6/28/21 6:39 PM.

Wells, R. E., Weaver, C. S., and Blakely, R. J., 1998, Fore arc migration in Cascadia and its neotectonic significance; Geology, v. 26, p. 759-762.

Youd, T.L., and Perkins, D.M., 1978, Mapping Liquefaction-Induced Ground Failure Potential: Journal of the Geotechnical Engineering Division, Volume 104, Issue 4, p. 433-446.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

0 0.5 1 2

Scale in Miles

N

St. Helen's Wastewater and Stormwater Master Plan Update
St. Helens, Oregon

VICINITY MAP

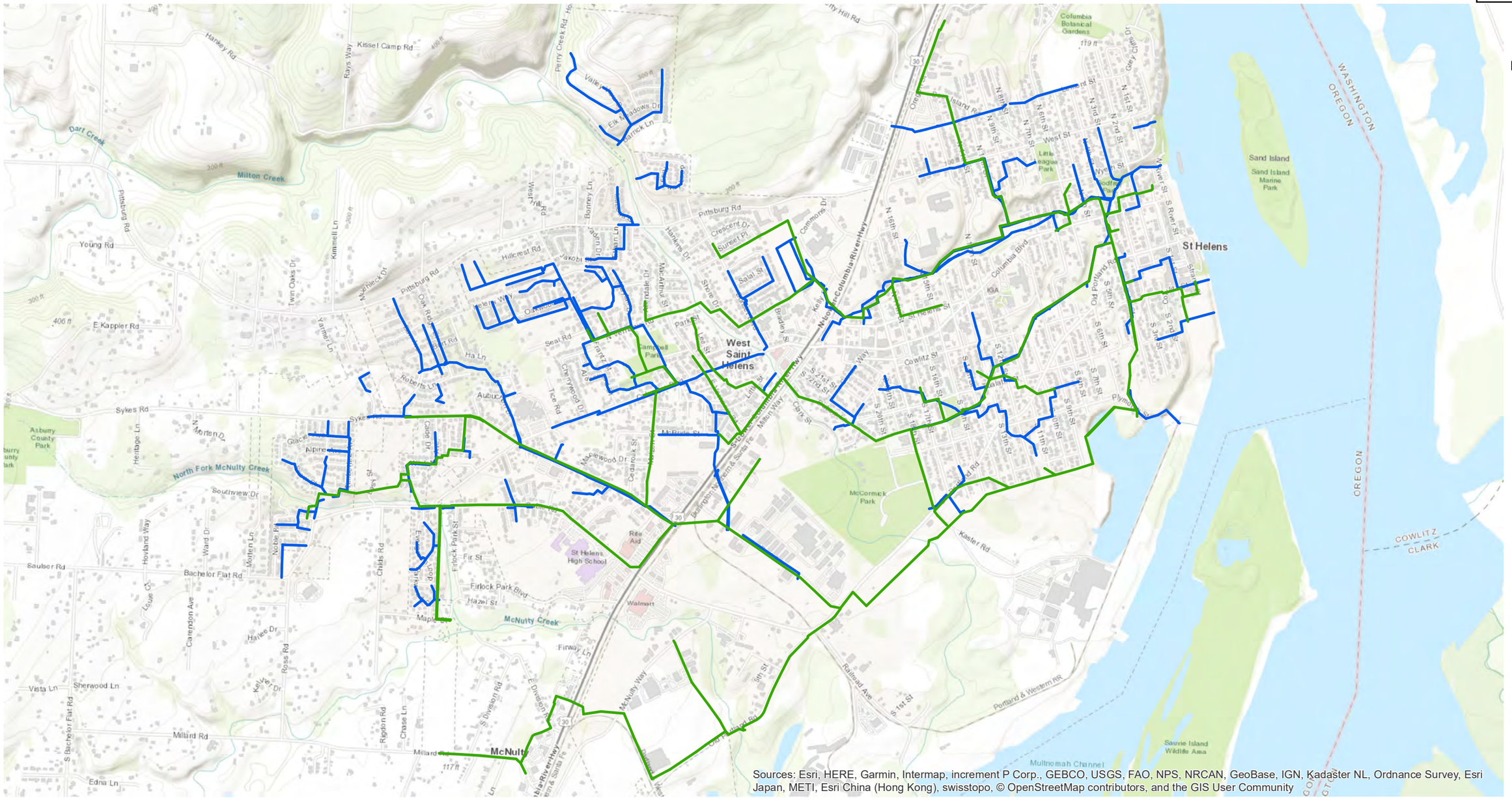
November 2021 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

F

Filename: I:\EF\PDX\104000s\104961 St. Helen's Sto\GIS Files\2015 Vicinity Map_OR.mxd Date: 6/28/2021 Login: ECM

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



LEGEND

- Sewer Pipelines
- Stormwater Conduits

0 800 1,600 3,200

Scale in Feet

NOTES

1. Stormwater and sewer assets provided by Keller Associates on June 14, 2021.

St. Helens Wastewater and Stormwater Master Plan Update
St. Helens, Oregon

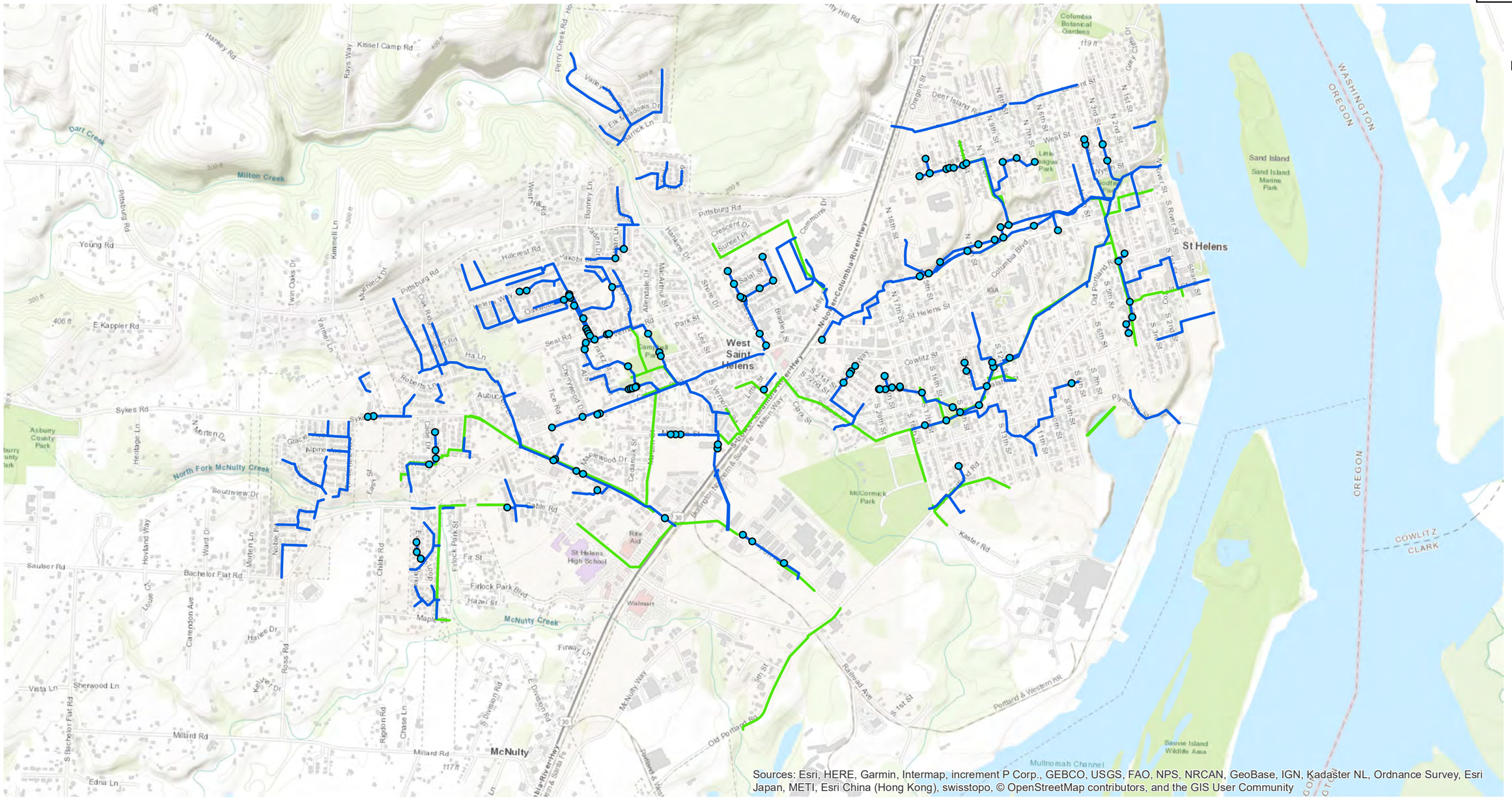
SITE PLAN

November 2021 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

F

Filename: T:\Projects\PDX\104000s\104961 - St Helens\Site Plan.mxd Date: 6/30/2021 Login: DSJ



LEGEND

- Stormwater Junctions Indicating Need of Improvement
- Sewers in need of Improvement
- Stormwater Conduits

0 800 1,600 3,200

Scale in Feet

NOTES

1. Stormwater and sewer assets provided by Keller Associates on June 14, 2021.

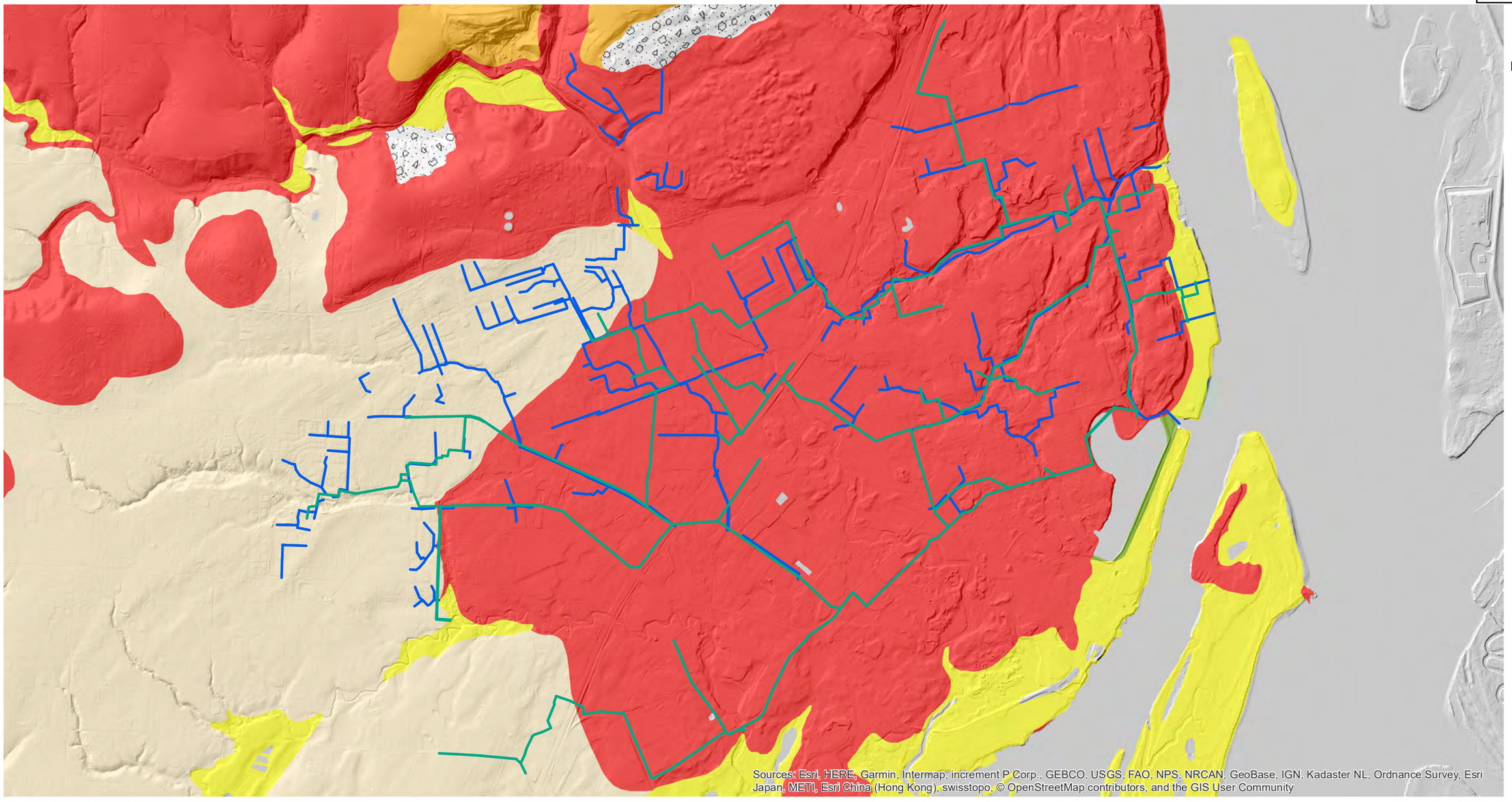
St. Helens Stormwater and Wastewater Master Plan Update
St. Helens, Oregon

PIPELINE VULNERABILITIES

November 2021 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Filename: T:\Projects\PDX\104000s\104961 - St Helens\Pipeline Vulnerabilities.mxd Date: 6/30/2021 Login: DSJ



LEGEND

Geologic Map Unit

- Alluvial deposits
- Grande Ronde Basalt
- Landslide deposits
- Man-made fill deposits
- Missoula Flood deposits
- Troutdale Formation

- Sewer Pipelines
- Stormwater Conduits

0 800 1,600 3,200

Scale in Feet

NOTES

1. Geologic map from Oregon Geologic Data Compilation release 6 (OGDC-6).
2. LiDAR hillshade from Oregon Lidar Consortium (OLC)

St. Helens Wastewater and Stormwater Master Plan Update
St. Helens, Oregon

GEOLOGIC MAP

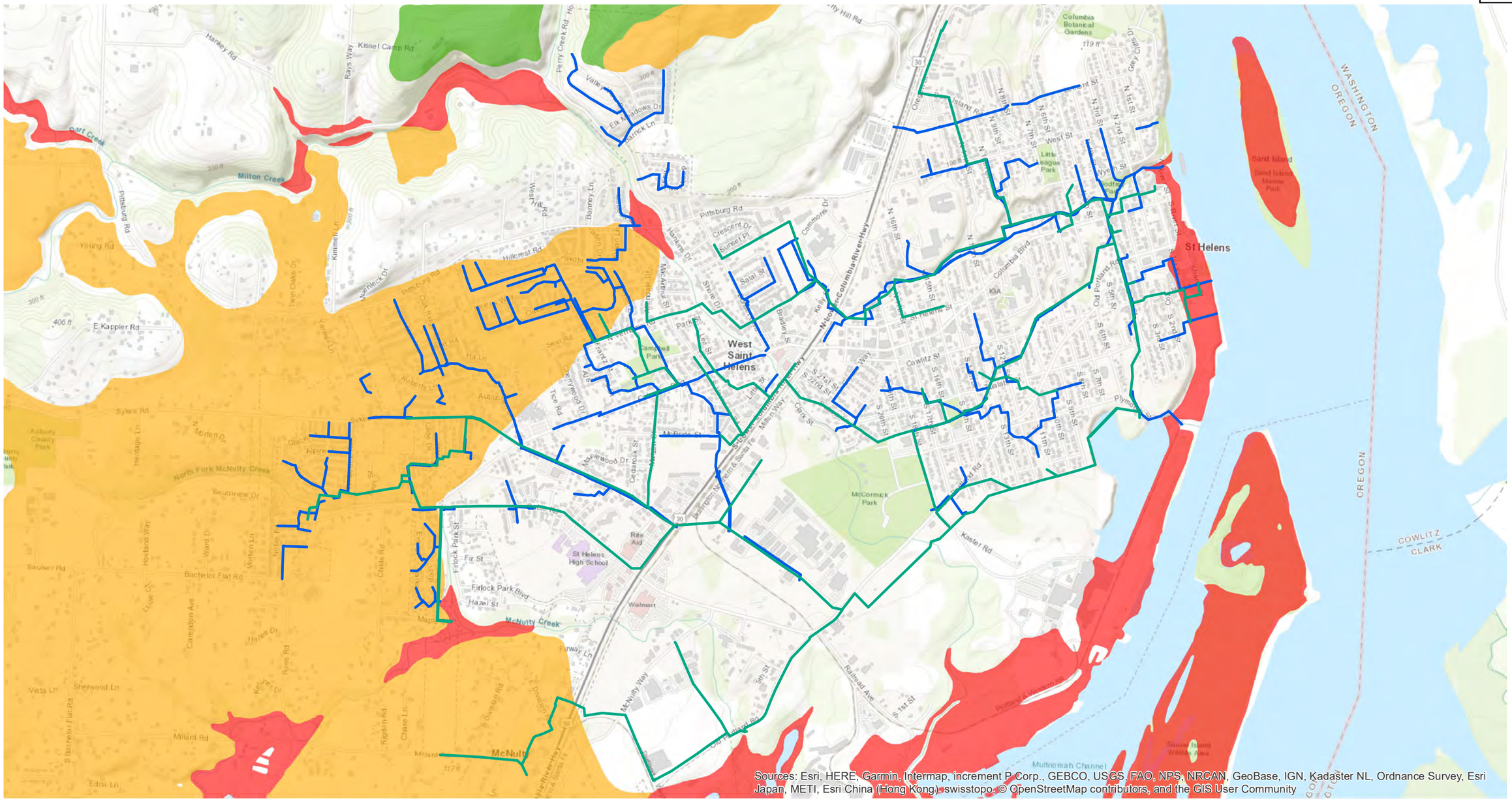
November 2021 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

F

Filename: T:\Projects\PDX\104000s\104961 - St Helens\Geologic Map.mxd Date: 6/30/2021 Login: DSJ

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



LEGEND

Liquefaction Hazard

- Low
- Moderate
- High

- Sewer Pipelines
- Stormwater Conduits

0 800 1,600 3,200

Scale in Feet

NOTES

1. Liquefaction hazard developed from data provided with OGDC-6, the Youd and Perkins, 1978 metodology, and knowledge of regional liquefaction hazards.
2. Stormwater and sewer assets provided by Keller Associates on June 14, 2021.

St. Helens Wastewater and Stormwater Master Plan Update
St. Helens, Oregon

LIQUEFACTION HAZARD

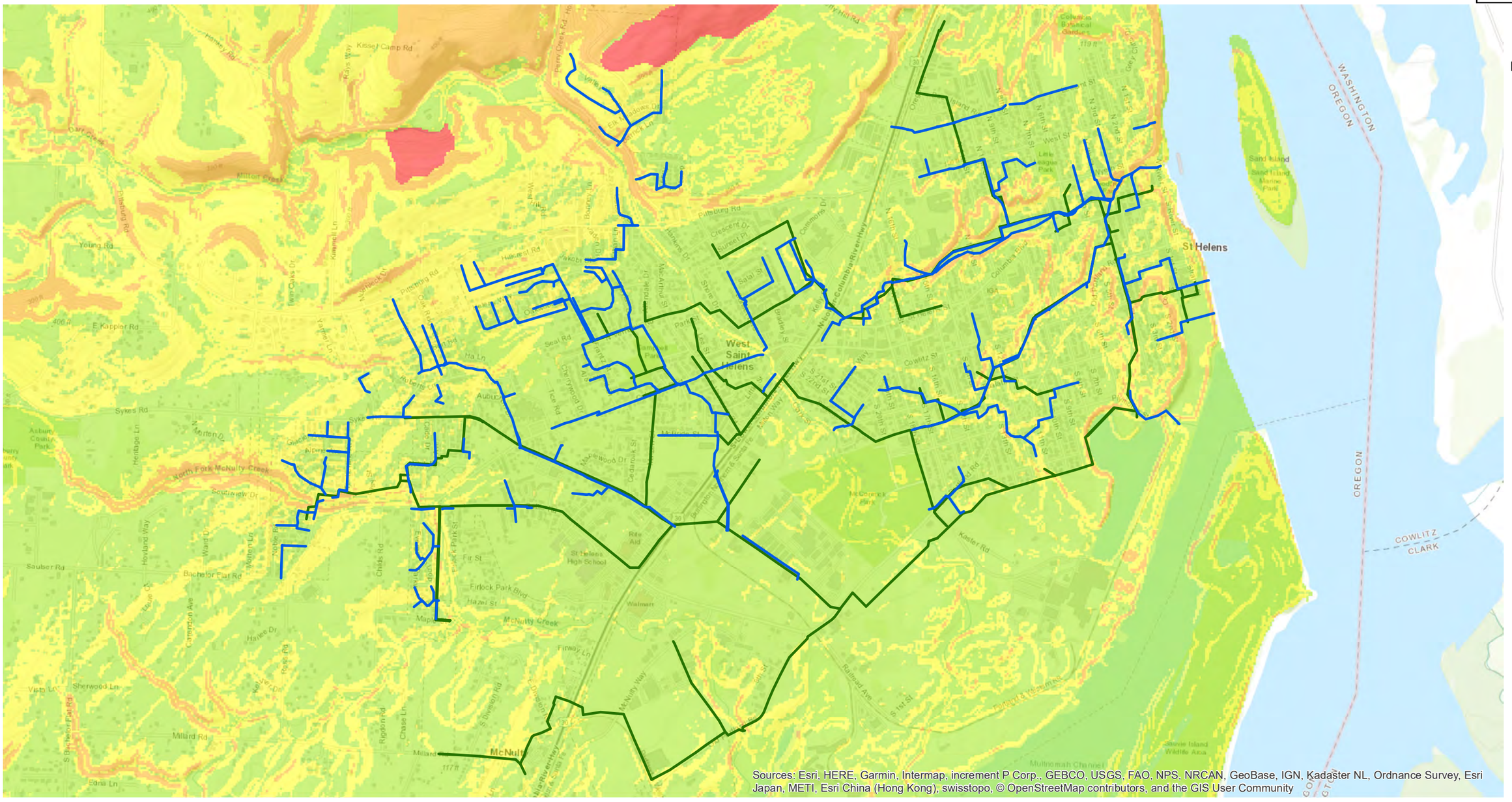
November 2021 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

F

Filename: T:\Projects\PDX\104000s\104961 - St Helens\Liquefaction2.mxd Date: 6/30/2021 Login: DSJ

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



LEGEND

Landslide Susceptibility

- Low
- Moderate
- High
- Very High

- Stormwater Conduits
- Sewer Pipelines

0 800 1,600 3,200

Scale in Feet

NOTES

1. Stormwater and sewer assets provided by Keller Associates on June 14, 2021.
2. Landslide susceptibility from DOGAMI Open-File Report O-16-02.

St. Helens Wastewater and Stormwater Master Plan Update
St. Helens, Oregon

LANDSLIDE SUSCEPTIBILITY

November 2021 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

F

Filename: T:\Projects\PDX\104000s\104961 - St Helens\Landslide Susceptibility.mxd Date: 6/30/2021 Login: DSJ

Filename: T:\Projects\PDX\104000s\104961 - St Helens\Liquefaction.mxd Date: 2/28/2022 Login: DSJ

Ranney Well #1
Ranney Well #2
Ranney Well #3
Water Filtration Facility
Elk Ridge Booster Station
Lemont Booster Station
Bayport Well
Columbia City
St Helens
Warren
McBride Creek
Perry Creek
Milton Creek
McNulty Creek
Harrie Creek
Scappoose Bay
Dart Creek Rd
Smith Rd
Robinette Rd
Farms Dr
Liberty Hill Rd
Hankey Rd
Pittsburg Rd
Kappler Rd
Bachelor Flat Rd
Gable Rd
Miliard Rd
Bennett Rd
Achilles Rd
Dike Rd SW
5th St
6th St
3rd St
4th St
2nd St
Caples
WASHINGTON
OREGON
COWLITZ
CLARK
806 ft
457 ft
400 ft
300 ft
119 ft
73 ft

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

LEGEND

Liquefaction Hazard

- Low
- Moderate
- High

Water Pipelines

Water Infrastructure Points of Interest

0 1,250 2,500 5,000

Scale in Feet

NOTES

1. Liquefaction hazard developed from data provided with OGDC-6, the Youd and Perkins, 1978 metodology, and knowledge of regional liquefaction hazards.
2. Water assets provided by Keller Associates on February 28, 2022.

St. Helens Master Plan Update
St. Helens, Oregon

LIQUEFACTION SUSCEPTIBILITY

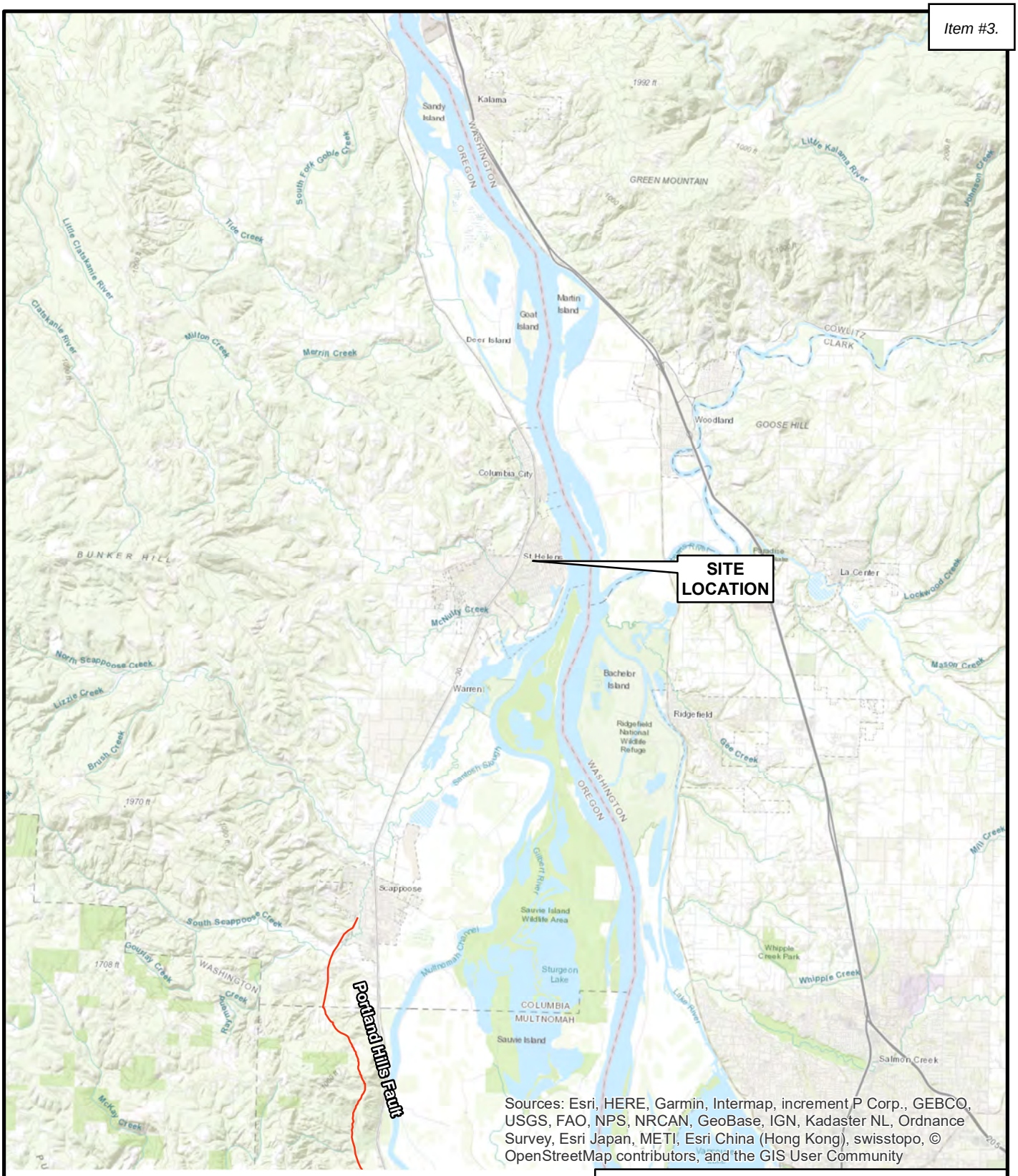
February 2022 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2

FIG. 2

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



0 1.5 3 6

Scale in Miles

N

St. Helens Wastewater and Stormwater Master Plan Update
St. Helens, Oregon

FAULT MAP

November 2021 104961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

F

Filename: T:\Projects\PDX\104000s\104961 - St Helens\Fault Map.mxd Date: 6/30/2021 Login: DSJ

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

ATTACHMENT A

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Attachment to and part of Report: 104961
Date: November 2021
To: Peter Olsen
Keller Associates

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the GBA, Silver Spring, Maryland

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APPENDIX C

Facility Inventory Sheets

KELLER ASSOCIATES

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – WELL

Date of Assessment: 07/21/2021

Inventory

Facility Name:	*Ranney Collector Well #1*
Address:	*West of US HWY 30 between Pacific Street and A Street (Columbia City)*
Date of Original Construction:	*1955*

Date(s) of Major Upgrades and Description of Upgrades:

- *Ranney Collector Well #1 was not visited during the condition's assessment on July 21, 2021.*



Pump Capacity and Settings

	Type*/Manufacture	Flow (gpm)	Head (TDH)	On (psi/ft)	Off (psi/ft)	VFD (psi)	Control Feature
Pump	Unknown	1,050	320	n/a	n/a	n/a	n/a
Pump	Unknown	1,050	320	n/a	n/a	n/a	n/a

*VT = vertical turbine; S = submersible; SPA = submersible with pitiless adaptor

Category	Very Small	Small	Medium	**Large**		
Total Capacity (gpm)	<200 gpm	200 – 500	500 -2,000	**>2,000**		

Well Details

Casing		Column		Water Right		Pump Was last Pulled / Inspected
Depth	72 (ft)	**Depth**	72 (ft)	**Number**	*GR-282*	
Diameter	13 (ft)	**Diameter**	Unknown	**Capacity**	*4.64 cfs*	Unknown

Security		Electrical		Building	
Fence	No	**Power**	3Θ	**Material**	CMU
Video	No	**LED Lighting**	No	**HVAC**	Heater/Fans
Intrusion Alarm	No	**Standby Power / Capacity**	N/A	**Pipe Mat.**	CI
Metal Door	Yes	**Fuel Type**	N/A	**Flow Meter Type**	No
Locks	Yes	**Transfer Switch Type**	N/A		

SCADA			Miscellaneous			
Alarms			**As-Builts**	Yes	**Pump to Waste**	Yes
High Pressure	No		**O&M**	No	**Pressure Relief**	Yes
Low Pressure	No		**Pump Curve**	No	**Pressure Tank**	No
Pump Failure	Yes		**Drawdown Curve**	No	**VFD/Soft Start**	No
Other	No		**WQ Monitoring**	No	**Air Release**	Yes
Flow Trending	No		**CL Injection**	No	**Dschg PT/Switch**	No
Pressure Trending	No		**Other Chemical**	No	**Well Level PT**	No
Pump Run Time	No		**Eye Wash**	No		
Other Trending			**Sample Taps**	Yes	*PT = Pressure Transducer*	

Backup Supply Provisions

- *N/A*

Problems

List of Known Problems	- *Water source is groundwater under the influence of surface water and would require treatment before delivery to distribution if used in day-to-day use.* - *This water source is only used as an emergency supply. The well is not configured to pump into the water filtration facility. This source can be used to supply emergency water.*

Recommended Improvements Based on Physical Conditions

- *None recommended*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – WELL

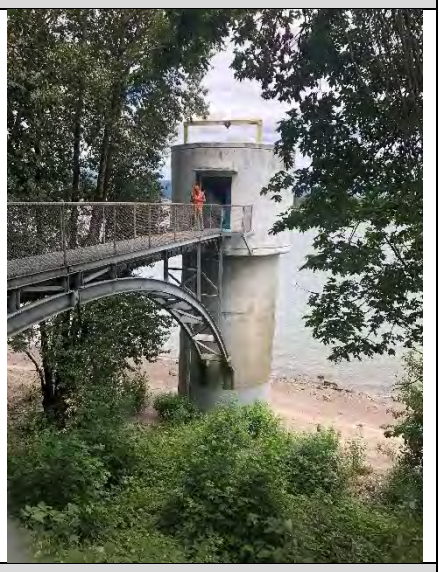
Date of Assessment: 07/21/2021

Inventory (completed by Owner)

Facility Name:	*Ranney Collector Well #2*
Address:	*E street and Strand Street*
Date of Original Construction:	*1970*

Date(s) of Major Upgrades and Description of Upgrades:

- *Before WFF was constructed, gas chlorine was used for treatment. The gas chlorine equipment (pumps and pipes) is still in the building but disconnected.*
- *Pumps were replaced when the WFF was constructed in 2007*
- *One of the pumps was rebuilt in 2020*



Pump Capacity and Settings

	Type*/Manufacture	Flow (gpm)	Head (TDH)	On (ft)	Off (ft)	VFD (psi)	Control Feature
Pump #5	VT/ 75 hp	1,240	465	18	21	None	2.0 & 2.5 MG Res.
Pump #6	VT/ 75 hp	1,240	465	18	21	None	2.0 & 2.5 MG Res.
Pump #7	VT/ 75 hp	1,240	465	18	21	None	2.0 & 2.5 MG Res.

*VT = vertical turbine; S = submersible; SPA = submersible with pitiless adaptor

Category	Very Small	Small	Medium	**Large**		
Total Capacity (gpm)	<200 gpm	200 – 500	500 -2,000	**>2,000**		

Well Details

Casing		Column		Water Right		Pump Was last Pulled / Inspected
Depth	96 (ft)	Depth	77 (ft)	Number	S-34529	
Diameter	13 (ft)	Diameter	10 (in)	Capacity	3.5 cfs	2020

Security		Electrical		Building	
Fence	Yes	Power	3Θ	Material	Concrete
Video	Yes	LED Lighting	No	HVAC	Fans
Intrusion Alarm	No	Standby Power / Capacity	Portable	Pipe Mat.	Steel
Metal Door	Yes	Fuel Type	Diesel	Flow Meter Type	Yes
Locks	Yes	Transfer Switch Type	MTS		

SCADA			Miscellaneous			
Alarms	Yes		As-Builts	Yes	Pump to Waste	No
High Pressure	No		O&M	Yes	Pressure Relief	Yes
Low Pressure	No		Pump Curve	Yes	Pressure Tank	No
Pump Failure	Yes		Drawdown Curve	No	VFD/Soft Start	No
Other	No		WQ Monitoring	No	Air Release	Yes
Flow Trending	Yes		CL Injection	No	Dschg PT/Switch	No
Pressure Trending	Yes		Other Chemical	No	Well Level PT	Yes
Pump Run Time	Yes		Eye Wash	No		
Other Trending			Sample Taps	Yes	*PT = Pressure Transducer*	

Backup Supply Provisions

- *This well can be operated with a portable generator connection. There is a dedicated generator to be used at Ranney Well #2 OR Ranney Well #3.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Problems	
List of Known Problems	- *Caisson is due for a cleaning (it has been a while since has been cleaned)* - *No VFDs* - *Turbidity in raw water fluctuates with season.* - *Well depth from July 1st to July 21st ranged from 28' to 30'. The well was not operated in this time period.*
Recommended Improvements Based on Physical Conditions	
- *Install VFDs* - *Improve PLC and change to be called on based on the raw water wetwell rather than the distribution system storage reservoirs.*	

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – WELL

Date of Assessment: 07/21/2021

Inventory (completed by Owner)

Facility Name:	*Ranney Collector Well #3*
Address:	*K Street and 1st Street*
Date of Original Construction:	*2006*

Date(s) of Major Upgrades and Description of Upgrades:

- *Chlorination tank was decommissioned once WFF was constructed.*



Pump Capacity and Settings

	Type*/Manufacture	Flow (gpm)	Head (TDH)	On (psi/ft)	Off (psi/ft)	VFD (psi)	Control Feature
Pump #12	VT / 125 hp	930	330	18	21	None	2.0 & 2.5 MG Res.
Pump #11	VT / 125 hp	920	330	18	21	None	2.0 & 2.5 MG Res.
Pump #10	VT / 200 hp	1,970	330	18	21	None	2.0 & 2.5 MG Res.

*VT = vertical turbine; S = submersible; SPA = submersible with pitiless adaptor

Category	Very Small	Small	Medium	**Large**		
Total Capacity (gpm)	<200 gpm	200 – 500	500 -2,000	**>2,000**		

Well Details

Casing		Column		Water Right		Pump Was last Pulled / Inspected
Depth	60 (ft)	Depth	40 (ft)	Number	S-47234	
Diameter	16 (ft)	Diameter	18 (in)	Capacity (Authorized, Beneficial use)	60 cfs, 8.9 cfs	2006

Security		Electrical		Building	
Fence	No	Power	3Θ	Material	CMU
Video	No	LED Lighting	No	HVAC	Heater and Fans
Intrusion Alarm	No	Standby Power / Capacity	Portable	Pipe Mat.	Steel
Metal Door	Yes	Fuel Type	Diesel	Flow Meter Type	Yes
Locks	Yes	Transfer Switch Type	MTS		

SCADA			Miscellaneous			
Alarms	Yes		As-Builts	Yes	Pump to Waste	Yes
High Pressure	No		O&M	Yes	Pressure Relief	Yes
Low Pressure	No		Pump Curve	Yes	Pressure Tank	No
Pump Failure	No		Drawdown Curve	No	VFD/Soft Start	No
Other	No		WQ Monitoring	No	Air Release	Yes
Flow Trending	Yes		CL Injection	No	Dschg PT/Switch	No
Pressure Trending	Yes		Other Chemical	No	Well Level PT	No
Pump Run Time	Yes		Eye Wash	No		
Other Trending			Sample Taps	Yes	*PT = Pressure Transducer*	

Backup Supply Provisions

- *This well can be operated with a portable generator connection. There is a dedicated generator to be used at Ranney Well #2 OR Ranney Well #3.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Problems	
List of Known Problems	- *1,500-gallon hypochlorite tank below control building. Hypochlorite tank leaked in the confined space and had to use a temporary above ground tank. The tank has been abandoned and disconnected once the WFF was constructed.*
Additional Notes	- *No fencing. Bollards in front of control building. Building and pump vaults are locked.* - *Pump vault is within the 100-year flood plain and the hatch into the vault is meant to protect the pump vault but there are air vents* - *Pump #10 (200 hp) is run significantly more often than the other two.*
Recommended Improvements Based on Physical Conditions	
- *Install VFDs* - *Improve PLC and change to be called on based on the raw water wetwell rather than the distribution system storage reservoirs.*	

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – WELL

Date of Assessment: 07/21/2021

Inventory (completed by Owner)

Facility Name:	*Bayport Well*
Address:	*Old Portland Rd and Bayport Marina Ln*
Date of Original Construction:	*1987*

Date(s) of Major Upgrades and Description of Upgrades:

- *Bayport Well was not visited during the condition's assessment on July 21, 2021.*



Pump Capacity and Settings

	Type*/Manufacture	Flow (gpm)	Head (TDH)	On (psi/ft)	Off (psi/ft)	VFD (psi)	Control Feature
Pump	Unknown	850					Manual

*VT = vertical turbine; S = submersible; SPA = submersible with pitiless adaptor

Category	Very Small	Small	**Medium**	Large		
Total Capacity (gpm)	<200 gpm	200 – 500	**500 -2,000**	>2,000		

Well Details

Casing		Column		Water Right		Pump Was last Pulled / Inspected
Depth	376 (ft)	Depth	(ft)	Number	G-10803	
Diameter	12 (in)	Diameter	(in)	Capacity	1.78 cfs	Unknown

Security		Electrical		Building	
Fence	No	Power	3Θ	Material	CMU
Video	No	LED Lighting	No	HVAC	Heater/Fans
Intrusion Alarm	No	Standby Power / Capacity	N/A	Pipe Mat.	Steel
Metal Door	Yes	Fuel Type	N/A	Flow Meter Type	No
Locks	Yes	Transfer Switch Type	N/A		

SCADA			Miscellaneous			
Alarms			As-Builts	Yes	Pump to Waste	Yes
High Pressure	No		O&M	Yes	Pressure Relief	Yes
Low Pressure	No		Pump Curve	No	Pressure Tank	No
Pump Failure	No		Drawdown Curve	No	VFD/Soft Start	No
Other	No		WQ Monitoring	No	Air Release	Yes
Flow Trending	No		CL Injection	Yes	Dschg PT/Switch	No
Pressure Trending	No		Other Chemical	No	Well Level PT	No
Pump Run Time	No		Eye Wash	No		
Other Trending			Sample Taps	Yes/No	*PT = Pressure Transducer*	

Backup Supply Provisions

N/A

Problems

List of Known Problems	- *Taste and odor complaints.* - *Cannot currently be operated until approval is received from DEQ.*

Recommended Improvements Based on Physical Conditions

- *Activate well for emergency use and exercise regularly*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment –WTP

Date of Assessment 07/21/2021

Inventory

Facility Name:	*Water Filtration Facility*
Address:	*1215 4th St, Columbia City*
Date of Original Construction:	*2006*
Date(s) of Major Upgrades and Description of Upgrades:	



Pump Capacity and Settings

	Type*/Manufacture	Flow (gpm)	Head (TDH)		On (psi/ft)		Off (psi/ft)	Control Feature
Pump 1	C / 125 hp	1240	264		18 ft		21 ft	2.0 & 2.5 MG Res.
Pump 2	C / 125 hp	1240	264		18 ft		21 ft	2.0 & 2.5 MG Res.
Pump 3	C / 125 hp	1240	264		18 ft		21 ft	2.0 & 2.5 MG Res.
Pump 4	C / 125 hp	1240	264		18 ft		21 ft	2.0 & 2.5 MG Res.

*VT = vertical turbine; I-VT = Inline VT; C = centrifugal; CCC = closed couple centrifugal; SCC = split case centrifugal

Category	Very Small	Small	Medium	**Large**	Are there Fire Pump(s)
Total Capacity (gpm)	<200 gpm	200 – 500	500 -2,000	**>2,000**	N/A

Security		Electrical		Building	
Fence	Yes	Power	3Θ	Material	CMU
Video	No	LED Lighting	Yes	HVAC	Heater and Fans
Intrusion Alar	No	Standby Power / Capacity	Yes	Pipe Mat.	DI/Steel/PVC/other
Metal Door	Yes	Fuel Type	Diesel	Flow Meter	Yes
Locks	Yes	Transfer Switch Type	MTS	Type	

SCADA		Miscellaneous			
Alarms	Yes	As-Builts	Yes	Pressure Relief	Yes
High Pressure	Yes	O&M	Yes	Pressure Tank	No
Low Pressure	Yes	Pump Curves	Yes	VFD/Soft Start	Yes
Pump Failure	Yes	Pump Removal	Yes	Air Release	Yes
Other	No	WQ Monitoring	Yes	Suctn PT/Switch	Yes
Flow Trending	Yes	CL Injection	Yes	Dschg PT/Switch	Yes
Pressure Trending	Yes	Other Chemical	Yes		
Pump Run Time	Yes	Eye Wash	Yes		
Other Trending	No	Sample Taps	Yes	*PT = Pressure Transducer*	

Backup Supply Provisions

- *Emergency diesel generator on-site*

Problems

List of Known Problems	- *Membranes filters should begin to be replaced due to reaching the end of their typical useful life.* - *WFF cannot be operated with the raw water wetwell offline because raw water supply is not operated with VFDs.* - *Raw water and treated water are conveyed through a long single 20-inch pipeline.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Recommended Improvements Based on Physical Conditions
- *Activate the Bayport Well and exercise regularly to provide an emergency source of water if the WFF is offline.* - *Install a redundant supply pipeline from K Street and 3rd Street to the WFF. Install a redundant supply line to the system from the WFF to Oregon Street.* - *Install VFDs at the Ranney Wells to continue operation of the WFF with the raw water wet well offline.* - *Update WFF controls process to be called on based on the 2.5 MG Reservoir rather than the raw water wet well levels.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment –PUMP STATION

Date of Assessment 07/21/2021

Inventory

Facility Name:	*Lemont Booster Station*
Address:	*Oregon Street*
Date of Original Construction:	*1965*

Date(s) of Major Upgrades and Description of Upgrades:



Pump Capacity and Settings

	Type*/Manufacture	Flow (gpm)	Head (TDH)		On (psi/ft)		Off (psi/ft)	Control Feature
Pump #3	I-VT / 25 hp	570	125		18		28	Green Tank
Pump #4	I-VT / 25 hp	570	125		18		28	Green Tank
Pump #9	I-VT / 25 hp	570	125		18		28	Green Tank

*VT = vertical turbine; I-VT = Inline VT; C = centrifugal; CCC = closed couple centrifugal; SCC = split case centrifugal

Category	Very Small	Small	**Medium**	Large	Are there Fire Pump(s)
Total Capacity (gpm)	<200 gpm	200 – 500	**500 -2,000**	>2,000	No

Security		Electrical		Building	
Fence	Yes	Power	3Θ	Material	Concrete
Video	No	LED Lighting	No	HVAC	Heater/Fans
Intrusion Alarm	No	Standby Power / Capacity	Portable	Pipe Mat.	CI
Metal Door	Yes	Fuel Type	Diesel	Flow Meter	No
Locks	Yes	Transfer Switch Type	MTS	Type	

SCADA		Miscellaneous			
Alarms	Yes	As-Builts	Yes	Pressure Relief	No
High Pressure	No	O&M	Yes	Pressure Tank	No
Low Pressure	No	Pump Curves	Yes	VFD/Soft Start	No
Pump Failure	Yes	Pump Removal	Yes	Air Release	No
Other	No	WQ Monitoring	Yes	Suctn PT/Switch	No
Flow Trending	No	CL Injection	No	Dschg PT/Switch	No
Pressure Trending	Yes	Other Chemical	No		
Pump Run Time	Yes	Eye Wash	No		
Other Trending	No	Sample Taps	Yes	*PT = Pressure Transducer*	

Backup Supply Provisions

- *Portable generator connection*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Problems	
List of Known Problems	- *Damaged window vent* - *No flow meter and only pressures are tracked in SCADA* - *Overhead crane does not track underneath all three pumps* - *Fragile concrete cylinder yard piping could be susceptible to fracture and is difficult to repair*

Recommended Improvements Based on Physical Conditions

- *Consider a second source of water supply to the High PZ.*
- *Replace the concrete cylinder pipeline with CL52 cement lined DI pipe and replace the butterfly valves downstream of the BS with gate valves to provide better confidence in isolating the BS.*
- *Install a flow meter/vault on the discharge line and a pressure transducer on the suction and discharge side of the pumps. Upgrade the existing SCADA to track the flows, discharge and suction pressure, and pump runtimes on a time scale for each of the pumps.*
- *The vent to the pump housing has been damaged by trespassers and should be repaired or replaced to the original condition.*
- *The overhead crane does not appear to be able to track over all of the pumps. Adjust the overhead crane to track over each of the pumps.*
- *Consider full replacement of the booster station because it is reaching the end of it's typical useful life of 50-years.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment –PUMP STATION

Date of Assessment 07/21/2021

Inventory

Facility Name:	*Elk Ridge Booster Station*
Address:	*Kestrel View Drive*
Date of Original Construction:	*2017*
Date(s) of Major Upgrades and Description of Upgrades:	



Pump Capacity and Settings

	Type*/Manufacture	Flow (gpm)	Head (TDH)		On (psi/ft)		Off (psi/ft)	Control Feature
Pump 1	Grufundos, I-VT / 3 hp	53	114		25 psi		25 psi	VFD
Pump 2	Grufundos, I-VT / 3 hp	53	114		25 psi		25 psi	VFD

*VT = vertical turbine; I-VT = Inline VT; C = centrifugal; CCC = closed couple centrifugal; SCC = split case centrifugal

Category	**Very Small**	Small	Medium	Large	Are there Fire Pump(s)
Total Capacity (gpm)	**<200 gpm**	200 – 500	500 -2,000	>2,000	No

Security		Electrical		Building	
Fence	Yes	Power	3Θ	Material	CMU
Video	No	LED Lighting	Yes	HVAC	None
Intrusion Alarm	No	Standby Power / Capacity	None	Pipe Mat.	DI
Metal Door	Yes	Fuel Type	N/A	Flow Meter	Yes
Locks	Yes	Transfer Switch Type	MTS	Type	

SCADA		Miscellaneous			
Alarms	Yes	As-Builts	Yes	Pressure Relief	Yes
High Pressure	No	O&M	Yes	Pressure Tank	No
Low Pressure	No	Pump Curves	Yes	VFD/Soft Start	Yes
Pump Failure	Yes	Pump Removal	No	Air Release	Yes
Other	No	WQ Monitoring	No	Suctn PT/Switch	No
Flow Trending	Yes	CL Injection	No	Dschg PT/Switch	No
Pressure Trending	Yes	Other Chemical	No		
Pump Run Time	Yes	Eye Wash	No		
Other Trending	No	Sample Taps	Yes	*PT = Pressure Transducer*	

Backup Supply Provisions

- *None currently. Would have to be served from the High PZ and pressures would be below 30 psi*

Problems

List of Known Problems	- *No floor drain or ventilation in the pump house structure* - *No back-up power supply configuration*

Recommended Improvements Based on Physical Conditions

- *Install proper ventilation within the pump house, which may include roof vents, windows, and floor vents.*
- *Install a floor drain and drainpipe plumbed into storm sewer north of the property.*
- *Add connection for portable generator.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – RESERVOIR

Date of Assessment 07/21/2021

Inventory

Facility Name:	*2.5 MG Reservoir*
Address:	*Battle Mountain Road and Pittsburg Road*
Date of Original Construction:	*1970*

Date(s) of Major Upgrades and Description of Upgrades:



Local Fill Controls/ Settings	Remote Fill Controls
.	Operating Levels from 18-feet to 21-feet.

Tank Volume

Category	Very Small	Small	Medium	**Large**	Height	Diameter	Tank Volume
Volume	<25k gal	26k – 100k gal	101k -500k gal	**>500k gal**	23 ft	136 ft	2,500,000 Gal

Tank Shape, Materials, and Type

Material/Type	Tank Shape	Roof Type	Roof Material	Buried (Y/N)
Concrete	Circular	Flat/Sloped	Concrete	Yes

Security (circle one)		Electrical (circle one)		Out Building (circle one)	
Fence	Yes	Site Lighting	No	Material	Wood
Video	No	LED Lighting	No	HVAC	Fans
Intrusion Alarm	Yes			Pipe Mat.	Cast Iron
Locked Ladder	N/A			Flow Meter	No
Locked Hatch	Yes			Type	

SCADA (circle one)		Miscellaneous			
Alarms	Yes	As- Builts	Yes	Mixing System	No
High Level	Yes	O&M	Yes	Separate in/out	Yes
Low Level	Yes	WQ Monitoring	No	Level Monitoring	Yes
Intrusion	Yes	CL Injection	No	Access Ladder	No
Other	No	Other Chemical	No		
Flow Trending	No	Drain Piping	Yes		
Level Trending	Yes	Overflow	Yes		
Other Trending	No	Overflow Pond	No		

Backup Supply Provisions

- *2.0 MG Reservoir is in the same PZ located at the same site*

Problems

List of Known Problems	- *None identified*

Recommended Improvements Based on Physical Conditions

- *None recommended*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – RESERVOIR

Date of Assessment 07/21/2021

Inventory

Facility Name:	*2.0 MG Reservoir*
Address:	*Battle Mountain Road and Pittsburg Road*
Date of Original Construction:	*1927*
Date(s) of Major Upgrades and Description of Upgrades:	



Local Fill Controls/ Settings	Remote Fill Controls
	Levels control Ranney Well #2 and #3 under normal operation

Tank Volume

Category	Very Small	Small	Medium	**Large**	Height	Diameter	Tank Volume
Volume	<25k gal	26k – 100k gal	101k -500k gal	**>500k gal**	20 ft	28.3-140 ft	2,000,000 Gal

Tank Shape, Materials, and Type

Material/Type	Tank Shape	Roof Type	Roof Material	Buried (Y/N)
	Circular	Geodesic	Aluminum	Y

Security (circle one)		Electrical (circle one)		Out Building (circle one)	
Fence	Yes	Site Lighting	No	Material	Wood
Video	No	LED Lighting	No	HVAC	Fans
Intrusion Alarm	Yes			Pipe Mat.	Cast Iron
Locked Ladder	N/A			Flow Meter	No
Locked Hatch	Yes			Type	

SCADA (circle one)		Miscellaneous			
Alarms	Yes	As- Builts	Yes	Mixing System	No
High Level	Yes	O&M	Yes	Separate in/out	Yes
Low Level	Yes	WQ Monitoring	No	Level Monitoring	Yes
Intrusion	Yes	CL Injection	No	Access Ladder	No
Other	No	Other Chemical	No		
Flow Trending	No	Drain Piping	Yes		
Level Trending	Yes	Overflow	Yes		
Other Trending	No	Overflow Pond	No		

Backup Supply Provisions

- *2.5 MG Reservoir is in the same PZ located at the same site*

Problems

List of Known Problems	- *Currently out of service due to leak*

Recommended Improvements Based on Physical Conditions

- *Repair leak and bring reservoir back online*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – RESERVOIR

Date of Assessment 07/21/2021

Inventory

Facility Name:	*High Reservoir*
Address:	*Oliver Heights Court*
Date of Original Construction:	*1970*
Date(s) of Major Upgrades and Description of Upgrades:	



Local Fill Controls/ Settings	Remote Fill Controls
n/a	*Operating levels from 18 feet to 28 feet*

Tank Volume

Category	Very Small	Small	**Medium**	Large	Height	Diameter	Tank Volume
Volume	<25k gal	26k – 100k gal	**101k -500k gal**	>500k gal	31 ft	33 ft	200,000 Gal

Tank Shape, Materials, and Type

Material/Type	Tank Shape	Roof Type	Roof Material	Buried (Y/N)
Steel	Circular	Flat	Steel	No

Security (circle one)		Electrical (circle one)		Out Building (circle one)	
Fence	Yes	Site Lighting	No	Material	N/A
Video	No	LED Lighting	No	HVAC	N/A
Intrusion Alarm	Yes			Pipe Mat.	N/A
Locked Ladder	Yes			Flow Meter	No
Locked Hatch	Yes			Type	

SCADA (circle one)		Miscellaneous			
Alarms	Yes	As- Builts	Yes	Mixing System	Yes
High Level	Yes	O&M	Yes	Separate in/out	No
Low Level	Yes	WQ Monitoring	No	Level Monitoring	Yes
Intrusion	Yes	CL Injection	No	Access Ladder	Yes
Other	No	Other Chemical	No	Hatch Fall Protection	Yes
Flow Trending	No	Drain Piping	Yes		
Level Trending	Yes	Overflow	Yes		
Other Trending	No	Overflow Pond	No		

Backup Supply Provisions

- *Elk Ridge Reservoir is in the same PZ*

Problems

List of Known Problems	- *Tank overflow is located directly above the control vault.*

Recommended Improvements Based on Physical Conditions

- *None recommended*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Physical Conditions Assessment – RESERVOIR

Date of Assessment 07/21/2021

Inventory

Facility Name:	*Elk Ridge Reservoir*
Address:	*Kestrel View Drive*
Date of Original Construction:	*2009*
Date(s) of Major Upgrades and Description of Upgrades:	



Local Fill Controls/ Settings	Remote Fill Controls
	Floats on Green Tank HGL

Tank Volume

Category	Very Small	Small	**Medium**	Large	Height	Diameter	Tank Volume
Volume	<25k gal	26k – 100k gal	**101k -500k gal**	>500k gal	31 ft	51 ft	500,000 Gal

Tank Shape, Materials, and Type

Material/Type	Tank Shape	Roof Type	Roof Material	Buried (Y/N)
Bolted Steel	Circular	Geodesic	Aluminum	No

Security (circle one)		Electrical (circle one)		Out Building (circle one)	
Fence	Yes	Site Lighting	No	Material	N/A
Video	No	LED Lighting	No	HVAC	N/A
Intrusion Alarm	Yes			Pipe Mat.	N/A
Locked Ladder	Yes			Flow Meter	No
Locked Hatch	Yes			Type	

SCADA (circle one)		Miscellaneous			
Alarms	Yes	As- Builts	Yes	Mixing System	Yes
High Level	Yes	O&M	Yes	Separate in/out	No
Low Level	Yes	WQ Monitoring	No	Level Monitoring	Yes
Intrusion	Yes	CL Injection	No	Access Ladder	Yes
Other	No	Other Chemical	No	Hatch Fall Protection	Yes
Flow Trending	No	Drain Piping	Yes		
Level Trending	Yes	Overflow	Yes		
Other Trending	No	Overflow Pond	No		

Backup Supply Provisions

- *Green Tank is in the same PZ*

Problems

List of Known Problems	- *None identified*

Recommended Improvements Based on Physical Conditions

- *None recommended*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

PAGE 1

(1) OWNER:
Name City of St. Helens Well Number:
Address PO Box 278
City St Helens State OR Zip 97051

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☒ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☒ Other TEST

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☐ No ☒ Depth of Completed Well 403 ft.
Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10	0	97	Cement +5% Bent	0	97	36

How was seal placed: Method ☐ A ☐ B ☐ C ☒ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+2	97	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	none				☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) none

(7) PERFORATIONS/SCREENS: none
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.
356		400	8

Temperature of water Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☒ Other Blue Basalt
Depth of strata: 227 & 56'

(9) LOCATION OF WELL by legal descrip
County Col Latitude Longitu
Township 4-N N or S, Range 1W
Section 17 ¼ ¼
Tax Lot Lot Block Sub
Street Address of Well (or nearest address)
BAY FRONT MARINA

(10) STATIC WATER LEVEL:
25 ft. below land surface. Date 7-16-97
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL
150	154	15	
221	229	45	

(12) WELL LOG: Ground elevation 30

Material	From	To	SWL
TOP SOIL	0	1	
BRN SILTY CLAY	1	9	
Blue SILTY CLAY	9	12	
BRN SILTY CLAY	12	27	
ROUND RIVER ROCK, BLUE/			
BLACK SAND	27	52	
ROUND RIVER ROCK, DARK	52	56	
BROWN CLAY			
BROWN SHALE STONE W/	56	62	
LAYERS OF BLUE/GRY SHALE			
WEATHERED BASALT	62	77	
BLUE BASALT, MED HARD	77	87	
HARD			
BLUE BASALT MED HARD	87	90	
BLACK BASALT, MED HARD	90	103	
GREY BASALT, HARD	103	150	
MULTI COLORED BASALT AND			
SANDSTONE	150	154	W
BLACK BASALT, MED HARD	154	186	
GREY BASALT, HARD	186	221	
GREY BASALT, BROKEN	221	229	W
GREY BASALT, HARD	229	241	
GREY BASALT, BROKEN	241	253	

Date started July 6 Completed July 16

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 215
Signed Ken Foster Date 7-20-97

WHITE COPIES - WATER RESOURCES DEPARTMENT YELLOW COPY - CONSTRUCTOR PINK COPY - CUSTOMER

FOLD IN 1ST A

ASSEMBLY

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

PAGE 2

(1) OWNER:

Name City of St Helens Well Number:

Address P.O Box 278

City ST Helens State OR Zip 97051

(2) TYPE OF WORK:

☐ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Other

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval Yes ☐ No ☐ Depth of Completed Well _____ ft.

Explosives used Yes ☐ No ☐ Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☐ Other

Backfill placed from _____ ft. to _____ ft. Material _____

Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type _____ Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Col Latitude Longitude

Township 4N N or S, Range 1W E or W, WM.

Section 11 ¼ ¼

Tax Lot Lot Block Subdivision

Street Address of Well (or nearest address) BAY PORT MARINA

(10) STATIC WATER LEVEL:

_____ ft. below land surface. Date

Artesian pressure _____ lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found

From	To	Estimated Flow Rate	SWL
302	318	50	28
400	403	20	28

(12) WELL LOG: Ground elevation 30

Material	From	To	SWL
GREY BASALT, HARD	253	285	
GREY BASALT, HARD	285	302	
GREY BASALT, POROUS w/ BRN SEAMS	302	318	W
GREY BASALT, POROUS	318	332	
GREY BASALT, HARD	332	403	W

Date started Completed

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed WWC Number

Date

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water well construction standards. This report is true to the best of my knowledge and belief.

Signed Don Fuchs WWC Number

Date

WHITE COPIES - WATER RESOURCES DEPARTMENT YELLOW COPY - CONSTRUCTOR PINK COPY - CUSTOMER

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

PAGE 2

(1) OWNER:

Name City of St Helens Well Number:

Address P.O Box 278

City ST Helens State OR Zip 97051

(2) TYPE OF WORK:

☐ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Other

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval Yes ☐ No ☐ Depth of Completed Well _____ ft.

Explosives used Yes ☐ No ☐ Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☐ Other

Backfill placed from _____ ft. to _____ ft. Material

Gravel placed from _____ ft. to _____ ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of water _____ Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____

Depth of strata: _____

(9) LOCATION OF WELL by legal description:

County Col Latitude _____ Longitude _____

Township 4N N or S, Range 1W E or W, WM.

Section 11 _____ ¼ _____ ¼

Tax Lot _____ Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address) _____

BAY PORT MARINA

(10) STATIC WATER LEVEL:

_____ ft. below land surface. Date _____

Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:

Depth at which water was first found _____

From	To	Estimated Flow Rate	SWL
302	318	50	28
400	403	20	28

(12) WELL LOG:

Ground elevation 30

Material	From	To	SWL
GREY BASALT, HARD	253	285	
GREY BASALT, HARD	285	302	
GREY BASALT, POROUS W/ BRN SEAMS	302	318	W
GREY BASALT, POROUS	318	332	
GREY BASALT, HARD	332	403	W

Date started _____ Completed _____

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____

Signed _____ Date _____

(bonded) Water Well Constructor Certification:

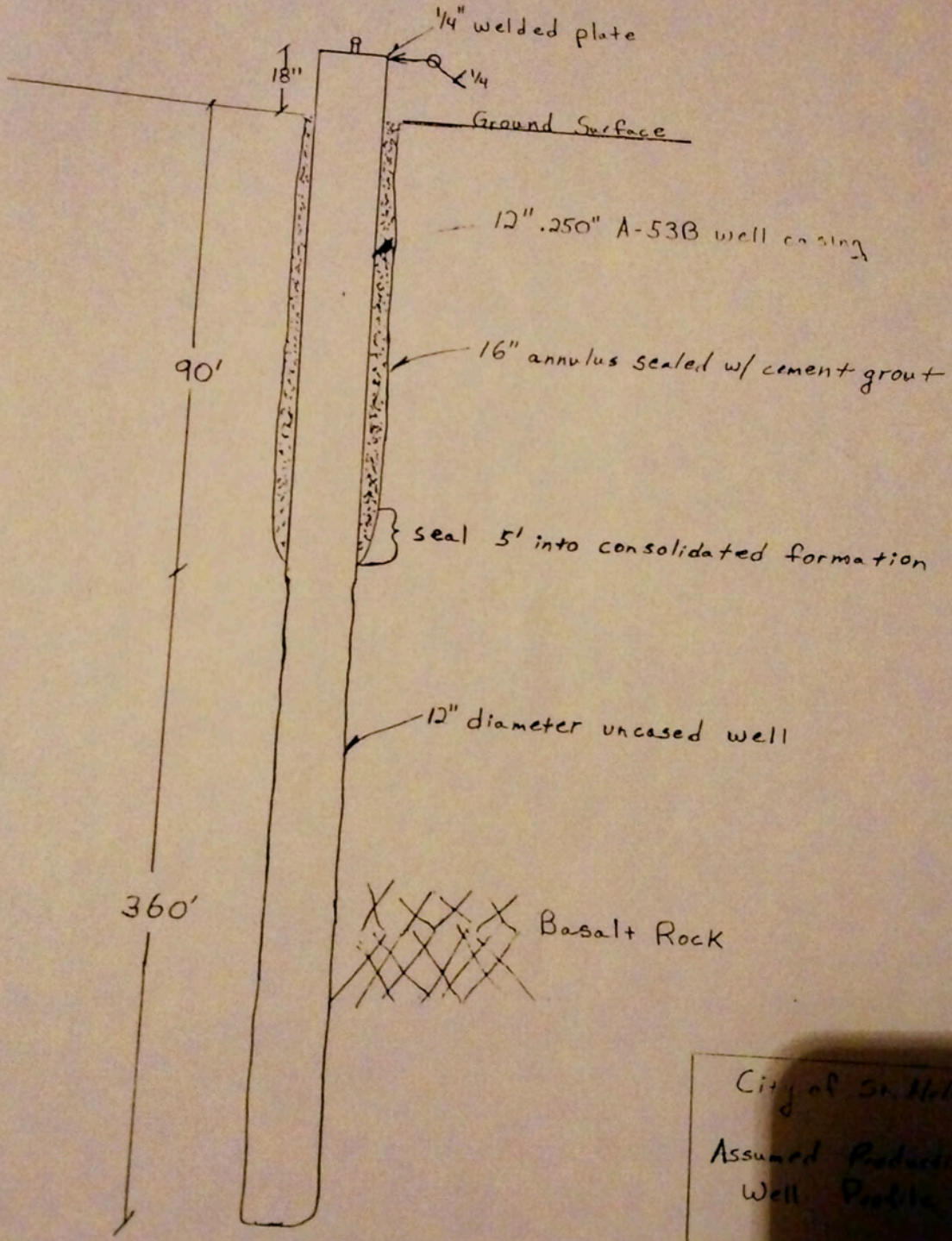
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water well construction standards. This report is true to the best of my knowledge and belief.

WWC Number _____

Signed Don Fuchs Date _____

ITE COPIES - WATER RESOURCES DEPARTMENT YELLOW COPY - CONSTRUCTOR PINK COPY - CUSTOMER

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

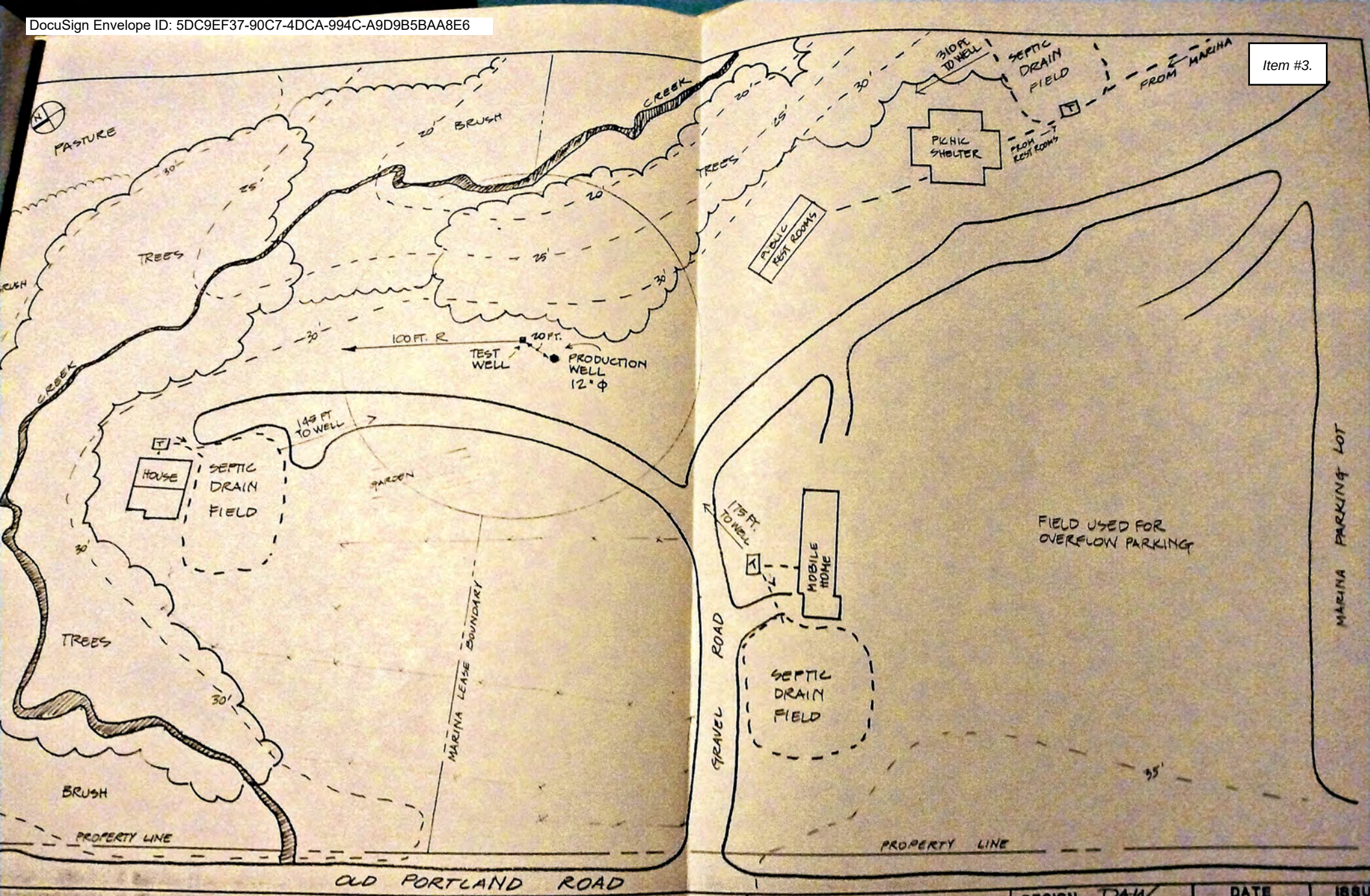


City of St. Helens

Assumed Production Well Profile

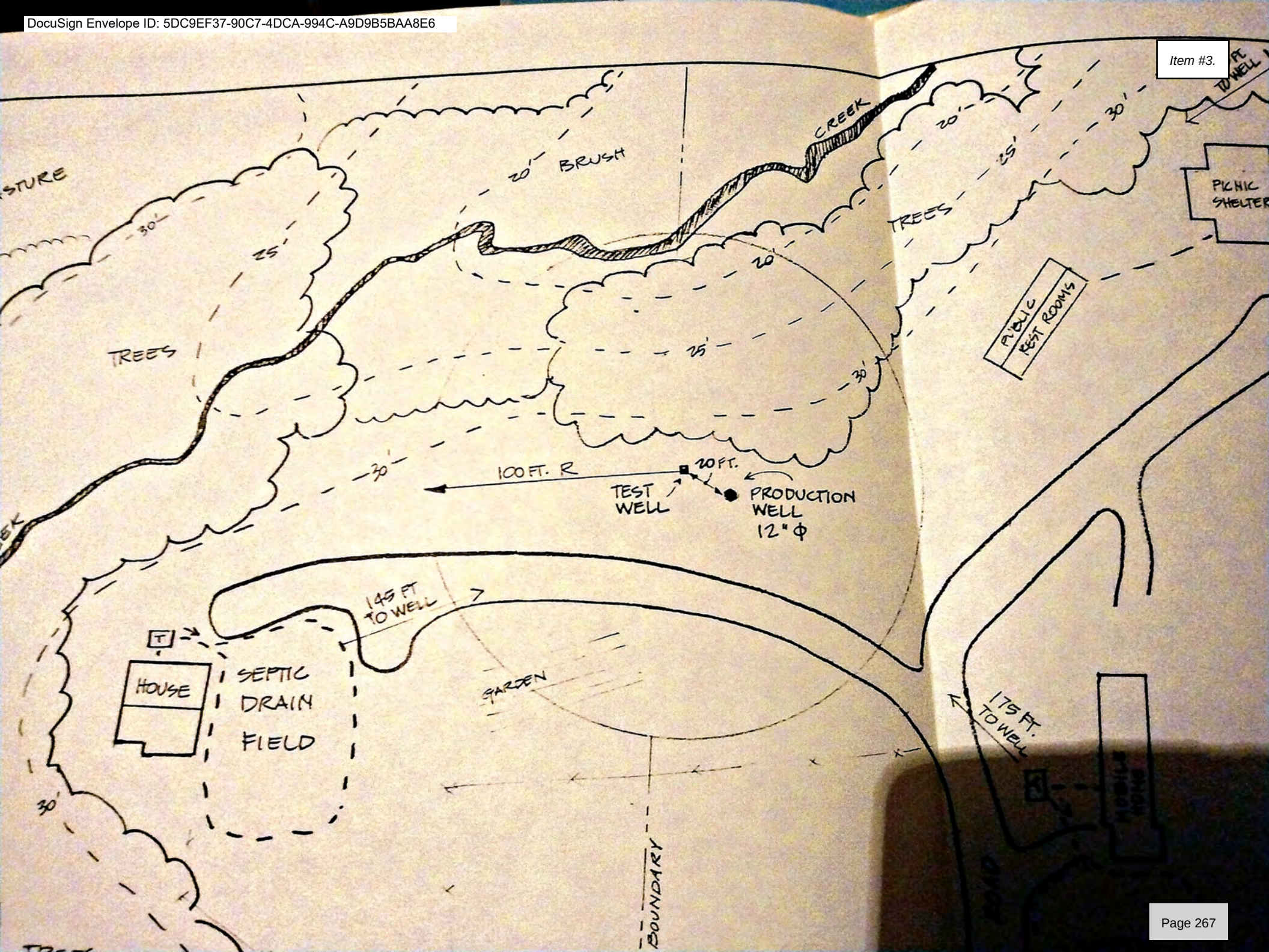
E. Bates
9-19-07
No Scale

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



T PRODUCTION WELL.	CITY OF ST.HELENS	SCALE: 1" = 50'	DESIGN DAW DRAWN JR	DATE 9-23-87	ISSU 3

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APPENDIX D

Supporting Calculations

KELLER ASSOCIATES

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

St. Helens WFF Production Data (2016-2021)

	Month	Water Produced (MG)	Days in Month	Calculated Daily Average (MGD)	Reported Maximum (MGD)
2016	January	41.0	31	1.32	1.73
	February	36.9	29	1.27	1.68
	March	40.9	31	1.32	1.68
	April	43.5	30	1.45	2.62
	May	45.5	31	1.47	1.81
	June	51.2	30	1.71	2.27
	July	55.0	31	1.77	2.25
	August	59.3	31	1.91	2.27
	September	46.7	30	1.56	2.00
	October	43.3	31	1.40	1.67
	November	41.8	30	1.39	1.61
	December	42.5	31	1.37	1.67
	Total (MG)	547.6	Average	1.50	1.94
			Max	1.91	2.62
2017	January	43.2	31	1.39	1.85
	February	37.6	29	1.30	1.64
	March	41.0	31	1.32	1.73
	April	42.3	30	1.41	2.57
	May	46.1	31	1.49	1.94
	June	48.6	30	1.62	2.25
	July	59.8	31	1.93	2.38
	August	64.6	31	2.08	3.05
	September	50.6	30	1.69	2.34
	October	44.5	31	1.44	1.86
	November	41.7	30	1.39	1.72
	December	42.2	31	1.36	1.71
	Total (MG)	562.1	Average	1.53	2.09
			Max	2.08	3.05

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

St. Helens WFF Production Data (2016-2021)

	Month	Water Produced (MG)	Days in Month	Calculated Daily Average (MGD)	Reported Maximum (MGD)
2018	January	42.9	31	1.38	1.70
	February	38.4	29	1.32	1.78
	March	43.6	31	1.41	2.09
	April	41.6	30	1.39	1.86
	May	47.7	31	1.54	2.04
	June	48.6	30	1.62	2.22
	July	64.4	31	2.08	2.47
	August	57.5	31	1.86	2.40
	September	45.6	30	1.52	2.21
	October	39.2	31	1.27	1.53
	November	36.1	30	1.20	1.47
	December	38.6	31	1.24	1.53
	Total (MG)	**544.2**	**Average**	**1.49**	**1.94**
			Max	**2.08**	**2.47**
2019	January	39.8	31	1.28	2.70
	February	42.1	29	1.45	1.81
	March	43.3	31	1.40	1.88
	April	41.0	30	1.37	2.10
	May	43.4	31	1.40	1.74
	June	43.1	30	1.44	2.15
	July	56.4	31	1.82	2.81
	August	54.1	31	1.74	2.24
	September	43.2	30	1.44	1.73
	October	40.5	31	1.31	1.61
	November	38.0	30	1.27	1.56
	December	38.6	31	1.24	1.60
	Total (MG)	**523.6**	**Average**	**1.43**	**1.99**
			Max	**1.82**	**2.81**

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

St. Helens WFF Production Data (2016-2021)

	Month	Water Produced (MG)	Days in Month	Calculated Daily Average (MGD)	Reported Maximum (MGD)
2020	January	39.5	31	1.27	1.57
	February	36.8	28	1.31	1.66
	March	38.4	31	1.24	1.54
	April	37.8	30	1.26	1.53
	May	38.9	31	1.25	1.81
	June	41.2	30	1.37	1.87
	July	53.1	31	1.71	2.35
	August	58.9	31	1.90	2.32
	September	48.7	30	1.62	2.25
	October	39.2	31	1.26	1.48
	November	37.1	30	1.24	1.57
	December	38.7	31	1.25	1.76
	Total (MG)	**508.1**	**Average**	**1.39**	**1.81**
			Max	**1.90**	**2.35**
2021	January	38.6	31	1.25	1.63
	February	35.4	29	1.22	1.66
	March	41.6	31	1.34	1.71
	April	43.0	30	1.43	1.75
	May	50.1	31	1.62	2.31
	June	60.0	30	2.00	2.91
	July	-	31	-	-
	August	-	31	-	-
	September	-	30	-	-
	October	-	31	-	-
	November	-	30	-	-
	December	-	31	-	-
	Total (MG)	**268.8**	**Average**	**1.48**	**1.99**
			Max	**2.00**	**2.91**

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client:	**City of St. Helens**
Project:	**Water Master Plan**
Project No.:	**221096**
Location:	Meridian Office
Date:	Nov-21
Completed By:	TJB

2021 Main PZ Storage Analysis - Scenario 1

Operational Storage		
% of total storage[4]	10%	
Total Operating Volume	**240,000**	**gallons**

Peaking Storage[1]		
Total Peaking Storage	**329,000**	**gallons**

Emergency Storage		
Average Day Demand	888	gpm
Duration	48	hours
Total Emergency Storage	**2,558,000**	**gallons**

Fire Storage[2]		
Fire Demand	3,500	gpm
Duration	4	hours
Total Fire Storage	**840,000**	**gallons**

Total Storage Available	**2,398,000**	**gallons**
Total Storage Required[2]	**3,127,000**	**gallons**
Storage Surplus / Deficiency	**-729,000**	**gallons**

2021 Main PZ Storage Analysis - Scenario 2

Operational Storage		
% of total storage[4]	10%	
Total Operating Volume (gal)[3]	**432,000**	**gallons**

Peaking Storage		
Total Peaking Storage	**329,000**	**gallons**

Emergency Storage		
Average Day Demand	888	gpm
Duration	48	hours
Total Emergency Storage	**2,558,000**	**gallons**

Fire Storage		
Fire Demand	3,500	gpm
Duration	4	hours
Total Fire Storage	**840,000**	**gallons**

Total Storage Available	**4,320,000**	**gallons**
Total Storage Required[2]	**3,319,000**	**gallons**
Storage Surplus	**1,001,000**	**gallons**

2041 Main PZ Storage Analysis

Operational Storage		
% of total storage[4]	10%	
Total Operating Volume (gal)	**432,000**	**gallons**

Peaking Storage		
Total Peaking Storage	**533,000**	**gallons**

Emergency Storage		
Average Day Demand	1,441	gpm
Duration	48	hours
Total Emergency Storage	**4,150,000**	**gallons**

Fire Storage		
Fire Demand	3,500	gpm
Duration	4	hours
Total Fire Storage	**840,000**	**gallons**

Total Storage Available[4]	**4,320,000**	**gallons**
Total Storage Required[2]	**5,115,000**	**gallons**
Additional Storage Needed	**-795,000**	**gallons**

Notes:

1) Peaking storage calculated based on unit diurnal curve. See detailed calculations on following pages.

2) Emergency Storage is greater than the fire storage. Fire storage is to be nested within the emergency storage volume.

3) Assumes altitude valve in 2.0 MG Reservoir operates to achieve 10% of the available storage in the zone.

4) Assumes operational storage accounts for 10% of the available storage in the zone.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client:	**City of St. Helens**
Project:	**Water Master Plan**
Project No.:	**221096**
Location:	Meridian Office
Date:	Nov-21
Completed By:	TJB

2021 High PZ Storage Analysis - Scenario 1

Operational Storage		
% of total storage	10%	
Total Operating Volume	**64,000**	**gallons**

Peaking Storage[2]		
Total Peaking Storage	**49,000**	**gallons**

Emergency Storage		
Average Day Demand	130	gpm
Duration	48	hours
Total Emergency Storage	**375,000**	**gallons**

Fire Storage[3,5]		
Fire Demand[3]	3,000	gpm
Duration	3	hours
Total Fire Storage	**540,000**	**gallons**

Total Storage Available	**631,500**	**gallons**
Total Storage Required[2]	**653,000**	**gallons**
Storage Surplus / Deficiency	**-21,500**	**gallons**

2041 High PZ Storage Analysis

Operational Storage[4]		
% of total storage	10%	
Total Operating Volume	**64,000**	**gallons**

Peaking Storage		
Total Peaking Storage	**78,000**	**gallons**

Emergency Storage		
Average Day Demand	211	gpm
Duration	48	hours
Total Emergency Storage	**609,000**	**gallons**

Fire Storage		
Fire Demand	3,000	gpm
Duration	3	hours
Total Fire Storage	**540,000**	**gallons**

Total Storage Available[4]	**631,500**	**gallons**
Total Storage Required[2]	**751,000**	**gallons**
Additional Storage Needed	**-119,500**	**gallons**

Notes:

1) Assumes operational storage accounts for 10% of the available storage in the zone.

2) Peaking storage calculated based on unit diurnal curve. See detailed calculations on following pages.

2) Fire storage is greater than the emergency storage. Emergency storage is nested within the fire storage.

3) Assumes no industrial fire flow demands within the High PZ.

4) Assumes future reservoir setpoints are operated to maintain 10% of total storage

5) Assumes emergency storage nested in fire storage for 2021. Assumes fire storage nested in emergency storage in 2041.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client:	**City of St. Helens**
Project:	**Water Master Plan**
Project No.:	**221096**
Location:	Meridian Office
Date:	Nov-21
Completed By:	TJB

Peaking Storage Calculations

2021 Main PZ Peaking Storage

Hour	System Diurnal Unit Curve	Main PZ MDD (gpm)	Hourly Demand (gpm)	Required Storage (gpm)[1]	Required Storage (gal/hour)
0	0.59	1,867	1,100	0	0
1	0.87	1,867	1,620	0	0
2	1.40	1,867	2,619	752	45,104
3	1.70	1,867	3,166	1,298	77,888
4	1.73	1,867	3,237	1,370	82,176
5	1.73	1,867	3,233	1,366	81,951
6	1.38	1,867	2,578	711	42,657
7	0.99	1,867	1,848	0	0
8	0.96	1,867	1,791	0	0
9	0.97	1,867	1,818	0	0
10	0.94	1,867	1,759	0	0
11	0.89	1,867	1,670	0	0
12	0.83	1,867	1,554	0	0
13	0.72	1,867	1,345	0	0
14	0.70	1,867	1,314	0	0
15	0.70	1,867	1,305	0	0
16	0.81	1,867	1,504	0	0
17	0.89	1,867	1,657	0	0
18	0.88	1,867	1,644	0	0
19	0.99	1,867	1,848	0	0
20	1.02	1,867	1,901	33	2,005
21	0.88	1,867	1,650	0	0
22	0.66	1,867	1,225	0	0
23	0.77	1,867	1,432	0	0
Total	-	-	-	5,530	331,780

1) Required supply greater than the maximum day demand. Equal to zero if demand is less than maximum day demand.

2041 Main PZ Peaking Storage

Hour	System Diurnal Unit Curve	Main PZ MDD (gpm)	Hourly Demand (gpm)	Required Storage (gpm)[1]	Required Storage (gal/hour)
0	0.59	2,736	1,612	0	0
1	0.87	2,736	2,373	0	0
2	1.40	2,736	3,837	1,101	66,080
3	1.70	2,736	4,638	1,902	114,111
4	1.73	2,736	4,742	2,007	120,393
5	1.73	2,736	4,737	2,001	120,062
6	1.38	2,736	3,777	1,042	62,495
7	0.99	2,736	2,707	0	0
8	0.96	2,736	2,624	0	0
9	0.97	2,736	2,663	0	0
10	0.94	2,736	2,578	0	0
11	0.89	2,736	2,446	0	0
12	0.83	2,736	2,277	0	0
13	0.72	2,736	1,970	0	0
14	0.70	2,736	1,925	0	0
15	0.70	2,736	1,912	0	0
16	0.81	2,736	2,204	0	0
17	0.89	2,736	2,428	0	0
18	0.88	2,736	2,408	0	0
19	0.99	2,736	2,708	0	0
20	1.02	2,736	2,785	49	2,937
21	0.88	2,736	2,417	0	0
22	0.66	2,736	1,795	0	0
23	0.77	2,736	2,098	0	0
Total	-	-	-	8,101	486,078

1) Required supply greater than the maximum day demand. Equal to zero if demand is less than maximum day demand.

2021 High PZ Peaking Storage

Hour	System Diurnal Unit Curve	High PZ MDD (gpm)	Hourly Demand (gpm)	Required Storage (gpm)[1]	Required Storage (gal/hour)
2	1.40	275	386	111	6,645
3	1.70	275	466	191	11,474
4	1.73	275	477	202	12,106
5	1.73	275	476	201	12,073
6	1.38	275	380	105	6,284
7	0.99	275	272	0	0
8	0.96	275	264	0	0
9	0.97	275	268	0	0
10	0.94	275	259	0	0
11	0.89	275	246	0	0
12	0.83	275	229	0	0
13	0.72	275	198	0	0
14	0.70	275	194	0	0
15	0.70	275	192	0	0
16	0.81	275	222	0	0
17	0.89	275	244	0	0
18	0.88	275	242	0	0
19	0.99	275	272	0	0
20	1.02	275	280	5	295
21	0.88	275	243	0	0
22	0.66	275	180	0	0
23	0.77	275	211	0	0
Total	-	-	-	815	48,877

1) Required supply greater than the maximum day demand. Equal to zero if demand is less than maximum day demand.

2041 High PZ Peaking Storage

Hour	System Diurnal Unit Curve	High PZ MDD (gpm)	Hourly Demand (gpm)	Required Storage (gpm)[1]	Required Storage (gal/hour)
2	1.40	403	565	162	9,735
3	1.70	403	683	280	16,810
4	1.73	403	699	296	17,736
5	1.73	403	698	295	17,687
6	1.38	403	556	153	9,207
7	0.99	403	399	0	0
8	0.96	403	387	0	0
9	0.97	403	392	0	0
10	0.94	403	380	0	0
11	0.89	403	360	0	0
12	0.83	403	335	0	0
13	0.72	403	290	0	0
14	0.70	403	284	0	0
15	0.70	403	282	0	0
16	0.81	403	325	0	0
17	0.89	403	358	0	0
18	0.88	403	355	0	0
19	0.99	403	399	0	0
20	1.02	403	410	7	433
21	0.88	403	356	0	0
22	0.66	403	264	0	0
23	0.77	403	309	0	0
Total	-	-	-	1,193	71,608

1) Required supply greater than the maximum day demand. Equal to zero if demand is less than maximum day demand.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing Steps

Recommended minimum four people for testing.	
Person 1	Monitor SCADA from PW office
Person 2	Record static and residual pressures at hydrants
Person 3	Record static and residual pressures at hydrants
Person 4	Open flow hydrant and record flow

Instructions	
Step 0:	Install 2 pressure gauges on same hydrant to calibrate
Step 1:	Screenshot or record SCADA during static pressure reading
Step 2:	Record static pressures at hydrants A and B
Step 3:	Open flow hydrant and run for 5-10 minutes
Step 4:	Take screenshot of SCADA after flowing hydrant
Step 5:	Record residual pressures at Hydrants A and B
Step 6:	Slowly close the flowing fire hydrant

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #1, Main PZ

Completed By: *TB & EF*	
Date: 8/18/2021	
Flow Hydrant Location:	**175 Lemont Street**
Item	**Residual (Hydrant B)**
Time	8:42
Flow (gpm)	1,190

Flow Hydrant Location:	**396 North 4th Street**
Item	**Residual (Hydrant A)**
Time	8:42
Flow (gpm) [1]	1,300

Hydrant P1A Location:	**394 N 3rd St**	
Item	**Static**	**Residual**
Time	8:38	8:42
Pressure (psi)	68	58
Pressure Drop (psi)	10	

Hydrant P1B Location:	**297 N 7th Street**	
Item	**Static**	**Residual**
Time	8:38	8:42
Pressure (psi)	75	69
Pressure Drop (psi)	6	

Boundary Conditions			
Item	**Static**	**Residual**	
Time	8:38	8:42	
2.5 MG Tank Level (ft)	20.857	20.86	
Elk Ridge Tank Level (ft)	14.859	14.823	
Green Tank Level (ft)	21.354	21.348	
WFF Flow (gpm)	Unknown	Unknown	SCADA error and exact flows unavailable
WFF Pressure (psi)	83.5	83.5	
Lemont BS Pressure (psi)	-	-	Not trended. Exact Pressure unavailable

1) Pitot tube broke after reaching ~1,300 gpm. Diffuser was repaired after this test.
**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*
***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #2, Main PZ

Completed By: *TB & EF*	
Date: 8/18/2021	
Flow Hydrant Location:	**171 Columbia Boulevard**
Item	**Residual (Hydrant B)**
Time	9:10
Flow (gpm)	1,250

Flow Hydrant Location:	**105 South 3rd Street**
Item	**Residual (Hydrant A)**
Time	9:10
Flow (gpm)	1,400

Hydrant P2A Location:	**100 South 1st Street**	
Item	**Static**	**Residual**
Time	9:07	9:10
Pressure (psi)	89	78
Pressure Drop (psi)	11	

Hydrant P2B Location:	**970 Columbia Boulevard**	
Item	**Static**	**Residual**
Time	9:07	9:10
Pressure (psi)	70	64
Pressure Drop (psi)	6	

Boundary Conditions			
Item	**Static**	**Residual**	
Time	9:07	9:10	
2.5 MG Tank Level (ft)	20.944	20.956	
Elk Ridge Tank Level (ft)	14.584	14.559	
Green Tank Level (ft)	21.161	21.144	
WFF Flow (gpm)	Unknown	Unknown	SCADA error and exact flows unavailable
WFF Pressure (psi)	83.5	83.5	
Lemont BS Pressure (psi)	-	-	Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*
***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #3, Main PZ

Completed By: *TB & EF*	
Date: 8/18/2021	
Flow Hydrant Location:	**454 S 17th Street**
Item	**Residual (Hydrant B)**
Time	9:28
Flow (gpm)	1,060

Flow Hydrant Location:	**1707 South Plymouth Street**
Item	**Residual (Hydrant A)**
Time	0:00
Flow (gpm)	1,060

Hydrant P3A Location:	**404 South 16th Street**	
Item	**Static**	**Residual**
Time	9:25	9:28
Pressure (psi)	82	52
Pressure Drop (psi)	30	

Hydrant P3B Location:	**1780 Columbia Boulevard**	
Item	**Static**	**Residual**
Time	9:25	9:28
Pressure (psi)	69	66
Pressure Drop (psi)	3	

Boundary Conditions			
Item	**Static**	**Residual**	
Time	9:25	9:28	
2.5 MG Tank Level (ft)	20.954	20.956	
Elk Ridge Tank Level (ft)	14.437	14.402	
Green Tank Level (ft)	21.044	21.129	
WFF Flow (gpm)	Unknown	Unknown	SCADA error and exact flows unavailable
WFF Pressure (psi)	83.5	83.5	
Lemont BS Pressure (psi)	-	-	Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*
***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #4, Main PZ

Completed By: *TB & EF*	
Date: 8/18/2021	
Flow Hydrant Location:	**7 Crescent Drive**
Item	**Residual (Hydrant B)**
Time	9:53
Flow (gpm)	1,060

Flow Hydrant Location:	**17 Sunset Place**
Item	**Residual (Hydrant A)**
Time	9:53
Flow (gpm)	1,130

Hydrant P4A Location:	**17 Red Cedar Street**	
Item	**Static**	**Residual**
Time	9:50	9:53
Pressure (psi)	64	54
Pressure Drop (psi)	10	

Hydrant P4B Location:	**196 North Vernonia Road**	
Item	**Static**	**Residual**
Time	9:50	9:53
Pressure (psi)	62	58
Pressure Drop (psi)	4	

Boundary Conditions		
Item	**Static**	**Residual**
Time	9:50	9:53
2.5 MG Tank Level (ft)	21.011	21
Elk Ridge Tank Level (ft)	14.256	14.23
Green Tank Level (ft)	21.136	21.13
WFF Flow (gpm)	Off	Off
WFF Pressure (psi)	Off	Off
Lemont BS Pressure (psi)	-	-

Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*

***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #5, Main PZ

Completed By:	*TB & EF*
Date:	8/18/2021

Flow Hydrant Location:	35182 Fir Street
Item	Residual (Hydrant A)
Time	10:16
Flow (gpm)	1,000

Hydrant P5A Location:	35182 Fir Street	
Item	Static	Residual
Time	10:12	10:16
Pressure (psi)	62	32
Pressure Drop (psi)	30	

Hydrant P5B Location:	58985 Firlok Park Street	
Item	Static	Residual
Time	10:12	10:16
Pressure (psi)	61	58
Pressure Drop (psi)	3	

Boundary Conditions		
Item	Static	Residual
Time	10:12	10:16
2.5 MG Tank Level (ft)	21.721	20.666
Elk Ridge Tank Level (ft)	14.107	14.079
Green Tank Level (ft)	21.069	21.058
WFF Flow (gpm)	Off	Off
WFF Pressure (psi)	Off	Off
Lemont BS Pressure (psi)	-	-

Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*

***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #6, High PZ

Completed By: *TB & EF*	
Date: 8/18/2021	
Flow Hydrant Location:	**34699 Snow Street**
Item	**Residual (Hydrant B)**
Time	10:35
Flow (gpm)	1,060

Flow Hydrant Location:	**58931 Tundra Court**
Item	**Residual (Hydrant A)**
Time	10:35
Flow (gpm)	1,060

Hydrant P6A Location:	**3461 Snow Street**	
Item	**Static**	**Residual**
Time	10:31	10:35
Pressure (psi)	82	58
Pressure Drop (psi)	24	

Hydrant P6B Location:	**34896 Pittsburg Road**	
Item	**Static**	**Residual**
Time	10:31	10:35
Pressure (psi)	44	31
Pressure Drop (psi)	13	

Boundary Conditions			
Item	**Static**	**Residual**	
Time	10:31	10:35	
2.5 MG Tank Level (ft)	20.45	20.39	
Elk Ridge Tank Level (ft)	13.98	13.93	
Green Tank Level (ft)	21.00	18.55	Reservoir level sensor may be inaccurate. Refer to Test 6 Re-Test.
WFF Flow (gpm)	Off	Off	
WFF Pressure (psi)	Off	Off	
Lemont BS Pressure (psi)	-	-	Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*
***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #6, High PZ , RE-TEST

Completed By: *PO*
Date: *01/19/2022*

Flow Hydrant Location:	34699 Snow Street
Item	Residual (Hydrant B)
Time	9:27
Flow (gpm)	1,190 - 1,250

Hydrant P6A Location:	3461 Snow Street	
Item	Static	Residual
Time	9:22	9:27
Pressure (psi)	83	70
Pressure Drop (psi)	13	

Hydrant P6B Location:	34896 Pittsburg Road	
Item	Static	Residual
Time	9:24	9:27
Pressure (psi)	48	38
Pressure Drop (psi)	10	

Boundary Conditions		
Item	Static	Residual
Time	9:24	9:30
2.5 MG Tank Level (ft)	19.78	19.73
Elk Ridge Tank Level (ft)	16.7	16.58
Green Tank Level (ft)	23.95	22.4
WFF Flow (gpm)	0	0
WFF Pressure (psi)	80	80
Lemont BS Pressure (psi)	117	108
Lemont BS Status (On/off)	OFF	OFF

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #7, High & Elk Ridge BS PZ

Completed By:	*TB & EF*
Date:	8/18/2021

Flow Hydrant Location:	35640 Elk Meadows Drive	
Item	**Residual (Hydrant A)**	
Time	11:15	
Flow (gpm)	1,190	Opened hydrant slowly

Hydrant P7A Location:	60281 Wapiti Drive	
Item	**Static**	**Residual**
Time	11:03	11:15
Pressure (psi)	52	50
Pressure Drop (psi)	2	

Hydrant P7B Location:	35580 Elk Meadows Drive	
Item	**Static**	**Residual**
Time	11:03	11:15
Pressure (psi)	76	74
Pressure Drop (psi)	2	

Boundary Conditions			
Item	**Static**	**Residual**	
Time	11:03	11:15	
2.5 MG Tank Level (ft)	19.887	19.69	
Elk Ridge Tank Level (ft)	13.97	13.943	
Green Tank Level (ft)	21.18	21.135	
WFF Flow (gpm)	Off	Off	
WFF Pressure (psi)	Off	Off	
Lemont BS Pressure (psi)	-	-	Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*
***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #8, Main PZ

Completed By: *TB & EF*	
Date: 8/18/2021	
Flow Hydrant Location:	**57420 Old Portland Road**
Item	**Residual (Hydrant B)**
Time	1:00
Flow (gpm)	975

Flow Hydrant Location:	**57630 Old Portland Road**
Item	**Residual (Hydrant A)**
Time	1:00
Flow (gpm)	1,275

Hydrant P8A Location:	**57425 Old Portland Road**	
Item	**Static**	**Residual**
Time	12:56	1:00
Pressure (psi)	98	84
Pressure Drop (psi)	14	

Hydrant P8B Location:	**901 Port Avenue**	
Item	**Static**	**Residual**
Time	12:56	1:00
Pressure (psi)	86	77
Pressure Drop (psi)	9	

Boundary Conditions		
Item	**Static**	**Residual**
Time	12:56	1:00
2.5 MG Tank Level (ft)	18.033	17.955
Elk Ridge Tank Level (ft)	14.726	14.765
Green Tank Level (ft)	21.098	23.14
WFF Flow (gpm)	Off	Off
WFF Pressure (psi)	Off	Off
Lemont BS Pressure (psi)	-	-

Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*

***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Fire Hydrant Flow Testing - Test #9, High PZ

Completed By: *TB & EF*	
Date: 8/18/2021	
Flow Hydrant Location:	**Near 555 Commons Drive**
Item	**Residual (Hydrant B)**
Time	11:34
Flow (gpm)	1,455

Flow Hydrant Location:	**36070 Pittsburg Road**
Item	**Residual (Hydrant A)**
Time	11:34
Flow (gpm)	1,475

Hydrant P9A Location:	**36200 Pittsburg Road**	
Item	**Static**	**Residual**
Time	11:29	11:34
Pressure (psi)	108	90
Pressure Drop (psi)	18	

Hydrant P9B Location:	**35712 Steinke Drive**	
Item	**Static**	**Residual**
Time	11:29	11:34
Pressure (psi)	77	63
Pressure Drop (psi)	14	

Boundary Conditions			
Item	**Static**	**Residual**	
Time	11:29	11:34	
2.5 MG Tank Level (ft)	19.43	19.339	
Elk Ridge Tank Level (ft)	14.063	14.107	
Green Tank Level (ft)	21.547	20.712	
WFF Flow (gpm)	Off	Off	
WFF Pressure (psi)	Off	Off	
Lemont BS Pressure (psi)	-	-	Not trended. Exact Pressure unavailable

**Ranney Collector Well #3 was on until 9:44 a.m. and then came back on at 1:04 p.m.*
***Lemont BS turned on at 10:35 a.m. and ran for the rest of the day.*

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 1

Water Master Plan

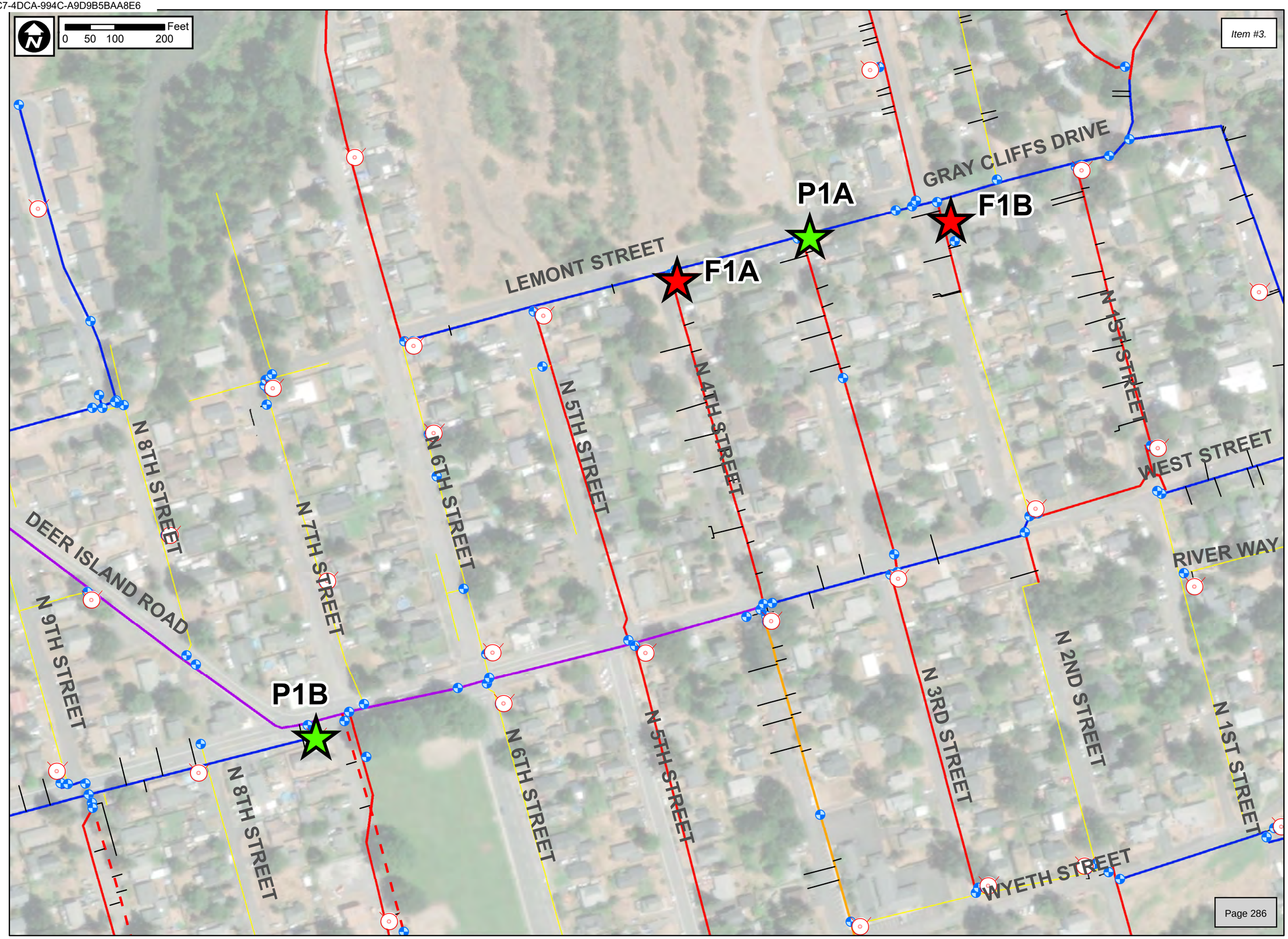
- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

KELLER ASSOCIATES

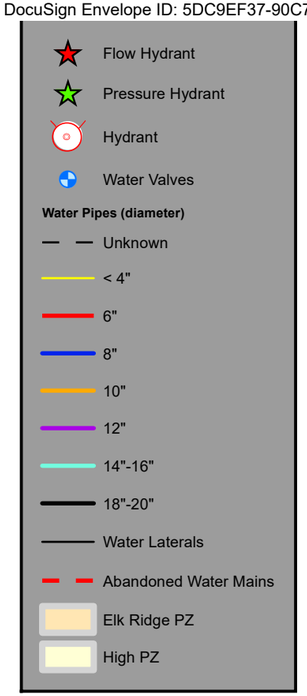
City of St. Helens FOUNDED 1850 Oregon

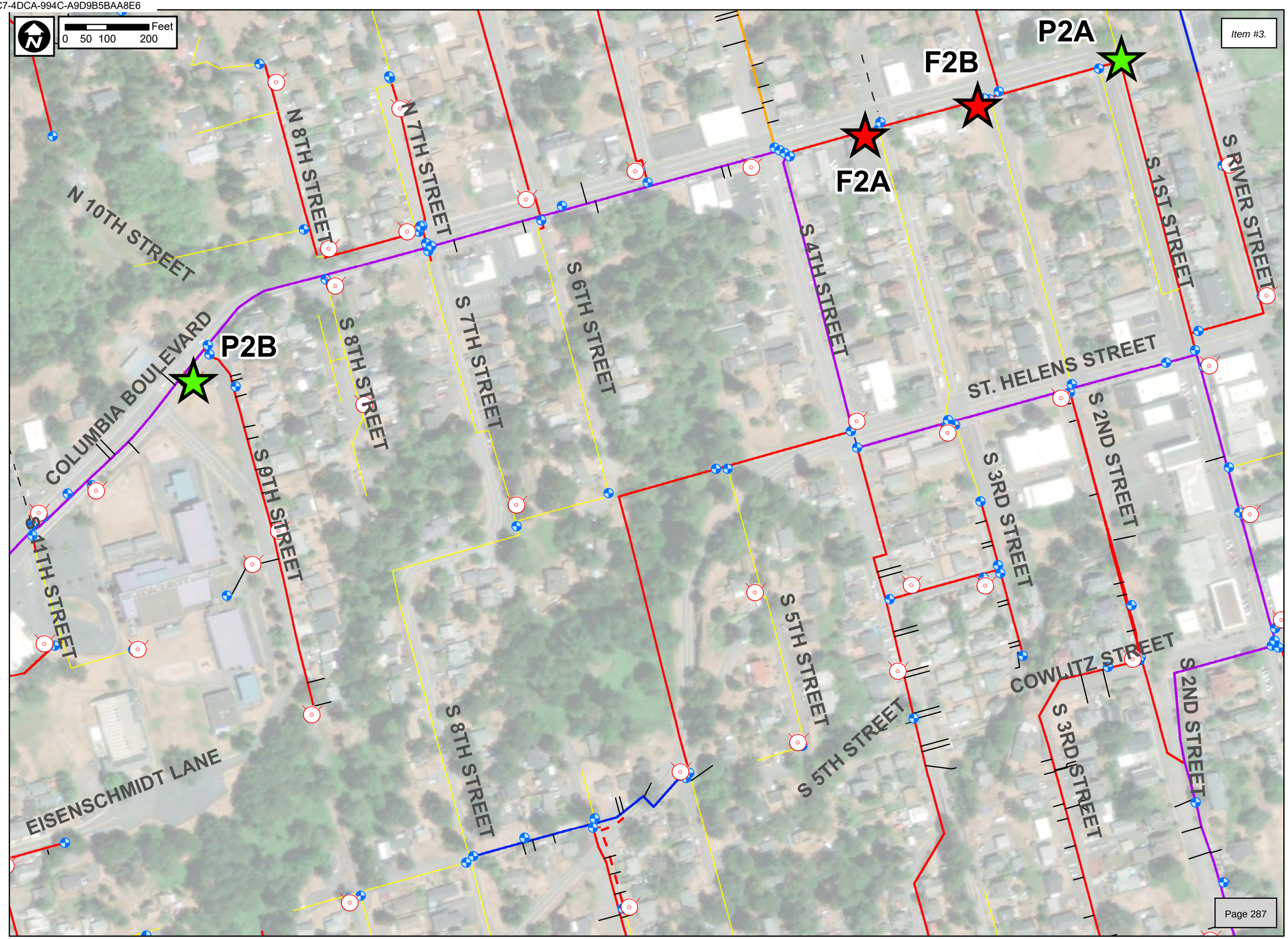


DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 2

Water Master Plan





KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 3

Water Master Plan

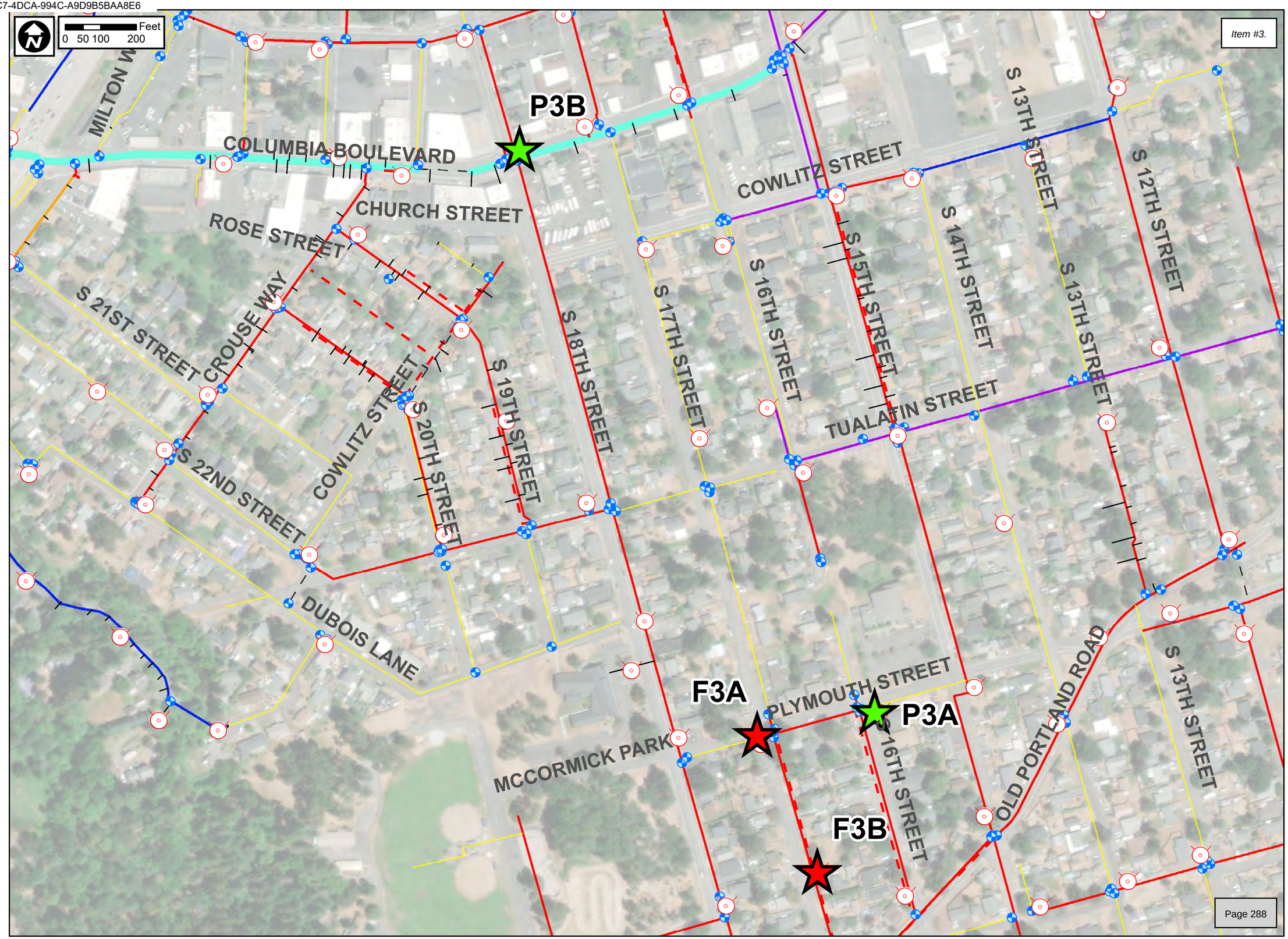
- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 4

Water Master Plan

- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

0 50 100 200 Feet

Item #3.

PITTSBURG ROAD
HANKINS DRIVE
WAGNER AVENUE
CRESENT DRIVE
SUNSET PLACE
F4B
F4A
RED CEDAR STREET
TRILLIUM STREET
P4A
SALAL STREET
SUNSET BOULEVARD
SALMON STREET
SHORE DRIVE
HALSEY STREET
NIMITZ STREET
ALLENDALE DRIVE
SHERMAN PLACE
P4B
PARK STREET
SHORE DRIVE

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 5

Water Master Plan

- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

Feet
0 50 100 200

BACHELOR FLAT ROAD
GABLE ROAD
P5B
GABLE ROAD
ALEXANDRA LANE
ALDER STREET
EVERGREEN LOOP
PARKWOOD DRIVE
F5A
FIR STREET
P5A
FIRLOCK BOULEVARD

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 6

Water Master Plan

- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

Feet
0 50100 200

P6B

PITTSBURG ROAD
POVERTY LANE
YARMER LANE
BARR AVENUE
EDNA-BARR LANE
HELENS WAY
HA LANE
DARCY STREET
OAKRIDGE STREET
HA LANE
MOUNTAIN VIEW DRIVE
ROBERTS LANE
BENJAMIN LANE
SYKES ROAD
GLACIER AVENUE
ALPINE AVENUE
F6A
P6A
F6B
SUMMIT VIEW DRIVE
EASY STREET
CADE DRIVE
ARCHER COURT
WESTSHIRE LANE
SIX DEES LANE
COLUMBIA BOULEVARD
SOUTHVIEW DRIVE
BACHELOR FLAT ROAD
GABLE ROAD

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

RE-TEST

Hydrant Testing Map: Test 6

Water Master Plan

- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

Feet
0 50100 200

P6B
P6A
F6B

PITTSBURG ROAD
POVERTY LANE
YARMER LANE
BARR AVENUE
EDNA-BARR LANE
MOUNTAIN VIEW DRIVE
HELENS WAY
HA LANE
DARCY STREET
OAKRIDGE STREET
HA LANE
ROBERTS LANE
BENJAMIN LANE
SYKES ROAD
GLACIER AVENUE
ALPINE AVENUE
SUMMIT VIEW DRIVE
EASY STREET
CADE DRIVE
ARCHER COURT
WESTSHIRE LANE
SIX DEES LANE
COLUMBIA BOULEVARD
SOUTHVIEW DRIVE
BACHELOR FLAT ROAD
GABLE ROAD

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 7

Water Master Plan

- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

Feet
0 50 100 200

PERRY CREEK ROAD

HANKEY ROAD

SPOTTED HILL DRIVE

WAPITI DRIVE

ELK MEADOWS DRIVE

P7A

F7A

P7B

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Hydrant Testing Map: Test 8

Water Master Plan

- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

Feet
0 500 1,000

P8B
F8A
F8B
P8A

CHILDS ROAD
RIGDON ROAD
CHASE ROAD
N MORSE ROAD
ECHO LANE
S DIVISION ROAD
E DIVISION ROAD
KAVANAGH AVE
FISHER LANE
COLUMBIA RIVER HIGHWAY
SHADLEY LANE
MCNULTY WAY
INDUSTRIAL WAY
GABLE ROAD
9TH STREET
OLD PORTLAND ROAD
RAILROAD AVENUE
S 1ST STREET
BAY VIEW DRIVE
BECKY LANE
ACHILLES ROAD
BAY VIEW RIDGE

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

Hydrant Testing Map: Test 9

Water Master Plan

- Flow Hydrant
- Pressure Hydrant
- Hydrant
- Water Valves

Water Pipes (diameter)

- Unknown
- < 4"
- 6"
- 8"
- 10"
- 12"
- 14"-16"
- 18"-20"
- Water Laterals
- Abandoned Water Mains
- Elk Ridge PZ
- High PZ

KELLER ASSOCIATES

City of St. Helens FOUNDED 1850 Oregon

Feet
0 50 100 200

Item #3.

SKYLINE DRIVE
STEINKE DRIVE
P9B
HANKEY ROAD
PITTSBURG ROAD
F9A
F9B
PITTSBURG ROAD
P9A
(PRIVATE DRIVE)
COMMONS DRIVE
SUNSET BOULEVARD
CRESENT DRIVE
SUNSET PLACE
F4B
F4A
RED CEDAR STREET
P4A
SHORE DRIVE
SALMON STREET
KELLY STREET
ALLENDALE DRIVE
MACARTHUR DRIVE
HANKINS DRIVE
HALSEY STREET
NIMITZ STREET

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan
Project No.: 221096

Consequence and Likelihood of Failure Evaluation

Consequence of Failure

Size of Facility	Score
Capacity > 2,000 gpm OR Volume > 1.0 MG	1.5
2,000 gpm < Capacity < 500 gpm OR 1.0 MG < Volume < 0.5 MG	1
Capacity < 500 gpm OR Volume < 0.5 MG	0.5

Facility Services	Score
Critical Government Infrastructure (emergency services/police/fire/etc.)	2
School/Hospital	2
Commercial/Industrial zone	1
Historic Site	1
System Intertie	1

Population Served	Score
>500 EDUs	3
100-500 EDUs	2
< 100 EDUs	1

Back-Up Supply / Sources	Score
No additional supply or delivery facility and no system storage	3
Temporary supply through system storage	2
Back-up supply or delivery facility	1

Critical Infrastructure Facility	Score
Yes	3

Max Consequence	17.5

Likelihood of Failure

Liquification Hazard	Score
High	2
Medium	1
Low	0.5

Landslide Susceptibility	Score
Very High	3
High	2
Moderate	1
Low	0

Age of Facility	Score
Before 1970 (Likely structural and mechanical failure)	2
Between 1970 and 1990 (Potential structural and mechanical failure)	1
After 1990 (Likely some structural and mechanical failure but still operable)	0

Backup Power	Score
No on-site backup power available	1
On-site backup power available	0

Facility Pipeline Condition	Score
Poor Condition (cracked/broken concrete, disconnected/broken pumps)	2
Moderate Condition (FOG buildup, wear on concrete/electronics/pumps)	1
Good Condition (no concrete damage, operable pipes, no root intrusion)	0

Sensor and Alarm Redundancy	Score
No redundancy in level sensors	0.5
Level sensor redundancy	0

Flooding Susceptibility	Score
Within 100-year floodplain	1
Outside of 100-year floodplain	0

Structural Condition	
High Risk for Structural Failure	3
Moderate Risk for Structural Failure	2
Low Risk for Structural Failure	1
Minimal risk for Structural Failure	0

Max Likelihood	14.5

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client:	City of St. Helens
Project:	Water Master Plan
Project No.:	221096

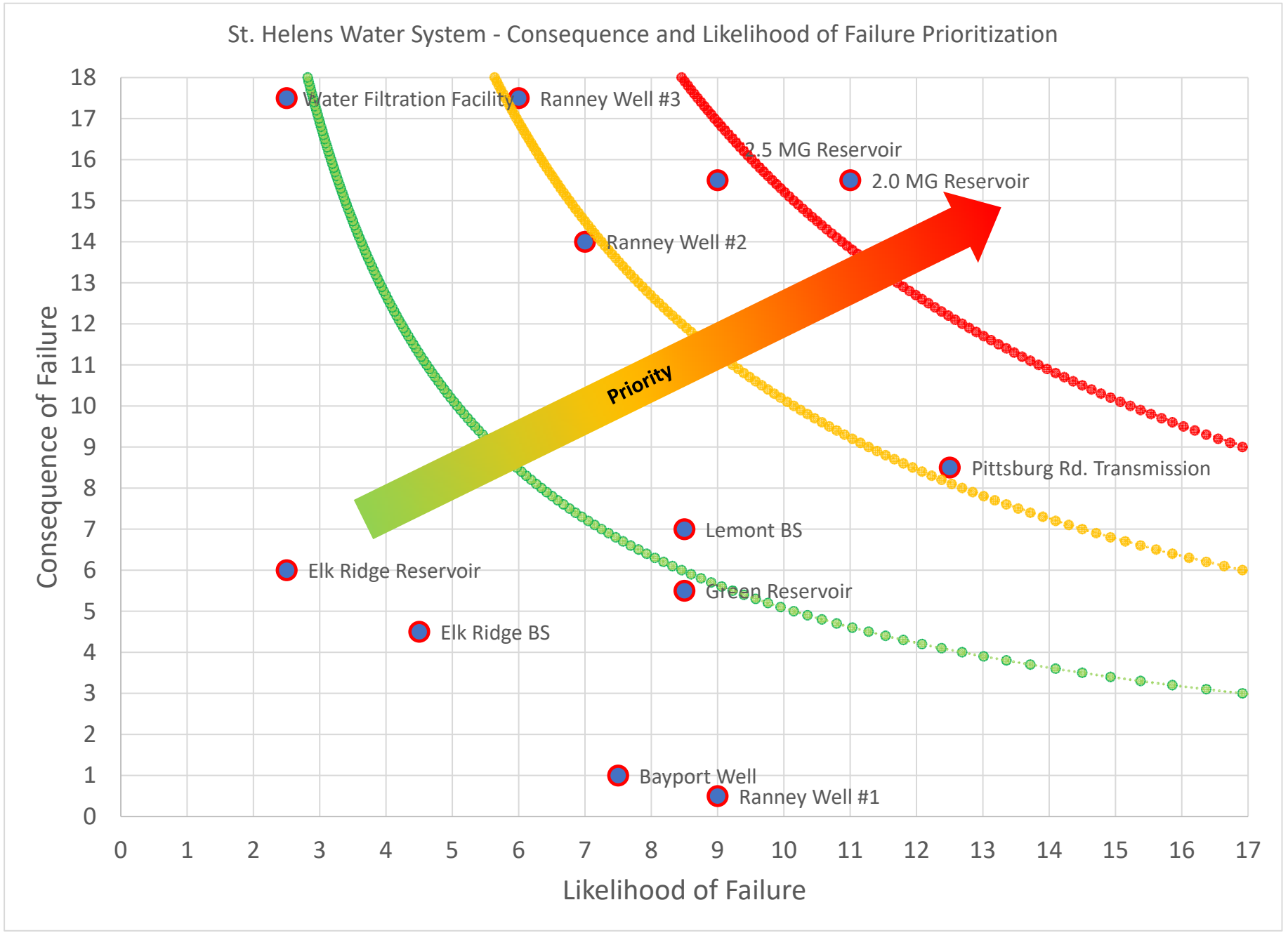
Consequence and Likelihood of Failure Evaluation

	Consequence of Failure									
Facility Name	Size of Facility	Critical Government Infrastructure (emergency services/police/ fire/etc.)	School/Hospital	Commercial/ Industrial zone	Historic Site	System Intertie	Population Served	Back-up Supply/ Source	Critical Infrastructure Facility	Consequence Sum
Ranney Well #1	0.5	0	0	0	0	0	0	0	0	0.5
Ranney Well #2	1	2	2	1	1	1	3	3	0	14
Ranney Well #3	1.5	2	2	1	1	1	3	3	3	17.5
Bayport Well	1	0	0	0	0	0	0	0	0	1
Water Filtration Facility	1.5	2	2	1	1	1	3	3	3	17.5
Lemont BS	1	0	0	1	0	0	2	3	0	7
Elk Ridge BS	0.5	0	0	0	0	0	1	3	0	4.5
2.0 MG Reservoir	1.5	2	2	1	1	0	3	2	3	15.5
2.5 MG Reservoir	1.5	2	2	1	1	0	3	2	3	15.5
Elk Ridge Reservoir	1	0	0	1	0	0	2	2	0	6
Green Reservoir	0.5	0	0	1	0	0	2	2	0	5.5
Pittsburg Rd. Transmission	1.5	0	0	0	0	1	3	3	0	8.5
Score Range	**0.5-1.5**	**0-2**	**0-2**	**0-1**	**0-1**	**0-1**	**1-3**	**1-3**	**0-3**	**0-17.5**

	Likelihood of Failure								
Facility Name	Liquification Hazard	Landslide Susceptibility	Age of Facility	Back-Up Power	Facility Piping Condition	Sensor and Alarm Redundancy	Flooding Susceptibility	Structural Condition	Likelihood Sum
Ranney Well #1	0.5	1	2	1	1	0.5	1	2	**9**
Ranney Well #2	0.5	1	2	0	1	0.5	0	2	**7**
Ranney Well #3	0.5	1	1	0	1	0.5	1	1	**6**
Bayport Well	1	1	1	1	2	0.5	0	1	**7.5**
Water Filtration Facility	0.5	1	0	0	0	0	0	1	**2.5**
Lemont BS	1	1	2	0	2	0.5	0	2	**8.5**
Elk Ridge BS	0	2	0	1	1	0.5	0	0	**4.5**
2.0 MG Reservoir	0.5	2	2	1	2	0.5	0	3	**11**
2.5 MG Reservoir	0.5	2	2	1	2	0.5	0	1	**9**
Elk Ridge Reservoir	0	2	0	0	0	0.5	0	0	**2.5**
Green Reservoir	0	2	2	0	2	0.5	0	2	**8.5**
Pittsburg Rd. Transmission	2	1	2	1	2	0.5	1	3	**12.5**
Score Range	**0-2**	**0-3**	**0-2**	**0-1**	**0-2**	**0-0.5**	**0-1**	**0-3**	**0-14.5**

Facility Name	Risk of Failure (Likelihood Sum x Consequence Sum)
Ranney Well #1	**5**
Ranney Well #2	**98**
Ranney Well #3	**105**
Bayport Well	**8**
Water Filtration Facility	**44**
Lemont BS	**60**
Elk Ridge BS	**20**
2.0 MG Reservoir	**171**
2.5 MG Reservoir	**140**
Elk Ridge Reservoir	**15**
Green Reservoir	**47**
Score Range	**0-200**

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6



DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APPENDIX E

Capital Improvement Plan

KELLER ASSOCIATES

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens
Project: Water Master Plan

2022 Water System Assets Inventory

Short-Lived Assets	Typical Useful Life (yrs)	Replacement Cost (2022, $)	Annualized Replacement Cost ($/yr)	2022 Remaining Life (yrs)	Value of Depreciation Experienced to Date	Depreciated Value (2022)
Pumps and Electrical						
Lemont BS Pumps and Motors (3 @ 25 HP)	20	$150,000	$7,500	0	$150,000	$0
Elk Ridge Booster Station Pumps and Motors (2 @ 3 HP)	20	$30,000	$1,500	20	$0	$30,000
Water Meter Full Replacement (4,800 @ $250 each)	20	$1,200,000	$60,000	10	$600,000	$600,000
Water Meters Registers (4,800 @ $200 each)	10	$960,000	$96,000	0	$960,000	$0
SHORT-LIVED ASSETS REPLACEMENT COST (ROUNDED)		**$2,300,000**	**$170,000**	**-**	**$1,700,000**	**$630,000**
Long-Lived Assets	**Typical Useful Life (yrs)**	**Replacement Cost (2022, $)**	**Annualized Replacement Cost ($/yr)**	**2022 Remaining Life (yrs)[1]**	**Value of Depreciation Experienced to Date**	**Depreciated Value (2022)**
Pipes[5]						
≤4 - inch Pipe (80,200 feet)	75	$14,436,000	$192,000	40	$6,736,800	$7,699,200
6 - inch Pipe (144,900 feet)	75	$30,429,000	$406,000	40	$14,200,200	$16,228,800
8 - inch Pipe (53,400 feet)	75	$12,282,000	$164,000	40	$5,731,600	$6,550,400
10 - inch Pipe (7,900 feet)	75	$1,975,000	$26,000	40	$921,667	$1,053,333
12 - inch Pipe (40,000 feet)	75	$10,800,000	$144,000	40	$5,040,000	$5,760,000
14 - inch Pipe (36,300 feet)	75	$10,890,000	$145,000	40	$5,082,000	$5,808,000
16 - inch Pipe (15,900 feet)	75	$5,088,000	$68,000	40	$2,374,400	$2,713,600
>16-inch Pipe (17,100 feet)	75	$5,985,000	$80,000	40	$2,793,000	$3,192,000
Pipes Replacement Cost		**$92,000,000**	**$1,200,000**	-	**$43,000,000**	**$49,000,000**
Wells, Valves, Hydrants, Misc.						
Elk Ridge Booster Station Maintenance Replacements	50	$100,000	$2,000	48	$4,000	$96,000
Water Valves (1,500 @ $3,500 each)	50	$5,250,000	$105,000	15	$3,675,000	$1,575,000
Fire Hydrants (530 @ $5,000 each)	50	$1,325,000	$27,000	15	$927,500	$397,500
Wells, Valves, Hydrants, Misc.		**$6,700,000**	**$130,000**	**-**	**$4,600,000**	**$2,100,000**
Storage Reservoirs						
2.5 MG Reservoir	100	$6,250,000	$63,000	51	$3,062,500	$3,187,500
Green Tank	75	$500,000	$7,000	24	$340,000	$160,000
Elk Ridge Reservoir	75	$1,250,000	$17,000	62	$216,667	$1,033,333
Storage Reservoirs		**$8,000,000**	**$90,000**	**-**	**$3,600,000**	**$4,400,000**
LONG-LIVED ASSETS REPLACEMENT COST (ROUNDED)		**$107,000,000**	**$1,400,000**	**-**	**$51,000,000**	**$56,000,000**
GRAND TOTAL (ROUNDED)		**$109,000,000**	**$1,600,000**	**-**	**$53,000,000**	**$56,000,000**

1) Assumes pipes have an average age of 35 years based on the length of pipe installed each decade.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Capital Improvement Plan - Summary Table

Project ID#	Project Name	Project Trigger	Total Estimated Cost (2022 Dollars)	SDC Eligibility (%)	Cost Allocated to Growth	Cost Allocated to City
Priority 1 Improvements (2022-2027)						
1.1	Repair Existing 2.0 MG Reservoir	Storage Deficit	$700,000	0%	$0	$700,000
1.2	Full-Rate Study	New Capital Improvement Plan	$30,000	100%	$30,000	$0
1.3	Bayport Well Activation	Emergency preparedness	$10,000	40%	$4,000	$6,000
1.4	Install Redundant Pittsburg Rd / Milton Creek Crossing	Condition / Likelihood of Failure	$680,000	20%	$140,000	$540,000
1.5	Back-up Generator for PW Shop	Emergency preparedness	$100,000	40%	$40,000	$60,000
		Total Priority 1 Improvements (rounded)	**$1,600,000**	**-**	**$300,000**	**$1,400,000**
Priority 2 Improvements (2027-2032)						
2.1	Water Master Plan Update #1	Recommended every 5-10 years	$200,000	100%	$200,000	$0
2.2	Lemont BS to Pittsburg Rd Pipeline Replacement	Condition / Likelihood of Failure	$6,000,000	55%	$3,270,000	$2,730,000
2.3	Elk Ridge BS Condition Improvements	Condition and emergency preparedness	$110,000	100%	$110,000	$0
2.4	Ranney Wells Control Upgrades	Operations upgrades	$700,000	40%	$280,000	$420,000
2.5	Helens Way PZ Boundary Modification	Low PHD Pressures	$400,000	56%	$220,000	$180,000
2.6	Spotted Hill and Wapiti Drive PZ Boundary Modification	Low PHD Pressures	$160,000	0%	$0	$160,000
2.7	Small Pipe Diameter Replacement Phase I	Existing AFF less than 1,000 gpm	$6,300,000	0%	$0	$6,300,000
2.8	Small Pipe Diameter Replacement Phase II	Existing AFF less than 1,000 gpm	$5,300,000	0%	$0	$5,300,000
2.9	Small Pipe Diameter Replacement Phase III	Existing AFF less than 1,000 gpm	$3,700,000	0%	$0	$3,700,000
2.10	High PZ Low Pressure Study	Low PHD Pressures	$30,000	0%	$0	$30,000
		Total Priority 2 Improvements (rounded)	**$22,900,000**	**-**	**$4,100,000**	**$18,900,000**
Priority 3 Improvements (2032-2041)						
3.1	Water Master Plan Update #2	Recommended every 5-10 years	$200,000	100%	$200,000	$0
3.2	4.0 MG Reservoir Construction	Future Storage Deficit	$24,800,000	40%	$9,810,000	$14,990,000
3.3	Lemont BS Replacement	Condition improvements	$1,300,000	55%	$710,000	$590,000
3.4	Small Pipe Diameter Replacement Phase IV	AFF below recommended FF demand by zone	$3,700,000	0%	$0	$3,700,000
3.5	Small Pipe Diameter Replacement Phase V	AFF below recommended FF demand by zone	$3,200,000	0%	$0	$3,200,000
3.6	Redundant WFF Supply and Distribution Transmission	Emergency preparedness	$8,400,000	40%	$3,320,000	$5,080,000
		Total Priority 3 Improvements (rounded)	**$41,600,000**	**-**	**$14,100,000**	**$27,600,000**
Priority 4 Improvements (Future / Developer Driven Improvements within Study Period 2022-2041) [1]						
4.1	Riverfront District Development	Development Driven	$3,400,000	100%	$3,400,000	$0
4.2	Industrial Business Park Development	Development Driven	$11,900,000	100%	$11,900,000	$0
4.3	Elk Ridge Upper Development	Meet recommended operating pressures	$1,000,000	100%	$1,000,000	$0
4.4	Houlton Business District Development	Meet recommended fire flow demands	$1,200,000	100%	$1,200,000	$0
4.5	Growth Area 4 Commercial Development	Meet recommended fire flow demands	$900,000	100%	$900,000	$0
4.6	Growth Area 1, 9, 11, and 13 Development	Development Driven and meet fire flow demands	$11,300,000	100%	$11,300,000	$0
4.7	Growth Area 10 Residential Development	Meet recommended operating pressures	$2,600,000	100%	$2,600,000	$0
4.8	Growth Area 8 Residential Development	Meet recommended operating pressures	$400,000	100%	$400,000	$0
		Total Future Improvements (rounded)	**$32,700,000**	**-**	**$32,700,000**	**$0**
Priority 5 Improvements (2041-2071)						
5.1	Ranney Well #3 Structural Evaluation	*Cost Estimates not Developed for Priority 5 Improvements*				
5.2	Backbone Water System Replacement					
		TOTALWATER SYSTEM IMPROVEMENTS COSTS (rounded)	**$98,800,000**	**-**	**$51,200,000**	**$47,900,000**

1) Timing of these capital improvement projects depends on when growth occurs. It is anticipated the future development will participate in capital improvement projects as required.

2) The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Capital Improvement Plan - 6-Year CIP Summary

ID#	Item	2022 Cost	Opinion of Probable Costs (2022 Dollars)					
			2022	2023	2024	2025	2026	2027
Priority 1 Improvements								
1.1	Repair Existing 2.0 MG Reservoir	$ 700,000	$ 700,000					
1.2	Full-Rate Study	$ 30,000	$ 30,000					
1.3	Bayport Well Activation	$ 10,000		$ 10,000				
1.4	Install Redundant Pittsburg Rd / Milton Creek Crossing	$ 680,000			$ 680,000			
1.5	Back-up Generator for PW Shop	$ 100,000				$ 100,000		
Total (rounded)		**$ 1,600,000**	**$ 730,000**	**$ 10,000**	**$ 680,000**	**$ 100,000**	**$ -**	**$ -**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Repair Existing 2.0 MG Reservoir

Project Identifier: 1.1

Location: Battle Mountain Road

Need for Project:
- The City's 2.0 MG Reservoir has been out of service since 2016 due to an unknown leak. Without the 2.0 MG of storage, the City has a storage deficit and cannot meet the required storage components for fire and emergency storage.

Objective:
- Determine the source of the leak and repair the reservoir.

Design Considerations:
- As of February 2022, the City has advertised request for qualifications for the forensic engineering investigation.
- Quantifying costs for repair of the reservoir are based on typical reservoir repairs for similar sized reservoirs. The costs should be re-evaluated once the source of the leak and proposed repair is determined.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Repair Reservoir	1	LS	$ 350,000	$ 350,000	
				Construction Subtotal	***$ 350,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 35,000	
Bonding			2.5%	$ 9,000	
Contractor Overhead and Profit			15%	$ 53,000	
Prevailing Wages			2.5%	$ 9,000	
Contingency			30%	$ 105,000	
				Total Construction Subtotal	***$ 561,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 56,000	
Engineering - Construction Contract Administration			5%	$ 28,000	
Engineering -- Inspection			8%	$ 45,000	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ -	
Environmental			LS	$ -	
Legal, Administrative, and Funding			1.0%	$ 6,000	
				Total Project Costs (rounded)	**$ 700,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Full-Rate Study

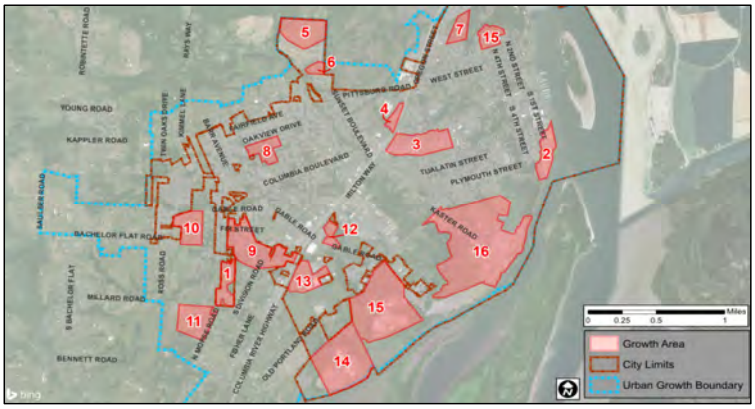
Project Identifier: 1.2

Location: System Wide

Need for Project:
- CIP has been updated

Objective:
- Evaluate potential user rate and SDC impacts of the recommended CIP

Design Considerations:
- Consider rate structures which encourage water conservation practices.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Full-Rate Study	1	LS	$ 30,000	$ 30,000	
				Construction Subtotal	***$ 30,000***
				Total Project Costs (rounded)	**$ 30,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Bayport Well Activation

Project Identifier: 1.3

Location: Bayport Well

Need for Project:
- The City's primary water source is from groundwater under the influence of surface water of the Columbia River. The Columbia River is at high risk for contamination or pollution upstream.

Objective:
- Provide the City with an emergency water source independent of the Columbia River water quality.

Design Considerations:
- Assumes no major improvements are needed to the well pump, controls, hypochlorite dosing system, or mechanical piping.
- Authorization from OHA and DEQ should be obtained before activating the well. This will likely consist of water quality monitoring and a report documenting the water quality of the well.
- Following activation of the well, the City should exercise regularly and be prepared for emergency use of the source.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Water Quality Testing and Activation Setup	1	LS	$ 10,000	$ 10,000	
				Construction Subtotal	***$ 10,000***
				Total Project Costs (rounded)	**$ 10,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Install Redundant Pittsburg Rd / Milton Creek Crossing

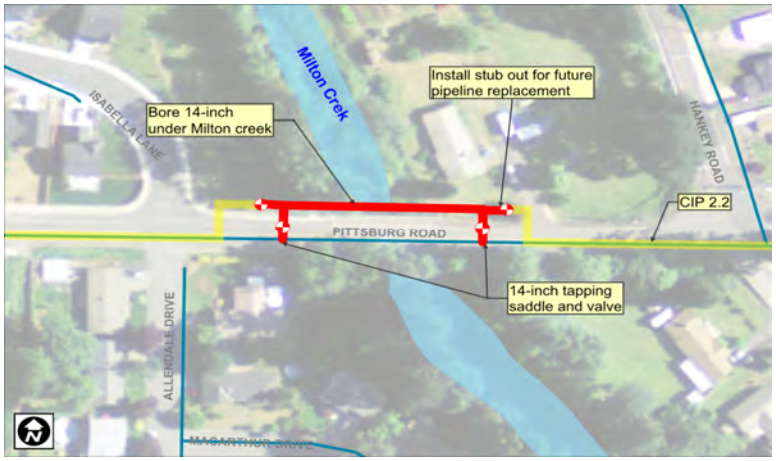
Project Identifier: 1.4

Location: Pittsburg Road and Milton Creek

Need for Project:
- The 14-inch pipeline supplying the High PZ crosses Milton Creek along Pittsburg Rd and has been identified as a vulnerable point in the distribution system. The majority of the High PZ users will not have water supply if this pipeline is damaged.

Objective:
- Increase resiliency in this transmission pipeline by installing a redundant transmission pipeline underneath Milton Creek which can be utilized if the primary transmission pipe is damaged.

Design Considerations:
- The project is located within Waters of the State and Wetlands. A wetlands delineation is likely required and additional permitting through DSL and USACE.
- Project costs are based on directional drilling underneath the creek. Additional pipeline alignments should be considered in the preliminary design of this pipeline.
-Temporary water should be supplied to the High PZ if the transmission is put out of service.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
14-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	250	LF	$ 300	$ 75,000	
Boring Under Highway (18" casing)	125	LF	$ 1,000	$ 125,000	
Connect to Existing Water Main (14" & 16")	2	EA	$ 9,000	$ 18,000	
14-inch Gate Valve - Includes Installation	2	EA	$ 5,000	$ 10,000	
Roadway Restoration	1	LS	$ 20,000	$ 20,000	
Traffic Control w/ Flaggers	1	LS	$ 28,000	$ 28,000	
				Construction Subtotal	***$ 276,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 28,000	
Bonding			2.5%	$ 7,000	
Contractor Overhead and Profit			15%	$ 41,000	
Prevailing Wages			2.5%	$ 7,000	
Contingency			35%	$ 97,000	
				Total Construction Subtotal	***$ 456,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			15%	$ 68,000	
Engineering - Construction Contract Administration			5%	$ 23,000	
Engineering -- Inspection			8%	$ 36,000	
Permitting			LS	$ 25,000	
Geotechnical Investigation			LS	$ 40,000	
Surveying			LS	$ 3,500	
Environmental			LS	$ 15,000	
Legal, Administrative, and Funding			2.5%	$ 11,000	
				Total Project Costs (rounded)	**$ 680,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Back-up Generator for PW Shop Project Identifier: 1.5	**Location: PW Shop**
Need for Project: - The PW shop serves as a critical facility in the event of an emergency within the City. The PW shop does not currently have a back-up power source. Objective: - Install a back-up generator to supply the PW shop in the event of an emergency. Design Considerations: - Consider sizing a generator to only power the critical parts of the PW shop	

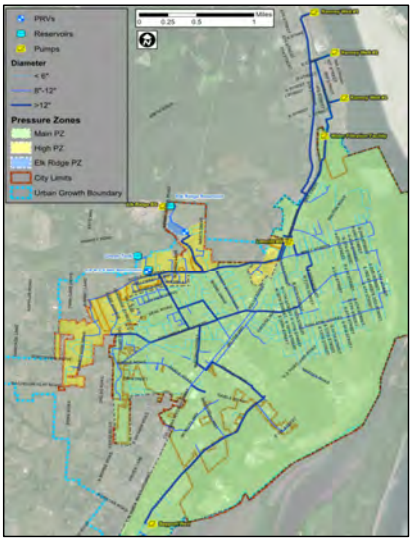
General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
40 kW Diesel Generator and Installation	1	EA	$ 50,000	$ 50,000	
				Construction Subtotal	***$ 50,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 5,000	
Bonding			2.5%	$ 1,000	
Contractor Overhead and Profit			15%	$ 8,000	
Prevailing Wages			2.5%	$ 1,000	
Contingency			30%	$ 15,000	
				Total Construction Subtotal	***$ 80,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			15%	$ 12,000	
Engineering - Construction Contract Administration			8%	$ 6,000	
Engineering -- Inspection			0%	$ -	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ -	
Environmental			LS	$ -	
Legal, Administrative, and Funding			0.0%	$ -	
				Total Project Costs (rounded)	**$ 100,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Water Master Plan Update #1 Project Identifier: 2.1	**Location: Whole System**
Need for Project: - Recommended to update water master plan every 5-10 years. Objective: - Re-assess needs, priorities, and properly allocated budgets to address system deficiencies.	

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Water Master Plan Update	1	LS	$ 200,000	$ 200,000	
			Total Project Costs (rounded)		**$ 200,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Lemont BS to Pittsburg Rd Pipeline Replacement

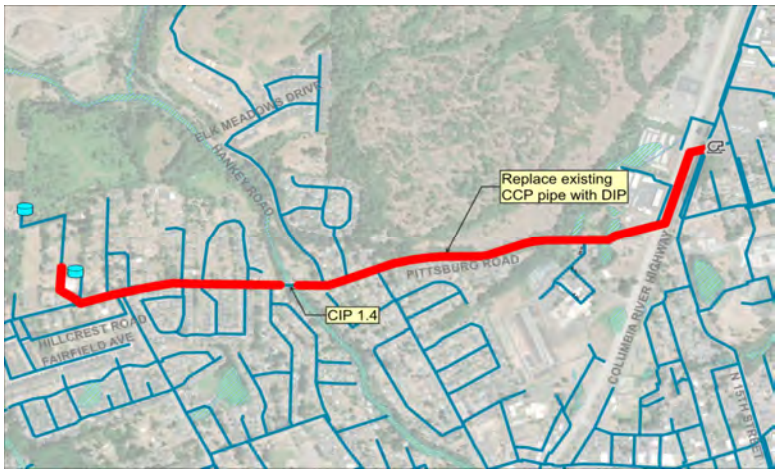
Project Identifier: 2.2

Location: Pittsburg Road

Need for Project:
- The existing concrete cylinder pipe along Pittsburg Road is reaching the end of its useful life and repairs of the pipe material are unable to be completed in-house in an emergency.

Objective:
- Replace the concrete cylinder pipe with DI pipe material from Lemont BS to Battle Mountain Road connection with the Green Tank transmission pipe

Design Considerations:
- Project can be completed in conjunction with CIP 1.2
- Project can be split into serval phases and be included in the City's annual water line replacement budget.
- Temporary water should be supplied to the High PZ while the transmission line is being replaced. This could consist of a temporary booster pump supplying the High PZ.
-Wetlands are within project vicinity and wetland delineation may be necessary.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
14-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	7,500	LF	$ 300	$ 2,250,000	
Connect to Existing Water Main (6" & 8")	10	EA	$ 5,000	$ 50,000	
Roadway Restoration (Full Lane)	7,500	LF	$ 75	$ 563,000	
Traffic Control w/ Flaggers	1	LS	$ 139,000	$ 139,000	
				Construction Subtotal	***$ 3,002,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 300,000	
Bonding			2.5%	$ 75,000	
Contractor Overhead and Profit			15%	$ 450,000	
Prevailing Wages			2.5%	$ 75,000	
Contingency			30%	$ 901,000	
				Total Construction Subtotal	***$ 4,803,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 480,000	
Engineering - Construction Contract Administration			3%	$ 120,000	
Engineering -- Inspection			8%	$ 384,000	
Permitting			LS	$ 15,000	
Geotechnical Investigation			LS	$ 10,000	
Surveying			LS	$ 75,000	
Environmental			LS	$ 15,000	
Legal, Administrative, and Funding			1.0%	$ 48,000	
				Total Project Costs (rounded)	**$ 6,000,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Elk Ridge BS Condition Improvements

Project Identifier: 2.3

Location: Elk Ridge BS

Need for Project:
- The Elk Ridge BS does not have proper ventilation, floor drain, or back-up power supply

Objective:
- Install proper ventilation, floor drain, and an emergency generator configuration

Design Considerations
- Consider completing improvements in conjunction with CIP 4.3 when the next phase of the Elk Ridge development occurs.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Building Upgrades (includes ventilation and floor drain)	1	LS	$ 35,000	$ 35,000	
Back-Up Power Connection	1	LS	$ 10,000	$ 10,000	
				Construction Subtotal	***$ 45,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 5,000	
Bonding			2.5%	$ 1,000	
Contractor Overhead and Profit			15%	$ 7,000	
Prevailing Wages			2.5%	$ 1,000	
Contingency			30%	$ 14,000	
				Total Construction Subtotal	***$ 73,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			20%	$ 15,000	
Engineering - Construction Contract Administration			10%	$ 7,000	
Engineering -- Inspection			10%	$ 7,000	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ -	
Environmental			LS	$ -	
Legal, Administrative, and Funding			1.0%	$ 1,000	
				Total Project Costs (rounded)	**$ 110,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Ranney Wells Control Upgrades

Project Identifier: 2.4

Location: Ranney Well #2 and #3

Need for Project:
- The Ranney Wells #2 and #3 are controlled by the 2.5 MG Reservoir levels in the distribution system and the WFF cannot be operated if the raw water clearwell is offline.

Objective:
- Upgrade the existing controls for Ranney Wells #2 and #3 to be controlled by the raw water wet well level. Also upgrade the pump controls to alternate pump rotations and be controlled by VFDs

Design Considerations
- Complete improvement one well at a time to continue to supply the WFF with water.
- Complete as the existing pumps reach the end of their useful life and need replaced.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Upgrade Pumps to VFDs	1	LS	$ 284,000	$ 284,000	
SCADA Panel, Installation, programming, and integration	1	LS	$ 50,000	$ 50,000	
				Construction Subtotal	***$ 334,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 33,000	
Bonding			2.5%	$ 8,000	
Contractor Overhead and Profit			15%	$ 50,000	
Prevailing Wages			2.5%	$ 8,000	
Contingency			30%	$ 100,000	
				Total Construction Subtotal	***$ 533,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 53,000	
Engineering - Construction Contract Administration			3%	$ 13,000	
Engineering -- Inspection			8%	$ 43,000	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ -	
Environmental			LS	$ -	
				Total Project Costs (rounded)	**$ 700,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Helens Way PZ Boundary Modification

Project Identifier: 2.5

Location: Helens Way and Oakwood Drive

Need for Project:
- Service connections along Helens Way and Oakwood Drive have been observed below 40 psi during PHD.

Objective:
- Raise service pressures by incorporating Helens Way and Oakwood Drive into the High PZ

Design Considerations:
- Service connections may require individual pressure regulator once incorporated into the High PZ (included in project costs).
- Consider completing project in conjunction with Growth Area 8 development.



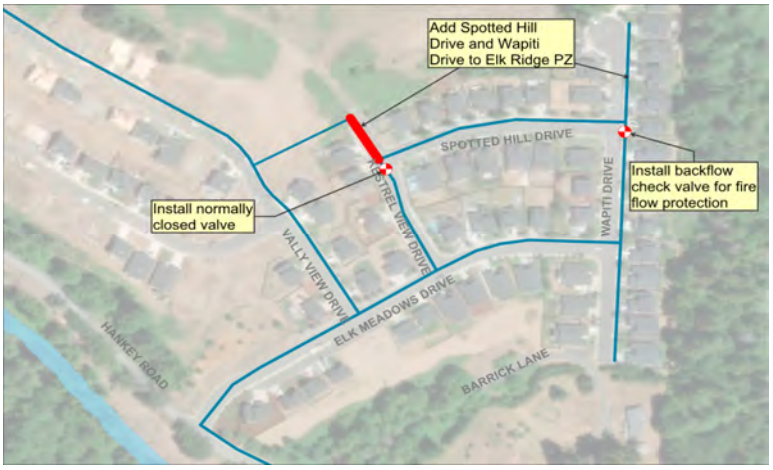
General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	300	LF	$ 230	$ 69,000	
Connect to Existing Water Main (6" & 8")	6	EA	$ 5,000	$ 30,000	
Roadway Restoration (Half Lane)	300	LF	$ 45	$ 14,000	
Traffic Control w/o Flaggers	1	LS	$ 7,000	$ 7,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	67	CY	$ 300	$ 20,000	
Individual Pressure Regulators	66	EA	$ 500	$ 33,000	
				Construction Subtotal	***$ 173,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 17,000	
Bonding			2.5%	$ 4,000	
Contractor Overhead and Profit			15%	$ 26,000	
Prevailing Wages			2.5%	$ 4,000	
Contingency			30%	$ 52,000	
				Total Construction Subtotal	***$ 276,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 28,000	
Engineering - Construction Contract Administration			3%	$ 7,000	
Engineering -- Inspection			8%	$ 22,000	
Permitting			LS	$ 5,000	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ 5,000	
Environmental			LS	$ -	
Legal, Administrative, and Funding			5.0%	$ 14,000	
				Total Project Costs (rounded)	**$ 400,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Spotted Hill and Wapiti Drive PZ Boundary Modification Project Identifier: 2.6	**Location: Spotted Hill Drive and Wapiti Drive**
Need for Project: - Observed pressures below 40 psi Objective: - Incorporate the homes into the Elk Ridge PZ to obtain operating pressures above 40 psi Design Considerations: - Existing Elk Ridge BS Pumps are projected to have sufficient capacity to meet PHD with additional 20 homes. - Consider potential impacts from Elk Ridge Phase 7 Development.	

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	120	LF	$ 230	$ 28,000	
8-inch Gate Valves - Includes installation	1	EA	$ 3,500	$ 4,000	
Check Valve with Vault	1	EA	$ 20,000	$ 20,000	
Roadway Restoration (Half Lane)	120	LF	$ 45	$ 6,000	
				Construction Subtotal	***$ 58,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 6,000	
Bonding			2.5%	$ 1,000	
Contractor Overhead and Profit			15%	$ 9,000	
Prevailing Wages			2.5%	$ 1,000	
Contingency			30%	$ 17,000	
				Total Construction Subtotal	***$ 92,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			30%	$ 28,000	
Engineering - Construction Contract Administration			20%	$ 18,000	
Engineering -- Inspection			10%	$ 9,000	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ 5,000	
Environmental			LS	$ -	
Legal, Administrative, and Funding			5.0%	$ 5,000	
				Total Project Costs (rounded)	**$ 160,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Small Pipe Diameter Replacement Phase I

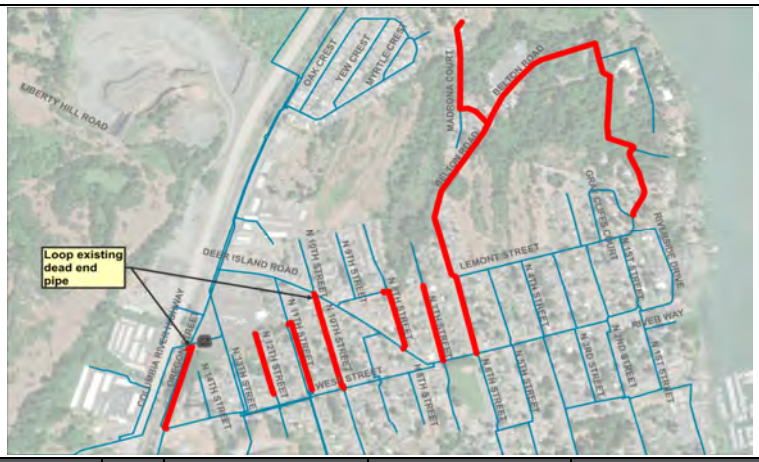
Project Identifier: 2.7

Location: North of West Street

Need for Project:
- Available fire flow at these locations was observed to be less than 1,000 gpm. It is recommended that the system be able to provide a minimum of 1,000 gpm at existing hydrants.

Objective:
- Replace the small diameter pipes with a minimum size of 8-inch pipes. Loop pipes where additional pipe installation is minimal.

Design Considerations:
- Develop a prioritized small pipe replacement program and target to replace the identified pipelines within the next 10 years.
-Consider incorporating additional pipe upsizing shown in CIP Projects 3.4 and 3.5 as appropriate.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	10,400	LF	$ 305	$ 3,172,000	
				Construction Subtotal	***$ 3,172,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 317,000	
Bonding			2.5%	$ 79,000	
Contractor Overhead and Profit			15%	$ 476,000	
Prevailing Wages			2.5%	$ 79,000	
Contingency			30%	$ 952,000	
				Total Construction Subtotal	***$ 5,075,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 508,000	
Engineering - Construction Contract Administration			3%	$ 127,000	
Engineering -- Inspection			8%	$ 406,000	
Permitting			LS	$ 15,000	
Geotechnical Investigation			LS	$ 10,000	
Surveying			LS	$ 104,000	
Environmental			LS	$ 1,500	
Legal, Administrative, and Funding			1.0%	$ 51,000	
				Total Project Costs (rounded)	**$ 6,300,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Small Pipe Diameter Replacement Phase II

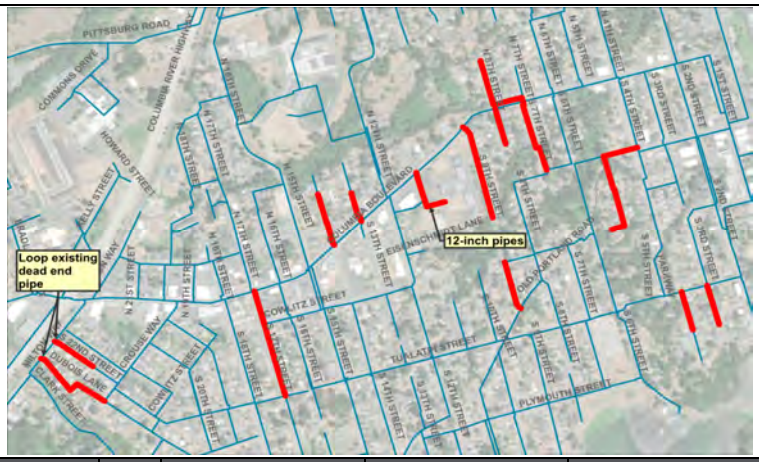
Project Identifier: 2.8

Location: Between Columbia Boulevard and Tualatin Street

Need for Project:
- Available fire flow at these locations was observed to be less than 1,000 gpm. It is recommended that the system be able to provide a minimum of 1,000 gpm at existing hydrants.

Objective:
- Replace the small diameter pipes with a minimum size of 8-inch pipes and 12-inches where indicated. Loop the where additional pipe installation is minimal.

Design Considerations:
- Develop a prioritized small pipe replacement program and target to replace the identified pipelines within the next 10 years.
- Install larger than 8-inch diameter where necessary to meet the recommended fire flow demand.
-Consider incorporating additional pipe upsizing shown in CIP Projects 3.4 and 3.5 as appropriate.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	8,160	LF	$ 305	$ 2,489,000	
12-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	500	LF	$ 345	$ 173,000	
				Construction Subtotal	***$ 2,662,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 266,000	
Bonding			2.5%	$ 67,000	
Contractor Overhead and Profit			15%	$ 399,000	
Prevailing Wages			2.5%	$ 67,000	
Contingency			30%	$ 799,000	
				Total Construction Subtotal	***$ 4,260,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 426,000	
Engineering - Construction Contract Administration			3%	$ 107,000	
Engineering -- Inspection			8%	$ 341,000	
Permitting			LS	$ 15,000	
Geotechnical Investigation			LS	$ 10,000	
Surveying			LS	$ 86,600	
Environmental			LS	$ 1,500	
Legal, Administrative, and Funding			1.0%	$ 43,000	
				Total Project Costs (rounded)	**$ 5,300,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Small Pipe Diameter Replacement Phase III

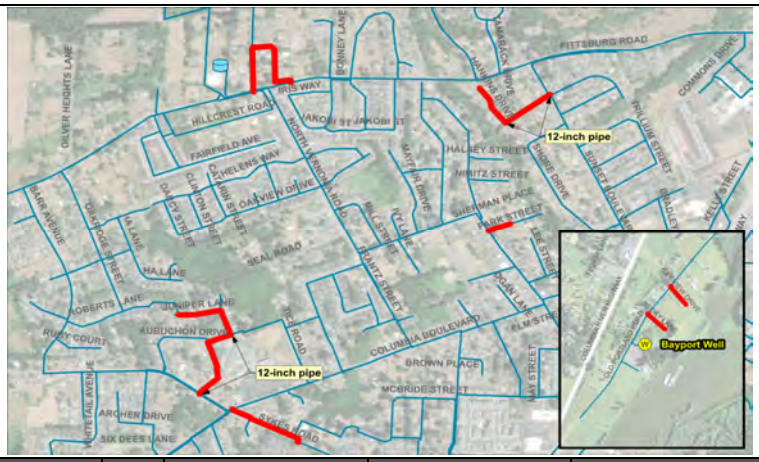
Project Identifier: 2.9

Location: West of the Columbia River Highway and along Old Portland Road

Need for Project:
- Available fire flow at these locations was observed to be less than 1,000 gpm. It is recommended that the system be able to provide a minimum of 1,000 gpm at existing hydrants.

Objective:
- Replace the small diameter pipes with a minimum size of 8-inch pipes and 12-inch where indicated.

Design Considerations:
- Develop a prioritized small pipe replacement program and target to replace the identified pipelines within the next 10 years.
- Install larger than 8-inch diameter where necessary to meet the recommended fire flow demand.
-Consider incorporating additional pipe upsizing shown in CIP Projects 3.4 and 3.5 as appropriate.



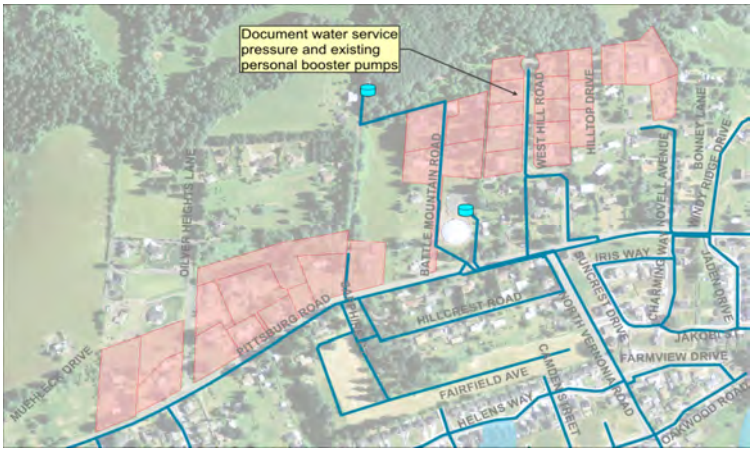
General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	4,630	LF	$ 305	$ 1,413,000	
12-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	1,290	LF	$ 345	$ 446,000	
				Construction Subtotal	***$ 1,859,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 186,000	
Bonding			2.5%	$ 46,000	
Contractor Overhead and Profit			15%	$ 279,000	
Prevailing Wages			2.5%	$ 46,000	
Contingency			30%	$ 558,000	
				Total Construction Subtotal	***$ 2,974,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 297,000	
Engineering - Construction Contract Administration			3%	$ 74,000	
Engineering -- Inspection			8%	$ 238,000	
Permitting			LS	$ 15,000	
Geotechnical Investigation			LS	$ 10,000	
Surveying			LS	$ 59,200	
Environmental			LS	$ 1,500	
Legal, Administrative, and Funding			1.0%	$ 30,000	
				Total Project Costs (rounded)	**$ 3,700,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: High PZ Low Pressure Study Project Identifier: 2.10	**Location: High PZ, North of Pittsburg Road**
Need for Project: - Several areas within the High PZ were observed to have pressures below 40 psi during PHD. Objective: - Document existing service connections with individual booster pumps and locate additional connections below 40 psi. Design Considerations: - Pressures should be checked during peak demand season from July to August - Future CIP project should be considered if numerous services are below 40 psi. One alternative could be creating a new pressure zone.	

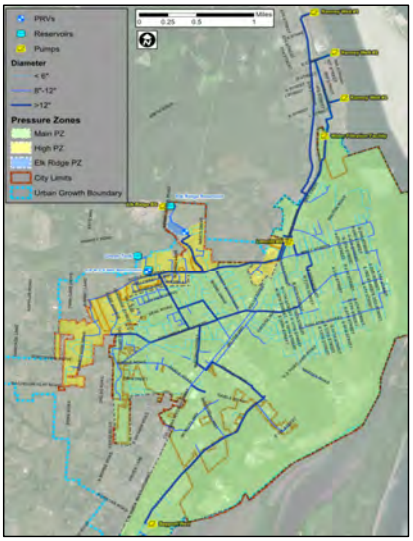
General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Pressure Monitoring Study	1	LS	$ 30,000	$ 30,000	
				Construction Subtotal	***$ 30,000***
				Total Project Costs (rounded)	**$ 30,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Water Master Plan Update #2 Project Identifier: 3.1	**Location: Whole System**
Need for Project: - Recommended to update water master plan every 5-10 years. Objective: - Re-assess needs, priorities, and properly allocated budgets to address system deficiencies.	

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Water Master Plan Update #2	1	LS	$ 200,000	$ 200,000	
				Total Project Costs (rounded)	**$ 200,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: 4.0 MG Reservoir Construction

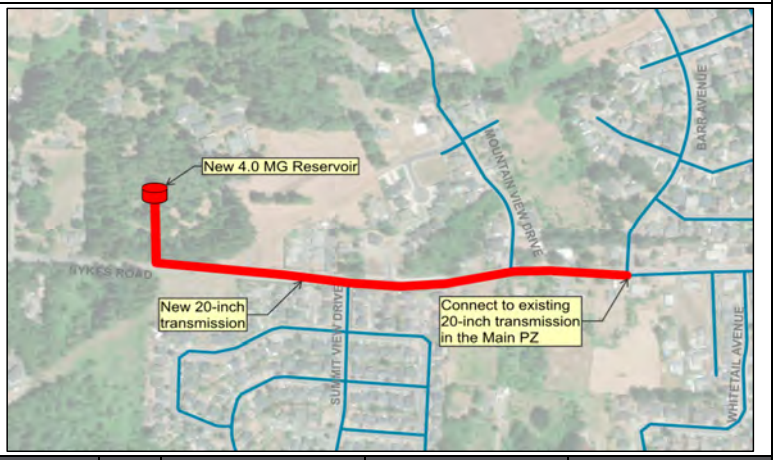
Project Identifier: 3.2

Location: Sykes Road

Need for Project:
- The City has a projected future storage deficit if no additional storage is installed by 2041.

Objective:
- Install a new 4.0 MG Reservoir to replace the 2.0 MG Reservoir, meet 2041 storage projections, and provide a surplus of 1.0 MG beyond the study period.

Design Considerations:
- Complete a siting feasibility study in the preliminary design phase. Note costs are based on the Sykes Road location.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Siting Feasibility Study	1	LS	$ 45,000	$ 45,000	
New 4.0 MG Concrete Storage Reservoir (includes sitework, controls, yard piping)	1	LS	$ 8,000,000	$ 8,000,000	
20-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	2,700	LF	$ 390	$ 1,053,000	
Roadway Restoration (Full Lane)	2,300	LF	$ 75	$ 173,000	
Gravel Access Road Construction	400	LF	$ 100	$ 40,000	
Traffic Control w/ Flaggers	1	LS	$ 48,000	$ 48,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	1,000	CY	$ 300	$ 300,000	
Land Acquisition	6	AC	$ 500,000	$ 3,000,000	
				Construction Subtotal	***$ 12,659,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 1,266,000	
Bonding			2.5%	$ 316,000	
Contractor Overhead and Profit			15%	$ 1,899,000	
Prevailing Wages			2.5%	$ 316,000	
Contingency			30%	$ 3,798,000	
				Total Construction Subtotal	***$ 20,254,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 2,025,000	
Engineering - Construction Contract Administration			3%	$ 506,000	
Engineering -- Inspection			8%	$ 1,620,000	
Permitting			LS	$ 25,000	
Geotechnical Investigation			LS	$ 10,000	
Surveying			LS	$ 50,000	
Environmental			LS	$ 25,000	
Legal, Administrative, and Funding			1.0%	$ 203,000	
				Total Project Costs (rounded)	**$ 24,800,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Lemont BS Replacement Project Identifier: 3.3	**Location: Lemont BS**
Need for Project: - Booster station is reaching the end of its useful life and is in need of upgrades. Objective: - Replace the Lemont BS with a new building, new piping, and instrumentation. Install same sized pumps with updated controls including flow meters and pressure transducers. Design Considerations - Consider structural retrofitting in lieu of new booster station structure if feasible.	

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
Demolition of existing Booster Station	1	LS	$ 58,000	$ 58,000	
New Booster Station (includes building, sitework, and instrumentation)	1	LS	$ 580,000	$ 580,000	
				Construction Subtotal	***$ 638,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 64,000	
Bonding			2.5%	$ 16,000	
Contractor Overhead and Profit			15%	$ 96,000	
Prevailing Wages			2.5%	$ 16,000	
Contingency			30%	$ 191,000	
				Total Construction Subtotal	***$ 1,021,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 102,000	
Engineering - Construction Contract Administration			3%	$ 26,000	
Engineering -- Inspection			8%	$ 82,000	
Permitting			LS	$ 2,500	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ 15,000	
Environmental			LS	$ 2,500	
Legal, Administrative, and Funding			1.0%	$ 10,000	
				Total Project Costs (rounded)	**$ 1,300,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Small Pipe Diameter Replacement Phase IV

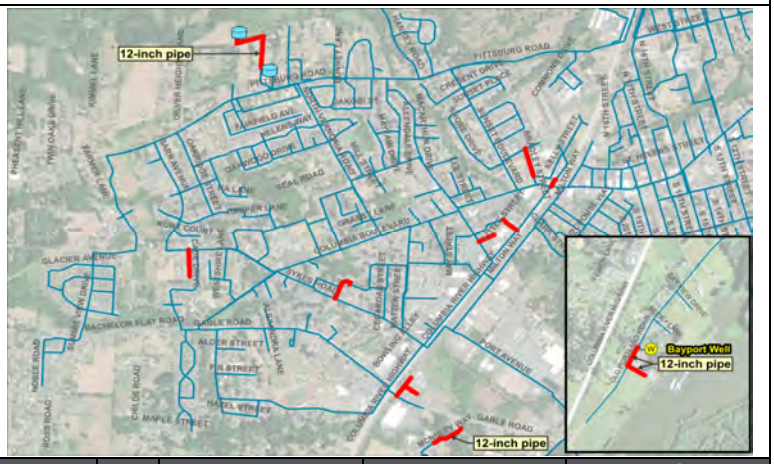
Project Identifier: 3.4

Location: Systemwide

Need for Project:
- Several areas within the water system do not meet the recommended fire flow demand for each zone type

Objective:
- Replace the small diameter pipes with a minimum size of 8-inch pipe and 12-inch where indicated
- Improve available fire flow within the system to meet the recommended fire demand.

Design Considerations:
- Developed a prioritized small pipe replacement program and target to replace the identified pipelines within the next 20 years.
- Upsizing the Green Tank transmission pipe improves available fire flow throughout the High PZ.
-Consider incorporating additional pipe upsizing shown in CIP Projects 2.7, 2.8, and 2.9 as appropriate.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	2,910	LF	$ 305	$ 888,000	
12-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	2,790	LF	$ 345	$ 963,000	
				Construction Subtotal	***$ 1,851,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 185,000	
Bonding			2.5%	$ 46,000	
Contractor Overhead and Profit			15%	$ 278,000	
Prevailing Wages			2.5%	$ 46,000	
Contingency			30%	$ 555,000	
				Total Construction Subtotal	***$ 2,961,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 296,000	
Engineering - Construction Contract Administration			3%	$ 74,000	
Engineering -- Inspection			8%	$ 237,000	
Permitting			LS	$ 15,000	
Geotechnical Investigation			LS	$ 10,000	
Surveying			LS	$ 57,000	
Environmental			LS	$ 1,500	
Legal, Administrative, and Funding			1.0%	$ 30,000	
				Total Project Costs (rounded)	**$ 3,700,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Small Pipe Diameter Replacement Phase V

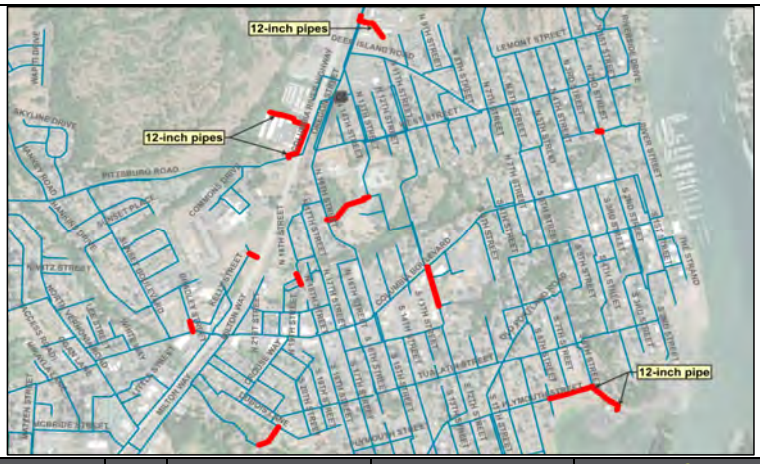
Project Identifier: 3.5

Location: Systemwide

Need for Project:
- Several areas within the water system do not meet the recommended fire flow demand for each zone type

Objective:
- Replace the small diameter pipes with a minimum size of 8-inch pipe and 12-inch where indicated
- Improve available fire flow within the system to meet the recommended fire demand.

Design Considerations:
- Developed a prioritized small pipe replacement program and target to replace the identified pipelines within the next 20 years.
-Consider incorporating additional pipe upsizing shown in CIP Projects 2.7, 2.8, and 2.9 as appropriate.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	2,820	LF	$ 305	$ 861,000	
12-inch DIP Pipe, Hydrants, Services, Valves, and Surface Restoration	2,160	LF	$ 345	$ 746,000	
				Construction Subtotal	***$ 1,607,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 161,000	
Bonding			2.5%	$ 40,000	
Contractor Overhead and Profit			15%	$ 241,000	
Prevailing Wages			2.5%	$ 40,000	
Contingency			30%	$ 482,000	
				Total Construction Subtotal	***$ 2,571,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 257,000	
Engineering - Construction Contract Administration			3%	$ 64,000	
Engineering -- Inspection			8%	$ 206,000	
Permitting			LS	$ 15,000	
Geotechnical Investigation			LS	$ 10,000	
Surveying			LS	$ 28,200	
Environmental			LS	$ 1,500	
Legal, Administrative, and Funding			1.0%	$ 26,000	
				Total Project Costs (rounded)	**$ 3,200,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

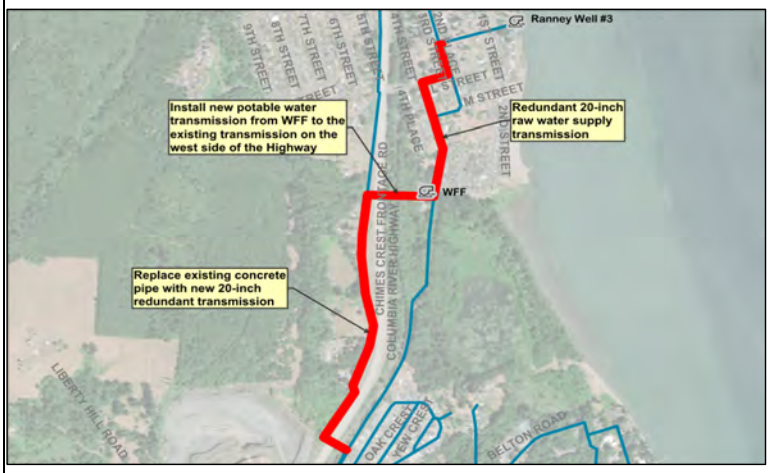
Project: Water Master Plan

Project Title: Redundant WFF Supply and Distribution Transmission Project Identifier: 3.6	**Location: K Street and 4th Street to Oregon Street**

Need for Project:
- Improve redundancy and system resiliency in the raw water supply to the WFF and the treated water supply to the distribution system

Objective:
- Install a redundant raw water supply transmission from K Street and 3rd Street to the WFF.
- Install a new potable water transmission from the WFF across the Columbia River Hwy and connect to the existing 14-inch concrete transmission. Replace the existing concrete pipe on the west side of the Highway to the Oregon Street (east side of Highway)

Design Considerations
- Project consists of two crossings of the Columbia River Highway and pipe installation within ODOT ROW. Trenchless pipe installations such as pipe bursting and boring shoudl be considered during the conceptual design.
- Coordinate water supply to Port of Columbia City during replacement of the existing 14-inch pipeline.
- Project includes two crossings under existing railroads and



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
20-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	5,760	LF	$ 390	$ 2,247,000	
Connect to Existing Water Main (18" & 20")	5	EA	$ 11,000	$ 55,000	
Boring Under Highway (24" casing)	600	LF	$ 1,500	$ 900,000	
Roadway Restoration (Full Lane)	4,360	LF	$ 75	$ 327,000	
Lean Concrete Trench Backfill Under ODOT Roadways	2,800	LF	$ 165	$ 462,000	
Soil Surface Repair, Seeding, and Stabilization	800	LF	$ 5	$ 4,000	
Traffic Control w/ Flaggers	1	LS	$ 200,000	$ 200,000	
				Construction Subtotal	***$ 4,195,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 420,000	
Bonding			2.5%	$ 105,000	
Contractor Overhead and Profit			15%	$ 629,000	
Prevailing Wages			2.5%	$ 105,000	
Contingency			30%	$ 1,259,000	
				Total Construction Subtotal	***$ 6,713,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 671,000	
Engineering - Construction Contract Administration			3%	$ 168,000	
Engineering -- Inspection			8%	$ 537,000	
Permitting			LS	$ 50,000	
Geotechnical Investigation			LS	$ 50,000	
Surveying			LS	$ 50,000	
Environmental			LS	$ 15,000	
Legal, Administrative, and Funding			1.0%	$ 67,000	
				Total Project Costs (rounded)	**$ 8,400,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Riverfront District Development

Project Identifier: 4.1

Location: Riverfront Development

Need for Project:
- As development occurs for the Riverfront Development

Objective:
- Install water mainlines through the development to meet the projected demands and fire flow requirements

Design Considerations:
- Project is within 100-year and 500-year floodplain
- Recommends installation of 12-inch pipe to minimize pipe velocities during fire flow event



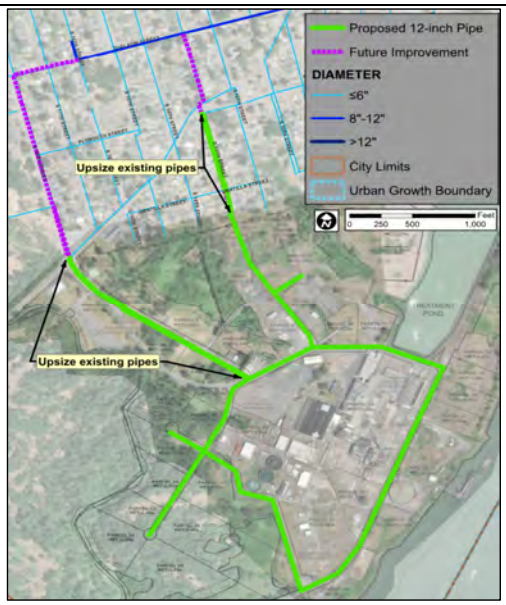
General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	1,000	LF	$ 230	$ 230,000	
12-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	2,600	LF	$ 270	$ 702,000	
Roadway Restoration (Full Lane)	3,600	LF	$ 75	$ 270,000	
ADA Ramp Reconstruction (Compliance)	23	EA	$ 4,600	$ 106,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	800	CY	$ 300	$ 240,000	
Traffic Control w/ Flaggers	1	LS	$ 82,000	$ 82,000	
				Construction Subtotal	***$ 1,630,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 163,000	
Bonding			2.5%	$ 41,000	
Contractor Overhead and Profit			15%	$ 245,000	
Prevailing Wages			2.5%	$ 41,000	
Contingency			30%	$ 489,000	
				Total Construction Subtotal	***$ 2,609,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 261,000	
Engineering - Construction Contract Administration			3%	$ 65,000	
Engineering -- Inspection			8%	$ 209,000	
Permitting			LS	$ 25,000	
Geotechnical Investigation			LS	$ 100,000	
Surveying			LS	$ 25,000	
Environmental			LS	$ 25,000	
Legal, Administrative, and Funding			1.0%	$ 26,000	
				Total Project Costs (rounded)	**$ 3,400,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Industrial Business Park Development Project Identifier: 4.2	**Location: Industrial Business Park**
Need for Project: - As development occurs for the Industrial Business Park Development Objective: - Install water mainlines through the development to meet the projected demands and fire flow requirements Design Considerations: - Project is within 100-year and 500-year floodplain - Recommends installation of 12-inch pipe to minimize pipe velocities during fire flow event - Upsize existing pipes to 12-inchs from Old Portland Road to Tualatin Street as pipes need replaced.	

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
12-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	14,300	LF	$ 270	$ 3,861,000	
Roadway Restoration (Full Lane)	14,300	LF	$ 75	$ 1,073,000	
ADA Ramp Reconstruction (Compliance)	10	EA	$ 4,600	$ 46,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	3,178	CY	$ 300	$ 954,000	
Traffic Control w/ Flaggers	1	LS	$ 50,000	$ 50,000	
				Construction Subtotal	***$ 5,984,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 598,000	
Bonding			2.5%	$ 150,000	
Contractor Overhead and Profit			15%	$ 898,000	
Prevailing Wages			2.5%	$ 150,000	
Contingency			30%	$ 1,795,000	
				Total Construction Subtotal	***$ 9,575,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 958,000	
Engineering - Construction Contract Administration			3%	$ 239,000	
Engineering -- Inspection			8%	$ 766,000	
Permitting			LS	$ 25,000	
Geotechnical Investigation			LS	$ 140,000	
Surveying			LS	$ 25,000	
Environmental			LS	$ 25,000	
Legal, Administrative, and Funding			1.0%	$ 96,000	
				Total Project Costs (rounded)	**$ 11,900,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Elk Ridge Upper Development

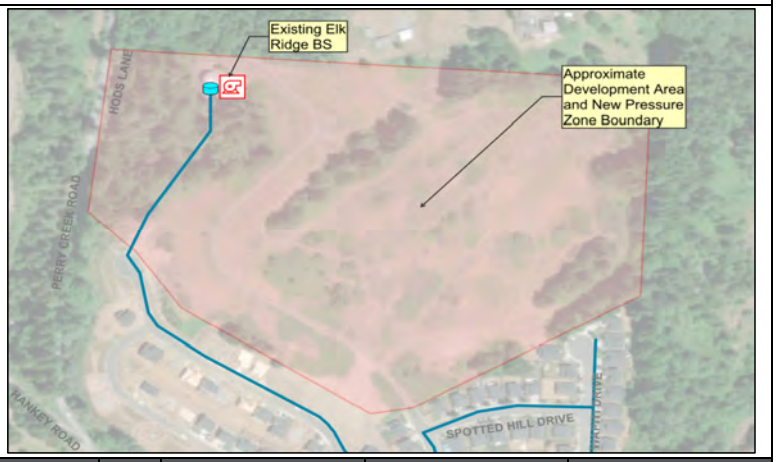
Project Identifier: 4.3

Location: Elk Ridge Booster Station

Need for Project:
- As development occurs in the Elk Ridge Development

Objective:
- Install new pumps in the existing Elk Ridge BS to deliver water to a new pressure zone in the next phase of the Elk Ridge Development.

Design Considerations:
- Pumps must meet fire flow demands because system storage cannot be utilized.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
New Jockey Pump and VFD (25 gpm)	1	EA	$ 22,000	$ 22,000	
New Duty Pump (100 gpm)	2	EA	$ 40,000	$ 80,000	
New Fire Pump (1,500 gpm)	2	EA	$ 122,000	$ 244,000	
SCADA Panel, Installation, programming, and integration	1	LS	$ 150,000	$ 150,000	
				Construction Subtotal	***$ 496,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 50,000	
Bonding			2.5%	$ 12,000	
Contractor Overhead and Profit			15%	$ 74,000	
Prevailing Wages			2.5%	$ 12,000	
Contingency			30%	$ 149,000	
				Total Construction Subtotal	***$ 793,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 79,000	
Engineering - Construction Contract Administration			3%	$ 20,000	
Engineering -- Inspection			8%	$ 63,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ -	
Environmental			LS	$ 5,000	
Legal, Administrative, and Funding			1.0%	$ 8,000	
				Total Project Costs (rounded)	**$ 1,000,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Houlton Business District Development

Project Identifier: 4.4

Location: Houlton Business District

Need for Project:
- Available fire flow does not meet the recommended fire flow demands.

Objective:
- Upsize existing pipes and increase looping to increase available fire flow in this development.

Design Considerations:
- Alternative pipe upsizing and alignments can be considered to meet the recommended fire flow developments.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	1,630	LF	$ 230	$ 375,000	
Connect to Existing Water Main (14" & 16")	1	EA	$ 9,000	$ 9,000	
Connect to Existing Water Main (10" & 12")	1	EA	$ 7,000	$ 7,000	
Connect to Existing Water Main (6" & 8")	4	EA	$ 5,000	$ 20,000	
Roadway Restoration (Half Lane)	1,630	LF	$ 45	$ 74,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	224	CY	$ 300	$ 68,000	
Traffic Control w/ Flaggers	1	LS	$ 31,000	$ 31,000	
				Construction Subtotal	***$ 584,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 58,000	
Bonding			2.5%	$ 15,000	
Contractor Overhead and Profit			15%	$ 88,000	
Prevailing Wages			2.5%	$ 15,000	
Contingency			30%	$ 175,000	
				Total Construction Subtotal	***$ 935,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 94,000	
Engineering - Construction Contract Administration			3%	$ 23,000	
Engineering -- Inspection			8%	$ 75,000	
Permitting			LS	$ 5,000	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ 16,000	
Environmental			LS	$ -	
Legal, Administrative, and Funding			1.0%	$ 9,000	
				Total Project Costs (rounded)	**$ 1,200,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Growth Area 4 Commercial Development

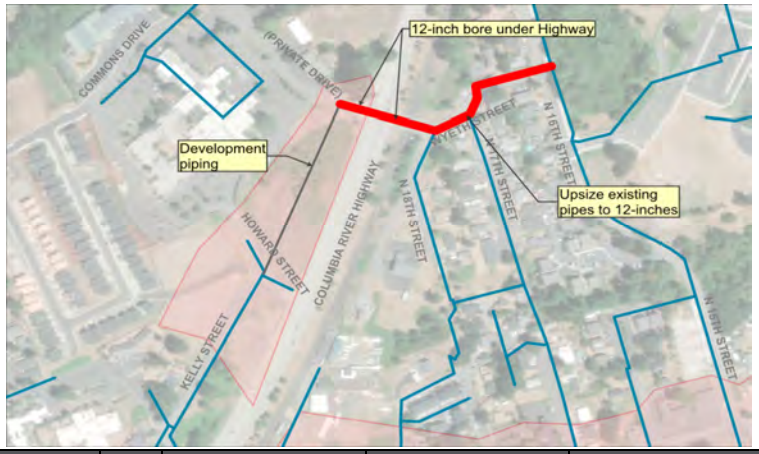
Project Identifier: 4.5

Location: Kelly Street and Columbia River HWY

Need for Project:
- Available fire flow does not meet the recommended fire flow demands.

Objective:
- Upsize existing pipes and increase looping to increase available fire flow in this development.

Design Considerations:
- Alternative pipe upsizing and alignments can be considered to meet the recommended fire flow developments.
-Development's piping should loop with the existing 8-inch pipe along Kelly Street.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
12-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	840	LF	$ 270	$ 227,000	
Connect to Existing Water Main (10" & 12")	1	EA	$ 7,000	$ 7,000	
Connect to Existing Water Main (6" & 8")	2	EA	$ 5,000	$ 10,000	
Boring Under Highway (14" casing)	120	LF	$ 900	$ 108,000	
Roadway Restoration (Half Lane)	840	LF	$ 45	$ 38,000	
ADA Ramp Reconstruction (Compliance)	4	EA	$ 4,600	$ 19,000	
Traffic Control w/ Flaggers	1	LS	$ 17,000	$ 17,000	
				Construction Subtotal	***$ 426,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 43,000	
Bonding			2.5%	$ 11,000	
Contractor Overhead and Profit			15%	$ 64,000	
Prevailing Wages			2.5%	$ 11,000	
Contingency			30%	$ 128,000	
				Total Construction Subtotal	***$ 683,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 68,000	
Engineering - Construction Contract Administration			3%	$ 17,000	
Engineering -- Inspection			8%	$ 55,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 10,000	
Environmental			LS	$ 5,000	
Legal, Administrative, and Funding			1.0%	$ 7,000	
				Total Project Costs (rounded)	**$ 900,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Client: City of St. Helens

Project: Water Master Plan

Project Title: Growth Area 1, 9, 11, and 13 Development

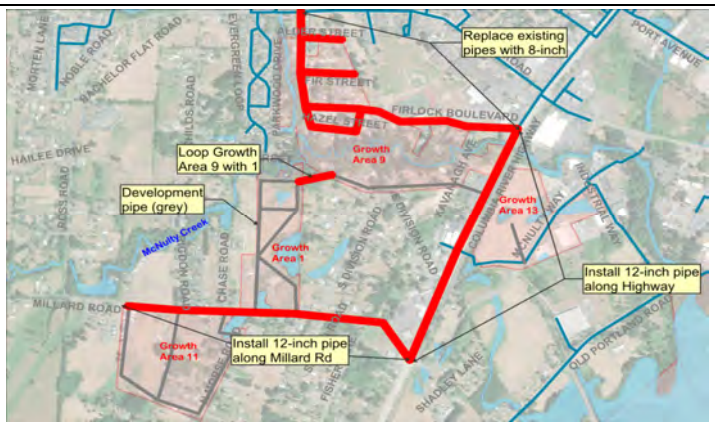
Project Identifier: 4.6

Location: Columbia River Hwy, Firlock Blvd, and Millard Rd

Need for Project:
- Development driven

Objective:
- Upsize existing pipes along Alder St, Fir St, Hazel St, and Firlock Blvd to 8-inches to improve available fire flow.
-Install a new 12-inch pipe along the Highway to supply new developments along Millard Road and improve fire flow in Growth Area 13.
-Loop Growth Areas 1 and 9 to meet recommended fire flow demands for commercially zone areas.

Design Considerations:
- Alternative pipe upsizing and alignments can be considered to meet the recommended fire flow developments.
- 12-inch pipe along the Highway crosses McNulty Creek.
-Wetland are present throughout project area (shown in blue) and may require wetland delineation.



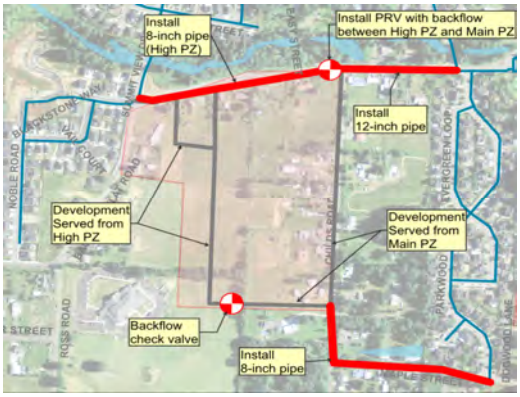
General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	6,500	LF	$ 230	$ 1,495,000	
12-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	7,000	LF	$ 270	$ 1,890,000	
Connect to Existing Water Main (10" & 12")	2	EA	$ 7,000	$ 14,000	
Connect to Existing Water Main (6" & 8")	1	EA	$ 5,000	$ 5,000	
Boring, Construction & Repairs Under Waterway (14" casing)	15	LF	$ 900	$ 14,000	
Lean Concrete Trench Backfill Under ODOT Roadways	3,500	LF	$ 165	$ 578,000	
Roadway Restoration (Full Lane)	13,500	LF	$ 75	$ 1,013,000	
ADA Ramp Reconstruction (Compliance)	15	EA	$ 4,600	$ 69,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	1,556	CY	$ 300	$ 467,000	
Traffic Control w/ Flaggers	1	LS	$ 244,000	$ 244,000	
				Construction Subtotal	***$ 5,789,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 579,000	
Bonding			2.5%	$ 145,000	
Contractor Overhead and Profit			15%	$ 868,000	
Prevailing Wages			2.5%	$ 145,000	
Contingency			30%	$ 1,737,000	
				Total Construction Subtotal	***$ 9,263,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 926,000	
Engineering - Construction Contract Administration			3%	$ 232,000	
Engineering -- Inspection			8%	$ 741,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 10,000	
Environmental			LS	$ 5,000	
Legal, Administrative, and Funding			1.0%	$ 93,000	
				Total Project Costs (rounded)	**$ 11,300,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Growth Area 10 Residential Development Project Identifier: 4.7	**Location: Gable Road and Maple Street**
Need for Project: - Development driven Objective: - Serve development with most desirable operating pressures and provide pressure zone interties. Design Considerations: - Pressure zone boundaries may vary depending on final development elevations	

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	1,700	LF	$ 230	$ 391,000	
12-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	1,200	LF	$ 270	$ 324,000	
Connect to Existing Water Main (10" & 12")	2	EA	$ 7,000	$ 14,000	
Connect to Existing Water Main (6" & 8")	1	EA	$ 5,000	$ 5,000	
PRV w Vault (8" valve and larger)	1	EA	$ 50,000	$ 50,000	
Check Valve with Vault	1	EA	$ 20,000	$ 20,000	
Roadway Restoration (Full Lane)	2,900	LF	$ 75	$ 218,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	644	CY	$ 300	$ 194,000	
Traffic Control w/ Flaggers	1	LS	$ 54,000	$ 54,000	
				Construction Subtotal	***$ 1,270,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 127,000	
Bonding			2.5%	$ 32,000	
Contractor Overhead and Profit			15%	$ 191,000	
Prevailing Wages			2.5%	$ 32,000	
Contingency			30%	$ 381,000	
				Total Construction Subtotal	***$ 2,033,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 203,000	
Engineering - Construction Contract Administration			3%	$ 51,000	
Engineering -- Inspection			8%	$ 163,000	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ 30,000	
Environmental			LS	$ 5,000	
Legal, Administrative, and Funding			1.0%	$ 20,000	
				Total Project Costs (rounded)	**$ 2,600,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client: City of St. Helens

Project: Water Master Plan

Project Title: Growth Area 8 Residential Development

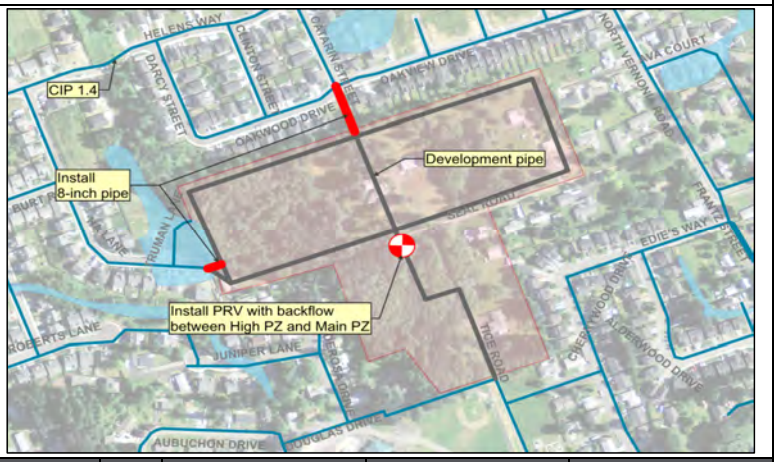
Project Identifier: 4.8

Location: N Vernonia Road and Oakview Drive

Need for Project:
- Development driven

Objective:
- Serve development with most desirable operating pressures and provide pressure zone interties.

Design Considerations:
- Pressure zone boundaries may vary depending on final development elevations
- Connection off of Oakwood Drive may require easement.
- Wetlands are present throughout the project area (shown in blue) and may require wetland delineation.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2022 Dollars)
Goods and Services					
8-inch DIP Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Services	250	LF	$ 230	$ 58,000	
Connect to Existing Water Main (6" & 8")	3	EA	$ 5,000	$ 15,000	
PRV w Vault (8" valve and larger)	1	EA	$ 50,000	$ 50,000	
Roadway Restoration (Full Lane)	250	LF	$ 75	$ 19,000	
Rock Excavation (Assumes bedrock 3.0 ft BGS)	56	CY	$ 300	$ 17,000	
Traffic Control w/ Flaggers	1	LS	$ 6,000	$ 6,000	
				Construction Subtotal	***$ 165,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 17,000	
Bonding			2.5%	$ 4,000	
Contractor Overhead and Profit			15%	$ 25,000	
Prevailing Wages			2.5%	$ 4,000	
Contingency			30%	$ 50,000	
				Total Construction Subtotal	***$ 265,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			10%	$ 27,000	
Engineering - Construction Contract Administration			3%	$ 7,000	
Engineering -- Inspection			8%	$ 21,000	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ 30,000	
Environmental			LS	$ 5,000	
Legal, Administrative, and Funding			1.0%	$ 3,000	
				Total Project Costs (rounded)	**$ 400,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APPENDIX F

WMCP Supplemental Material

KELLER ASSOCIATES

Item #3.

Oregon Water Resources Department
Water Rights Information Query

Cert:6085 OR *

Contact Information (Click to Collapse...)

Contact information

OWNER:
SAINT HELENS WATER COMMISSION
SAINT HELENS, OR 97051

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Processing History (Click to Collapse...)

Application: S 5266
- Staff Person Responsible: no caseworker currently assigned
- Received: 11/23/1916

Permit: S 3211 document , paper map
- Signature: 1/12/1917

Certificate: 6085 document , paper map
- Signature: 2/15/1926
- Type: Original

View right with Web Mapping
View Places of Use from Water Rights in the Same Area
View Reported Water Use

Scanned Documents (Click to Collapse...)

Records per page: 4

Document Type	Document Title	Date	Remarks
Permit	Permit S3211 Map Image	1/12/1917	
Permit	Permit S3211 Image	1/12/1917	
Certificate	Certificate 6085 Image	2/15/1926	
Certificate	Certificate 6085 Map	2/15/1926	

Point(s) of Diversion (Click to Collapse...)

POD 1 - MILTON CREEK > SCAPPOOSE BAY

Description
- **T-R-S-QQ:** 5.00N-2.00W-27-NW NW
- **Location Description:** SOUTH 73 DEGREES 9 MINUTES EAST, 172.41 FEET FROM NW CORNER, SECTION 27

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
15.0	15.0		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
11/23/1916	15.0	15.0						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES
(Primary); Priority Date: 11/23/1916

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
4.00N-1.00W-3	NE NE					NC			
4.00N-1.00W-3	NW NE					NC			
4.00N-1.00W-3	SW NE					NC			
4.00N-1.00W-3	SE NE					NC			
4.00N-1.00W-3	NE NW					NC			
4.00N-1.00W-3	NW NW					NC			
4.00N-1.00W-3	SW NW					NC			
4.00N-1.00W-3	SE NW					NC			
4.00N-1.00W-3	NE SW					NC			
4.00N-1.00W-3	NW SW					NC			
4.00N-1.00W-3	SW SW					NC			
4.00N-1.00W-3	SE SW					NC			
4.00N-1.00W-3	NE SE					NC			

4.00N-1.00W-3	NW SE					NC			
4.00N-1.00W-3	SW SE					NC			
4.00N-1.00W-3	SE SE					NC			
4.00N-1.00W-4	NE NE					NC			
4.00N-1.00W-4	NW NE					NC			
4.00N-1.00W-4	SW NE					NC			
4.00N-1.00W-4	SE NE					NC			
4.00N-1.00W-4	NE NW					NC			
4.00N-1.00W-4	NW NW					NC			
4.00N-1.00W-4	SW NW					NC			
4.00N-1.00W-4	SE NW					NC			
4.00N-1.00W-4	NE SW					NC			
4.00N-1.00W-4	NW SW					NC			
4.00N-1.00W-4	SW SW					NC			
4.00N-1.00W-4	SE SW					NC			
4.00N-1.00W-4	NE SE					NC			
4.00N-1.00W-4	NW SE					NC			
4.00N-1.00W-4	SW SE					NC			
4.00N-1.00W-4	SE SE					NC			
4.00N-1.00W-5	NE NE					NC			
4.00N-1.00W-5	NW NE					NC			
4.00N-1.00W-5	SW NE					NC			
4.00N-1.00W-5	SE NE					NC			
4.00N-1.00W-5	NE NW					NC			
4.00N-1.00W-5	NW NW					NC			
4.00N-1.00W-5	SW NW					NC			
4.00N-1.00W-5	SE NW					NC			
4.00N-1.00W-5	NE SW					NC			
4.00N-1.00W-5	NW SW					NC			
4.00N-1.00W-5	SW SW					NC			
4.00N-1.00W-5	SE SW					NC			
4.00N-1.00W-5	NE SE					NC			
4.00N-1.00W-5	NW SE					NC			
4.00N-1.00W-5	SW SE					NC			
4.00N-1.00W-5	SE SE					NC			
4.00N-1.00W-6	NE NE					NC			
4.00N-1.00W-6	NW NE					NC			
4.00N-1.00W-6	SW NE					NC			
4.00N-1.00W-6	SE NE					NC			
4.00N-1.00W-6	NE NW					NC			
4.00N-1.00W-6	NW NW					NC			
4.00N-1.00W-6	SW NW					NC			
4.00N-1.00W-6	SE NW					NC			
4.00N-1.00W-6	NE SW					NC			
4.00N-1.00W-6	NW SW					NC			
4.00N-1.00W-6	SW SW					NC			
4.00N-1.00W-6	SE SW					NC			
4.00N-1.00W-6	NE SE					NC			
4.00N-1.00W-6	NW SE					NC			
4.00N-1.00W-6	SW SE					NC			
4.00N-1.00W-6	SE SE					NC			
4.00N-1.00W-7	NE NE					NC			
4.00N-1.00W-7	NW NE					NC			
4.00N-1.00W-7	SW NE					NC			
4.00N-1.00W-7	SE NE					NC			
4.00N-1.00W-7	NE NW					NC			
4.00N-1.00W-7	NW NW					NC			
4.00N-1.00W-7	SW NW					NC			
4.00N-1.00W-7	SE NW					NC			
4.00N-1.00W-7	NE SW					NC			
4.00N-1.00W-7	NW SW					NC			
4.00N-1.00W-7	SW SW					NC			
4.00N-1.00W-7	SE SW					NC			
4.00N-1.00W-7	NE SE					NC			

4.00N-1.00W-7	NW SE					NC			
4.00N-1.00W-7	SW SE					NC			
4.00N-1.00W-7	SE SE					NC			
4.00N-1.00W-8	NE NE					NC			
4.00N-1.00W-8	NW NE					NC			
4.00N-1.00W-8	SW NE					NC			
4.00N-1.00W-8	SE NE					NC			
4.00N-1.00W-8	NE NW					NC			
4.00N-1.00W-8	NW NW					NC			
4.00N-1.00W-8	SW NW					NC			
4.00N-1.00W-8	SE NW					NC			
4.00N-1.00W-8	NE SW					NC			
4.00N-1.00W-8	NW SW					NC			
4.00N-1.00W-8	SW SW					NC			
4.00N-1.00W-8	SE SW					NC			
4.00N-1.00W-8	NE SE					NC			
4.00N-1.00W-8	NW SE					NC			
4.00N-1.00W-8	SW SE					NC			
4.00N-1.00W-8	SE SE					NC			
4.00N-1.00W-9	NE NE					NC			
4.00N-1.00W-9	NW NE					NC			
4.00N-1.00W-9	SW NE					NC			
4.00N-1.00W-9	SE NE					NC			
4.00N-1.00W-9	NE NW					NC			
4.00N-1.00W-9	NW NW					NC			
4.00N-1.00W-9	SW NW					NC			
4.00N-1.00W-9	SE NW					NC			
4.00N-1.00W-9	NE SW					NC			
4.00N-1.00W-9	NW SW					NC			
4.00N-1.00W-9	SW SW					NC			
4.00N-1.00W-9	SE SW					NC			
4.00N-1.00W-9	NE SE					NC			
4.00N-1.00W-9	NW SE					NC			
4.00N-1.00W-9	SW SE					NC			
4.00N-1.00W-9	SE SE					NC			
4.00N-1.00W-10	NE NE					NC			
4.00N-1.00W-10	NW NE					NC			
4.00N-1.00W-10	SW NE					NC			
4.00N-1.00W-10	SE NE					NC			
4.00N-1.00W-10	NE NW					NC			
4.00N-1.00W-10	NW NW					NC			
4.00N-1.00W-10	SW NW					NC			
4.00N-1.00W-10	SE NW					NC			
4.00N-1.00W-10	NE SW					NC			
4.00N-1.00W-10	NW SW					NC			
4.00N-1.00W-10	SW SW					NC			
4.00N-1.00W-10	SE SW					NC			
4.00N-1.00W-10	NE SE					NC			
4.00N-1.00W-10	NW SE					NC			
4.00N-1.00W-10	SW SE					NC			
4.00N-1.00W-10	SE SE					NC			
4.00N-1.00W-16	NE NE					NC			
4.00N-1.00W-16	NW NE					NC			
4.00N-1.00W-16	SW NE					NC			
4.00N-1.00W-16	SE NE					NC			
4.00N-1.00W-16	NE NW					NC			
4.00N-1.00W-16	NW NW					NC			
4.00N-1.00W-16	SW NW					NC			
4.00N-1.00W-16	SE NW					NC			
4.00N-1.00W-16	NE SW					NC			
4.00N-1.00W-16	NW SW					NC			
4.00N-1.00W-16	SW SW					NC			
4.00N-1.00W-16	SE SW					NC			
4.00N-1.00W-16	NE SE					NC			

4.00N-1.00W-16	NW SE					NC			
4.00N-1.00W-16	SW SE					NC			
4.00N-1.00W-16	SE SE					NC			
4.00N-1.00W-17	NE NE					NC			
4.00N-1.00W-17	NW NE					NC			
4.00N-1.00W-17	SW NE					NC			
4.00N-1.00W-17	SE NE					NC			
4.00N-1.00W-17	NE NW					NC			
4.00N-1.00W-17	NW NW					NC			
4.00N-1.00W-17	SW NW					NC			
4.00N-1.00W-17	SE NW					NC			
4.00N-1.00W-17	NE SW					NC			
4.00N-1.00W-17	NW SW					NC			
4.00N-1.00W-17	SW SW					NC			
4.00N-1.00W-17	SE SW					NC			
4.00N-1.00W-17	NE SE					NC			
4.00N-1.00W-17	NW SE					NC			
4.00N-1.00W-17	SW SE					NC			
4.00N-1.00W-17	SE SE					NC			
5.00N-1.00W-27	NE NE					NC			
5.00N-1.00W-27	NW NE					NC			
5.00N-1.00W-27	SW NE					NC			
5.00N-1.00W-27	SE NE					NC			
5.00N-1.00W-27	NE NW					NC			
5.00N-1.00W-27	NW NW					NC			
5.00N-1.00W-27	SW NW					NC			
5.00N-1.00W-27	SE NW					NC			
5.00N-1.00W-27	NE SW					NC			
5.00N-1.00W-27	NW SW					NC			
5.00N-1.00W-27	SW SW					NC			
5.00N-1.00W-27	SE SW					NC			
5.00N-1.00W-27	NE SE					NC			
5.00N-1.00W-27	NW SE					NC			
5.00N-1.00W-27	SW SE					NC			
5.00N-1.00W-27	SE SE					NC			
5.00N-1.00W-32	NE NE					NC			
5.00N-1.00W-32	NW NE					NC			
5.00N-1.00W-32	SW NE					NC			
5.00N-1.00W-32	SE NE					NC			
5.00N-1.00W-32	NE NW					NC			
5.00N-1.00W-32	NW NW					NC			
5.00N-1.00W-32	SW NW					NC			
5.00N-1.00W-32	SE NW					NC			
5.00N-1.00W-32	NE SW					NC			
5.00N-1.00W-32	NW SW					NC			
5.00N-1.00W-32	SW SW					NC			
5.00N-1.00W-32	SE SW					NC			
5.00N-1.00W-32	NE SE					NC			
5.00N-1.00W-32	NW SE					NC			
5.00N-1.00W-32	SW SE					NC			
5.00N-1.00W-32	SE SE					NC			
5.00N-1.00W-33	NE NE					NC			
5.00N-1.00W-33	NW NE					NC			
5.00N-1.00W-33	SW NE					NC			
5.00N-1.00W-33	SE NE					NC			
5.00N-1.00W-33	NE NW					NC			
5.00N-1.00W-33	NW NW					NC			
5.00N-1.00W-33	SW NW					NC			
5.00N-1.00W-33	SE NW					NC			
5.00N-1.00W-33	NE SW					NC			
5.00N-1.00W-33	NW SW					NC			
5.00N-1.00W-33	SW SW					NC			
5.00N-1.00W-33	SE SW					NC			
5.00N-1.00W-33	NE SE					NC			

5.00N-1.00W-33	NW SE					NC			
5.00N-1.00W-33	SW SE					NC			
5.00N-1.00W-33	SE SE					NC			
5.00N-1.00W-34	NE NE					NC			
5.00N-1.00W-34	NW NE					NC			
5.00N-1.00W-34	SW NE					NC			
5.00N-1.00W-34	SE NE					NC			
5.00N-1.00W-34	NE NW					NC			
5.00N-1.00W-34	NW NW					NC			
5.00N-1.00W-34	SW NW					NC			
5.00N-1.00W-34	SE NW					NC			
5.00N-1.00W-34	NE SW					NC			
5.00N-1.00W-34	NW SW					NC			
5.00N-1.00W-34	SW SW					NC			
5.00N-1.00W-34	SE SW					NC			
5.00N-1.00W-34	NE SE					NC			
5.00N-1.00W-34	NW SE					NC			
5.00N-1.00W-34	SW SE					NC			
5.00N-1.00W-34	SE SE					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

Cert:6085 OR * (Other Parents: Cert:2403 OR *; Cert:2403 OR *)

View Water Rights in same Family **Report Errors with Water Right Data**

Oregon Water Resources Department
Water Rights Information Query

Cert:6086 OR *

Contact Information (Click to Collapse...)

Contact information

OWNER:
SAINT HELENS WATER COMMISSION
SAINT HELENS, OR 97051

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Processing History (Click to Collapse...)

Application: S 7228
- Staff Person Responsible: no caseworker currently assigned
- Received: 4/22/1920

Permit: S 4559 document
- Signature: 5/5/1920

Certificate: 6086 document , paper map
- Signature: 2/15/1926
- Type: Original

View right with Web Mapping
View Places of Use from Water Rights in the Same Area
View Reported Water Use

Scanned Documents (Click to Collapse...)

Records per page: 3

Document Type	Document Title	Date	Remarks
Permit	Permit S4559 Image	5/5/1920	
Certificate	Certificate 6086 Map	2/15/1926	
Certificate	Certificate 6086 Image	2/15/1926	

Point(s) of Diversion (Click to Collapse...)

POD 1 - MILTON CREEK > SCAPPOOSE BAY

Description
- **T-R-S-QQ:** 5.00N-2.00W-21-NW NE
- **Location Description:** NONE GIVEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
30.0	30.0		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
4/22/1920	30.0	30.0						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES
(Primary); Priority Date: 4/22/1920

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
4.00N-1.00W-3	NE NE					NC			
4.00N-1.00W-3	NW NE					NC			
4.00N-1.00W-3	SW NE					NC			
4.00N-1.00W-3	SE NE					NC			
4.00N-1.00W-3	NE NW					NC			
4.00N-1.00W-3	NW NW					NC			
4.00N-1.00W-3	SW NW					NC			
4.00N-1.00W-3	SE NW					NC			
4.00N-1.00W-3	NE SW					NC			
4.00N-1.00W-3	NW SW					NC			
4.00N-1.00W-3	SW SW					NC			
4.00N-1.00W-3	SE SW					NC			
4.00N-1.00W-3	NE SE					NC			
4.00N-1.00W-3	NW SE					NC			

4.00N-1.00W-3	SW SE					NC			
4.00N-1.00W-3	SE SE					NC			
4.00N-1.00W-4	NE NE					NC			
4.00N-1.00W-4	NW NE					NC			
4.00N-1.00W-4	SW NE					NC			
4.00N-1.00W-4	SE NE					NC			
4.00N-1.00W-4	NE NW					NC			
4.00N-1.00W-4	NW NW					NC			
4.00N-1.00W-4	SW NW					NC			
4.00N-1.00W-4	SE NW					NC			
4.00N-1.00W-4	NE SW					NC			
4.00N-1.00W-4	NW SW					NC			
4.00N-1.00W-4	SW SW					NC			
4.00N-1.00W-4	SE SW					NC			
4.00N-1.00W-4	NE SE					NC			
4.00N-1.00W-4	NW SE					NC			
4.00N-1.00W-4	SW SE					NC			
4.00N-1.00W-4	SE SE					NC			
4.00N-1.00W-5	NE NE					NC			
4.00N-1.00W-5	NW NE					NC			
4.00N-1.00W-5	SW NE					NC			
4.00N-1.00W-5	SE NE					NC			
4.00N-1.00W-5	NE NW					NC			
4.00N-1.00W-5	NW NW					NC			
4.00N-1.00W-5	SW NW					NC			
4.00N-1.00W-5	SE NW					NC			
4.00N-1.00W-5	NE SW					NC			
4.00N-1.00W-5	NW SW					NC			
4.00N-1.00W-5	SW SW					NC			
4.00N-1.00W-5	SE SW					NC			
4.00N-1.00W-5	NE SE					NC			
4.00N-1.00W-5	NW SE					NC			
4.00N-1.00W-5	SW SE					NC			
4.00N-1.00W-5	SE SE					NC			
4.00N-1.00W-6	NE NE					NC			
4.00N-1.00W-6	NW NE					NC			
4.00N-1.00W-6	SW NE					NC			
4.00N-1.00W-6	SE NE					NC			
4.00N-1.00W-6	NE NW					NC			
4.00N-1.00W-6	NW NW					NC			
4.00N-1.00W-6	SW NW					NC			
4.00N-1.00W-6	SE NW					NC			
4.00N-1.00W-6	NE SW					NC			
4.00N-1.00W-6	NW SW					NC			
4.00N-1.00W-6	SW SW					NC			
4.00N-1.00W-6	SE SW					NC			
4.00N-1.00W-6	NE SE					NC			
4.00N-1.00W-6	NW SE					NC			
4.00N-1.00W-6	SW SE					NC			
4.00N-1.00W-6	SE SE					NC			
4.00N-1.00W-7	NE NE					NC			
4.00N-1.00W-7	NW NE					NC			
4.00N-1.00W-7	SW NE					NC			
4.00N-1.00W-7	SE NE					NC			
4.00N-1.00W-7	NE NW					NC			
4.00N-1.00W-7	NW NW					NC			
4.00N-1.00W-7	SW NW					NC			
4.00N-1.00W-7	SE NW					NC			
4.00N-1.00W-7	NE SW					NC			
4.00N-1.00W-7	NW SW					NC			
4.00N-1.00W-7	SW SW					NC			
4.00N-1.00W-7	SE SW					NC			
4.00N-1.00W-7	NE SE					NC			
4.00N-1.00W-7	NW SE					NC			

4.00N-1.00W-7	SW SE					NC			
4.00N-1.00W-7	SE SE					NC			
4.00N-1.00W-8	NE NE					NC			
4.00N-1.00W-8	NW NE					NC			
4.00N-1.00W-8	SW NE					NC			
4.00N-1.00W-8	SE NE					NC			
4.00N-1.00W-8	NE NW					NC			
4.00N-1.00W-8	NW NW					NC			
4.00N-1.00W-8	SW NW					NC			
4.00N-1.00W-8	SE NW					NC			
4.00N-1.00W-8	NE SW					NC			
4.00N-1.00W-8	NW SW					NC			
4.00N-1.00W-8	SW SW					NC			
4.00N-1.00W-8	SE SW					NC			
4.00N-1.00W-8	NE SE					NC			
4.00N-1.00W-8	NW SE					NC			
4.00N-1.00W-8	SW SE					NC			
4.00N-1.00W-8	SE SE					NC			
4.00N-1.00W-9	NE NE					NC			
4.00N-1.00W-9	NW NE					NC			
4.00N-1.00W-9	SW NE					NC			
4.00N-1.00W-9	SE NE					NC			
4.00N-1.00W-9	NE NW					NC			
4.00N-1.00W-9	NW NW					NC			
4.00N-1.00W-9	SW NW					NC			
4.00N-1.00W-9	SE NW					NC			
4.00N-1.00W-9	NE SW					NC			
4.00N-1.00W-9	NW SW					NC			
4.00N-1.00W-9	SW SW					NC			
4.00N-1.00W-9	SE SW					NC			
4.00N-1.00W-9	NE SE					NC			
4.00N-1.00W-9	NW SE					NC			
4.00N-1.00W-9	SW SE					NC			
4.00N-1.00W-9	SE SE					NC			
4.00N-1.00W-10	NE NE					NC			
4.00N-1.00W-10	NW NE					NC			
4.00N-1.00W-10	SW NE					NC			
4.00N-1.00W-10	SE NE					NC			
4.00N-1.00W-10	NE NW					NC			
4.00N-1.00W-10	NW NW					NC			
4.00N-1.00W-10	SW NW					NC			
4.00N-1.00W-10	SE NW					NC			
4.00N-1.00W-10	NE SW					NC			
4.00N-1.00W-10	NW SW					NC			
4.00N-1.00W-10	SW SW					NC			
4.00N-1.00W-10	SE SW					NC			
4.00N-1.00W-10	NE SE					NC			
4.00N-1.00W-10	NW SE					NC			
4.00N-1.00W-10	SW SE					NC			
4.00N-1.00W-10	SE SE					NC			
4.00N-1.00W-16	NE NE					NC			
4.00N-1.00W-16	NW NE					NC			
4.00N-1.00W-16	SW NE					NC			
4.00N-1.00W-16	SE NE					NC			
4.00N-1.00W-16	NE NW					NC			
4.00N-1.00W-16	NW NW					NC			
4.00N-1.00W-16	SW NW					NC			
4.00N-1.00W-16	SE NW					NC			
4.00N-1.00W-16	NE SW					NC			
4.00N-1.00W-16	NW SW					NC			
4.00N-1.00W-16	SW SW					NC			
4.00N-1.00W-16	SE SW					NC			
4.00N-1.00W-16	NE SE					NC			
4.00N-1.00W-16	NW SE					NC			

4.00N-1.00W-16	SW SE					NC			
4.00N-1.00W-16	SE SE					NC			
4.00N-1.00W-17	NE NE					NC			
4.00N-1.00W-17	NW NE					NC			
4.00N-1.00W-17	SW NE					NC			
4.00N-1.00W-17	SE NE					NC			
4.00N-1.00W-17	NE NW					NC			
4.00N-1.00W-17	NW NW					NC			
4.00N-1.00W-17	SW NW					NC			
4.00N-1.00W-17	SE NW					NC			
4.00N-1.00W-17	NE SW					NC			
4.00N-1.00W-17	NW SW					NC			
4.00N-1.00W-17	SW SW					NC			
4.00N-1.00W-17	SE SW					NC			
4.00N-1.00W-17	NE SE					NC			
4.00N-1.00W-17	NW SE					NC			
4.00N-1.00W-17	SW SE					NC			
4.00N-1.00W-17	SE SE					NC			
5.00N-1.00W-27	NE NE					NC			
5.00N-1.00W-27	NW NE					NC			
5.00N-1.00W-27	SW NE					NC			
5.00N-1.00W-27	SE NE					NC			
5.00N-1.00W-27	NE NW					NC			
5.00N-1.00W-27	NW NW					NC			
5.00N-1.00W-27	SW NW					NC			
5.00N-1.00W-27	SE NW					NC			
5.00N-1.00W-27	NE SW					NC			
5.00N-1.00W-27	NW SW					NC			
5.00N-1.00W-27	SW SW					NC			
5.00N-1.00W-27	SE SW					NC			
5.00N-1.00W-27	NE SE					NC			
5.00N-1.00W-27	NW SE					NC			
5.00N-1.00W-27	SW SE					NC			
5.00N-1.00W-27	SE SE					NC			
5.00N-1.00W-32	NE NE					NC			
5.00N-1.00W-32	NW NE					NC			
5.00N-1.00W-32	SW NE					NC			
5.00N-1.00W-32	SE NE					NC			
5.00N-1.00W-32	NE NW					NC			
5.00N-1.00W-32	NW NW					NC			
5.00N-1.00W-32	SW NW					NC			
5.00N-1.00W-32	SE NW					NC			
5.00N-1.00W-32	NE SW					NC			
5.00N-1.00W-32	NW SW					NC			
5.00N-1.00W-32	SW SW					NC			
5.00N-1.00W-32	SE SW					NC			
5.00N-1.00W-32	NE SE					NC			
5.00N-1.00W-32	NW SE					NC			
5.00N-1.00W-32	SW SE					NC			
5.00N-1.00W-32	SE SE					NC			
5.00N-1.00W-33	NE NE					NC			
5.00N-1.00W-33	NW NE					NC			
5.00N-1.00W-33	SW NE					NC			
5.00N-1.00W-33	SE NE					NC			
5.00N-1.00W-33	NE NW					NC			
5.00N-1.00W-33	NW NW					NC			
5.00N-1.00W-33	SW NW					NC			
5.00N-1.00W-33	SE NW					NC			
5.00N-1.00W-33	NE SW					NC			
5.00N-1.00W-33	NW SW					NC			
5.00N-1.00W-33	SW SW					NC			
5.00N-1.00W-33	SE SW					NC			
5.00N-1.00W-33	NE SE					NC			
5.00N-1.00W-33	NW SE					NC			

5.00N-1.00W-33	SW SE					NC			
5.00N-1.00W-33	SE SE					NC			
5.00N-1.00W-34	NE NE					NC			
5.00N-1.00W-34	NW NE					NC			
5.00N-1.00W-34	SW NE					NC			
5.00N-1.00W-34	SE NE					NC			
5.00N-1.00W-34	NE NW					NC			
5.00N-1.00W-34	NW NW					NC			
5.00N-1.00W-34	SW NW					NC			
5.00N-1.00W-34	SE NW					NC			
5.00N-1.00W-34	NE SW					NC			
5.00N-1.00W-34	NW SW					NC			
5.00N-1.00W-34	SW SW					NC			
5.00N-1.00W-34	SE SW					NC			
5.00N-1.00W-34	NE SE					NC			
5.00N-1.00W-34	NW SE					NC			
5.00N-1.00W-34	SW SE					NC			
5.00N-1.00W-34	SE SE					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

Cert:6086 OR * (Other Parents: Cert:2403 OR *)

View Water Rights in same Family **Report Errors with Water Right Data**

Oregon Water Resources Department
Water Rights Information Query

Cert:6084 OR *

Contact Information (Click to Collapse...)

Contact information

OWNER:
SAINT HELENS WATER COMMISSION
SAINT HELENS, OR 97051

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Processing History (Click to Collapse...)

Application: S 9473
- Staff Person Responsible: no caseworker currently assigned
- Received: 4/22/1924

Permit: S 6307 document
- Signature: 6/23/1924

Certificate: 6084 document , paper map
- Signature: 2/15/1926
- Type: Original

View right with Web Mapping
View Places of Use from Water Rights in the Same Area
View Reported Water Use

Scanned Documents (Click to Collapse...)

Records per page: 3

Document Type	Document Title	Date	Remarks
Permit	Permit S6307 Image	6/23/1924	
Certificate	Certificate 6084 Image	2/15/1926	
Certificate	Certificate 6084 Map	2/15/1926	

Point(s) of Diversion (Click to Collapse...)

POD 1 - SMITH CREEK > MILTON CREEK

Description
- **T-R-S-QQ:** 5.00N-2.00W-28-SE NE
- **Location Description:** NONE GIVEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
0.5	0.0833(est)		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
4/22/1924	0.5	0.0833(est)						1/1	12/31	

POD 2 - A SPRING > MILTON CREEK

Description
- **T-R-S-QQ:** 5.00N-2.00W-21-SE NE
- **Location Description:** NONE GIVNE

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
0.5	0.0833(est)		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
4/22/1924	0.5	0.0833(est)						1/1	12/31	

POD 3 - UNNAMED STREAM > MILTON CREEK

Description
- **T-R-S-QQ:** 5.00N-2.00W-22-SW NW
- **Location Description:** NONE GIVEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
0.5	0.0833(est)		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
4/22/1924	0.5	0.0833(est)						1/1	12/31	

POD 4 - A SPRING > MILTON CREEK

Description
- **T-R-S-QQ:** 5.00N-2.00W-22-NW SW
- **Location Description:** NONE GIVEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
0.5	0.0833(est)		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
4/22/1924	0.5	0.0833(est)						1/1	12/31	

POD 5 - SALMONBERRY CREEK > SMITH CREEK

Description

T-R-S-QQ: 5.00N-2.00W-28-NE SE

Location Description: NONE GVIEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
0.5	0.0833(est)		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
4/22/1924	0.5	0.0833(est)						1/1	12/31	

POD 6 - SMITH CREEK > MILTON CREEK

Description

T-R-S-QQ: 5.00N-2.00W-28-NE SE

Location Description: NONE GIVEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
0.5	0.0833(est)		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
4/22/1924	0.5	0.0833(est)						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES
(Primary); Priority Date: 4/22/1924

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
4.00N-1.00W-3	NE NE					NC			
4.00N-1.00W-3	NW NE					NC			
4.00N-1.00W-3	SW NE					NC			
4.00N-1.00W-3	SE NE					NC			
4.00N-1.00W-3	NE NW					NC			
4.00N-1.00W-3	NW NW					NC			
4.00N-1.00W-3	SW NW					NC			
4.00N-1.00W-3	SE NW					NC			
4.00N-1.00W-3	NE SW					NC			
4.00N-1.00W-3	NW SW					NC			
4.00N-1.00W-3	SW SW					NC			
4.00N-1.00W-3	SE SW					NC			
4.00N-1.00W-3	NE SE					NC			
4.00N-1.00W-3	NW SE					NC			
4.00N-1.00W-3	SW SE					NC			
4.00N-1.00W-3	SE SE					NC			
4.00N-1.00W-4	NE NE					NC			
4.00N-1.00W-4	NW NE					NC			
4.00N-1.00W-4	SW NE					NC			
4.00N-1.00W-4	SE NE					NC			
4.00N-1.00W-4	NE NW					NC			
4.00N-1.00W-4	NW NW					NC			
4.00N-1.00W-4	SW NW					NC			
4.00N-1.00W-4	SE NW					NC			
4.00N-1.00W-4	NE SW					NC			
4.00N-1.00W-4	NW SW					NC			
4.00N-1.00W-4	SW SW					NC			
4.00N-1.00W-4	SE SW					NC			
4.00N-1.00W-4	NE SE					NC			
4.00N-1.00W-4	NW SE					NC			
4.00N-1.00W-4	SW SE					NC			

4.00N-1.00W-4	SE SE					NC			
4.00N-1.00W-5	NE NE					NC			
4.00N-1.00W-5	NW NE					NC			
4.00N-1.00W-5	SW NE					NC			
4.00N-1.00W-5	SE NE					NC			
4.00N-1.00W-5	NE NW					NC			
4.00N-1.00W-5	NW NW					NC			
4.00N-1.00W-5	SW NW					NC			
4.00N-1.00W-5	SE NW					NC			
4.00N-1.00W-5	NE SW					NC			
4.00N-1.00W-5	NW SW					NC			
4.00N-1.00W-5	SW SW					NC			
4.00N-1.00W-5	SE SW					NC			
4.00N-1.00W-5	NE SE					NC			
4.00N-1.00W-5	NW SE					NC			
4.00N-1.00W-5	SW SE					NC			
4.00N-1.00W-5	SE SE					NC			
4.00N-1.00W-6	NE NE					NC			
4.00N-1.00W-6	NW NE					NC			
4.00N-1.00W-6	SW NE					NC			
4.00N-1.00W-6	SE NE					NC			
4.00N-1.00W-6	NE NW					NC			
4.00N-1.00W-6	NW NW					NC			
4.00N-1.00W-6	SW NW					NC			
4.00N-1.00W-6	SE NW					NC			
4.00N-1.00W-6	NE SW					NC			
4.00N-1.00W-6	NW SW					NC			
4.00N-1.00W-6	SW SW					NC			
4.00N-1.00W-6	SE SW					NC			
4.00N-1.00W-6	NE SE					NC			
4.00N-1.00W-6	NW SE					NC			
4.00N-1.00W-6	SW SE					NC			
4.00N-1.00W-6	SE SE					NC			
4.00N-1.00W-7	NE NE					NC			
4.00N-1.00W-7	NW NE					NC			
4.00N-1.00W-7	SW NE					NC			
4.00N-1.00W-7	SE NE					NC			
4.00N-1.00W-7	NE NW					NC			
4.00N-1.00W-7	NW NW					NC			
4.00N-1.00W-7	SW NW					NC			
4.00N-1.00W-7	SE NW					NC			
4.00N-1.00W-7	NE SW					NC			
4.00N-1.00W-7	NW SW					NC			
4.00N-1.00W-7	SW SW					NC			
4.00N-1.00W-7	SE SW					NC			
4.00N-1.00W-7	NE SE					NC			
4.00N-1.00W-7	NW SE					NC			
4.00N-1.00W-7	SW SE					NC			
4.00N-1.00W-7	SE SE					NC			
4.00N-1.00W-8	NE NE					NC			
4.00N-1.00W-8	NW NE					NC			
4.00N-1.00W-8	SW NE					NC			
4.00N-1.00W-8	SE NE					NC			
4.00N-1.00W-8	NE NW					NC			
4.00N-1.00W-8	NW NW					NC			
4.00N-1.00W-8	SW NW					NC			
4.00N-1.00W-8	SE NW					NC			
4.00N-1.00W-8	NE SW					NC			
4.00N-1.00W-8	NW SW					NC			
4.00N-1.00W-8	SW SW					NC			
4.00N-1.00W-8	SE SW					NC			
4.00N-1.00W-8	NE SE					NC			
4.00N-1.00W-8	NW SE					NC			
4.00N-1.00W-8	SW SE					NC			

4.00N-1.00W-8	SE SE					NC			
4.00N-1.00W-9	NE NE					NC			
4.00N-1.00W-9	NW NE					NC			
4.00N-1.00W-9	SW NE					NC			
4.00N-1.00W-9	SE NE					NC			
4.00N-1.00W-9	NE NW					NC			
4.00N-1.00W-9	NW NW					NC			
4.00N-1.00W-9	SW NW					NC			
4.00N-1.00W-9	SE NW					NC			
4.00N-1.00W-9	NE SW					NC			
4.00N-1.00W-9	NW SW					NC			
4.00N-1.00W-9	SW SW					NC			
4.00N-1.00W-9	SE SW					NC			
4.00N-1.00W-9	NE SE					NC			
4.00N-1.00W-9	NW SE					NC			
4.00N-1.00W-9	SW SE					NC			
4.00N-1.00W-9	SE SE					NC			
4.00N-1.00W-10	NE NE					NC			
4.00N-1.00W-10	NW NE					NC			
4.00N-1.00W-10	SW NE					NC			
4.00N-1.00W-10	SE NE					NC			
4.00N-1.00W-10	NE NW					NC			
4.00N-1.00W-10	NW NW					NC			
4.00N-1.00W-10	SW NW					NC			
4.00N-1.00W-10	SE NW					NC			
4.00N-1.00W-10	NE SW					NC			
4.00N-1.00W-10	NW SW					NC			
4.00N-1.00W-10	SW SW					NC			
4.00N-1.00W-10	SE SW					NC			
4.00N-1.00W-10	NE SE					NC			
4.00N-1.00W-10	NW SE					NC			
4.00N-1.00W-10	SW SE					NC			
4.00N-1.00W-10	SE SE					NC			
4.00N-1.00W-16	NE NE					NC			
4.00N-1.00W-16	NW NE					NC			
4.00N-1.00W-16	SW NE					NC			
4.00N-1.00W-16	SE NE					NC			
4.00N-1.00W-16	NE NW					NC			
4.00N-1.00W-16	NW NW					NC			
4.00N-1.00W-16	SW NW					NC			
4.00N-1.00W-16	SE NW					NC			
4.00N-1.00W-16	NE SW					NC			
4.00N-1.00W-16	NW SW					NC			
4.00N-1.00W-16	SW SW					NC			
4.00N-1.00W-16	SE SW					NC			
4.00N-1.00W-16	NE SE					NC			
4.00N-1.00W-16	NW SE					NC			
4.00N-1.00W-16	SW SE					NC			
4.00N-1.00W-16	SE SE					NC			
4.00N-1.00W-17	NE NE					NC			
4.00N-1.00W-17	NW NE					NC			
4.00N-1.00W-17	SW NE					NC			
4.00N-1.00W-17	SE NE					NC			
4.00N-1.00W-17	NE NW					NC			
4.00N-1.00W-17	NW NW					NC			
4.00N-1.00W-17	SW NW					NC			
4.00N-1.00W-17	SE NW					NC			
4.00N-1.00W-17	NE SW					NC			
4.00N-1.00W-17	NW SW					NC			
4.00N-1.00W-17	SW SW					NC			
4.00N-1.00W-17	SE SW					NC			
4.00N-1.00W-17	NE SE					NC			
4.00N-1.00W-17	NW SE					NC			
4.00N-1.00W-17	SW SE					NC			

4.00N-1.00W-17	SE SE					NC			
5.00N-1.00W-27	NE NE					NC			
5.00N-1.00W-27	NW NE					NC			
5.00N-1.00W-27	SW NE					NC			
5.00N-1.00W-27	SE NE					NC			
5.00N-1.00W-27	NE NW					NC			
5.00N-1.00W-27	NW NW					NC			
5.00N-1.00W-27	SW NW					NC			
5.00N-1.00W-27	SE NW					NC			
5.00N-1.00W-27	NE SW					NC			
5.00N-1.00W-27	NW SW					NC			
5.00N-1.00W-27	SW SW					NC			
5.00N-1.00W-27	SE SW					NC			
5.00N-1.00W-27	NE SE					NC			
5.00N-1.00W-27	NW SE					NC			
5.00N-1.00W-27	SW SE					NC			
5.00N-1.00W-27	SE SE					NC			
5.00N-1.00W-32	NE NE					NC			
5.00N-1.00W-32	NW NE					NC			
5.00N-1.00W-32	SW NE					NC			
5.00N-1.00W-32	SE NE					NC			
5.00N-1.00W-32	NE NW					NC			
5.00N-1.00W-32	NW NW					NC			
5.00N-1.00W-32	SW NW					NC			
5.00N-1.00W-32	SE NW					NC			
5.00N-1.00W-32	NE SW					NC			
5.00N-1.00W-32	NW SW					NC			
5.00N-1.00W-32	SW SW					NC			
5.00N-1.00W-32	SE SW					NC			
5.00N-1.00W-32	NE SE					NC			
5.00N-1.00W-32	NW SE					NC			
5.00N-1.00W-32	SW SE					NC			
5.00N-1.00W-32	SE SE					NC			
5.00N-1.00W-33	NE NE					NC			
5.00N-1.00W-33	NW NE					NC			
5.00N-1.00W-33	SW NE					NC			
5.00N-1.00W-33	SE NE					NC			
5.00N-1.00W-33	NE NW					NC			
5.00N-1.00W-33	NW NW					NC			
5.00N-1.00W-33	SW NW					NC			
5.00N-1.00W-33	SE NW					NC			
5.00N-1.00W-33	NE SW					NC			
5.00N-1.00W-33	NW SW					NC			
5.00N-1.00W-33	SW SW					NC			
5.00N-1.00W-33	SE SW					NC			
5.00N-1.00W-33	NE SE					NC			
5.00N-1.00W-33	NW SE					NC			
5.00N-1.00W-33	SW SE					NC			
5.00N-1.00W-33	SE SE					NC			
5.00N-1.00W-34	NE NE					NC			
5.00N-1.00W-34	NW NE					NC			
5.00N-1.00W-34	SW NE					NC			
5.00N-1.00W-34	SE NE					NC			
5.00N-1.00W-34	NE NW					NC			
5.00N-1.00W-34	NW NW					NC			
5.00N-1.00W-34	SW NW					NC			
5.00N-1.00W-34	SE NW					NC			
5.00N-1.00W-34	NE SW					NC			
5.00N-1.00W-34	NW SW					NC			
5.00N-1.00W-34	SW SW					NC			
5.00N-1.00W-34	SE SW					NC			
5.00N-1.00W-34	NE SE					NC			
5.00N-1.00W-34	NW SE					NC			
5.00N-1.00W-34	SW SE					NC			

5.00N-1.00W-34	SE SE					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

Cert:6084 OR * (Other Parents: Cert:2403 OR *)

View Water Rights in same Family **Report Errors with Water Right Data**

Oregon Water Resources Department
Water Rights Information Query

Cert:2403 OR *

Main Help Return Contact Us

Contact Information (Click to Collapse...)

Contact information

OWNER:
CITY OF SAINT HELENS
PO BOX 278
SAINT HELENS, OR 97051

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Processing History (Click to Collapse...)

Application: S 1155
- Staff Person Responsible: no caseworker currently assigned
- Received: 12/21/1910

Permit: S 535 document , paper map
- Signature: 2/6/1911

Certificate: 2403 document , paper map
- Signature: 10/13/1919
- Type: Original

View right with Web Mapping
View Places of Use from Water Rights in the Same Area
View Reported Water Use

Scanned Documents (Click to Collapse...)

Records per page: 4

Document Type	Document Title	Date	Remarks
Permit	Permit S535 Image	2/6/1911	
Permit	Permit S535 Map Image	2/6/1911	
Certificate	Certificate 2403 Image	10/13/1919	
Certificate	Certificate 2403 Map	10/13/1919	

Point(s) of Diversion (Click to Collapse...)

POD 1 - SALMON CREEK > SMITH CREEK

Description
- **T-R-S-QQ:** 5.00N-2.00W-28-NE SE
- **Location Description:** NONE GIVEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
25.0	25.0		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
12/21/1910	25.0	25.0						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES
(Primary); Priority Date: 12/21/1910

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
4.00N-1.00W-3	NE NE					NC			
4.00N-1.00W-3	NW NE					NC			
4.00N-1.00W-3	SW NE					NC			
4.00N-1.00W-3	SE NE					NC			
4.00N-1.00W-3	NE NW					NC			
4.00N-1.00W-3	NW NW					NC			
4.00N-1.00W-3	SW NW					NC			
4.00N-1.00W-3	SE NW					NC			
4.00N-1.00W-3	NE SW					NC			
4.00N-1.00W-3	NW SW					NC			
4.00N-1.00W-3	SW SW					NC			
4.00N-1.00W-3	SE SW					NC			

4.00N-1.00W-3	NE SE					NC			
4.00N-1.00W-3	NW SE					NC			
4.00N-1.00W-3	SW SE					NC			
4.00N-1.00W-3	SE SE					NC			
4.00N-1.00W-4	NE NE					NC			
4.00N-1.00W-4	NW NE					NC			
4.00N-1.00W-4	SW NE					NC			
4.00N-1.00W-4	SE NE					NC			
4.00N-1.00W-4	NE NW					NC			
4.00N-1.00W-4	NW NW					NC			
4.00N-1.00W-4	SW NW					NC			
4.00N-1.00W-4	SE NW					NC			
4.00N-1.00W-4	NE SW					NC			
4.00N-1.00W-4	NW SW					NC			
4.00N-1.00W-4	SW SW					NC			
4.00N-1.00W-4	SE SW					NC			
4.00N-1.00W-4	NE SE					NC			
4.00N-1.00W-4	NW SE					NC			
4.00N-1.00W-4	SW SE					NC			
4.00N-1.00W-4	SE SE					NC			
4.00N-1.00W-5	NE NE					NC			
4.00N-1.00W-5	NW NE					NC			
4.00N-1.00W-5	SW NE					NC			
4.00N-1.00W-5	SE NE					NC			
4.00N-1.00W-5	NE NW					NC			
4.00N-1.00W-5	NW NW					NC			
4.00N-1.00W-5	SW NW					NC			
4.00N-1.00W-5	SE NW					NC			
4.00N-1.00W-5	NE SW					NC			
4.00N-1.00W-5	NW SW					NC			
4.00N-1.00W-5	SW SW					NC			
4.00N-1.00W-5	SE SW					NC			
4.00N-1.00W-5	NE SE					NC			
4.00N-1.00W-5	NW SE					NC			
4.00N-1.00W-5	SW SE					NC			
4.00N-1.00W-5	SE SE					NC			
4.00N-1.00W-6	NE NE					NC			
4.00N-1.00W-6	NW NE					NC			
4.00N-1.00W-6	SW NE					NC			
4.00N-1.00W-6	SE NE					NC			
4.00N-1.00W-6	NE NW					NC			
4.00N-1.00W-6	NW NW					NC			
4.00N-1.00W-6	SW NW					NC			
4.00N-1.00W-6	SE NW					NC			
4.00N-1.00W-6	NE SW					NC			
4.00N-1.00W-6	NW SW					NC			
4.00N-1.00W-6	SW SW					NC			
4.00N-1.00W-6	SE SW					NC			
4.00N-1.00W-6	NE SE					NC			
4.00N-1.00W-6	NW SE					NC			
4.00N-1.00W-6	SW SE					NC			
4.00N-1.00W-6	SE SE					NC			
4.00N-1.00W-7	NE NE					NC			
4.00N-1.00W-7	NW NE					NC			
4.00N-1.00W-7	SW NE					NC			
4.00N-1.00W-7	SE NE					NC			
4.00N-1.00W-7	NE NW					NC			
4.00N-1.00W-7	NW NW					NC			
4.00N-1.00W-7	SW NW					NC			
4.00N-1.00W-7	SE NW					NC			
4.00N-1.00W-7	NE SW					NC			
4.00N-1.00W-7	NW SW					NC			
4.00N-1.00W-7	SW SW					NC			
4.00N-1.00W-7	SE SW					NC			

4.00N-1.00W-7	NE SE					NC			
4.00N-1.00W-7	NW SE					NC			
4.00N-1.00W-7	SW SE					NC			
4.00N-1.00W-7	SE SE					NC			
4.00N-1.00W-8	NE NE					NC			
4.00N-1.00W-8	NW NE					NC			
4.00N-1.00W-8	SW NE					NC			
4.00N-1.00W-8	SE NE					NC			
4.00N-1.00W-8	NE NW					NC			
4.00N-1.00W-8	NW NW					NC			
4.00N-1.00W-8	SW NW					NC			
4.00N-1.00W-8	SE NW					NC			
4.00N-1.00W-8	NE SW					NC			
4.00N-1.00W-8	NW SW					NC			
4.00N-1.00W-8	SW SW					NC			
4.00N-1.00W-8	SE SW					NC			
4.00N-1.00W-8	NE SE					NC			
4.00N-1.00W-8	NW SE					NC			
4.00N-1.00W-8	SW SE					NC			
4.00N-1.00W-8	SE SE					NC			
4.00N-1.00W-9	NE NE					NC			
4.00N-1.00W-9	NW NE					NC			
4.00N-1.00W-9	SW NE					NC			
4.00N-1.00W-9	SE NE					NC			
4.00N-1.00W-9	NE NW					NC			
4.00N-1.00W-9	NW NW					NC			
4.00N-1.00W-9	SW NW					NC			
4.00N-1.00W-9	SE NW					NC			
4.00N-1.00W-9	NE SW					NC			
4.00N-1.00W-9	NW SW					NC			
4.00N-1.00W-9	SW SW					NC			
4.00N-1.00W-9	SE SW					NC			
4.00N-1.00W-9	NE SE					NC			
4.00N-1.00W-9	NW SE					NC			
4.00N-1.00W-9	SW SE					NC			
4.00N-1.00W-9	SE SE					NC			
4.00N-1.00W-10	NE NE					NC			
4.00N-1.00W-10	NW NE					NC			
4.00N-1.00W-10	SW NE					NC			
4.00N-1.00W-10	SE NE					NC			
4.00N-1.00W-10	NE NW					NC			
4.00N-1.00W-10	NW NW					NC			
4.00N-1.00W-10	SW NW					NC			
4.00N-1.00W-10	SE NW					NC			
4.00N-1.00W-10	NE SW					NC			
4.00N-1.00W-10	NW SW					NC			
4.00N-1.00W-10	SW SW					NC			
4.00N-1.00W-10	SE SW					NC			
4.00N-1.00W-10	NE SE					NC			
4.00N-1.00W-10	NW SE					NC			
4.00N-1.00W-10	SW SE					NC			
4.00N-1.00W-10	SE SE					NC			
4.00N-1.00W-16	NE NE					NC			
4.00N-1.00W-16	NW NE					NC			
4.00N-1.00W-16	SW NE					NC			
4.00N-1.00W-16	SE NE					NC			
4.00N-1.00W-16	NE NW					NC			
4.00N-1.00W-16	NW NW					NC			
4.00N-1.00W-16	SW NW					NC			
4.00N-1.00W-16	SE NW					NC			
4.00N-1.00W-16	NE SW					NC			
4.00N-1.00W-16	NW SW					NC			
4.00N-1.00W-16	SW SW					NC			
4.00N-1.00W-16	SE SW					NC			

4.00N-1.00W-16	NE SE					NC			
4.00N-1.00W-16	NW SE					NC			
4.00N-1.00W-16	SW SE					NC			
4.00N-1.00W-16	SE SE					NC			
4.00N-1.00W-17	NE NE					NC			
4.00N-1.00W-17	NW NE					NC			
4.00N-1.00W-17	SW NE					NC			
4.00N-1.00W-17	SE NE					NC			
4.00N-1.00W-17	NE NW					NC			
4.00N-1.00W-17	NW NW					NC			
4.00N-1.00W-17	SW NW					NC			
4.00N-1.00W-17	SE NW					NC			
4.00N-1.00W-17	NE SW					NC			
4.00N-1.00W-17	NW SW					NC			
4.00N-1.00W-17	SW SW					NC			
4.00N-1.00W-17	SE SW					NC			
4.00N-1.00W-17	NE SE					NC			
4.00N-1.00W-17	NW SE					NC			
4.00N-1.00W-17	SW SE					NC			
4.00N-1.00W-17	SE SE					NC			
5.00N-1.00W-27	NE NE					NC			
5.00N-1.00W-27	NW NE					NC			
5.00N-1.00W-27	SW NE					NC			
5.00N-1.00W-27	SE NE					NC			
5.00N-1.00W-27	NE NW					NC			
5.00N-1.00W-27	NW NW					NC			
5.00N-1.00W-27	SW NW					NC			
5.00N-1.00W-27	SE NW					NC			
5.00N-1.00W-27	NE SW					NC			
5.00N-1.00W-27	NW SW					NC			
5.00N-1.00W-27	SW SW					NC			
5.00N-1.00W-27	SE SW					NC			
5.00N-1.00W-27	NE SE					NC			
5.00N-1.00W-27	NW SE					NC			
5.00N-1.00W-27	SW SE					NC			
5.00N-1.00W-27	SE SE					NC			
5.00N-1.00W-32	NE NE					NC			
5.00N-1.00W-32	NW NE					NC			
5.00N-1.00W-32	SW NE					NC			
5.00N-1.00W-32	SE NE					NC			
5.00N-1.00W-32	NE NW					NC			
5.00N-1.00W-32	NW NW					NC			
5.00N-1.00W-32	SW NW					NC			
5.00N-1.00W-32	SE NW					NC			
5.00N-1.00W-32	NE SW					NC			
5.00N-1.00W-32	NW SW					NC			
5.00N-1.00W-32	SW SW					NC			
5.00N-1.00W-32	SE SW					NC			
5.00N-1.00W-32	NE SE					NC			
5.00N-1.00W-32	NW SE					NC			
5.00N-1.00W-32	SW SE					NC			
5.00N-1.00W-32	SE SE					NC			
5.00N-1.00W-33	NE NE					NC			
5.00N-1.00W-33	NW NE					NC			
5.00N-1.00W-33	SW NE					NC			
5.00N-1.00W-33	SE NE					NC			
5.00N-1.00W-33	NE NW					NC			
5.00N-1.00W-33	NW NW					NC			
5.00N-1.00W-33	SW NW					NC			
5.00N-1.00W-33	SE NW					NC			
5.00N-1.00W-33	NE SW					NC			
5.00N-1.00W-33	NW SW					NC			
5.00N-1.00W-33	SW SW					NC			
5.00N-1.00W-33	SE SW					NC			

5.00N-1.00W-33	NE SE					NC			
5.00N-1.00W-33	NW SE					NC			
5.00N-1.00W-33	SW SE					NC			
5.00N-1.00W-33	SE SE					NC			
5.00N-1.00W-34	NE NE					NC			
5.00N-1.00W-34	NW NE					NC			
5.00N-1.00W-34	SW NE					NC			
5.00N-1.00W-34	SE NE					NC			
5.00N-1.00W-34	NE NW					NC			
5.00N-1.00W-34	NW NW					NC			
5.00N-1.00W-34	SW NW					NC			
5.00N-1.00W-34	SE NW					NC			
5.00N-1.00W-34	NE SW					NC			
5.00N-1.00W-34	NW SW					NC			
5.00N-1.00W-34	SW SW					NC			
5.00N-1.00W-34	SE SW					NC			
5.00N-1.00W-34	NE SE					NC			
5.00N-1.00W-34	NW SE					NC			
5.00N-1.00W-34	SW SE					NC			
5.00N-1.00W-34	SE SE					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

- Cert:2403 OR *
  - Other Child: Cert:6085 OR *
  - Other Child: Cert:6085 OR *
  - Other Child: Cert:6086 OR *
  - Other Child: Cert:6084 OR *

View Water Rights in same Family **Report Errors with Water Right Data**

Item #3.

Oregon Water Resources Department
Water Rights Information Query

Claim:GR 282 *

Main Help Return Contact Us

Contact Information (Click to Collapse...)

Contact information

CITY OF SAINT HELENS
ST HELENS, OR 97051

Processing History (Click to Collapse...)

Claim: GR 282 document , paper map

Claim Date: n/a

Unable to view right in new web mapping because this water right is not currently mapped.

View Places of Use from Water Rights in the Same Area

View Reported Water Use

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Scanned Documents (Click to Collapse...)

Records per page: 2

Document Type	Document Title	Date	Remarks
Claim	Claim GR282 Map Image		
Claim	Claim GR282 Image		

Point(s) of Diversion (Click to Collapse...)

POD 1 - A WELL > MCBRIDE CREEK (View Groundwater Site COLU0001206)

Description

T-R-S-QQ: 5.00N-1.00W-21-SW NE

Location Description: 2177.83 FEET SO AND 2688.16 FEET EAST FROM NW CORNER, JACOB CAPLES DLC

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
4.641	4.641		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
9/8/1954	4.641	4.641						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES
(Primary); Priority Date: 9/8/1954

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
5.00N-1.00W-21	SW NE					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

No genealogy records available for this water right, try the family link below instead.

View Water Rights in same Family Report Errors with Water Right Data

Oregon Water Resources Department
Water Rights Information Query

Cert:47166 OR *

Contact Information (Click to Collapse...)

Contact information

OWNER:
CITY OF SAINT HELENS
PO BOX 37
SAINT HELENS, OR 97051

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Processing History (Click to Collapse...)

Application: S 46214
- Staff Person Responsible: no caseworker currently assigned
- Received: 7/11/1969

Permit: S 34529 document , paper map
- Signature: 4/24/1970

Certificate: 47166 document , paper map
- Signature: 1/19/1979
- Type: Original

View right with Web Mapping
View Places of Use from Water Rights in the Same Area
View Reported Water Use

Scanned Documents (Click to Collapse...)

Records per page: 4

Document Type	Document Title	Date	Remarks
Permit	Permit S34529 Map Image	4/24/1970	
Permit	Permit S34529 Image	4/24/1970	
Certificate	Certificate 47166 Map	1/19/1979	
Certificate	Certificate 47166 Image	1/19/1979	

Point(s) of Diversion (Click to Collapse...)

POD 1 - COLUMBIA RIVER > PACIFIC OCEAN

Description
- **T-R-S-QQ:** 5.00N-1.00W-28-NE NE; DLC: 41
- **Location Description:** 251 FEET SOUTH AND 4543 FEET EAST FROM NW CORNER, SECTION 28

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
3.5	3.5		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
7/11/1969	3.5	3.5						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES
(Primary); Priority Date: 7/11/1969

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
4.00N-1.00W-3	NE NW					NC			
4.00N-1.00W-3	NW NW					NC			
4.00N-1.00W-3	SW NW					NC			
4.00N-1.00W-3	SE NW					NC			
4.00N-1.00W-3	NE SW					NC			
4.00N-1.00W-3	NW SW					NC			
4.00N-1.00W-3	SW SW					NC			
4.00N-1.00W-3	SE SW					NC			
4.00N-1.00W-4	NE NE					NC			
4.00N-1.00W-4	NW NE					NC			
4.00N-1.00W-4	SW NE					NC			
4.00N-1.00W-4	SE NE					NC			

4.00N-1.00W-4	NE NW					NC			
4.00N-1.00W-4	NW NW					NC			
4.00N-1.00W-4	SW NW					NC			
4.00N-1.00W-4	SE NW					NC			
4.00N-1.00W-4	NE SW					NC			
4.00N-1.00W-4	NW SW					NC			
4.00N-1.00W-4	SW SW					NC			
4.00N-1.00W-4	SE SW					NC			
4.00N-1.00W-4	NE SE					NC			
4.00N-1.00W-4	NW SE					NC			
4.00N-1.00W-4	SW SE					NC			
4.00N-1.00W-4	SE SE					NC			
4.00N-1.00W-5	NE NE					NC			
4.00N-1.00W-5	NW NE					NC			
4.00N-1.00W-5	SW NE					NC			
4.00N-1.00W-5	SE NE					NC			
4.00N-1.00W-5	NE NW					NC			
4.00N-1.00W-5	NW NW					NC			
4.00N-1.00W-5	SW NW					NC			
4.00N-1.00W-5	SE NW					NC			
4.00N-1.00W-5	NE SW					NC			
4.00N-1.00W-5	NW SW					NC			
4.00N-1.00W-5	SW SW					NC			
4.00N-1.00W-5	SE SW					NC			
4.00N-1.00W-5	NE SE					NC			
4.00N-1.00W-5	NW SE					NC			
4.00N-1.00W-5	SW SE					NC			
4.00N-1.00W-5	SE SE					NC			
4.00N-1.00W-8	NE NE					NC			
4.00N-1.00W-8	NW NE					NC			
4.00N-1.00W-8	SW NE					NC			
4.00N-1.00W-8	SE NE					NC			
4.00N-1.00W-8	NE NW					NC			
4.00N-1.00W-8	NW NW					NC			
4.00N-1.00W-8	SW NW					NC			
4.00N-1.00W-8	SE NW					NC			
4.00N-1.00W-8	NE SE					NC			
4.00N-1.00W-8	SW SE					NC			
4.00N-1.00W-8	SE SE					NC			
4.00N-1.00W-9	NE NE					NC			
4.00N-1.00W-9	NW NE					NC			
4.00N-1.00W-9	SW NE					NC			
4.00N-1.00W-9	SE NE					NC			
4.00N-1.00W-9	NE NW					NC			
4.00N-1.00W-9	NW NW					NC			
4.00N-1.00W-9	SW NW					NC			
4.00N-1.00W-9	SE NW					NC			
4.00N-1.00W-9	NE SW					NC			
4.00N-1.00W-9	NW SW					NC			
4.00N-1.00W-9	SW SW					NC			
4.00N-1.00W-9	SE SW					NC			
4.00N-1.00W-9	NE SE					NC			
4.00N-1.00W-9	NW SE					NC			
4.00N-1.00W-9	SW SE					NC			
4.00N-1.00W-9	SE SE					NC			
4.00N-1.00W-10	NW NW					NC			
4.00N-1.00W-10	SW NW					NC			
4.00N-1.00W-16	NE NW					NC			
4.00N-1.00W-16	NW NW					NC			
4.00N-1.00W-16	SW NW					NC			
4.00N-1.00W-17	NE NE					NC			
4.00N-1.00W-17	NW NE					NC			
4.00N-1.00W-17	SW NE					NC			
4.00N-1.00W-17	SE NE					NC			

4.00N-1.00W-17	NE NW					NC			
4.00N-1.00W-17	SE NW					NC			
4.00N-1.00W-17	NE SW					NC			
4.00N-1.00W-17	NW SW					NC			
5.00N-1.00W-33	SW NE					NC			
5.00N-1.00W-33	SE NE					NC			
5.00N-1.00W-33	NE SW					NC			
5.00N-1.00W-33	SE SW					NC			
5.00N-1.00W-33	NE SE					NC			
5.00N-1.00W-33	NW SE					NC			
5.00N-1.00W-33	SW SE					NC			
5.00N-1.00W-33	SE SE					NC			
5.00N-1.00W-34	SW NW					NC			
5.00N-1.00W-34	NE SW					NC			
5.00N-1.00W-34	NW SW					NC			
5.00N-1.00W-34	SW SW					NC			
5.00N-1.00W-34	SE SW					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

No genealogy records available for this water right, try the family link below instead.

View Water Rights in same Family **Report Errors with Water Right Data**

Oregon Water Resources Department
Water Rights Information Query

Permit: S 47234 *

Contact Information (Click to Collapse...)

Contact information

OWNER:
CITY OF SAINT HELENS
PO BOX 278
SAINT HELENS, OR 97051

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Processing History (Click to Collapse...)

Application: S 64529

- Staff Person Responsible: no caseworker currently assigned
- Received: 11/8/1982

Permit: S 47234 document

- Signature: 1/14/1983

Process Step	Date Completed	Result	Comp
Completion Date [C Date]	10/1/2001		
Extension Application Received	4/23/2003		ANN F
Extension Comment Period Ends	4/29/2003		ANN F
Extension PFO 315 Issued	3/29/2011	Propose to Approve	JERRY
Extension PFO Protest Period Ends	5/13/2011		JERRY
Extension FO Issued	5/27/2011	Approved	ANN F
Extended Completion Date [Extension C Date]	10/1/2051		ANN F

Order(s)

Order Origin	Volume-Page	Signature	Description
Special	38-109	1/24/1984	EXTENDS PERMIT 47234
Special	39-48	2/21/1985	EXTENSION OF PERMIT 47234
Special	43-240	5/16/1989	ABC EXT. OF TIME ON PERMIT 47234, CITY OF S HELENS
Special	45-471	11/20/1991	EXTENSION OF TIME FOR SEVERAL PERMITS
Special	51-556	6/19/1997	EXTENDS TIME LIMIT ON PERMIT 47234
Special	89-134	3/21/2013	WMCP FOR CITY OF ST. HELENS

Transfer(s)

Transfer	Transfer type	Status
T8426 ()	Permit Amendment Transfer	Misfiled

- View right with Web Mapping
- View Places of Use from Water Rights in the Same Area
- View Reported Water Use

Scanned Documents (Click to Collapse...)

Records per page: 8

Document Type	Document Title	Date	Remarks
Permit	Permit S47234 Image	1/14/1983	
Order	Order Image - Volume: 38 Page: 109	1/24/1984	EXTENDS PERMIT 47234
Order	Order Image - Volume: 39 Page: 48	2/21/1985	EXTENSION OF PERMIT 47234
Order	Order Image - Volume: 43 Page: 240	5/16/1989	ABC EXT. OF TIME ON PERMIT 47234, CITY OF ST. HELENS
Order	Order Image - Volume: 45 Page: 471	11/20/1991	EXTENSION OF TIME FOR SEVERAL PERMITS
Order	Order Image - Volume: 51 Page: 556	6/19/1997	EXTENDS TIME LIMIT ON PERMIT 47234
Order - Extension of Time	Extension of Time	5/27/2011	
Order	Order Image - Volume: 89 Page: 134	3/21/2013	WMCP FOR CITY OF ST. HELENS

Point(s) of Diversion (Click to Collapse...)

POD 1 - COLUMBIA RIVER > PACIFIC OCEAN

Description

- **T-R-S-QQ:** 5.00N-1.00W-28-SE NE
- **Location Description:** 3995 FEET NORTH AND 515 FEET WEST FROM SE CORNER,SECTON 28

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
60.0	60.0		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Rema
11/8/1982	60.0	60.0						1/1	12/31	

Item #3.

POD 2 - COLUMBIA RIVER > PACIFIC OCEAN

Description

T-R-S-QQ: 5.00N-1.00W-28-SE NE

Location Description: 2705 FEET NORTH AND 360 FEET WEST FROM SE CORNER,SECTION 28

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
60.0			

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
11/8/1982	60.0	0.0(est)						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS g

Use - MUNICIPAL USES
(Primary); Priority Date: 11/8/1982

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
4.00N-1.00W-3	NE NW					NC			
4.00N-1.00W-3	NW NW					NC			
4.00N-1.00W-3	SW NW					NC			
4.00N-1.00W-3	SE NW					NC			
4.00N-1.00W-3	NE SW					NC			
4.00N-1.00W-3	NW SW					NC			
4.00N-1.00W-3	SW SW					NC			
4.00N-1.00W-3	SE SW					NC			
4.00N-1.00W-4	NE NE					NC			
4.00N-1.00W-4	NW NE					NC			
4.00N-1.00W-4	SW NE					NC			
4.00N-1.00W-4	SE NE					NC			
4.00N-1.00W-4	NE NW					NC			
4.00N-1.00W-4	NW NW					NC			
4.00N-1.00W-4	SW NW					NC			
4.00N-1.00W-4	SE NW					NC			
4.00N-1.00W-4	NE SW					NC			
4.00N-1.00W-4	NW SW					NC			
4.00N-1.00W-4	SW SW					NC			
4.00N-1.00W-4	SE SW					NC			
4.00N-1.00W-4	NE SE					NC			
4.00N-1.00W-4	NW SE					NC			
4.00N-1.00W-4	SW SE					NC			
4.00N-1.00W-4	SE SE					NC			
4.00N-1.00W-5	NE NE					NC			
4.00N-1.00W-5	NW NE					NC			
4.00N-1.00W-5	SW NE					NC			
4.00N-1.00W-5	SE NE					NC			
4.00N-1.00W-5	NE NW					NC			
4.00N-1.00W-5	NW NW					NC			
4.00N-1.00W-5	SW NW					NC			
4.00N-1.00W-5	SE NW					NC			
4.00N-1.00W-5	NE SW					NC			
4.00N-1.00W-5	NW SW					NC			
4.00N-1.00W-5	SW SW					NC			
4.00N-1.00W-5	SE SW					NC			
4.00N-1.00W-5	NE SE					NC			
4.00N-1.00W-5	NW SE					NC			
4.00N-1.00W-5	SW SE					NC			
4.00N-1.00W-5	SE SE					NC			
4.00N-1.00W-8	NE NW					NC			
4.00N-1.00W-8	SE NW					NC			
4.00N-1.00W-9	NE NE					NC			
4.00N-1.00W-9	NW NE					NC			
4.00N-1.00W-9	SW NE					NC			
4.00N-1.00W-9	SE NE					NC			
4.00N-1.00W-9	NE NW					NC			

4.00N-1.00W-9	NW NW					NC			
4.00N-1.00W-9	SW NW					NC			
4.00N-1.00W-9	SE NW					NC			
4.00N-1.00W-9	NE SW					NC			
4.00N-1.00W-9	NW SW					NC			
4.00N-1.00W-9	SW SW					NC			
4.00N-1.00W-9	SE SW					NC			
4.00N-1.00W-9	NE SE					NC			
4.00N-1.00W-9	NW SE					NC			
4.00N-1.00W-9	SW SE					NC			
4.00N-1.00W-9	SE SE					NC			
4.00N-1.00W-10	NE NW					NC			
4.00N-1.00W-10	NW NW					NC			
4.00N-1.00W-10	SW NW					NC			
4.00N-1.00W-10	SE NW					NC			
4.00N-1.00W-16	NE NW					NC			
4.00N-1.00W-16	NW NW					NC			
4.00N-1.00W-16	SW NW					NC			
4.00N-1.00W-16	SE NW					NC			
4.00N-1.00W-17	NE NE					NC			
4.00N-1.00W-17	NW NE					NC			
4.00N-1.00W-17	SW NE					NC			
4.00N-1.00W-17	SE NE					NC			
5.00N-1.00W-33	NE SW					NC			
5.00N-1.00W-33	SE SW					NC			
5.00N-1.00W-34	NE NW					NC			
5.00N-1.00W-34	NW NW					NC			
5.00N-1.00W-34	SW NW					NC			
5.00N-1.00W-34	SE NW					NC			
5.00N-1.00W-34	NE SW					NC			
5.00N-1.00W-34	NW SW					NC			
5.00N-1.00W-34	SW SW					NC			
5.00N-1.00W-34	SE SW					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

Permit: S 47234 *

View Water Rights in same Family **Report Errors with Water Right Data**

Item #3.

Oregon Water Resources Department
Water Rights Information Query

Cert:64879 OR *

Contact Information (Click to Collapse...)

Contact information

OWNER:
CITY OF SAINT HELENS
PO BOX 278
SAINT HELENS, OR 97051

Processing History (Click to Collapse...)

Application: G 11709
- Staff Person Responsible: no caseworker currently assigned
- Received: 10/9/1987

Permit: G 10803 document
- Signature: 5/16/1988

Certificate: 64879 document , paper map
- Signature: 10/29/1990
- Type: Original

View right with Web Mapping
View Places of Use from Water Rights in the Same Area
View Reported Water Use

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Scanned Documents (Click to Collapse...)

Records per page: 3

Document Type	Document Title	Date	Remarks
Permit	Permit G10803 Image	5/16/1988	
Certificate	Certificate 64879 Image	10/29/1990	
Certificate	Certificate 64879 Map	10/29/1990	

Point(s) of Diversion (Click to Collapse...)

POD 1 - A WELL > SCAPPOOSE BAY

Description
- **T-R-S-QQ:** 4.00N-1.00W-17-NE SW; DLC: 56
- **Location Description:** NORTH 64 DEGREES WEST 680 FEET FROM SE CORNER, DLC 56

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
1.78	1.78		

MUNICIPAL USES (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
10/9/1987	1.78	1.78						1/1	12/31	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES
(Primary); Priority Date: 10/9/1987

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
4.00N-1.00W-3	NE NW					NC			
4.00N-1.00W-3	NW NW					NC			
4.00N-1.00W-3	SW NW					NC			
4.00N-1.00W-3	SE NW					NC			
4.00N-1.00W-3	NE SW					NC			
4.00N-1.00W-3	NW SW					NC			
4.00N-1.00W-3	SW SW					NC			
4.00N-1.00W-3	SE SW					NC			
4.00N-1.00W-4	NE NE					NC			
4.00N-1.00W-4	NW NE					NC			
4.00N-1.00W-4	SW NE					NC			
4.00N-1.00W-4	SE NE					NC			
4.00N-1.00W-4	NE NW					NC			

4.00N-1.00W-4	NW NW					NC			
4.00N-1.00W-4	SW NW					NC			
4.00N-1.00W-4	SE NW					NC			
4.00N-1.00W-4	NE SW					NC			
4.00N-1.00W-4	NW SW					NC			
4.00N-1.00W-4	SW SW					NC			
4.00N-1.00W-4	SE SW					NC			
4.00N-1.00W-4	NE SE					NC			
4.00N-1.00W-4	NW SE					NC			
4.00N-1.00W-4	SW SE					NC			
4.00N-1.00W-4	SE SE					NC			
4.00N-1.00W-5	NE NE					NC			
4.00N-1.00W-5	NW NE					NC			
4.00N-1.00W-5	SW NE					NC			
4.00N-1.00W-5	SE NE					NC			
4.00N-1.00W-5	NE NW					NC			
4.00N-1.00W-5	NW NW					NC			
4.00N-1.00W-5	SW NW					NC			
4.00N-1.00W-5	SE NW					NC			
4.00N-1.00W-5	NE SW					NC			
4.00N-1.00W-5	NW SW					NC			
4.00N-1.00W-5	SW SW					NC			
4.00N-1.00W-5	SE SW					NC			
4.00N-1.00W-5	NE SE					NC			
4.00N-1.00W-5	NW SE					NC			
4.00N-1.00W-5	SW SE					NC			
4.00N-1.00W-5	SE SE					NC			
4.00N-1.00W-8	NE NE					NC			
4.00N-1.00W-8	NW NE					NC			
4.00N-1.00W-8	SW NE					NC			
4.00N-1.00W-8	SE NE					NC			
4.00N-1.00W-8	NE SE					NC			
4.00N-1.00W-8	SW SE					NC			
4.00N-1.00W-8	SE SE					NC			
4.00N-1.00W-9	NE NE					NC			
4.00N-1.00W-9	NW NE					NC			
4.00N-1.00W-9	SW NE					NC			
4.00N-1.00W-9	SE NE					NC			
4.00N-1.00W-9	NE NW					NC			
4.00N-1.00W-9	NW NW					NC			
4.00N-1.00W-9	SW NW					NC			
4.00N-1.00W-9	SE NW					NC			
4.00N-1.00W-9	NE SW					NC			
4.00N-1.00W-9	NW SW					NC			
4.00N-1.00W-9	SW SW					NC			
4.00N-1.00W-9	SE SW					NC			
4.00N-1.00W-9	NE SE					NC			
4.00N-1.00W-9	NW SE					NC			
4.00N-1.00W-9	SW SE					NC			
4.00N-1.00W-9	SE SE					NC			
4.00N-1.00W-10	NW NW					NC			
4.00N-1.00W-10	SW NW					NC			
4.00N-1.00W-16	NW NW					NC			
4.00N-1.00W-16	SW NW					NC			
4.00N-1.00W-17	NE NE					NC			
4.00N-1.00W-17	NW NE					NC			
4.00N-1.00W-17	SW NE					NC			
4.00N-1.00W-17	SE NE					NC			
4.00N-1.00W-17	NE NW					NC			
4.00N-1.00W-17	SE NW					NC			
4.00N-1.00W-17	NE SW					NC			
4.00N-1.00W-17	NW SW					NC			
5.00N-1.00W-21	NE SW					NC			
5.00N-1.00W-21	NW SW					NC			

5.00N-1.00W-21	SW SW					NC			
5.00N-1.00W-21	SE SW					NC			
5.00N-1.00W-28	NE NE					NC			
5.00N-1.00W-28	NW NE					NC			
5.00N-1.00W-28	SW NE					NC			
5.00N-1.00W-28	SE NE					NC			
5.00N-1.00W-28	NE NW					NC			
5.00N-1.00W-28	SE NW					NC			
5.00N-1.00W-28	NE SW					NC			
5.00N-1.00W-28	SE SW					NC			
5.00N-1.00W-28	NE SE					NC			
5.00N-1.00W-28	NW SE					NC			
5.00N-1.00W-28	SW SE					NC			
5.00N-1.00W-28	SE SE					NC			
5.00N-1.00W-32	SE SW					NC			
5.00N-1.00W-32	SW SE					NC			
5.00N-1.00W-33	NE NE					NC			
5.00N-1.00W-33	NW NE					NC			
5.00N-1.00W-33	SW NE					NC			
5.00N-1.00W-33	SE NE					NC			
5.00N-1.00W-33	NE SW					NC			
5.00N-1.00W-33	SE SW					NC			
5.00N-1.00W-33	NE SE					NC			
5.00N-1.00W-33	NW SE					NC			
5.00N-1.00W-33	SW SE					NC			
5.00N-1.00W-33	SE SE					NC			
5.00N-1.00W-34	NW NW					NC			
5.00N-1.00W-34	SW NW					NC			
5.00N-1.00W-34	NE SW					NC			
5.00N-1.00W-34	NW SW					NC			
5.00N-1.00W-34	SW SW					NC			
5.00N-1.00W-34	SE SW					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

No genealogy records available for this water right, try the family link below instead.

View Water Rights in same Family **Report Errors with Water Right Data**

Oregon Water Resources Department
Water Rights Information Query

Permit: R 11387 *

Contact Information (Click to Collapse...)

Contact information

OWNER:
CITY OF SAINT HELENS
PO BOX 278
SAINT HELENS, OR 97051

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Columbia
File Folder Location: Salem
Watermaster District: 18

Processing History (Click to Collapse...)

Application: R 63272
- Staff Person Responsible: no caseworker currently assigned
- Received: 2/19/1982

Permit: R 11387 document , paper map
- Signature: 7/29/1991

Process Step	Date Completed	Result	Completed By
Completion Date [C Date]	10/1/1994		

- View right with Web Mapping
- View Places of Use from Water Rights in the Same Area
- View Reported Water Use

Scanned Documents (Click to Collapse...)

Records per page: 2

Document Type	Document Title	Date	Remarks
Permit	Permit R11387 Image	7/29/1991	
Permit	Permit R11387 Map Image	7/29/1991	

Point(s) of Diversion (Click to Collapse...)

POD 1 - SALMONBERRY CREEK > SMITH CREEK

Description
- **T-R-S-QQ:** 5.00N-2.00W-28-NW SE
- **Location Description:** NONE GIVEN

POD Rate

Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)
		46.2	46.2

RECREATION (Primary)

Priority Date	Max Rate (cfs)	Rate (cfs)	Max Volume (af)	Volume (af)	Elevation (ft)	Rate/Acre	Duty	Start Date	End Date	Remarks
1/9/1991			46.2	46.2				1/1	4/30	
1/9/1991			46.2	46.2				11/1	12/31	

Reservoir

SALMONBERRY RESERVOIR

Dam Location
- NONE GIVEN

Volume (af)	Dam Height (ft)	Submerged Acres
46.2	38.7	

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - RECREATION
(Primary); Priority Date: 1/9/1991

T-R-S	QQ	DLC	Gov't Lot	Taxlot	Acres	Status	Linked PODs	Inchoate Info	Remarks
5.00N-2.00W-28	NW SE					NC			

Sum of Acres: 0.0

Water Right Genealogy (Click to Collapse...)

No genealogy records available for this water right, try the family link below instead.

View Water Rights in same Family Report Errors with Water Right Data

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Client:	City of St. Helens
Project:	Water Master Plan
Project No.:	221096
Location:	Meridian Office
Date:	
Reviewed By:	

Raw Water Production Data (2016-2021)

	Gallons		
Annual Production	Ranney #2	Ranney #3	Total
2016	106,297,908	390,939,465	497,237,373
2017	2,179,553	562,020,000	564,199,553
2018	73,522,567	428,177,868	501,700,435
2019	165,107,907	305,669,401	470,777,308
2020	166,309,573	266,426,130	432,735,703
5-Year Avg.	102,683,502	390,646,573	493,330,074

	Gallons per Day		
Daily Average	Ranney #2	Ranney #3	Total
2016	291,227	1,071,067	1,362,294
2017	5,971	1,539,781	1,545,752
2018	201,432	1,173,090	1,374,522
2019	452,350	837,450	1,289,801
2020	455,643	729,935	1,185,577
5-Year Avg.	281,325	1,070,265	1,351,589

		Gallons		
Year	Month	Ranney #2	Ranney #3	Total
2016	January	0	32,915,435	32,915,435
	February	10,370	30,319,770	30,330,140
	March	0	33,103,712	33,103,712
	April	0	33,988,371	33,988,371
	May	20,962	36,402,696	36,423,658
	June	0	41,010,275	41,010,275
	July	275,879	54,276,932	54,552,811
	August	59,320,000	8,854	59,328,854
	September	46,650,000	1,293,420	47,943,420
	October	0	43,300,000	43,300,000
	November	20,697	41,810,000	41,830,697
	December	0	42,510,000	42,510,000
2017	January	0	43,230,000	43,230,000
	February	8,666	37,517,000	37,525,666
	March	0	40,970,000	40,970,000
	April	630,341	42,290,000	42,920,341
	May	50,965	46,103,000	46,153,965
	June	111,349	48,640,000	48,751,349
	July	406,585	59,780,000	60,186,585
	August	925,142	64,530,000	65,455,142
	September	10,035	50,570,000	50,580,035
	October	13,895	44,500,000	44,513,895
	November	15,510	41,680,000	41,695,510
	December	7,065	42,210,000	42,217,065

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

		Gallons		
Year	Month	Ranney #2	Ranney #3	Total
2018	January	2,496,152	40,059,312	42,555,464
	February	13,061,303	15,925,616	28,986,919
	March	18,124,743	18,736,096	36,860,839
	April	16,812,468	17,638,324	34,450,792
	May	19,957,096	20,292,273	40,249,369
	June	2,390,767	43,898,619	46,289,386
	July	24,109	62,493,400	62,517,509
	August	17,689	55,773,514	55,791,203
	September	604,572	43,371,674	43,976,246
	October	0	37,904,870	37,904,870
	November	33,668	34,992,933	35,026,601
	December	0	37,091,237	37,091,237
2019	January	0	38,763,718	38,763,718
	February	0	40,650,531	40,650,531
	March	217,499	41,634,309	41,851,808
	April	33,611,635	4,620,241	38,231,876
	May	0	44,767,550	44,767,550
	June	0	47,694,078	47,694,078
	July	758,021	53,409,888	54,167,909
	August	15,113,218	32,358,881	47,472,099
	September	31,421,396	0	31,421,396
	October	29,225,026	872,766	30,097,792
	November	26,830,736	897,439	27,728,175
	December	27,930,376	0	27,930,376
2020	January	28,516,076	0	28,516,076
	February	0	26,766,968	26,766,968
	March	27,860,770	0	27,860,770
	April	29,250,766	0	29,250,766
	May	17,333,526	16,069,245	33,402,771
	June	0	41,014,649	41,014,649
	July	7,635	51,607,487	51,615,122
	August	0	56,561,013	56,561,013
	September	6,941,777	37,567,664	44,509,441
	October	28,766,254	0	28,766,254
	November	27,359,758	0	27,359,758
	December	273,011	36,839,104	37,112,115
2021	January	0	37,094,458	37,094,458
	February	0	35,785,835	35,785,835
	March	0	40,000,883	40,000,883
	April	0	41,668,893	41,668,893
	May	0	47,545,742	47,545,742
	June	0	56,842,656	56,842,656

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APPENDIX G

Notice to Affected Local Governments

KELLER ASSOCIATES

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Trenton Buster

From: Helen Johnson <hJohnson@columbia-city.org>
Sent: Friday, April 22, 2022 4:12 PM
To: Trenton Buster
Cc: Michael McGlothlin; Sharon Darroux; Peter Olsen
Subject: RE: External:St. Helens Water Management and Conservation Plan

Trenton,

Our City Planner has had a chance to review and has no concerns.

Take care,

Helen Johnson
Columbia City
503-397-4010

From: Trenton Buster [mailto:tbuster@Kellerassociates.com]
Sent: Monday, March 28, 2022 12:00 PM
To: Helen Johnson <hJohnson@columbia-city.org>
Cc: Michael McGlothlin <MMcGlothlin@columbia-city.org>; Sharon Darroux <sdarroux@sthelensoregon.gov>; Peter Olsen <polsen@Kellerassociates.com>
Subject: External:St. Helens Water Management and Conservation Plan

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Helen Johnson,

The City of St. Helens has updated their previous Water Management and Conservation Plan (WMCP) as a part of their recent water master plan (WMP) update. One of the requirements of a WMCP is that the plan be made available for general comment to affected local governments. In addition, the affected local governments should be given the opportunity to comment concerning the consistency with the local government's comprehensive land use plan. We have identified Columbia City as an affected local government, and request that you provide comments to the WMCP within the next 30 days. Following the comment period, the plan will be finalized and submitted to Oregon Water Resources Department.

The WMCP is included in report Section 8 of the WMP, however, supporting information is provided throughout several sections the full WMP. Report Section 8 and the draft WMP can be reached at the following link: WMP and WMCP Draft Report

Please feel free to reach out to me with any questions regarding the report.

Thank you,

KELLER ASSOCIATES
TRENTON BUSTER, EI
Project Engineer
DIRECT 208-244-5068 | CELL 208-695-1404 | OFFICE 208-288-1992

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

100 East Bower St., Suite 110, Meridian, ID 83642
kellerassociates.com

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Trenton Buster

From: Michael Russell <Michael.Russell@columbiacountyor.gov>
Sent: Monday, March 28, 2022 8:44 AM
To: Trenton Buster; Robert Wheeldon
Cc: Peter Olsen; Sharon Darroux
Subject: RE: St. Helens Water Management and Conservation Plan

Hi Trenton,

Thank you for the opportunity to comment. I am forwarding your email on to our Land Development Services (LDS) Department Director, Robert Wheeldon for review as well. LDS has the primary responsibility for determining consistency with our Comp Plan.

Mike Russell | Director | Columbia County Public Works |
1054 Oregon Street, St Helens, OR 97051
503-397-5090 | F 503-397-7215 | Michael.russell@columbiacountyor.gov
Service ~ Engagement ~ Connection ~ Innovation

From: Trenton Buster <tbuster@Kellerassociates.com>
Sent: Friday, March 25, 2022 12:44 PM
To: Michael Russell <Michael.Russell@columbiacountyor.gov>
Cc: Peter Olsen <polsen@Kellerassociates.com>; Sharon Darroux <sdarroux@sthelensoregon.gov>
Subject: St. Helens Water Management and Conservation Plan

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Dear Mr. Mike Russell

The City of St. Helens has updated their previous Water Management and Conservation Plan (WMCP) as a part of their recent water master plan (WMP) update. One of the requirements of a WMCP is that the plan be made available for general comment to affected local governments. In addition, the affected local governments should be given the opportunity to comment concerning the consistency with the local government's comprehensive land use plan. We have identified Columbia County as an affected local government, and request that you provide comments to the WMCP within the next 30 days. Following the comment period, the plan will be finalized and submitted to Oregon Water Resources Department.

The WMCP is included in report Section 8 of the WMP, however, supporting information is provided throughout several sections the full WMP. Report Section 8 and the draft WMP can be reached at the following link: WMP and WMCP Draft Report

Please feel free to reach out to me with any questions regarding the report.

Thank you,

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

TRENTON BUSTER, EI
Project Engineer
DIRECT 208-244-5068 | CELL 208-695-1404 | OFFICE 208-288-1992
100 East Bower St., Suite 110, Meridian, ID 83642
kellerassociates.com

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Trenton Buster

From: shannon@mcnultywater.com
Sent: Tuesday, April 26, 2022 10:07 AM
To: Trenton Buster
Cc: Sharon Darroux; Peter Olsen
Subject: RE: St. Helens Water Management and Conservation Plan Update

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning,

McNulty Water PUD's Engineering firm AKS has read the City of St. Helen's Water Management and Conservation Plan and have no comments.

Have a great day!

Thank you,

Shannon Tice
Administrative Services
McNulty Water PUD
Po Box 260
St. Helens, OR 97051
503-397-1301

From: Trenton Buster <tbuster@Kellerassociates.com>
Sent: Friday, March 25, 2022 12:41 PM
To: shannon@mcnultywater.com
Cc: Sharon Darroux <sdarroux@sthelensoregon.gov>; Peter Olsen <polsen@Kellerassociates.com>
Subject: St. Helens Water Management and Conservation Plan Update

Dear Ms. Shannon Tice,

The City of St. Helens has updated their previous Water Management and Conservation Plan (WMCP) as a part of their recent water master plan (WMP) update. One of the requirements of a WMCP is that the plan be made available for general comment to affected local governments. In addition, the affected local governments should be given the opportunity to comment concerning the consistency with the local government's comprehensive land use plan. We have identified the McNulty Water PUD as an affected local government, and request that you provide comments to the WMCP within the next 30 days. Following the comment period, the plan will be finalized and submitted to Oregon Water Resources Department.

The WMCP is included in report Section 8 of the WMP, however, supporting information is provided throughout several sections the full WMP. Report Section 8 and the draft WMP can be reached at the following link: WMP and WMCP Draft Report

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Please feel free to reach out to me with any questions regarding the report.

Thank you,

TRENTON BUSTER, EI
Project Engineer
DIRECT 208-244-5068 | CELL 208-695-1404 | OFFICE 208-288-1992
100 East Bower St., Suite 110, Meridian, ID 83642
kellerassociates.com

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Trenton Buster

From: Trenton Buster
Sent: Friday, March 25, 2022 1:49 PM
To: house@portofcolumbiacounty.org
Cc: Peter Olsen; Sharon Darroux
Subject: St. Helens Water Management and Conservation Plan

Dear Miriam House,

The City of St. Helens has updated their previous Water Management and Conservation Plan (WMCP) as a part of their recent water master plan (WMP) update. One of the requirements of a WMCP is that the plan be made available for general comment to affected local governments. In addition, the affected local governments should be given the opportunity to comment concerning the consistency with the local government's comprehensive land use plan. We have identified the Port of Columbia County as an affected local government, and request that you provide comments to the WMCP within the next 30 days. Following the comment period, the plan will be finalized and submitted to Oregon Water Resources Department.

The WMCP is included in report Section 8 of the WMP, however, supporting information is provided throughout several sections the full WMP. Report Section 8 and the draft WMP can be reached at the following link: WMP and WMCP Draft Report

Please feel free to reach out to me with any questions regarding the report.

Thank you,

KELLER ASSOCIATES

TRENTON BUSTER, EI
Project Engineer
DIRECT 208-244-5068 | CELL 208-695-1404 | OFFICE 208-288-1992
100 East Bower St., Suite 110, Meridian, ID 83642
kellerassociates.com

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

APPENDIX H

Glossary

KELLER ASSOCIATES

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

GLOSSARY

Average Day Demand - The volume of water used by a system on an average day based on a specified historical production period.

Backbone Water System – Water system which should be capable of withstanding significant seismic activity and remain operational to supply potable water following a large seismic event.

Backflow - the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any sources other than its intended source, and is caused by backsiphonage or backpressure.

Caisson - a large watertight chamber, open at the bottom, from which the water is kept out by air pressure and in which construction work may be carried out under water.

Check Valve - a valve, which allows flow in only one direction.

Concentration x Time (CT) - The product of the residual disinfectant concentration "C" (measured in mg/l) and disinfectant contact time(s), "T" (measured in minutes).

Consumer Confidence Report (CCR) – An annual report that community water systems must deliver to their customers. The reports must contain information on the quality of the water delivered by the systems and characterize the risks (if any) from exposure to contaminants detected in the drinking water in an accurate and understandable manner.

Cross Connection - any actual or potential unprotected connection or structural arrangement between the public or user's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas, or substances other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel, or change-over devices, and other temporary or permanent devices through which, or because of which, backflow can occur are considered to be cross connections.

Dead Storage – The volume in the reservoir which cannot be used due to physical constraints. Generally, this is the volume of storage below the elevation of the reservoir outlet pipe.

Disinfection - A process by which a chemical or ultraviolet light is used to inactivate pathogenic organisms in water. Disinfection intended to inactivate one or more pathogens in source water is referred to as disinfection for pathogen inactivation and is characterized by monitoring to verify the inactivation achieved.

Distribution System – The portion of the water system in which water is stored or conveyed from the water treatment plant or other supply point to the premises of a consumer

Diurnal Curve (Unit Curve) – Demand pattern of a water system illustrating the factors above or below the maximum day demand.

Finished Water - Water that is introduced into the distribution system of a public water system and intended for distribution and consumption without further treatment, except as necessary to maintain water quality in the distribution system such as booster disinfection or the addition of corrosion control chemicals.

Fire Protection Storage – Provides the volume necessary to meet maximum fire demands for the specified duration.

Firm Capacity – Capacity of a water system facility with the largest pump or treatment process offline.

Groundwater under the direct influence of surface water (GWUDI) - Any water beneath the surface of the ground with significant occurrence of insects or other macro-organisms, algae or large-diameter pathogens

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

such as Giardia lamblia or Cryptosporidium, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions.

Hydraulic Grade Line – The total hydraulic energy of a water component including elevation, pressure, and velocity components.

Liquefaction - ground failure or loss of strength that causes otherwise solid soil to behave temporarily as a viscous liquid

Maximum Day Demand - The average rate of consumption for the twenty-four (24) hour period in which total consumption is the largest for the design year.

Membrane filtration - A pressure or vacuum driven separation process in which particulate matter larger than one micrometer is rejected by engineered media, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test. This definition includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

Operational Storage – The volume of water drained from the reservoirs during normal operation before the water sources begin pumping to refill reservoirs. Typically, it is recommended to use approximately 10% of the total storage volume for operational storage to provide appropriate pump runtimes and adequate reservoir mixing.

Peak Hour Demand – The highest hourly flow, excluding fire flow, that a water system or distribution system pressure zone is likely to experience in the design year.

Peaking or Equalization Storage – Refers to the storage required to meet peak hour demands in excess of the supply pumping capacity.

Potable water - Water which has sufficiently low concentrations of microbiological, inorganic chemical, organic chemical, radiological or physical substances so that individuals drinking such water at normal levels of consumption, will not be exposed to disease organisms or other substances which may produce harmful physiological effects.

Pressure Reducing Valve (PRV) – a system control valve which maintains a set pressure on the downstream side of the valve. Used for reducing high pressures to low pressures or maintain minimum pressures.

Pressure Zone (PZ) – An interconnected pressurized pipe system with a similar hydraulic grade line.

Programmable Logic Controller (PLC) – a computerized device used for control of a system and has setpoints based on pressure, flow, timing, or other system characteristics.

Ranney Collector Well – type of radial well used to extract water from an aquifer with direct connection to a surface water source like a river or lake.

Service Connection - The piping connection through which water is conveyed from a public water system to a user's premises.

Standby Storage – A minimum volume or emergency supply equivalent to 48 hours of average day demand for extended power outages. This storage can be reduced if supply pumps are equipped with standby power.

Static Water Level - The vertical distance from ground surface to the water level in the well when the well is at rest, that is, the well has not been pumped recently and the water level is stable. This is the natural level of water in the well

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

Supervisory Control and Data Acquisition (SCADA) – control system architecture comprising computers, networked data communications and graphical user interfaces for high-level supervision of machines and processes. It also covers sensors and other devices, such as programmable logic controllers, which interface with process plant or machinery.

Surface Water - All water, which is open to the atmosphere and subject to surface runoff.

Turbidity - A measure of the cloudiness of water caused by suspended particles. The units of measure for turbidity are nephelometric turbidity units (NTU).

Unaccounted for Water – Difference between the quantity of water produced at the WFF and the volume of water metered at service connections.

Variable Frequency Drive (VFD) – a type of motor controller which can operate at varying frequencies. In a water system pump, this results in varying flow rates at the same discharge pressure.

Water hammering – Result of a pressure surge or high-pressure shockwave which propagates through a piped system when a fluid In motion is forced to change direction or stop abruptly.

Water Source - Any lake, stream, spring, groundwater supply, impoundment or other source of water from which water is obtained for a public water system. In some cases, a public water system can be the source of supply for one or more other public water systems.

Wholesale - a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more purchasing water systems

DocuSign Envelope ID: 5DC9EF37-90C7-4DCA-994C-A9D9B5BAA8E6

KELLER ASSOCIATES

245 Commercial St. SE, Suite 210 | Salem, OR 97301 | (503) 364-2002

City of St. Helens
RESOLUTION NO. 1951

A RESOLUTION DETERMINING THAT A NUISANCE EXISTS UPON PROPERTY LOCATED AT 394 S. 12TH STREET WITHIN THE CITY OF ST. HELENS AND DIRECTING THAT NOTICE TO ABATE THE NUISANCE BE POSTED ON SAID PREMISES

WHEREAS, St. Helens Municipal Code (SHMC) Section 8.12.090(3) provides that, "Except as provided in subsection (4) of this section, no owner or person in charge of property shall allow weeds or grasses to grow on his or her property or in adjacent streets or alleys in excess of 10 inches in height. If weeds or grasses are allowed to exceed 10 inches in height, the city may cut the vegetation if the owner or person in charge of the property fails to do so or requests the city to do so and the cost shall be charged to the owner or person in charge of said property or assessed against the property. "Weeds" and "grasses" shall mean, in addition to all plants commonly known by these terms, Russian thistles, Canadian thistles, Chinese thistles, cocklebur, poison oak, poison ivy, white mustard, silver saltbush, blackberries, any noxious weed or growth, or any brush, ferns, shrubs, or grass that are, or constitute, a fire hazard, a menace to public health or safety, or are unsightly;" and

WHEREAS, SHMC Section 8.12.150(1) defines "the term 'junk' shall include, but will not be limited to, old motor vehicle parts, old machinery, old machinery parts, old appliances and parts thereof, old iron or other metal, glass, paper, old lumber, old wood, waste material, discarded material or abandoned personal property of any nature;" and

WHEREAS, SHMC Section 8.12.150(2) provides that "Keeping of Junk Prohibited. It is hereby determined and declared that the keeping of or allowing of junk to be on or remain out of doors on any public or private premises within the city, unless the same is completely enclosed within a building, is a nuisance and is unlawful;" and

WHEREAS, the property located at 394 S. 12th Street, St. Helens, Oregon, has been determined by the Code Enforcement Officer to be in violation of one or more provisions of Chapter 8.12 of the St. Helens Municipal Code as described above and therefore a nuisance pursuant to the Code.

NOW, THEREFORE, THE CITY OF ST. HELENS RESOLVES AS FOLLOWS:

Section 1. The property located at 394 S. 12th Street, St. Helens, Oregon, constitutes a nuisance under SHMC Chapter 8.12.090(3) and 8.12.150(1) and (2), based on the photographs of the premises, attached hereto and incorporated herein by reference as **Exhibit A**, and information from the Code Enforcement Officer. Council finds that the photographs show trash, rubbish, debris, junk, and tall grass/weeds. Council hereby directs that the person(s) in charge of the premises located as 394 S. 12th Street, shall, within 30 days after such Council determination, remove or abate such nuisance.

Section 2. Pursuant to SHMC 8.12.250(10), Council hereby delegates, "If within the time fixed, as provided in this chapter, the nuisance has not been abated by the person in charge of the property, the common Council shall cause the nuisance to be abated." Council further directs that this nuisance be permanently abated within 30 days from the date of this Resolution.

Section 3. Council hereby directs a notice to be posted on property located at 394 S. [redacted] Street, St. Helens, Oregon, which contains: a description of the real property, by street address or otherwise; a direction to remove the nuisance within 30 days of the date of the notice; a description of the nuisance; a statement that unless a permanent abatement of the nuisance is performed within 30 days of this Resolution, the City will permanently remove the nuisance and that the costs shall be a lien against the property; and a statement that the person in charge of the property may protest the action by giving notice to the City Recorder within ten (10) days from the date of the notice.

Section 4. The City Recorder shall cause a copy of said notice to be forwarded by registered or certified mail, postage prepaid, to the person in charge of the property at the last known address of such person. That notice shall contain all the elements listed in Section 3, supra, that is, the posting. If the person responsible for the nuisance is not the owner, an additional notice shall be sent to the owner, stating that the cost of abatement not paid by the person responsible may be assessed to and become a lien on the property.

Approved and adopted by the City Council on May 4, 2022, by the following vote:

Ayes:

Nays:

_____
Rick Scholl, Mayor

ATTEST:

_____
Kathy Payne, City Recorder













City of St. Helens
RESOLUTION NO. 1952

A RESOLUTION TO AMEND THE CITY OF ST. HELENS PERSONNEL POLICIES AND PROCEDURES HANDBOOK (RESOLUTION NO. 1913) REGARDING PAYROLL POLICIES

WHEREAS, the City finds it necessary to update the personnel policy to reflect recommendations from the 2020/2021 audit final report concerning payroll processing; and

WHEREAS, the City will follow Oregon state law regarding providing itemized statements for payroll to employees that do not express interest in receiving electronic copies.

NOW, THEREFORE, THE CITY OF ST. HELENS RESOLVES AS FOLLOWS:

Section 1. Section 002 of the City of St. Helens Personnel Policies and Procedures Handbook is hereby amended as follows:

002. EMPLOYMENT STATUS AND TERMS AND CONDITIONS OF EMPLOYMENT

H. Payroll Policies

~~Employees are paid on the last business day of every month. Full-time employees have the option to receive up to 50% of their monthly paycheck via a draw on or the closest business day of the 15th of every month. The amount requested may be a percentage or a specific amount up to 50% of their base pay.~~ Employees are paid semi-monthly on the 15th and last business day of the month. If the 15th or last day of the month lands on a Saturday or Sunday, payroll will be processed for the preceding business day. All deductions for items like insurance payments will be split 50/50 with the semi-monthly payroll process.

~~New employees as of the date this policy is approved will be required to have their checks setup on a direct deposit to the bank of their choosing. No paychecks will be delivered to any person other than the employee named on the paycheck unless the employee provides written permission for someone else to receive the check. Employees with direct deposit will have their itemized statement of wages for each pay period uploaded to an employee self-service portal that is available 24/7 for employees that need to physically print their paystubs, which means no physical paystubs will be printed for anyone who receives direct deposit.~~ New employees as of the date this policy is approved will be required to have their checks setup on a direct deposit to the bank of their choosing. No paychecks will be delivered to any person other than the employee named on the paycheck unless the employee provides written permission for someone else to receive the check.

APPROVED AND ADOPTED by the City Council on May 4, 2022 by the following vote:

Ayes:
Nays:

_____
Rick Scholl, Mayor

ATTEST:

_____
Kathy Payne, City Recorder

City of St. Helens
RESOLUTION NO. 1953

A RESOLUTION OF THE CITY OF ST. HELENS CITY COUNCIL ADOPTING A STRATEGIC WORKPLAN FOR 2022-2024

WHEREAS, the City Council of St. Helens is committed to serving our community in adherence to our Vision: To provide quality, effective and efficient service to our community; and

WHEREAS, the City Council and staff have participated in an organizational development process to evaluate our vision, mission, goals, and objectives and to create this strategic workplan to direct limited resources to best meet the needs and aspirations of our community; and

WHEREAS, the City Council and staff commit to increase transparency, accountability and improve community civic engagement.

NOW THEREFORE, IT IS HEREBY RESOLVED that the City of St. Helens Strategic Workplan 2022-2024 adheres to the City's vision and strives to direct resources in line with strategic goals and work in the best possible manner to meet the needs of the community and to provide Council and staff a "report card" on how we are doing in leading and serving the City; and it is further

RESOLVED, that this plan will guide the work in core goal areas: effective and efficient organization, community and civic engagement, livable and safe community, economic development and long-term planning; and it is further

RESOLVED, that the City of St. Helens Strategic Workplan 2022-2024, attached hereto as Exhibit A, is hereby adopted.

Approved and adopted by the City Council on May 4, 2022, by the following vote:

Ayes:

Nays:

_____
Rick Scholl, Mayor

ATTEST:

_____
Kathy Payne, City Recorder

VISION: **TO PROVIDE QUALITY, EFFECTIVE AND EFFICIENT SERVICE TO OUR COMMUNITY**

Mission: *Develop and preserve the highest possible quality of life for residents, businesses and visitors.*
Provide a safe and healthy environment within a sound economic framework.
Provide leadership which is open and responsive to the needs of the community and works for the benef

GOAL AREA 1:	**EFFECTIVE AND EFFICIENT ORANIZATION**	**LEAD DEPARTMENT**	**COST**	**FUNDING SOURCE**
Objective	Create and Maintain an Effective Organization			
Tactic	Review City Goals & Objectives to Prioritize City Projects			
Project	Review, Update, and Create Biennial Strategic Workplan	Administration	-	General Fund
Tactic	Maintain a Balanced and Sustainable Budget			
Project	Review and Discuss Biennial City Budget Process	Finance	-	General Fund
Tactic	Maintain a Stable Technology Environment			
Tactic	Managers Attend Professional Development Opportunities			
Project	Dept Managers attend Human Resources Training	City Recorder	-	All Funds
Tactic	Attend Regional Meetings and Represent the Community			
Tactic	Maintain an effective and efficient City Council			
Objective	Recruit and Retain Talented Staff			
Tactic	Support Professional Development Among All Staff			
Project	Support Staff Development Training & Certification	All Departments	-	All Funds
Project	Team Building Retreats	All Departments	-	All Funds
Objective	Maintain a Professional and Effective City Council			
Tactic	City Staff Provide Support and Guidance for Council and Commissions			
Tactic	Council Attend Opportunities in Development Trainings			
Project	Media Training for Council and Commission Members	Administration	-	General Fund
Project	Workshop and legal briefings on Council Function and duties	Administration	-	General Fund
Project	Review and Update Council Governing Policy	Administration	-	General Fund
Project	Review and Update Council Operating Rules	Administration	-	General Fund

GOAL AREA 2:	COMMUNITY AND CIVIC ENGAGEMENT		LEAD DEPARTMENT	COST	FUNDING SOURCE
Objective	Be Responsive to Community Needs				
Objective	Expand Communication Efforts				
Tactic	Encourage & Build Collaboration with Local Organizations & Community				
Project	Explore & Strengthen Video/Media Communication		All Departments	-	General Fund
Project	Explore issue-focused stakeholder conversations		All Departments	-	General Fund
Project	Cultivate and sustain program level partnerships including: SHPL, SHPD, recreati		All Departments	-	All Funds
Project	Council Community engagement		Administration	-	General Fund
Project	Level of Service Review within Departments		Administration	-	All Funds
Project	Customer Focused FAQ Pamphlets/Videos		All Departments	-	All Funds
Objective	Expand Civic Participation				
Tactic	Hold Community Meetings to Encourage Participation				
Project	Host Town Hall Events for Community		Administration	-	General Fund
Project	Host Regular Public Forums on City Topics		Administration	-	General Fund
Project	Improve youth engagement through SHSD Civics/humanities class connections		Administration	-	General Fund
Objective	Community Center as Activity and Resource Hub				

GOAL AREA 3:	LIVABLE AND SAFE COMMUNITY		LEAD DEPARTMENT	COST	FUNDING SOURCE
Objective	Create and Maintain a Safe Community				
Tactic	Improve Safety Throughout the Community				
Project	Decrease crime incidents by 5%		Police	-	General Fund
Project	Increase traffic safety and reduce traffic accidents		Police	-	General Fund
Objective	Maintain Safe and Inviting Public Services & Facilities				
Tactic	Improve Public Services & Facilities				
Project	Completion of New Public Safety Center		Administration	18,000,000	ublic Safety Fund
Project	Complete Park Improvements - Campbell Park		Parks & Recreation	400,000	Grants
Project	Complete Urban Trail - Initial Implementation		Parks & Recreation	?	s & General Fund
Project	Incorporate Development Code Amendments from Housing Needs Analysis		Planning	-	General Fund
Project	CDBG Assistance with Columbia Pacific Food Bank		Planning	-	Grants
Project	City Hall Improvements - Bennet Building Façade Improvements (Phase 2)		Planning	20,000	Grants
Project	Park Improvements - Design & Permitting Dock & Fishing Pier at Grey Cliffs Par		Planning	-	General Fund

Project	Sidewalk Improvements - Columbia Blvd from Gable Rd to Sykes Rd	Public Works	404,000	Street Fund
Project	Waterline Improvements - Pittsburg Rd redundant line	Public Works	680,000	Water Fund
Project	Storm System Improvements - Ridgeway Loop	Public Works	60,000	Storm Fund
Project	Controls at collector wells # 2, #3	Public Works	13,000	Water Fund
Project	Fire suppression - small diameter pipe replacement	Public Works	250,000	Water Fund
Project	Repair 2MG Reservoir	Public Works	500,000	Water Fund
Project	WWTP Improvements - Rebuilding of Headworks Screen	Public Works	40,000	Sewer Fund
Project	Influent Flow Meter-WWTP	Public Works	100,000	Sewer Fund
Project	WFF Improvements - Rack Replacement	Public Works	204,000	Water Fund
Project	Elimination of Overdue Fines in Library	Library	-	General Fund
Project	Library Courier Service Between St. Helens and Scappoose	Library	-	General Fund
Project	Develop Sustainable Operations of Makerspace	Library	-	General Fund
Project	Expand Hybrid Library Programs (online & in-person)	Library	-	General Fund
Project	Increase Digital Library Resources	Library	-	General Fund
Project	Explore Rebranding of the Library	Library	-	General Fund
Objective	Create Access to Arts and Cultural Activities in the Community			
Objective	Improve City-wide emergency preparedness & resilience			
Tactic	Create Safety Plans			
Project	Improve Building access and safety	Administration	-	All Funds
Project	Public works backup power	Public Works	100,000	ublic Works Fund
Project	Continuity of Operations Plan	Administration	-	All Funds
Project	Evacuation plans/drills	Administration	-	All Funds

GOAL AREA 4: ECONOMIC DEVELOPMENT		LEAD DEPARTMENT	COST	FUNDING SOURCE
Objective	Develop Policies and Programs to Promote Economic Development			
Tactic	Review City policies and programs to promote economic development			
Project	Digitized Aerial Imaging	Planning	100,000	General Fund
Project	Economic Opportunities Analysis Update	Planning	?	General Fund
Project	Electronic Plan Submittal and Review	Building	13,000	General Fund
Project	Support Main Street Alliance	Administration	30,000	ARPA Funds
Project	Improve Recreational Boating Experience	Administration	?	Tourism / Grant
Project	S. River Street to N 2nd Street "micro" transportation systems plan	Planning	-	General Fund
Project	Concurrent Plan Review Process	Building	-	General Fund
Objective	Develop City Owned Property for Development			
Tactic	Create an Industrial Business Park			
Project	Phase 1 - Infrastructure Study	Planning	400,000	Grants
Project	Grading Plan			
Tactic	Create a Central Waterfront Development Plan			
Tactic	Create a Riverfront District for Development Plan			
Project	RFQ for Development Plans	Administration	-	General Fund
Project	Riverwalk and Columbia View Park Improvements	Administration	?	ants & SDC Funds
Project	Phase 1 - Infrastructure Design & Engineering	Administration	?	s & General Fund
Project	Additional Hotel Rooms			
Project	Phase 1 Construction	Administration	?	nterprise & Loans
Tactic	Review City-owned Property for Development			
Project	Prepare Redevelopment of N. 10th and 11th Bluff	Planning	-	General Fund
Project	Industrial Park - RV Park			
Project	Further develop Sand Island amenities	Parks & Recreation	?	eral Fund / Grant
Objective	Develop an Urban Renewal Agency for Economic Development			
Tactic	Create and Maintain Urban Renewal Agency			

GOAL AREA 5:	LONG TERM PLANNING		LEAD DEPARTMENT	COST	FUNDING SOURCE
	Objective	Maintain Effective Master Plans and Facility Plans			
	Tactic	Create and Maintain City Master Plans			
	Project	Parks & Recreation Master Plan Amendment	Parks & Recreation	-	SDC Funds
	Project	Transportation System Plan Update	Planning	?	Street Fund SDC
	Project	City-Wide Facility Master Plan	Administration	-	General Fund
	Objective	Maintain Reserves to Ensure Funding for Equipment Replacement			
	Objective	Maintain City Municipal Code to help guide/enforce City policy			
	Tactic	Identify potential changes and updates to Municipal City Code			
	Project	Floating Structure Code Amendments	Planning	-	General Fund
	Project	Building Code Enforcement Process Review	Planning	-	General Fund

LONG-TERM:	LONG TERM IDENTIFIED PROJECTS	LEAD DEPARTMENT	COST	FUNDING SOURCE
	Project Manage athletic field scheduling citywide	Parks & Rec	-	General Fund
	Project Activate Salmonberry Lake area	Parks & Rec	-	General Fund
	Project Provide Free Library Cards for SHSD and Educators	Library	-	General Fund
	Project Create a local history room	Library	-	General Fund
	Project develop a library facility master plan	Library	-	General Fund
	Project Upgrade Intersection at Plymouth and Old Portland Rd.	Planning	-	Street Fund
	Project Millard Road City Entrance Sign	Planning	-	General Fund
	Project Old Portland Rd. and S. 18th roundabout	Planning	-	Street Fund
	Project Old Portland Rd. and Port Ave. Reconfiguration	Planning	-	Street Fund
	Project Planning related FAQ pamphlets/videos	Planning	-	General Fund
	Project Update city Charter for no-vote annexations	Planning	5,000	General Fund
	Project Addressing policy update	Planning	-	General Fund
	Project Housing Production Strategy	Planning	50,000	General Fund
	Project Residential design standards	Planning	25,000	General Fund
	Project Locally significant wetland updates (buffer zones, etc.)	Planning	100,000	General Fund
	Project Flood code amendments related to BIOP (Endangered Species Act)	Planning	-	General Fund
	Project Development Code Amendments related to Sanitary, Storm and Water Master Plans	Planning	-	General Fund
	Project Right-of-way street vacation policy	Planning	-	General Fund
	Project Food cart/truck/trailers rules	Planning	-	General Fund
	Project Develop incentives for designation as a local historic landmark	Planning	-	General Fund
	Project Housing Needs Analysis Update per 2019 HB 2003 (2027 Update)	Planning	50,000	General Fund
	Project Historic resources inventorying	Planning	50,000	General Fund
	Project N. 4th St. Storm Extension	Public Works	-	Storm Fund
	Project Columbia Boulevard Storm Improvements	Public Works	-	Storm Fund
	Project Sykes Rd. Improvements	Public Works	-	Street Fund
	Project Milton Creek Bridge Replacement	Public Works	-	Street Fund
	Project Bradley, Park and S. 13th St. Waterline Replacement	Public Works	-	Water Fund
	Project New 4 MG Reservoir and Transmission Main	Public Works	-	Water Fund
	Project Relocate Waste Water Treatment Plant	Public Works	-	Sewer Fund
	Project Develop Incentive Program to Remove Storm Sump Pumps	Public Works	-	Storm Fund
	Project Relocate Pump Station #11	Public Works	-	Sewer Fund
	Project Upsize Pump Station #7	Public Works	-	Sewer Fund
	Project Upsize South Trunk Sewer	Public Works	-	Sewer Fund
	Project Interceptor Trunk Main Upgrades	Public Works	-	Sewer Fund
	Project Middle Trunk Sanitary Upgrades	Public Works	-	Sewer Fund

Project Public Works Facility Master Planning	Public Works	-	ublic Works Fund
Project Seismic Upgrades - Milton Creek at Pittsburg Rd. Bridge	Public Works	-	Street Fund
Project Heinie Human Park Storm Ditch	Public Works	25,000	Storm Fund
Project Fire Hydrant Replacement	Public Works	-	Water Fund
Project Shop Roof Replacement-WWTP	Public Works	-	ublic Works Fund

SECOND AMENDMENT TO
Public Improvement Contract
for the
Columbia Pacific Food Bank Renovation Project, Project No. C18005

This agreement is entered into this 4th day of May 2022, by and between the City of St. Helens, (hereinafter "City"), and **JH Kelly, LLC** (hereinafter "Contractor").

RECITALS

A. City and Contractor entered into a Public Improvement Contract on January 11, 2021 and said contract, hereinafter "original contract", is on file at St. Helens City Hall.

B. As part of the original contract, Contractor and City agreed that Contractor would provide all materials, equipment, labor, and services for the Columbia Pacific Food Bank Renovation Project.

C. The original contract expired on November 15, 2021. On October 20, 2021, the contract was extended to May 14, 2022.

D. The Contractor has experienced delays in receiving materials due to COVID-19 supply chain issues, delays due to staff COVID-19 quarantine requirements, and multiple structural and mechanical Change Orders that required additional time to complete the project.

E. The Contractor has requested additional time to complete the project, which is within the deadline of the completion deadline of the City's Agreement with the Oregon Business Development Department (Project Number C18005).

NOW, THEREFORE, in consideration for the mutual covenants contained herein the receipt and sufficiency of which are hereby acknowledged, Contractor and City agree as follows:

1. The recitals set forth above are true and correct and are incorporated herein by this reference.

2. The completion date of the contract shall be extended to June 30, 2022.

3. All other terms of the original contract not specifically amended by this agreement remain in full force and effect.

Dated this 4th day of May 2022.

Contractor

_____

Print Name:_____

Date:_____

City

_____

Rick Scholl, Mayor

Date:_____

Attest:

By:_____

Kathy Payne, City Recorder

City of St. Helens
INDEPENDENT CONTRACTOR AGREEMENT

This INDEPENDENT CONTRACTOR AGREEMENT (this "Agreement") is made and entered into by and between the **City of St. Helens** (the "City"), an Oregon municipal corporation, and **E2C Corp**. ("Contractor"), collectively the "Parties".

RECITALS

A. The City is in need of services to produce and manage the "Events" listed in Attachment A attached hereto.

B. The City has determined Contractor to be qualified and capable of performing the services sought by the City.

NOW, THEREFORE, the Parties agree as follows:

AGREEMENT

1. Engagement. The City hereby engages Contractor to provide services related to Special Events Management (the "Services"), and Contractor accepts such engagement. The principal contact for Contractor shall be Tina Curry, phone (360) 241-6456.

2. Scope of Work. The duties and responsibilities of Contractor, including a schedule of performance, shall be as described in Attachment A attached hereto and incorporated herein by reference.

3. Term. This Agreement shall become effective upon the full execution by the Parties (the "Effective Date") and shall terminate on December 31, 2023, unless sooner terminated in accordance with the terms stated herein (the "Initial Term"). This Agreement may be renewed by mutual written agreement of the Parties.

4. Compensation/Expenses. The terms of compensation for the Contractor shall be as provided in Attachment C. Contractor shall perform and complete the Services set forth in Attachment A within a budget agreed to by the Parties (the "General Budget"). Any expenses in the General Budget, including asset purchases, equal to $50,000.00 or more, shall require pre-approval from the City before making any such expenditure or purchase.

4.1. The City shall maintain a reserve account equal to the pro rata share of the Contractor's fee, amount of annual building lease obligations and utilities for leased premises (the "Reserve Account"). The Reserve Account is not part of the General Budget described in Paragraph 4 above and shall not be considered funds to be used by Contractor without written approval from the City, at its sole discretion. Contractor will work within the budget resulting from and created by tourism activities listed in "Attachment A."

4.2. Contractor shall be responsible for all receivables, payables and disbursements pertaining to tourism budget. A third party shall have access to all income,

expenses and subcontracted ticketing sites held in reference to Contractor's work for City throughout the year. The designated third party, at City's expense, shall also conduct an audit of all income, expenses, and subcontracted ticketing sites on at least an annual basis, or more frequently as needed, as determined at the City's discretion.

4.3. Contractor shall provide the City Administrator access to all electronic ticketing accounts to allow tracking and verification of the accounting provided by Contractor to City. To the extent possible, Contractor shall discourage the use of cash payments at Events and will be provided a "Square" card reader that directly connects to the bank accounts. Additionally, all cash income will be accounted for by a duplicate signature prior to depositing as a cash receipt. Contractor will be provided a secure, locked location, where cash receipts may be held during weekend events.

4.4. Any and all remaining funds received by Contractor, after the payment of budgeted and approved expenses (including any fees), shall be transferred to the City by December 28th of each year. Provided the Parties agree to renew or continue this Agreement, such funds may be invoiced and returned to Contractor to provide funding for approved future events in the upcoming year.

4.5. The City, at its discretion, may suspend or withhold payments in the event Contractor fails to comply with requirements of this Agreement.

4.6. Any provision of this Agreement that is held by a court to create an obligation that violates the debt limitation provision of Article XI, Section 9 of the Oregon Constitution shall be void. The City's obligation to make payments under this Agreement is conditioned upon appropriation of funds pursuant to ORS 294.305 through 294.565.

5. Independent Contractor. Contractor is engaged by the City as an independent contractor in accordance with the standards prescribed in ORS 670.600. Contractor shall not be entitled to any benefits that are provided by the City to City employees. Contractor is not an officer, employee, or agent of the State or Department as those terms are used in ORS 30.265 of the Oregon Tort Claims Act, and Contractor is not to be considered an officer, employee or agent of the City for any purpose. Contractor certifies that it currently has a City business license or will obtain one prior to delivering services under this Agreement.

All persons employed by Contractor and that may participate in Contractor's performance of the Services as provided in this Agreement, shall be considered to be its employees, subcontractors, agents or principals and not principals, agents or employees of the City. Contractor covenants and agrees not to hold itself/himself out as an employee of the City, and Contractor acknowledges that it/she/he and its employees have no right or entitlement in or to any right, privilege or benefit which would accrue to an employee of the City for any purposes, including, but not limited to, the application of the Federal Insurance Contribution Act, the Social Security Act, the Federal Unemployment Tax Act, the provisions of the Internal Revenue Code, the State Revenue and Taxation Code relating to income tax withholding at the source of income, the Workers' Compensation Insurance Code, 401(k), and other benefit payments or third-party liability claims.

6. Advertising and Document Ownership and Work Made for Hire. The City currently owns a number of websites including DiscoverColumbiaCounty.com, SpiritofHalloweentown.com as well as social media sites including Dark Market USA, Columbia County Events and others, that the Contractor will have access to in order to convey appropriate marketing for Events. Any ads or materials created for public use shall become the property of the City. Any reuse or alteration of any work produced under this Agreement, except as contemplated herein, shall be at the City's sole risk.

All materials produced for the City by Contractor or Contractor's employees performing services covered by this Agreement shall be deemed "work made for hire" within the meaning of the U.S. Copyright Act, as amended. If any portion of such work is determined not to be a work made for hire, Contractor hereby sells, assigns and transfers to the City all present and future right, title and interest, including all copyrights and trademarks, so that all copyrights for the work related to the work will immediately and automatically be the sole and absolute property of the City. Contractor will, at the expense of the City, execute any instruments and do all other things reasonably requested the City (both during and after the term of this Agreement) in order to vest more fully in the City any and all ownership rights in the transferred materials.

7. Notices. All notices or other communications required or permitted hereunder shall be in writing, and shall be considered as properly given if (a) mailed by first class United States mail, postage prepaid, registered or certified with return receipt requested, (b) by delivering same in person to the intended addressee, (c) by delivery to an independent third party commercial delivery service for same day or next day delivery and providing for evidence of receipt at the office of the intended addressee, or (d) by electronic mail at the electronic mail address commonly used by the recipient in the conduct of communications between the Parties. Notice sent pursuant to clause (a) shall be effective three (3) business days after its deposit with the United States Postal Service; notice sent pursuant to clause (b) shall be effective upon receipt by the intended recipient; notice sent pursuant to clause (c) shall be effective upon the date delivered by such a commercial delivery service; and notice given by email delivery pursuant to clause (d) shall be effective upon being sent by the sender. Notices sent by mail or email shall be addressed as follows:

City: City of St. Helens
Attn.: City Administrator
265 Strand Street
St. Helens, OR 97051
Email: jwalsh@sthelensoregon.gov

Contractor: E2C Corp
Attn: Tina Curry
2316 NE Minnehaha St
Vancouver, WA 98665
Email: _____

Any Party may designate a different address by giving notice to the other Parties delivered in accordance with the provisions of this Paragraph.

8. Standard of Care. Contractor shall perform the Services in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality.

9. Consequential Damages. Neither Party shall be liable to the other for consequential damages, including, without limitation, loss of use or loss of profits incurred by one another or their subsidiaries or successors, regardless of whether such damages are caused by either Party's breach of contract, willful misconduct, negligent act or omission, or other wrongful act.

10. Insurance. At all times during the term of this Agreement, Contractor shall carry, maintain and keep in full force and effect a policy or policies of insurance as specified in Attachment B attached hereto and incorporated herein by reference.

10.1. There shall be no cancellation, material change, exhaustion of aggregate limits or intent not to renew coverage without thirty (30) days' prior written notice to the City.

10.2. Contractor agrees that if it does not keep the aforesaid insurance in full force and effect, the City may either immediately terminate this Agreement or, if insurance is available at a reasonable cost, the City may take out the necessary insurance and pay, at Contractor's expense, the premium thereon. If the City procures such insurance, the City shall retain any cost incurred for same from moneys due Contractor hereunder.

10.3. At all times during the term of this Agreement, Contractor shall maintain on file with the City a Certificate of Insurance or a copy of actual policies acceptable to the City showing that the aforesaid policies are in effect in the required amounts. The policies shall contain an endorsement naming the City, its officers, employees and agents, as additional insured's (except for the professional liability and workers' compensation insurance). Renewal certificates shall be sent to the City at least ten (10) days prior to coverage expiration.

10.4. The insurance provided by Contractor shall be primary to any coverage available to the City. The insurance policies (other than workers' compensation) shall include provisions for waiver of subrogation. Contractor shall be responsible for any deductible amounts outlined in such policies.

11. Workers' Compensation. Contractor shall carry workers' compensation insurance as and to the extent required by law, and shall provide the City with appropriate proof of such insurance reflecting the required coverage prior to commencement of any Services. Contractor assumes full responsibility for any liability and exposure under law relating to workers' compensation because of any performance of Services under this Agreement and will hold the City harmless for and from any industrial accident or liability that is attributable to Contractor.

12. Termination. At any time and without cause, City or Contractor shall have the right in their sole discretion to terminate this Agreement by giving 90 days written notice to the other Party. If City terminates this Agreement pursuant to this section, the City shall pay Contractor for services rendered to the date of termination or 90 days compensation whichever is more.

13. No Third-Party Rights. This Agreement shall not create any rights in or inure to the benefit of any parties, whether directly, indirectly or otherwise, other than the City and Contractor.

14. Modification. Any modification of the provisions of this Agreement shall be set forth in writing and signed by the Parties.

15. Waiver. A waiver by a Party of any breach by the other shall not be deemed to be a waiver of any subsequent breach.

16. Indemnification. Contractor shall defend, indemnify and hold harmless the City and its officers, employees, elected officials, volunteers and agents from any and all liability, causes of action, claims, losses, damages, judgments or other costs or expenses including attorneys' fees ("Claims") that arise from the negligent or other wrongful acts, omissions, or willful misconduct of Contractor or officers, employees, agents, or subcontractors of Contractor, except to the extent that the Claims arise out of the negligence or other wrongful acts or omissions of the City or the City's officers, employees, or agents.

17. Governing Laws. This Agreement shall be governed by the laws of the State of Oregon. Venue shall be in the Circuit Court for Columbia County, Oregon.

18. Compliance with Law.

18.1. Contractor shall comply with all applicable federal, state and local statutes, ordinances, administrative rules, regulations and other legal requirements in performance of this Agreement.

18.2. Contractor shall comply with applicable provisions of ORS 279B.020, 279B.220, 279B.225, 279B.230 and 279B.235. Pursuant to ORS 279B.235, any person employed by Contractor who performs Services shall be paid at least time and a half pay for all overtime in excess of forty (40) hours in any one (1) week, except for persons who are excluded or exempt from overtime pay under ORS 653.010 through 653.261 or under 29 USC Sections 201 through 209.

18.3. Contractor is a "subject employer," as defined in ORS 656.005, and shall comply with ORS 656.017.

18.4. Contractor shall comply with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations and shall also comply with the Americans with Disabilities Act of 1990, ORS 659A.142, and all regulations and administrative rules established pursuant to those laws.

19. Confidentiality. Contractor understands the nature of the Services means the Contractor may be privy to information that is confidential or proprietary and shall not be disclosed to any third person or entity without the City's consent either during the term of this Agreement or after its termination.

20. Publicity. Contractor shall not use any data, pictures, or other representations of the City in its external advertising, marketing programs, or other promotional efforts except with prior specific written authorization from the City.

21. Succession. This Agreement shall inure to the benefit of and shall be binding upon each of the Parties hereto and such Parties' partners, successors, executors, administrators and assigns.

22. Assignment. This Agreement shall not be assigned by Contractor without the express written consent of the City. Contractor shall not assign Contractor's interest in this Agreement or enter into subcontracts for any part of the Services without the prior written consent of the City.

23. Dispute Resolution. Should a dispute arise between the Parties to this Agreement, it is agreed that such dispute will be submitted to a mediator prior to any litigation. The Parties shall exercise good-faith efforts to select a mediator who shall be compensated equally by both parties. Mediation shall be conducted in St. Helens, Oregon, unless both Parties agree in writing otherwise. Both Parties agree to exercise good-faith efforts to resolve disputes covered by this section through the mediation process. If a Party requests mediation and the other party fails to respond within ten (10) days, a mediator shall be appointed by the presiding judge of the Circuit Court of the State of Oregon for Columbia County upon request of either Party. The Parties shall have any rights at law or in equity with respect to any dispute not covered by this section. Nothing in this section shall preclude a Party from seeking equitable relief to enjoin a violation of this Agreement.

24. Force Majeure. Neither City nor Contractor shall be considered in default because of any delays in completion and responsibilities hereunder due to causes beyond the control and without fault or negligence on the part of the Parties so disenabled, including, but not restricted to, an act of God or of a public enemy, civil unrest, volcano, earthquake, fire, flood, epidemic, pandemic, quarantine restriction, area-wide strike, freight embargo, unusually severe weather or delay of subcontractor or supplies due to such cause; provided that the parties so disenabled shall within ten (10) days from the beginning of such delay, notify the other Party in writing of the cause of delay and its probable extent. Such notification shall not be the basis for a claim of additional compensation. Each Party shall, however, make all reasonable efforts to remove or eliminate such a cause of delay and shall, upon cessation of the cause, diligently pursue performance of its obligation under this Agreement.

25. Attorney Fees. If legal action is commenced in connection with this Agreement, the prevailing Party in such action shall be entitled to recover its reasonable attorney fees and costs incurred herein at trial and on appeal.

26. Inspection and Audit by the City.

26.1. Services provided by Contractor and Contractor's performance data, financial records, and other similar documents and records of Contractor that pertain, or may pertain, to the Services under this Agreement shall be open for inspection by the City or its agents at any reasonable time during business hours. Upon request, copies of records or public

documents shall be provided to the City free of charge that do not conflict with any third party or contractor that requires nondisclosures to obtain engagement.

26.2. The City shall have the right to inspect and audit Contractor's financial records pertaining to the Services under this Agreement at any time during the term of this Agreement or within two (2) years following the termination of this Agreement.

27. Entire Agreement. This Agreement contains the entire agreement between the Parties and supersedes all prior written or oral discussions or agreements regarding the Services described herein.

28. Severance. If any provision of this Agreement is held to be invalid, it will not affect the validity of any other provision. This Agreement will be construed as if the invalid provision had never been included.

Signatures on following page.

IN WITNESS WHEREOF, the City has caused this Agreement to be executed by its duly authorized undersigned agents, and Contractor has executed this Agreement on the date written below.

CITY:	**CONTRACTOR:**
CITY OF ST. HELENS	
Council Meeting Date: _____	
Signature: _____	Signature:_____
Print:	Print:
Title: _____	Title: _____
Date: _____	Date:_____

ATTACHMENT A

Scope of Work

CITY OF ST. HELENS, OREGON

Special Event Coordination & Management

PROGRAM OBJECTIVE

The primary objective of the City's Tourism program is to draw people to the St. Helens Community for a positive visitor experience. The strategy proposed for achieving this goal is to continue producing meaningful events and activities that draw visitors, fill hotel rooms, support local merchants and improve community identity and livability. In order to ensure sustainability, the program costs are expected to be fully recovered through event revenues and sponsorships.

EVENT DESCRIPTIONS

Over the past several years the City has concentrated tourism investments into four major event programs ("Events"). These Events include 13 Nights on the River, Fourth of July, The Spirit of Halloweentown, and the annual Christmas Tree Lighting ceremony. These events include the following:

- **13 Nights on the River**

  This popular 13 Nights on the River concert series has been a Thursday night favorite in Columbia View Park June through Labor Day. The event entails live music and other entertainment along with food and other vendors to attract citizens and visitors to our community.

- **Fourth of July**

  The Fourth of July Independence Day has been a long-standing tradition on the St. Helens waterfront. The Contractor should expect to collaborate with community organizations in an effort to ensure a quality event while minimizing the impact on City's financial Transient Room Fee resources.

- **Spirit of Halloweentown**

  This event has grown into an international sensation attracting tens of thousands of visitors to experience the magical place where Halloweentown was filmed in the late 1990's. The event has expanded from a modest community celebration into a month-long program where the City transforms and embraces the Spirit of Halloweentown. Past activities have included celebrity visitors, character actors, music, performances, meet and greet events, tractor rides, parking management, vendor management, festivals, tours, haunted houses, gift shop, and much more. The event provides the opportunity for community

organizations and nonprofits to generate revenue to support community programs throughout the year while supporting local business and covering the expenses of operating the event.

- **Christmas Tree Lighting**

  The Christmas Tree Lighting ceremony occurs annually on the evening the Portland Christmas Ships visit in December. This event oversees the decorating and take down of the Court House Plaza decorations including the Christmas Tree lighting and activities the night of the event. Traditionally, the City assists in the tree installation, decorations The City provides the ship captain's dinner, Santa and Mrs. Claus visit, amplified or live music, free hot chocolate, warming barrels and in 2018 there was a tribute fireworks program.

- **Other Events**

  The event contractor may opt to produce additional events and activities throughout the year to ensure program sustainability. Such additional events will be authorized by the City and may or may not receive additional compensation.

SCOPE OF SERVICES

Event Coordination & Management

Contractor will be responsible for coordinating and managing City events from inception to completion. At Contractor's discretion, these duties may include the following:

- Advertise, promote and market events
- Manage the City's social media and event accounts (Discover Columbia County, Spirit of Halloweentown Facebook and others)
- Create, manage and reconcile event budgets
- Track event revenue and expense
- Solicit sponsorships for events
- Create and/or coordinate informational brochures for visitors
- Provide adequate event staffing and management services
- Recruit musical talent
- Coordinate with vendors
- Ensure clean-up during and after each event
- Coordinate with City and County departments to ensure good communication and event logistical support
- Utilize community volunteers when possible

- Ensure deliverables are on time, on budget and meet City expectations

Report regularly to the City Council and staff

ATTACHMENT B
INSURANCE REQUIREMENTS

Contractor and its subcontractors shall maintain insurance acceptable to the City in full force and effect throughout the term of this Contract.

It is agreed that any insurance maintained by the City shall apply in excess of, and not contribute toward, insurance provided by Contractor. The policy or policies of insurance maintained by Contractor and its subcontractors shall provide at least the following limits and coverage:

TYPE OF INSURANCE	LIMITS OF LIABILITY		REQUIRED FOR THIS CONTRACT
General Liability	Each occurrence General Aggregate Products/Comp Ops Aggregate Personal and Advertising Injury	$1,000,000 $2,000,000 $2,000,000 $1,000,000 w/umbrella or $1,500,000 w/o umbrella	YES/NO
Please indicate if Claims Made or Occurrence			
Automobile Liability	Combined Single – covering any vehicle used on City business	$2,000,000	YES/NO
Workers' Compensation	Per Oregon State Statutes If workers compensation is not applicable please initial here: _____ State the reason it is not applicable here: _____		YES/NO
Professional Liability	Per occurrence Annual Aggregate	$500,000 or per contract $500,000 or per contract	YES/NO

Contractor's general liability and automobile liability insurance must be evidenced by certificates from the insurers. The policies shall name the City, its officers, agents and employees, as additional insureds and shall provide the City with a thirty (30)-day notice of cancellation.

Workers' compensation insurance must be evidenced by a certificate from the insurer. The certificate need not name the City as an additional insured but must list the City as a certificate holder and provide a thirty (30)-day notice of cancellation to the City.

Certificates of Insurance shall be forwarded to:

City Administrator
City of St. Helens
265 Strand Street
St. Helens, OR 97051

Contractor agrees to deposit with the City, at the time the executed Contract is returned, Certificates of Insurance and Binders of Insurance if the policy is new or has expired, sufficient

to satisfy the City that the insurance provisions of this Contract have been complied with and to keep such insurance in effect and the certificates and/or binders thereof on deposit with the City during the entire term of this Contract. Such certificates and/or binders must be delivered prior to commencement of the Work.

The procuring of such required insurance shall not be construed to limit Contractor's liability hereunder. Notwithstanding said insurance, Contractor shall be obligated for the total amount of any damage, injury or loss caused by negligence or neglect connected with this Contract.

ATTACHMENT C
TERMS OF COMPENSATION

City agrees to pay Contractor $120,000 (One Hundred Twenty Thousand dollars) paid in 12 monthly installments for and in consideration of the faithful performance of the services. Any reimbursable approved expenses shall be billed at cost without markup. Contractor's fee for approved management of sub-contractors, and consultants will be a maximum of five percent (5%) .

Monthly fee shall be invoiced to the City by Contractor. City may pay within seven (7) days upon receipt of the invoice.

City of St. Helens

Consent Agenda for Approval

CITY COUNCIL MINUTES

Presented for approval on this 4th day of May, 2022 are the following Council minutes:

2022

- Work Session, Executive Session, Public Hearing, and Regular Session Minutes dated April 6, 2022
- Executive Session Summary dated April 18, 2022
- Work Session and Regular Session Minutes dated April 20, 2022

After Approval of Council Minutes:

- ☐ Scan as PDF Searchable
- ☐ Make one double-sided, hole-punched copy and send to Library Reference
- ☐ Minutes related to hearings and deliberations get copied to working file
- ☐ Save PDF in Minutes folder
- ☐ Update file name & signature block on Word document & copy Word document into Council minutes folder in Shared Drive
- ☐ Upload & publish in MuniCode
- ☐ Email minutes link to distribution list
- ☐ Add minutes to HPRMS
- ☐ Add packet and exhibits to HPRMS
- ☐ File original in Vault
- ☐ Update minutes spreadsheet

COUNCIL WORK SESSION

Wednesday, April 06, 2022

DRAFT MINUTES

MEMBERS PRESENT
Mayor Rick Scholl
Council President Doug Morten
Councilor Patrick Birkle – 1:09 p.m.
Councilor Stephen R. Topaz
Councilor Jessica Chilton

STAFF PRESENT
John Walsh, City Administrator
Kathy Payne, City Recorder
Lisa Scholl, Deputy City Recorder
Matt Brown, Finance Director
Jacob Graichen, City Planner
Sharon Darroux, Engineering Manager
Crystal King, Communications Officer
Bill Monahan, City Attorney
Tina Curry, Event Coordinator

OTHERS
Robert Brawand
Lynne Pettit
Steve Toschi
Steve Donovan
Peter Olsen
Trenton Buster
Ryan Makinster
Amy Bynum

CALL WORK SESSION TO ORDER – 1 p.m.

VISITOR COMMENTS - *Limited to five (5) minutes per speaker*
None

DISCUSSION TOPICS

1. **Water Systems Master Plan Update - *Peter Olsen & Trenton Buster with Keller Associates, Inc.***

Peter Olsen and Trenton Buster were in attendance to review the Water Systems Master Plan update. A copy of their presentation is included in the archive packet for this meeting. They reviewed the need, purpose, usage, supply, storage, demands for fire flow, etc.

Recommendations
- Repair existing 2.0MG reservoir and construct new 4.0MG reservoir
    - Reviewed reservoir location recommendations
- Continue with reported operations and maintenance activities at Water Filtration Facility
- Complete annual water audit to determine unaccounted for water
- Continue with reported flushing program
- Develop valve exercising and replacement program
- Inspect storage reservoirs every 5-10 years
- Continue with waterline replacement program
- Continue with water meter replacement
- Develop leak detection program and incorporate into waterline replacement program

- Continue to develop public education

Review of replacement program and staffing needs.

Council President Morten referred to the word "safe" in their Mission Statement. Safety is of the utmost importance and is one of the main reasons he is serving. The State Fire Marshal's Office has designated the Dalton Lake area as a catastrophic fire zone. It is full of dry brush during the summer. The fire department won't go there because there is not enough pressure in the fire hydrants and a fire truck could get trapped. New residential units are required to have an 80-foot turnaround for fire trucks. The City hasn't moved forward to increase pressure in that area. It's an unsafe place to live, in terms of fire, and what can happen if the winds blow towards Pittsburg Road, where there is a massive number of homes. He is disappointed that fire safety is not included in the report. Peter responded that fire flow demands are what drives the need and efficiencies in a water system. It is addressed in the report, just not at the level of fire risk. He appreciates the input.

Questions from Councilor Topaz

- Referring to fire danger, are they referring to one dwelling or multiple? Peter responded that it's based on one event.
- Can five fire trucks connect to five different hydrants at the same time and have the same service? Peter said you probably wouldn't have that anywhere.
- Councilor Topaz spoke about the industrial area and highly flammable businesses. What was the level of firefighting? Peter said it's 3,500 gallons per minute for a four-hour event. They work with the fire department to determine what is required.
- They use the term "membrane" in filtration. Is it a particulate membrane or soluble membrane? Peter would have to ask their Process Engineers that question. It's Pall membrane.
- If someone dumps a constant flow of soluble material in the river, how can the system handle it? Peter said that is not analyzed as part of the report.
- They put chlorine in the pumping areas. Do they analyze the level of chemistry when it gets to a residence? Peter said they did not do a chlorine dissipation analysis. They work with operators who do the testing regularly and know what the chlorine residual is throughout the system. If there is an issue, it may be in the storage reservoir or the system. The model that has been developed as part of their scope can be utilized to further analyze those things. Council President Morten asked if the chlorine would settle to the lowest point if it's not continuously moving. Peter said it would dissipate. Discussion of the smell of chlorine. Peter said if you can smell it, it is active in the water. Mayor Scholl pointed out that this is for the Water Master Plan. If they want more details, they need to discuss it with Engineering Manager Sharon Darroux or staff at the Water Filtration Facility.
- If a major main breaks during an emergency, will it compromise the entire system? Peter said there is an entire part of the report addressing that. The most vulnerable part is the Pittsburg Road line, which is recommended for replacement.
- A large reservoir was discussed. Does the system have any automatic pressure controls? Trenton said there is one in the Elk Ridge development.
- Are there maintenance schedules for control systems? Trenton said they recommend valve exercising. Peter added that they also recommend a regular flushing program. There are parts of the system that are very fragile and recommended for replacement.
- Talked about major water flows for industrial fires. How easy would it be to triple water flows for industrial areas? Peter said it's not easy at all. It would be very expensive to increase pipe sizes.

Mayor Scholl addressed future fires. They have a big water tank and water rights to the pumps at Boise Cascade. It's partially being used by Boise. There is a huge water filtration facility there. Could the City

look at that to alleviate a section of town? Peter said they could have a separate fire hydrant system. Mixing the systems becomes a risk.

Councilor Chilton said they mentioned unaccounted water that can be improved by 18% and the average is 10%. Was that a part of their note with developed protection program? Is that something Public Works can investigate? Peter said leak detection, documentation, hydrant flushing, and meter replacement are all important. Public Works is already addressing it.

Councilor Birkle thanked them for their report. He concurs with addressing fire safety issues.

Council President Morten said they drained the reservoir several times. Does that factor into the high percentage Councilor Chilton referenced? Peter said yes.

2. System Development Charges (SDCs) Update - *Steve Donovan with Donovan Enterprises, Inc.*

Finance Director Brown reported that the goal at the end of the presentation is for Council to give direction on how to move forward. No decisions need to be made.

Steve Donovan reviewed the SDC report. A copy is included in the archive packet for this meeting.

- SDCs are one-time fees on new development, which are paid at the time of development.
- SDCs are intended to recover a fair share of the cost of existing and planned facilities that provide capacity to serve future growth. It cannot be used for repairs or replacement.
- Single family residential units pay approximately $13,614.
- Reviewed limitations of SDCs for infrastructure funding.
- Reviewed the breakdown of increasing SDCs to approximately $18,811.
- Reviewed SDC rates for other cities.

Mayor Scholl asked when the rates were last adjusted. Steve said it was done in 2017. They were only increased a small percentage because they didn't have updated master plans.

Council President Morten asked how it affects storm with the apartment units being built. Steve agreed that there will be a lot of water runoff. Brown said the large development already paid for their permits, at the current rate.

Steve recommends raising rates on July 1st to $18,811 to pay for growth. They can choose not to raise rates and have rate payers pay for growth.

Councilor Topaz talked about stormwater. What happens if the City raised the roads and changed the landscape, so the water from the impervious surface no longer flows into the City, but the City flows into them? Does that affect SDCs? Steve responded that there is still localized flooding and water quality issues.

Mayor Scholl asked if he has projected future costs going up. Steve said no. It's a snapshot every five years. They need to adjust for inflation, which they have not been doing. They've used the numbers in the master plan, which is the best guess at the time.

Mayor Scholl said the City plans to put a park on Ross Road. They acquired adjacent property to extend sewer and water through there. Could they factor that project into SDCs for that area? Steve said yes. As long as there's nothing there now and they're building for future growth, you can do it. Mayor Scholl asked if SDCs could be used to pay for repairing deficiencies that are due to growth put on existing lines. Steve concurred that it could be partially paid for with SDCs for growth.

Discussion of the Urban Growth Area. City Planner Graichen explained that they approved the housing needs analysis a few years ago. It confirmed that they had sufficient land at that time. They cannot expand their Urban Growth Boundary.

Council President Morten talked about the storm SDC tripling. That is a huge surprise. He wonders why that was not accounted for in the budget. Mayor Scholl clarified that Council President Morten is referring to rates. Steve said it's a function of the Capital Improvement Plan and is attributed to serve growth.

Councilor Chilton knows this will be a heated topic. She would like to see what the potential results could be in the rate study. What are users paying for?

Councilor Topaz said the sewer system is inadequate. If there's a new federal or state rule about what the system needs to handle, is that considered new or a repair? Steve said it would be paid for by the rate payer.

Council President Morten asked Brown what effect the stormwater will have on the budget. Brown responded that stormwater SDCs will not have a budgetary effect because it doesn't affect operations. They will be reviewing utility rates and updated master plans for operations and maintenance in May. They know where the deficiencies are now and where they should be. The deficiencies are caused from years of past predecessors not increasing rates. It's a difficult budget year. They can put their head in the sand or start making upgrades.

Councilor Birkle agreed with the need to communicate this well with the public. If he were a developer, he would not want to see these increases, but he would not want to take it on as a resident.

City Administrator Walsh talked about rates being the significant contributor to repair and replacement. They couldn't charge enough to pay for all of it.

Mayor Scholl pointed out that predecessors didn't plan for the future. They must be proactive for future growth. The sewer is sufficient for now. He has talked about sharing a sewer with Scappoose between the two. NW Natural even said they would help with laying pipes. Columbia County Commissioners agreed to collect SDCs from properties outside the City UGB. Steve said utilities is all about scale. When they developed in the 1950's and 1960's, they had industrial development subsidizing residents.

Councilor Chilton wants to have a more secure plan in place for utility rates to make sure they're not in this situation again. Council President Morten agreed. Predecessors did not go forward because they got pressure from builders and the economy did not help facilitate building at that time.

Mayor Scholl said this is big and shocking. He talked about development costs increasing. The big one will be the utility rate increase they discuss next month.

Brown said staff was reactive for a long time. With new staff, they see the importance of being proactive. The benefit needs to be communicated well with the public.

3. Discussion regarding Sanitary Sewer Deficiency & Development - *Sharon & Jacob*

Engineering Manager Darroux reviewed the city's sewer lines. They fixed about 20% of the sewers in the early 2000's as part of the Inflow & Infiltration (I&I) project mandated by DEQ. Now they have a capacity issue. A full master plan was done last in 1989. That's 33 years that they have been using the very old plan, which did not account for growth. Over the last couple years, they have been working with Keller Associates to update the Water and Wastewater master plans. The Wastewater Master Plan was adopted in November. Population has almost doubled in size since 1989. She pointed out the sewer lines that are at capacity and where potential overflows could occur on the map, a copy of which is included in the archive packet for this meeting. For example, the Comstock property would flow into the line on Sykes Road. It's at capacity. The main issue is the interceptor on 4th Street that runs from Godfrey Park over to the Wastewater Treatment Plant. The 1989 master plan even said there were capacity issues. Councilor Topaz interrupted to say that the City has had problems with him on the sewer and the fact that they got rid of stormwater on that very thing. Mayor Scholl pointed out that is not relevant to the master plan. Sharon went on to talk about the known problems with undersized lines. There has been a lot of new development connecting to existing lines, which doesn't have capacity. Mayor Scholl recommends

redirecting from 2nd Street through the Riverfront Development and the Olde School to take pressure off 4th Street. Darroux added the only adequate trunkline is on Millard Road. There are multiple lines that are inadequate.

City Planner Graichen reviewed three options:

- Do nothing and assume that SDCs and utility rates will take care of it, and address issues as they happen.
- Require a fee that is in addition to SDCs for anyone tapping into these systems. Steve explained that other communities do this. You can add a condition for developers to pay a fee in-leu-of building a system. They City is under capacity. There is no SDC eligibility. Most communities borrow money to fix these issues. Basin six is the highest priority. To improve basins four and six, would cost approximately $10.2 million. Only $460,000 could be used from SDCs to fix that. Basin five would need to be improved about two years after that. They would continue to take on debt. Residential users are currently paying about $46.95 for sewer. If they borrow the money for the two projects in these phases and they use cash reserves in the sewer fund, they will have to raise rates 8% per year for the next five years to get to $68.90. It would fix the problem and serve growth. After those five years, it will need to go up again to keep up with an aging system. Sewer systems are a corrosive environment for metals. Councilor Topaz asked if it would be cheaper to put in a whole new system. Darroux said repair is much cheaper. They may have to at some point. They already have a blown-out trench. Councilor Topaz said a new system could go somewhere else for treatment. There are sewer systems that pre-date 1913. Steve said they don't have a treatment problem. It's a collection problem. Councilor Topaz argued that the sewer system was installed 30 years ago. New rules have been implemented during that time. Steve pointed out that they are still operating under a valid NPDES permit. Councilor Topaz said that Art Leskowich, who is with the Army Corp of Engineers, talked about some problems coming up with the treatment plant. Darroux emphasized that the issue is with the collection system. They could put treatment plants all over, but if the pipes aren't adequate it will back up through manholes into streets and backyards. Steve said it can be fixed, accommodate growth, and serve the environment with the rate increase. Darroux said they could be fined by the State if they don't fix the problem.
- Prohibit or delay development. It's not easy and there are processes to follow. Steve confirmed that it has been done by other communities. Councilor Chilton pointed out that it still doesn't fix the problem.

Discussion ensued about future trunkline locations. Mayor Scholl suggests they add a line from Bings to the Fairgrounds, with a big trunkline at Chad Davis and Don Danielson's development and run down Gable Road to alleviate the Sykes Road line. Peter pointed out that it would still not fix the existing problem.

Darroux is seeking direction from Council on which option they prefer.

Councilor Chilton suggests they halt building until they know how to handle the problem. Mayor Scholl disagreed. Graichen explained that they can't just make a motion to do that. It's a process with notice to the State and a public hearing. Mayor Scholl went on to say they are aware of the problem. Staff is working on a solution. He is in favor of in-leu-of fees to allow development to continue. Brown said if they do the in-leu-of fee they don't move forward with the debt service. It was clarified that they can do both. Mayor Scholl wants to direct staff to look at 4th Street coming down Columbia Blvd. to include 2nd Street. Council President Morten suggests tying it all in with the Waterfront Development while it's trenched. Everything is gravity fed to where they want it.

Mayor Scholl reported that staff received a call about the Comstock property that was recently annexed. They found out that they can't develop until the City allows growth. Graichen recommends Council give clear guidance tonight during their work session action items.

Councilor Chilton asked about relief funds from the government. Has any of it been allocated for streets or stormwater projects. Brown said they have allocated $400,000 for water and sewer infrastructure. However, that infrastructure is intended for the Industrial Business Park.

Council President Morten asked if there is additional Federal money available. Steve said yes. The money will be allocated to the states and predicated to the neediest first, based on median household income. They may be in a good position with their household income.

Steve said they need to discuss the fee-in-leu-of concept. He suggests they obtain advice from their attorney.

Break - 3:19 p.m.

4. Discussion to Initiate Vacation of Right-of-Way by Motion related to the Public Safety Facility - *Jacob*

City Planner Graichen reviewed his report and map. A copy is included in the archive packet for this meeting. Graichen said this is their opportunity to get rid of the 7th Street right-of-way shown on the map. It needs to be done through a vacation. He needs a motion and approval at tonight's meeting for the Council to initiate the vacation process. There will be a public hearing in the future.

5. Review "If I Were Mayor…" Student Contest Entries

Four posters, three essays, and two digital presentations were received. A copy of the submittals is included in the archive packet for this meeting. Ballots were distributed to the Council. The winners will be announced at tonight's meeting.

6. Report from City Administrator John Walsh

- Tonight's agenda includes the fireworks contract. It's a $20,000 show.
- Council received a request for a leak adjustment. It exceeds the administrative adjustment amount allowed. Councilor Topaz asked how the leak was discovered. Walsh was not sure. A decision will be made at tonight's meeting. These come up occasionally. Council can make a policy revision to allow Finance Director Brown to make the adjustments if they would like to see these less often. Mayor Scholl announced that the gentleman requesting additional time to pay did pay his bill in full last month.
- The Riverfront Development RFQ closed on Friday. They received two responses from very qualified firms. He would like to schedule an opportunity for developers to come in and present to Council. He distributed a tentative schedule, a copy of which is included in the archive packet for this meeting.
    - Special Session for presentations from developers on May 11th at 4 p.m. It will be open for the public to attend in-person, or watch via Zoom or YouTube, but he recommends not allowing public comments. The proposals will be distributed electronically to Council, three Planning Commission members, citizen-at-large Al Petersen, Associate Planner, Public Works Director, Engineering Manager, and himself. Discussion about adding more at-large members. Consensus to add Parks & Trails Commission Chair Carmin Dunn and Superintendent Scott Stockwell, or a designated School Board member.
    - Special Session for deliberations on May 18th
    - There will be a later opportunity for public comment
- Public Safety Facility update
    - Good progress on design
    - Fill and grade portion is almost ready for permitting. Saving money by doing it in-house.
- Riverwalk, Columbia View Park re-design, and street design update

  - Funding and construction are moving along well
  - A couple months delayed on the Columbia View Park re-design. Council President Morten talked about the Parks & Recreation Division working on the Parks Master Plan. He encouraged good communication. Walsh agreed. It's essentially the change in scope for the play equipment. It will be moved towards Cowlitz Street. Council President Morten would like to share that information with the Parks & Recreation Commission when it's available. Councilor Chilton asked if the Parks Master Plan is complete. Council President Morten said no. They are still in the brainstorming phase.
- The events audit is being wrapped up. He received the tourism draft contract back from the attorney yesterday. They are calling it an Independent Contractor Agreement. There are no red flags from the audit yet. It explains why the City should not be in this business. He should have both ready for review at the next meeting.
- Working to reignite the Central Waterfront project. There is available money from the State Legislature. The project also has potential to create revenue.
- Dock update
  - Installed kiosks. The fee is less important than the tracking and enforcement.
  - Working on a camera system
- Call to action from the Senate and House for directed spending requests
  - Milton Creek Bridge
  - Technology upgrades for the public safety facility and fire station
- Armstrong accepted an offer from Dansons
- Meeting internally with Columbia River Fire & Rescue to identify needs. They are looking to relocate the fire station on the other side of the highway to a centrally located property.
- Library screening interviews on March 28th. There were seven interviews and two will return for an in-person interview on April 18th.
- There are challenges with the City budget and meeting infrastructure and public safety needs

ADJOURN – 4:16 p.m.

EXECUTIVE SESSION

Respectfully submitted by Lisa Scholl, Deputy City Recorder.

ATTEST:

Kathy Payne, City Recorder

Rick Scholl, Mayor

City of St. Helens
CITY COUNCIL

Executive Session Summary **April 6, 2022**

Members Present: Rick Scholl, Mayor
Doug Morten, Council President
Patrick Birkle, Councilor
Stephen R. Topaz, Councilor
Jessica Chilton, Councilor

Staff Present: John Walsh, City Administrator
Kathy Payne, City Recorder
William Monahan, City Attorney with Jordan Ramis PC

◆

At 4:19 p.m., Mayor Scholl opened the Executive Session pursuant to the ORS numbers listed below and then gave Council roll call. Representatives of the news media and designated staff shall be allowed to attend the executive session. All other members of the audience are asked to leave the room. Representatives of the news media were specifically directed not to report on or otherwise disclose any of the deliberations or anything said about these subjects during the executive session, except to state the general subject of the session as previously announced. No decision may be made in executive session. Any person in attendance, including the news media, who has a recording device is directed to turn it off.

- **Consult with Counsel,** under **ORS 192.660(2)(h)**
  - Update on litigation with regards to 2MG water reservoir.
  - Update on S. 12th Street property eviction.

- **Real Property Transactions,** under **ORS 192.660(2)(e)**
  - Nothing was discussed under this item.

The Executive Session was adjourned at 4:30 p.m.

◆

ATTEST:

Kathy Payne, City Recorder

Rick Scholl, Mayor

COUNCIL PUBLIC HEARING

Wednesday, April 06, 2022

DRAFT MINUTES

MEMBERS PRESENT
Mayor Rick Scholl
Council President Doug Morten
Councilor Patrick Birkle
Councilor Stephen R. Topaz
Councilor Jessica Chilton

STAFF PRESENT
John Walsh, City Administrator
Kathy Payne, City Recorder
Lisa Scholl, Deputy City Recorder
Jacob Graichen, City Planner
Jenny Dimsho, Associate Planner

OTHERS

Steve Toschi	Gerry Carnahan
Jennifer Pugsley	Andrew Niemi
Jane Garcia	Chase Berg
Ali Hasenkamp	Shawn Clark
Cory Englehardt	Dena Womack

OPEN PUBLIC HEARING – 6:33 p.m.

TOPIC

1. **Planned Development (Zoning Overlay) at the current northern termini of N. 8th and 9th Streets lying north of Deer Island Road (North 8th Street LLC - Shawn Clark)**

City Planner Graichen covered preliminary matters and presented the staff report, a copy of which is included in the archive packet for this meeting. There were no ex-parte contacts, conflicts of interest, or bias in this matter. There were no objections from the audience for the Council to make a fair decision. Graichen reported that he has only seen one of these applications in his almost 14 years of working here. He emphasized that this is just for the overlay zone. It is not a subdivision application. Planning Commission approved the subdivision at their last meeting. The planned development allows them to retain the developable land with smaller lots. They're not even approaching the maximum density here. The developer must be careful to not create lots too small, because lot coverage limits still apply. The zoning of the property is predominately Mobile Home Residential, which resulted in a condition added by the Planning Commission that development in this overlay zone cannot preclude manufactured homes. Planning Commission recommended approval unanimously with that condition.

Councilor Topaz asked if the Fire District has reviewed the proposal. Graichen said they have an approved preliminary plat, but this is an overlay so they may not always have a development proposal at this time. The Fire Code requires homes be sprinkled when a subdivision gets to a certain size and there's only one

access point. They made sure that the cul-de-sac at the end meets the Fire District standards. This cul-de-sac does exceed standards and Planning Commission approved a Subdivision Variance to allow it. Councilor Topaz is worried about the hole that some of the lots are in. There will be problems getting people out if there's a fire or freezing temperatures. Graichen reminded him that is not part of the overlay Council is approving. Councilor Topaz asked if they need to be concerned with traffic getting in and out on a normal day. Graichen said that each lot should accommodate at least two parking spaces. The subdivision did require a traffic analysis, which showed there were no functional deficiencies. Councilor Topaz said there is underground water coming in. If you look across Highway 30, there is a lot of hydraulic sauce that's driving water into the ground. He assumes it's coming into the quarry. Were there any studies about underground subterranean water coming into the area? Graichen is not sure. The applicant's engineer is here and may be able to address it.

Mayor Scholl requested Councilor Topaz keep his questions on topic. This is for the zoning overlay and not the development.

APPLICANT TESTIMONY

- Andrew Niemi and Chase Berg, Lower Columbia Engineering. There was a much denser development proposed, which would have involved greater impacts to the onsite wetlands. The current proposal is scaled back with less impacts. There is still some impact to the wetlands, which they have already been successfully through a joint application process with the US Army Corps of Engineers and the Department of State Lands. The overlay zone is what allows the project to be feasible. They have tried to be deliberate about minimizing impact. Some of the concerns they heard from the public was regarding construction traffic on 8th and 9th streets. Someone proposed a potential construction route through the adjacent property owned by Columbia County. The County is open to discussing it further. In response to Councilor Topaz, they did have an extensive geotechnical study done. The primary reason for doing it was to make sure they were going to be properly hydrating the remaining wetlands. They have already done a stormwater analysis that manages the runoff from the new streets and ensure the wetlands remain healthy. In response to the question about street gradient, the current design limits slope to a maximum of 5%.

TESTIMONY IN FAVOR – None

TESTIMONY IN NEUTRAL – None

TESTIMONY IN OPPOSITION – None

CLOSE PUBLIC HEARING – 7 p.m.

Respectfully submitted by Lisa Scholl, Deputy City Recorder.

ATTEST:

Kathy Payne, City Recorder

Rick Scholl, Mayor

COUNCIL REGULAR SESSION

Wednesday, April 06, 2022

DRAFT MINUTES

MEMBERS PRESENT
Mayor Rick Scholl
Council President Doug Morten
Councilor Patrick Birkle
Councilor Stephen R. Topaz
Councilor Jessica Chilton

STAFF PRESENT
John Walsh, City Administrator
Kathy Payne, City Recorder
Lisa Scholl, Deputy City Recorder
Jacob Graichen, City Planner
Jenny Dimsho, Associate Planner

OTHERS

Steve Toschi	Gerry Carnahan	Ellie Luke and Family
Jennifer Pugsley	Andrew Niemi	Olivia & Everette Fantus and Family
Jane Garcia	Chase Berg	Lily Drew and Family
Ali Hasenkamp	Shawn Clark	Morgan Lee and Family
Cory Englehardt	Dena Womack	Taylor Rose Parsons and Family
Hayden Stram and Family	Katelyn & Addison Wells-Callow and Family	

CALL REGULAR SESSION TO ORDER – 7 p.m.

PLEDGE OF ALLEGIANCE

VISITOR COMMENTS – *Limited to five (5) minutes per speaker*

- Jennifer Pugsley. She had follow-up questions from the Urban Renewal Agency meeting regarding the loan. Does the interest accrue from the beginning of the loan for those three years? Is it paid in the form of draws?

City Administrator Walsh responded that it is .6% interest rate on the amount that is drawn. Associate Planner Dimsho added that it's about $120,000 in interest during those three years. That's included in the loan.

ANNOUNCE & AWARD PRIZES TO "IF I WERE MAYOR…" STUDENT CONTEST WINNERS
Mayor Scholl announced and awarded the prizes to the "If I Were Mayor…" Student Contest winners. First place winners won $150. Their entries will compete for a prize at the State level. Second place winners won $50. All participants received a certificate and a swag bag containing a coupon for a free book at the Friends of the Library book sale, water bottle, tote bag, book light, buttons, pens and pencil, lanyard, postcard, lip balm, and candy. Mayor Scholl invited all participants to join him for a pizza lunch to be scheduled in the summer.

Grades 4-5 Poster Category:
First Place Winner – Ellie Luke
Second Place Winner – Everette Fantus
Participant – Lily Drew
Participant – Morgan Lee

Grades 6-8 Essay Category:
First Place Winner – Taylor "Rosie" Parsons
Second Place Winner – Olivia Fantus
Participant – Addison Wells-Callow

Grades 9-12 Digital Presentation Category:
First Place Winner – Hayden Stram
Second Place Winner – Katelyn Wells-Callow

DELIBERATIONS

1. **Planned Development (Zoning Overlay) at the current northern termini of N. 8th and 9th Streets lying north of Deer Island Road (North 8th Street LLC - Shawn Clark)**

Planning Commission unanimously recommended approval with the condition that no development allowed under this Planning Development (overlay zone) shall preclude manufactured homes. This includes development standards and other factors such as use restrictions the developer may place on themselves.

Councilor Birkle acknowledged that this is for the overlay and not the development. The Planning Commission did their due diligence considering the application.

Council President Morten acknowledged that the presentation was done well. He thanked the local Engineering firm for their work.

Councilor Chilton appreciated the care given to the wetlands and community.

Councilor Topaz asked about the value of the land. City Planner Graichen said they don't typically address that. Andrew Niemi mentioned in the public hearing that it was the Planned Development Overlay that made it work. They've been working on this a long time and have spent a lot of money dealing with wetland mitigation.

Councilor Topaz talked about migratory birds. Graichen said the Army Corps of Engineers often consults with Fish and Wildlife. They would have mentioned it if there were concerns. He pointed out that the ponds are being left alone. Councilor Topaz suggests that it will add value to the property.

Motion: Motion made by Council President Morten and seconded by Councilor Chilton to approve the Planned Development (Zoning Overlay) as recommended by Planning Commission. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

APPROVE AND/OR AUTHORIZE FOR SIGNATURE

2. Second Amendment to Agreement with Otak for S. 1st and Strand Streets Road and Utility Extensions Project
3. Revocable License Agreement with Soltronox LLC for ATM Located on City Property at 277 Strand Street
4. Intergovernmental Agreement to Transfer Tax Increment Revenues of the St. Helens Urban Renewal Area to the City of St. Helens to Pay a Special Public Works Fund Loan
5. Amendment No. 1 to IGA with State of Oregon for Disposal of Surplus Vehicles, Heavy Equipment, Titled Trailers, & Watercraft
6. Agreement with Western Display Fireworks for 4th of July Fireworks

Motion: Motion made by Council President Morten and seconded by Councilor Topaz to approve '2' through '6' above.

Discussion.

Councilor Chilton pointed out that it looks like the fireworks will be set off from a barge. Mayor Scholl confirmed that Wilsonville Concrete Products has offered to barge them in. They will be loaded at Even Construction. It frees up the entire island and brings the show closer to the citizens.

Vote: Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

CONSENT AGENDA FOR ACCEPTANCE

7. Parks & Trails Commission Minutes dated January 10, 2022
8. Parks & Recreation Commission Minutes dated February 7, 2022

Motion: Motion made by Councilor Birkle and seconded by Councilor Chilton to approve '7' and '8' above. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

CONSENT AGENDA FOR APPROVAL

9. South County Leadership Collaborative Special Session Minutes dated March 3, 2022
10. OLCC Licenses
11. Accounts Payable Bill Lists

Motion: Motion made by Councilor Chilton and seconded by Councilor Topaz to approve '9' through '11' above. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

WORK SESSION ACTION ITEMS

Initiation of Public Right-of-Way Vacation

Motion: Motion made by Council President Morten and seconded by Councilor Topaz to initiate public right-of-way vacation proceedings pursuant to ORS 271.130 to vacate two street segments: The entire 7th Street right-of-way of the South St. Helens addition to St. Helens, Oregon, lying northeast of the Kaster Road right-of-way; and the extension of the S. 16th Street right-of-way, lying south of the East Street right-of-way within the St. Helens Subdivision, St. Helens, Columbia County, Oregon, as dedicated by Columbia County Deed Book 272, Page 970."

Mayor Scholl clarified that this is not the normal 7th Street. It's across from Johnny's Tavern.

Vote: Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

Water Leak Adjustment

Mayor Scholl reported that the line cracked right at the cup link. Staff recommends adjusting it to the normal rate. It exceeded the dollar amount allowed by staff.

Motion: Motion made by Mayor Scholl and seconded by Councilor Topaz to adjust the bill down to the normal rate. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

Tram

Motion: Motion made by Mayor Scholl and seconded by Councilor Birkle to register the tram with DMV as a slow-moving vehicle and obtain the needed insurance coverage.

Discussion.

Councilor Topaz asked for the definition of a slow-moving vehicle. Mayor Scholl said it goes about 15 MPH. It's probably for insurance and liability purposes. Event Coordinator Tina Curry added that it will have a license plate.

Vote: Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

Sanitary Sewer Deficiency & Development Guidance

Mayor Scholl spoke of the sewer line capacity not being able to handle future growth. The last Sewer Master Plan was done in 1989. They are now trying to remedy a $10-15 million upgrade to meet future capacity needs. There was discussion during the work session about an in-leu-of fee, which Steve Donovan recommended they consult with an attorney about. Graichen reviewed the options:

- Do nothing;
- Delay/disallow development; or
- Create an impact fee-in-leu-of improvements as a condition of land use approval

Councilor Birkle asked if it's an option between raising System Development Charges (SDCs) or creating the fee-in-leu-of. Graichen said they have done both in limited respects as it pertains to transportation. It's a question of whether Council wants staff to do that. If they do, they're relying fully on SDCs and utility rates to make up for deficiencies. It's always subject to challenge.

Councilor Chilton wants to make sure the money is saved to fix the problem. Graichen said they would work with Finance to make sure it's allocated for only that project. Mayor Scholl said it's not just a $15 million project. He talked about all the future development that will potentially be catastrophic to the system if they do nothing.

Councilor Topaz said they have a problem and need to determine how to pay for it. Mayor Scholl added that it needs to pay for itself. Their predecessors should have taken care of this years ago. Now they must fix it. SDC rates are low compared to other cities. He has a piece of property to develop and will probably have to pay them.

Graichen asked if anyone is in favor of delaying or halting development. No Council members were in favor of that option.

Graichen asked if they want to do nothing and allow SDCs and user rates to take care of it? No response.

Graichen asked if staff should consider impact fees in-leu-of, as a condition of land use approval? Mayor Scholl is in favor of that. They can't use SDCs for existing infrastructure. Councilor Chilton is in favor of an in-lee-of fee if they track the money to fix the problems. Mayor Scholl emphasized the need to justify the fee.

Councilor Topaz asked if there are any other ways to raise money for the project. Walsh said they are looking for grants. Graichen added that there are also DEQ loans. Mayor Scholl wants to be proactive at pushing sewer towards Scappoose. Councilor Topaz suggested that unincorporated areas pay a higher rate to help pay for it.

Motion: Motion made by Mayor Scholl and seconded by Council President Morten to direct staff to figure out an in-leu-of fee, talk to legal counsel, and present their recommendation to Council. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

COUNCIL MEMBER REPORTS

Council President Morten reported...

- Lynn Chiotti requested a replacement for Sue Nelson on the Traffic Safety Commission. He will get more information from Lynn.
- Toured the new Food Bank. It's a wonderful, upscale renovation. It should be open to the public in June.
- He found out today that there is already a Parks Master Plan in place, which Steve Donovan was very impressed with. Associate Planner Jenny Dimsho helped create it when she was part of the RARE AmeriCorps Program. It's a sustainable document that staff can make amendments to for

now. It is available to view on the City's website or can be requested in paper form. Most of the urban trail will be handled by Public Works since it's in the public right-of-way.

Councilor Topaz reported...

- The mayor talked about advertising and patting themselves on the back. He recently heard on the radio that Intel is going to hurt four counties because of what it's doing. Columbia County was not mentioned as one of those. They need to figure out how to get in that loop because it does affect them.
- Sauvie Island did a study and found that mercury is a new problem in the Multnomah Channel. Since they can pump water out of the Channel and sell it for irrigation, do they have a good water analysis? The EPA is aware of the findings. It mainly involved farmland.
- The City's legal group is in the appeal process about the cost of litigation with Boise Cascade because of the sale of marijuana. How much money has the City spent on legal fees and other expenses for the marijuana property? And how much money have they received in rent?
- If the next pandemic comes through, do they have a plan or will they be told what to do by the State?
- Tourism should be advertising the good fishing on the river right now. Mayor Scholl requested Event Coordinator bring back the salmon dome and story.
- Received a survey for Broadband from Deputy City Administrator Matt Brown. When did his title change? Walsh noticed it as well.

Councilor Chilton reported...

- Softball and baseball are underway. She has been spending a lot of time at the fields.
- Recently visited the Botanical Gardens for a nature walk with her kid. It was beautiful.
- Attended the LEPC meeting with the County, which is the law enforcement commission for the County. It includes judges and representatives from the DA's office, police departments, and Sheriff's Office. She is looking forward to being more involved.
- Judge Grove will be retiring at the end of the month. He's been a huge supporter of all people in the community. She hopes to see people come together and wish him well. His retirement party is April 29 in Columbia View Park.
- They continue to work on the Riverfront Development. She is excited about the proposals and seeing ideas come to life.
- Budget discussions are coming up. She is open to conversations and answering questions from community members. She recommends people go back and listen to the work session to hear about the problems with sewer, stormwater, and water. She appreciates the presentations and transparency.

Councilor Birkle reported...

- He talked about the need for financing maintenance and upgrades to sewer, stormwater, and water. This is all based on master plans that were completed recently and available for review. Executive summaries for each help explain the need. They can't put this off if they want to continue to have a high quality of life and protect the safety and health of the environment and citizens.
- Spent spring break visiting their daughter in New York City. It was a wonderful experience, but he was happy to be back in Columbia County. He will share some ideas he gleaned there.
- Will continue to participate in the CERT training. He has received great information about the importance of being prepared for natural disasters or other threats. He won't be able to attend the Boards and Commissions Reception because of a training that night.
- Attended the St. Helens High School groundbreaking. He spoke with architects, developers, and construction people. They all had great things to say about Planning and Building Division staff.

He is very appreciative of the work the City is doing to help them move forward. They can be proud of the new high school.
- He joined a couple work parties at Nob Hill Nature Park. Over 50 volunteers participated. It was good to see a mix of ages.

Councilor Topaz reported…
- He mentioned a request to find out what costs have been incurred to sell the property. Can they make a request to Finance Director Brown to generate a report of costs since 2017? Mayor Scholl will try to get a ballpark.

Council President Morten reported…
- Thanked Councilor Birkle for reporting on Nob Hill Nature Park.
- Attended a two-day Diversity, Equity, and Inclusion (DEI) training. It focused on serving everyone responsibly. Equal means that everyone gets the same; equity means that there are adjustments made so everyone has the same opportunity. It was one of the best workshops he has attended.

MAYOR SCHOLL REPORTS
- Nice to see the "If I Were Mayor…" Student Contest participants here. Congratulations to all of them. He looks forward to having lunch with them.
- Citizens Day in the Park, June 25, 2022, 11 a.m. – 2 p.m., McCormick Park
    - Requested assistance from Council to help solicitate donations from businesses. Distributed a spreadsheet with business names and letters of request for each.
    - Encouraged organizations and businesses to participate as a vendor. There are no fees to participate.
    - Sunshine Pizza will do all the barbecuing.
    - The Decades will perform.
    - Highway 30 Cruisers is hosting a car show.
- There is not a lot of fish.
- It was an eye opener today about the work needing to be done with water, sewer, and stormwater. They'll get through it. They must make the repairs or will be fined by DEQ.
- He loves this time of year. It's busy with his landscape business, being mayor, and trying to fish.
- There are serious issues to tackle. It's vitally important to be able to explain funding mechanisms to the public.
- Two RFQs were submitted for the Riverfront Development project.

OTHER BUSINESS

ADJOURN – 8:32 p.m.

Respectfully submitted by Lisa Scholl, Deputy City Recorder.

ATTEST:

Kathy Payne, City Recorder

Rick Scholl, Mayor

City of St. Helens
CITY COUNCIL

Executive Session Summary **April 18, 2022**

Members Present: Rick Scholl, Mayor
Doug Morten, Council President
Patrick Birkle, Councilor
Stephen R. Topaz, Councilor
Jessica Chilton, Councilor (via Zoom)

Staff Present: John Walsh, City Administrator
Kathy Payne, City Recorder

◆

At 5:00 p.m., Mayor Scholl opened the Executive Session pursuant to the ORS numbers listed below and then gave Council roll call. Representatives of the news media and designated staff shall be allowed to attend the executive session. All other members of the audience are asked to leave the room. Representatives of the news media were specifically directed not to report on or otherwise disclose any of the deliberations or anything said about these subjects during the executive session, except to state the general subject of the session as previously announced. No decision may be made in executive session. Any person in attendance, including the news media, who has a recording device is directed to turn it off.

- **Consider Employment of a Public Officer,** under **ORS 192.660(2)(a)**
    - The Council interviewed two finalists for the Library Director position.

The Executive Session was adjourned at 7:35 p.m.

◆

ATTEST:

Kathy Payne, City Recorder

Rick Scholl, Mayor

COUNCIL WORK SESSION

Wednesday, April 20, 2022

DRAFT MINUTES

MEMBERS PRESENT
Mayor Rick Scholl
Council President Doug Morten
Councilor Patrick Birkle (1:04 p.m.)
Councilor Stephen R. Topaz
Councilor Jessica Chilton

STAFF PRESENT
Kathy Payne, City Recorder
Lisa Scholl, Deputy City Recorder
Jacob Graichen, City Planner
Jenny Dimsho, Associate Planner
Mouhamad Zaher, Public Work Director
Sharon Darroux, Engineering Manager
Dave Elder, Public Works Supervisor
Buck Tupper, Facility Maintenance Supervisor
Aaron Kunders, Water Quality Manager
Crystal King, Communications Officer
Bill Monahan, City Attorney
Tina Curry, Event Coordinator

OTHERS
Paige Diaz, CASA
Jazmin, CASA
Jacqueline Curry, CASA
Karin Miller, CASA
Paul Vogel
Lynne Pettit
Robert Brawand
Amy Bynum
Kevin Wick

CALL WORK SESSION TO ORDER – 1 p.m.

VISITOR COMMENTS - *Limited to five (5) minutes per speaker*

- Tina Curry, Event Coordinator. In attendance via Zoom to give a report.
  - She placed information in the Council's boxes regarding the proposed purchase of a boat. She will be attending tonight's meeting to answer any questions about it.
  - Congratulated Public Works Director Mouhamad Zaher on earning the Certificated Public Works Professional – Management (CPWP-M) designation from the American Public Works Association (APWA).
  - Getting the tram ready. It will be going to the City's Joint Maintenance Facility and Lively Automotive for an inspection. It has a great braking system on it. Anyone driving it will be trained properly.

Mayor Scholl thanked Curry for her report. They will discuss it tonight.

DISCUSSION TOPICS

1. Employee Length of Service Recognition - Officers Hartless & Boswell (5 Years)

Mayor Scholl congratulated Officers Hartless and Boswell and thanked them for their service. They were not able to attend in person.

2. Presentation from CASA for Children - *Paige Diaz, CASA Supervisor*

CASA Supervisor Paige Diaz reviewed her presentation. A copy is included in the archive packet for this meeting.

- Court Appointed Special Advocate
- Trained volunteers representing foster care children in Court
- Doing a pilot project for Columbia County to appoint a CASA to every case
- Children generally do better with birth families, so they do everything they can to keep them together if it's a safe, stable home
- Reviewed expectations
- Trainings for new volunteers will take place in May and June

Council President Morten sat on the CASA Board years ago. It was a rewarding experience. How many volunteers do they have now? Paige said they have 50 right now with active cases. They will be training four in May. She was an advocate before becoming a supervisor.

Council President Morten asked if there are community fundraisers. Paige said there is a development team in Portland. They do not have any development opportunities in Columbia County right now.

Councilor Birkle is glad to hear the report. He was one of the first CASA volunteers 25 years ago. At that time, the Boys and Girls Aid Society in Portland ran it. Jan Kenna, at Columbia County Children and Family Commission, had a desire to bring an independent CASA program to Columbia County. Birkle wrote a grant and became the first director of an independent Columbia County CASA program. He later became a full-time teacher and passed that position on. Years later, he joined the CASA Board. There was a significant turnover of Board members. It was difficult to maintain an independent program. To hear they have 50 volunteers is incredible. It is a wonderful service provided. They will do everything possible to promote the program. He hopes they can also do something official with communications to promote awareness. It is exciting to see what they are doing.

Paige thanked Council for their support.

Councilor Chilton appreciates their work. She sees it through her job at CCMH.

Mayor Scholl referred to the County's pilot project to appoint a CASA to every case. What triggers CASA's involvement? Paige explained that CASAs were previously assigned to only more difficult cases. Mayor Scholl asked if DHS is also involved? Paige said DHS looks out for their best interest, but they do not have a legal statute like a CASA. Jacqueline Curry added that the CASA is dedicated to that one child. DHS has multiple kids. Paige said CASAs having a long-lasting impact on kids. These kids are the future of the community. It is very fulfilling work.

3. Enterprise Zone Sponsor Request regarding Control Solutions Inc. - *Paul Vogel, CET Executive Director*

Paul Vogel introduced Kevin Wick, president of Control Solutions. Paul introduced Kevin and reviewed their request. A copy is included in the archive packet for this meeting. Control Solutions recently expanded and built a new building. They applied for and qualified for Enterprise Zone benefits. They met the wage threshold, increased employment by 30%, signed the WorkSource Hiring Agreement, and purchased equipment. They make data loggers for monitoring vaccines. A lot of competitors came out during the pandemic. Kevin diversified and is providing his product to museums, farm to table, and other temperature-controlled applications. Kevin is requesting a two-year Enterprise Zone extension to assist with cash-flow, marketing, and growth as he moves into the other sectors. CET supports the request.

Mayor Scholl is glad to see the business expand. It is a tough industry, but they found a way to overcome it.

Kevin explained that they are looking to grow the business more. Their facility is on Industrial Way. The data logger is a digital device that takes a date, time, and temperature recording and stores it in a format that is downloadable. If there are any temperature excursions or power outages, they have devices that will send an alert. The device can be used for anything that is temperature sensitive.

Councilor Chilton asked what problems cause the need for the extension. Kevin said they had huge supply chain issues and a lot of backlog. With more competitors now, they need to diversify.

Council President Morten is glad they found a place and are here. The founder had a lot of problems finding a facility to create these products six years ago.

Councilor Topaz asked what the life of the device is. Kevin said the devices last about two to five years. The batteries last about a year and a half. He talked about increased regulations for temperature monitoring.

Councilor Birkle is excited to see this business here and ready to expand.

This is on tonight's agenda for approval.

4. Planning Division Semi-Annual Report - *Jacob Graichen, City Planner*

City Planner Jacob Graichen and Associate Planner & Community Development Project Manager Jenny Dimsho reviewed their report. A copy is included in the archive packet for this meeting.

Dimsho reviewed updates for the following:

- St. Helens Industrial Business Park
- Riverwalk Phase I update
- Bennet Building Front Façade Phase II
- Community Development Block Grant (CDBG) Columbia Pacific Food Bank Relocation

Councilor Topaz pointed out that water is getting into the Food Bank building. Dimsho said that JH Kelly is installing a private french drain to fix the problem with water getting into the building. However, it will not fix the water ponding in the right-of-way. That is a deficiency of public infrastructure.

Mayor Scholl has been talking to Dimsho about the Alano Club building adjacent to the 6th Street Ballfield. It meets a lot of the criteria for CDBG funding.

- Additional projects she provided support for
    - Business Oregon Special Public Works Loan Program
    - Oregon State Marine Board Technical Assistance
    - Oregon Parks & Recreation Local Government Grant
    - Oregon Watershed Enhancement Board
    - ODOT Safe Routes to School
    - Marshall Street/US 30 Closure
    - Riverfront Redevelopment Request for Qualifications
    - Urban Renewal Agency

Councilor Topaz asked how much of Dimsho's work could be done by a secretary. Dimsho said Community Development Administrative Assistant Christina Sullivan does all the Planning notices and minutes now. Councilor Topaz does not want to see her abused and overworked. Graichen pointed out that Dimsho is a represented employee and is not abused. Dimsho does anticipate another Planner as Urban Renewal grows. Mayor Scholl said she is doing both Community Development and Planning. Councilor Birkle said they are actively looking at the need for assistance.

Graichen gave a Planning update

- Beekeeping amendments

- Broadleaf Arbor event was occurring around the time of the last report. Construction is backed up about two months because of the basalt.
- Planning Commission recruitment
- Aerial photos are on schedule
- SDC assistance
- Discussion of additional parking near St. Helens Marina. Council President Morten suggested partnering with Brad Hendrickson to use the vacated area for parking. Would it be private or public parking? Mayor Scholl said it would remain public. There are already six parking spots in there that are open to the public.
- Reviewed code enforcement issues

Current Planning Update

- Kervin's Custom Ironworks on Old Portland Road
- Elk Ridge Subdivision
- Four lot commercial subdivision near Commons Drive
    - Received an application for Burger King
- Comstock property submitted their subdivision application
- N. 8th Street subdivision
- High School renovations
- Public Safety Facility planning
- Two more potential subdivisions
- GIS is a priority

Mayor Scholl asked about the Millard Road property. Dimsho said it is in Walsh's realm right now. They are in negotiations. It has taken a back burner with the Waterfront property.

Councilor Topaz said he was at a Port of Portland restoration project meeting, and it brought something to his attention about the St. Helens Industrial Business Park. It shows property outlines for industrial use. When do they go through the partition process? He knows they did not go through that process when they put in the marijuana facility. The judge said the sale of the marijuana place is null and void. DEQ is working with Boise to cap the in-water of the mill. That blocks off the whole mill, which would change the value of the property. There was a presentation about water and sewer lines at the last Council meeting. There were maps about earthquakes and landslides. The whole front of the mill is a liquification zone, which would also affect the DEQ capping the contaminated water. Has any of that been considered? Mayor Scholl said they already did the parcelization as a Council. They had surveyors out there, ODOT rail for an easement, and parcelization for ACSP. Office Max started the work with DEQ to cap the in-water part, but the City stopped it. Now it is being revisited. They have been awarded additional funding to further explore the in-water piece. A lot of what Councilor Topaz is saying is yet to be determined, but he makes it sounds like the truth. Councilor Topaz asked if there was a public meeting for the parcelization? Mayor Scholl said yes. Councilor Topaz repeated the judge's ruling. Mayor Scholl pointed out that neither he nor Topaz are attorneys or engineers.

Graichen said the parcelization plan is a guide. Some of the parcels are legal lots of records. Some are conceptual and would have to be created by a land division process as part of that phase.

Mayor Scholl said Councilor Topaz is making Council look incompetent. Councilor Topaz pointed out that he is an Engineer and the State of Oregon had to admit that.

Councilor Birkle wants the citizens to know there is a conceptual framework. There is a process to follow State law and Municipal Code before they put a shovel in the ground. Councilor Topaz is correct, things have not been finalized, but they have not made final decisions on specific properties and development. Mayor Scholl agreed that they always follow their own rules.

Mayor Scholl acknowledged the great presentation. He does not know it all and relies on staff.

5. Public Works Department Semi-Annual Report - *Mouhamad Zaher, Director*

Public Works Director Mouhamad Zaher presented the Public Works report. A copy is included in the archive packet for this meeting.

Mayor Scholl congratulated Zaher on earning the CPWP-M designation from APWA. Only 90 people in the US have received it.

Zaher and Water Quality Manager Aaron Kunders reviewed the Water Quality Division report.

- The benefits of having the Water Filtration Facility (WFF) and Wastewater Treatment Plant (WWTP) are already paying off
  - Both facilities use the same chemicals
  - Chemical pumps that work at both locations
- SCADA upgrade
- Membrane replacement
- Move disinfection system
- Headworks screen rebuild

Zaher reported that National Public Works Week is in May. They will do their best to share videos with the community about all the divisions.

Zaher and Facilities Maintenance Supervisor Buck Tupper reviewed the Facilities and Joint Maintenance report.

- Relocated to the Stimson building
- Maintains City facilities, vehicles, and equipment
- Over 300 work requests since the inception of the PW maintenance service request system. No injuries or accidents during that time.
- Add the tram to the maintenance schedule
- Reviewed completed projects
- Money is being saved by doing work in-house
- Reviewed Fleet maintenance vehicles

Zaher and Public Works Supervisor Dave Elder reviewed the Public Works Operations report.

- Reviewed staff members. Best crew Elder has worked with in the 28 years he has been here.
- Extensive training
- Infrastructure maintenance
- Partnerships with multiple local and State agencies
- Crews take pride in all projects
- Ashwood storm ditch improvements
- Work is often behind the scenes
- Received an award for Outstanding Performers in the State of Oregon
- Reviewed projects
- Assists with tourism and event set-up
- Reviewed upcoming projects that can be done in-house to save the City money

Council acknowledged the good leadership and service.

Zaher and Engineering Manager Sharon Darroux reviewed the Engineering Division report.

- Project design, management, and construction inspection
- Planning and improving the City infrastructure through master planning
- Right-of-way permits
- Private development plan review
- Public infrastructure permits

- Blasting permits
- As-Built Drawings and GIS map requests
- Utility Coordination Meetings
- Reporting (road mileage, etc.)
- Support other departments
- Three full-time employees
- Proposing a fee increase to cover costs. Fees were last updated in 2003.
- Reviewed goals accomplished over the last year
- Cross-training to increase efficiency and customer service
- Updated webpage to make it more user-friendly
- Reviewed project highlights
- Reviewed upcoming projects

City Water System

- Reviewed the current water system leakage and work being done to reduce leakage
    - Ultrasonic technology
    - Reviewed benefits to remote reading
    - Costs of new deployment
        - AMI System $905,640 for half deployment
        - AMI system $1,535,526 for full deployment

Department Promotions

- Engineering Division Manager Sharon Darroux
- Water Quality Manager Aaron Kunders
- Facilities & Joint Maintenance Supervisor Buck Tupper
- Field & Safety Supervisor Ethan Stirling

Thank you from all the Public Works family.

Council President Morten thanked Zaher for the good report.

Councilor Topaz thanked Zaher for keeping the roads and rights-of-way clean.

Councilor Chilton asked which divisions will implement internship programs. Zaher responded that the plan is to begin with Engineering and Water Quality.

Mayor Scholl acknowledged that it starts from top and filters down to the crews. It was a great presentation and good leaders. It makes a big difference. There has been a dramatic change in Public Works. They are appreciated. He requested Tupper prepare the 1929 truck for the parade.

6. Discuss Appointing someone to Traffic Safety Committee - *Council President Morten*

Council President Morten received a request from Lynn Chiotti to replace Sue Nelson's position on the Traffic Safety Commission. It is a County advisory board of about 15 people. Zaher recommends appointing Engineer II Alex Bird, who has a PE in Transportation, and is up to date on every project.

ADJOURN – 4:16 p.m.

Respectfully submitted by Lisa Scholl, Deputy City Recorder.

ATTEST:

Kathy Payne, City Recorder

Rick Scholl, Mayor

COUNCIL REGULAR SESSION

Wednesday, April 20, 2022

DRAFT MINUTES

MEMBERS PRESENT
Mayor Rick Scholl
Council President Doug Morten
Councilor Patrick Birkle
Councilor Stephen R. Topaz
Councilor Jessica Chilton

STAFF PRESENT
Kathy Payne, City Recorder
Lisa Scholl, Deputy City Recorder
Matt Brown, Finance Director
Tina Curry, Event Coordinator

OTHERS
Jane Garcia
Brady Preheim
Chris Cannard

CALL REGULAR SESSION TO ORDER – 7 p.m.

PLEDGE OF ALLEGIANCE

VISITOR COMMENTS – *Limited to five (5) minutes per speaker*

- Tina Curry. Council received information and pictures of a tourism boat in their boxes. The timing to purchase it is critical because everything must be replaced on the boat, and it needs to be here by August. They are going to make the boat front-loading, so they do not have to have a dock. That will allow them to have Audubon tours, kayak tours, etc. She would also like it so the seats can be removable. Not needing a dock would allow them to expedite transports. They already have a licensed captain in mind. He is usually in Alaska during that time on a commercial boat that does guest tours. The person selling the boat owns Barge Works. They have had multiple people looking at. It is tough to find what they need.

Mayor Scholl likes the idea of it because they live on the river. It is a 30-passenger boat and two crew.

Councilor Chilton asked if this will be used for Sand Island camping transportation. Curry said yes, and for the Sandcastle competition. They could charge a minimal fee if there is a COI.

Council President Morten asked about Brad Hendrickson building yurts on the Island. Curry spoke with Brad, and he wants to complete the guest gathering space for the yacht club. He is opened to having more substantial dwellings. It takes time and money to do it. Brad would give them a boat slip if they need it.

Councilor Topaz asked if Brad's boat will still be operational. Curry said yes. This would be separate. She does not want it to just be a camping boat, but it could be used during busy event weekends.

Mayor Scholl talked about how busy it gets on the Island.

Councilor Birkle asked if the price is firm at $250,000. Curry said yes, it will not go over that. It includes the delivery and trailer. Councilor Birkle asked if they need to go through the same public hearing process as when they purchased the tram. Mayor Scholl said they could do that with a special meeting. It is time sensitive. Councilor Birkle also sees it as a resource during an emergency. Local bridges will come down during the Cascadia earthquake and they will be isolated.

Councilor Chilton is impressed with the proposal. It includes the cost, need, process, and the potential revenue.

Council President Morten talked about it giving citizens more access to the river. The river is a major asset to the city. Already having a certified pilot is an asset. The craft is made of aluminum and will be around for at least 40 years. You would only need to maintain the engine. It is a great opportunity. He appreciates the thorough proposal. The only negative thing is the time needed to make a decision.

Councilor Topaz listed some advantages of purchasing the boat:

- Army Corps of Engineers could take over the vessel in the event of a disaster to assist with aid in the community.
- Use it for tourism sight-seeing.
- Rent it as a source of revenue.

Mayor Scholl said they need to determine if a public hearing is needed. It can be added to the next agenda. Tina said her company could buy it and sell it to the City for $1.

Councilor Chilton asked who would maintain the boat. Mayor Scholl said it would be maintained by the City's mechanics.

Council President Morten thanked Curry for coming. Everything she touches turns to gold.

- Brady Preheim. He is requesting Council deny Resolution No. 1949. Control Solutions makes equipment for monitoring vaccines, which made a lot of money during the pandemic. It is embarrassing to ask the City for money when they have had record profits. They do not need the money nor the two-year abatement. They are doing well. The boat sounds like a great idea. He does not know if a public meeting is needed, but it does not seem like it since they did not do one for building a new police station.

Councilor Chilton recommended Brady listen to the work session. The business owner was in attendance with CET. Council had some of the same questions that Brady brought up. Council President Morten met the founder of the company. It had nothing to do with vaccines at that time. It was food temperatures for products coming here. It is a sound company.

Councilor Topaz showed Mayor Scholl a copy of his Professional Engineering license stamp from Maryland. He is a real Engineer with a license. It is not active right now because he has not paid this year's dues. He also showed a copy of his degree in Mechanical Engineering from Purdue University. Mayor Scholl pointed out that his Engineering degree is in Mechanical, which is different than Geological Engineering, but he recognizes the Professional Engineering license. He appreciates Councilor Topaz bringing these documents in.

ORDINANCES – *First Reading*

1. **Ordinance No. 3282:** An Ordinance to Amend the City of St. Helens Zoning District Map to Add a Planned Development Overlay Zone for Certain Property Generally Located at the Northern Termini of N. 8th, 9th, and 10th Streets North of Deer Island Road

Mayor Scholl read Ordinance No. 3282 by title. The final reading will be held at the next meeting.

RESOLUTIONS

2. **Resolution No. 1949:** A Resolution of the St. Helens City Council Authorizing Extended Enterprise Zone Benefits for a Fourth and Fifth Year to Control Solutions, Inc., Located in the South Columbia County Enterprise Zone

Mayor Scholl read Resolution No. 1949 by title. **Motion:** Motion made by Councilor Birkle and seconded by Councilor Chilton to adopt Resolution No. 1949.

Discussion.

Mayor Scholl explained that Kevin Wick and Paul Vogel were here this afternoon to talk about the request. There was a huge demand for the product at the beginning of the pandemic, but other companies flooded the market during that time. They have had to expand and go back to temperature monitoring devices for food. They met all the criteria to extend the Enterprise Zone benefits.

Vote: Yea: Mayor Scholl, Councilor Birkle, Councilor Topaz, Councilor Chilton; Abstained: Council President Morten because he knows the owner

APPROVE AND/OR AUTHORIZE FOR SIGNATURE

3. Amendment No. 1 to Safe Routes to School Program Grant Agreement with ODOT for Columbia Blvd. Sidewalk and Crosswalk Project
4. Extension No. 2 to Agreement with Columbia Pacific Economic Development District for Grant Administration for Columbia Pacific Food Bank Project
5. Public Right-of-Way Dedication for Barr Avenue Access for Comstock Property

Motion: Motion made by Council President Morten and seconded by Councilor Topaz to approve '3' through '5' above. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

CONSENT AGENDA FOR ACCEPTANCE

6. Library Board Minutes dated January 18, 2022
7. Parks & Recreation Commission Minutes dated March 14, 2022
8. Planning Commission Minutes dated March 8, 2022

Motion: Motion made by Councilor Chilton and seconded by Councilor Birkle to approve '6' through '8' above. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

CONSENT AGENDA FOR APPROVAL

9. Council Work Session, Executive Session, and Regular Session Minutes dated March 16, 2022 and Joint City Council/Planning Commission Minutes dated March 16, 2022
10. Animal Facility Licenses
11. OLCC Licenses
12. Accounts Payable Bill Lists

Motion: Motion made by Councilor Chilton and seconded by Council President Morten to approve '9' through '12' above. **Vote:** Yea: Mayor Scholl, Council President Morten, Councilor Birkle, Councilor Topaz, Councilor Chilton

WORK SESSION ACTION ITEMS

None

COUNCIL MEMBER REPORTS

Council President Morten reported...

- Participated in a two-day Diversity, Equity, and Inclusion (DEI) workshop. He grew a lot from it. It was a wonderful opportunity to go through it as a teacher and coach. He encouraged Council to take the workshop.
- The Parks & Recreation Commission had interviews to fill a vacant position. The two applicants were very close with the new point system. He spoke to the Chair about the interviews, and they decided the person with the highest score will be recommended for appointment.

Councilor Topaz reported...

- Library Director interviews were conducted on Monday. Both candidates were excellent.
- Suzanne Bonamici visited the Makerspace on Tuesday. She was very knowledgeable about what it offers and the value it brings to the community. Library Technician Allen Hansen led a very good presentation. They have exceeded expected growth by three times. Suzanne wanted to make sure we have a good communications system so everyone knows about it. Some people are even using it for business purposes.
- At the last Council meeting, they talked about fees paid to the attorney regarding the marijuana facility. Since City Administrator Walsh is not here, they can add it to the next agenda for discussion.

Councilor Chilton reported...

- She has been enjoying the parks a lot lately. There is a need for benches at McCormick Park.
- Concrete was poured in the Campbell Park dugouts. It is a huge improvement for the softball teams.
- She has been attending public forums and meeting the people running for various positions.
- Library Director interviews were conducted.
- Recently made garden gnomes at the Library Makerspace. Her kids love it there.
- She is looking forward to the upcoming Budget meeting in May. She will be reviewing the binder and researching information prior to the meeting.
- She is excited about the Riverfront RFQ presentations.

Councilor Birkle reported...

- He participated in the Nob Hill work party. It was a tremendous turnout.
- There are wildflowers everywhere around town.
- Sees potential for ecotourism with the boat and hiking.
- Had a nice meeting with the County District Attorney. He is a great asset to the community. He thinks highly of our Police Department.
- Attended the St. Helens School District Family Resource Center grand opening. They use the space that previously housed Plymouth High School.
- Have received one application for a vacant position on the Planning Commission. He encouraged community members to consider applying. Exciting times are ahead.
- Tomorrow is the Community Emergency Response Team (CERT) final test simulation at the Lee Broadbent Training Center. There will be three scenarios with different tragedies through which they will rotate. It has given him a greater appreciation of first responders. The CERT training is part of the reason he sees the boat as being an asset to the community. They will have to pull together as a community. They will not be getting help immediately from the metro area or State. He recommends everyone participate in the training.

Councilor Topaz reported...

- There are multiple groups in town who need help outside of normal methods. The community does well with that, especially the need for volunteers.

- There is a big puddle outside the Food Bank that will be investigated. As soon as they get their Certificate of Occupancy, it will become a busy place.

MAYOR SCHOLL REPORTS

- Met with Chief Medina of Columbia River Fire & Rescue. He will be inviting him to Council to introduce himself and give a presentation.
- Congratulated Public Works Director Zaher on earning the Certified Public Works Professional – Management (CPWP-M) designation from American Public Works Association (APWA). Only 90 people in the US have received it. Today's presentation was phenomenal. Public Works has a good crew.
- He and Walsh met with Mike Sykes from Columbia River PUD and Russ Hubbard, the new PUD liaison, as well as Craig Melton and Chris Iverson. They discussed the recent SWAT and the Port's inventory of lands, and how best to promote those properties. They have a lot to offer businesses in the area.
- Planning Division is doing a phenomenal job.
- He is looking forward to the Boards & Commissions annual reception. He appreciates everyone, even if they cannot be there. It is a lot of work and collaboration.
- He is proud of the progress they continue to make.
- Library Director interviews went well. The library is very important with good stuff happening.

Council President Morten asked if the State will be involved in the meetings with other jurisdictions. Mayor Scholl said he was talking about a SWAT follow-up meeting. Usually, State representatives attend the City County Quarterly Dinners, which they are trying to bring back. They may be able to use the Community Center.

Councilor Topaz was at the Spotlight office on Friday. It is only open on Fridays, 9 a.m. – 4 p.m. The connecting point at this end of the County does not exist anymore.

- Lot of good things are happening on the Council and sometimes it's thankless.

OTHER BUSINESS

ADJOURN – 7:59 p.m.

Respectfully submitted by Lisa Scholl, Deputy City Recorder.

ATTEST:

Kathy Payne, City Recorder

Rick Scholl, Mayor

St. Helens Public Library

April 2022

From: Brenda Herren-Kenaga, Interim Library Director

To: The Mayor and Members of the City Council

Subject: Declare Surplus Library Equipment

The St. Helens Public Library requests that the following list of items be declared surplus and that we are authorized to dispose of the property through sale, donation, or discard.

Quantity	Brand or further description	Model number, if known	Serial number, if known	Working condition
3	Individual-use computer desk	n/a	n/a	used
3	Metal file cabinet	n/a	n/a	used
45	Plastic magazine holders	n/a	n/a	used
1 box	Plastic magazine covers	n/a	n/a	used
1	Radio/CD player	n/a	n/a	used
Approx 25	CD binder pages	n/a	n/a	used
12	Plexi holders 8x10	n/a	n/a	used
1	Wooden magazine display shelf	n/a	n/a	used
1	Long table	n/a	n/a	used, wobbles (by over an inch)
20	Wood chairs, blue upholstery	n/a	n/a	used, vintage 1996
1	Wooden chair with arms	n/a	n/a	used

St. Helens, OR

Expense Approval Register

Packet: APPKT00521 - AP 4.8.2022

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
Fund: 100 - GENERAL FUND					
RUBENS LAWN SERVICE	0004745	04/10/2022	MONTHLY LAWN SERVICE	100-705-52023	80.00
STOP STICK LT	0024250-IN	04/10/2022	STOP STICK TRAINING KIT	100-705-52001	308.00
WILCOX	069533-IN	04/10/2022	FUEL PARKS DEPT	100-708-52022	1,302.56
HUDSON GARBAGE SERVICE	11958611S046	04/10/2022	1554- TRASH PUBLIC LIBRARY	100-706-52003	80.93
HUDSON GARBAGE SERVICE	11958830S046	04/10/2022	7539- TRASH CITY HALL 265 ST...	100-715-52023	118.68
HUDSON GARBAGE SERVICE	11958831S046	04/10/2022	2046-1287547 - POLICE GARB...	100-705-52023	108.30
HUDSON GARBAGE SERVICE	11958833S046	04/10/2022	7598- TRASH MCCORMICK ARK	100-708-52023	474.71
HUDSON GARBAGE SERVICE	11958834S046	04/10/2022	7636- TRASH COL VIEW PARK ...	100-708-52023	185.49
HUDSON GARBAGE SERVICE	11959180S046	04/10/2022	7056- TRASH REC CENTER OLD...	100-709-52023	29.74
HUDSON GARBAGE SERVICE	11959287S046	04/10/2022	5273- TRASH REC CENTER CH...	100-709-52023	70.55
HUDSON GARBAGE SERVICE	11959419S046	04/10/2022	3955-GODFREY PARK GARBAG...	100-708-52023	96.82
HUDSON GARBAGE SERVICE	11959785S046	04/10/2022	0892- PORTABLE TOILET 6TH S...	100-708-52023	48.41
SIERRA SPRINGS	21814586 040222	04/10/2022	WATER BOTTLED COURT / UB ...	100-715-52001	14.00
ORKIN	225355596	04/10/2022	1810 OLD PORTLAND RD PEST ...	100-709-52023	152.00
ORKIN	226501071	04/10/2022	265 STRAND PEST SERVICE CIT...	100-715-52023	97.00
ORKIN	226501886	04/10/2022	265 STRAND PEST SERVICE CIT...	100-715-52023	165.00
SCHOLASTIC INC	37362799	04/10/2022	SCHOLASTIC	100-706-52033	924.17
MIDWEST TAPE	501841656	04/10/2022	DVD / ABD 2000010011	100-706-52034	36.23
MIDWEST TAPE	501841657	04/10/2022	DVD / ABD 2000010011	100-706-52034	22.49
MIDWEST TAPE	501873708	04/10/2022	DVD / ABD 2000010011	100-706-52034	115.21
INGRAM LIBRARY SERVICES	58429472	04/10/2022	BOOKS 20C7921	100-706-52033	25.34
INGRAM LIBRARY SERVICES	58429474	04/10/2022	BOOKS 20C7921	100-706-52033	29.06
INGRAM LIBRARY SERVICES	58429475	04/10/2022	BOOKS 20C7921	100-706-52033	11.51
INGRAM LIBRARY SERVICES	58571877	04/10/2022	BOOKS 20C7921	100-706-52033	40.51
INGRAM LIBRARY SERVICES	58571878	04/10/2022	BOOKS 20C7921	100-706-52033	15.85
INGRAM LIBRARY SERVICES	58571879	04/10/2022	BOOKS 20C7921	100-706-52033	84.90
INGRAM LIBRARY SERVICES	58571880	04/10/2022	BOOKS 20C7921	100-706-52035	47.29
INGRAM LIBRARY SERVICES	58571881	04/10/2022	BOOKS 20C7921	100-706-52033	366.63
CINTAS	8405602524	04/10/2022	PARKS FIRST AID CABINET SER...	100-708-52001	128.97
NET ASSETS	95-202203	04/10/2022	ESCROW TITLE SERVICES	100-707-52019	652.00
DEPARTMENT OF TRANSPORT...	L0032896149	04/10/2022	DMV SERVICES ACCT 61018	100-702-52001	6.00
DEPARTMENT OF TRANSPORT...	L0032896149	04/10/2022	DMV SERVICES ACCT 61018	100-704-52019	8.80
CIS Trust	STH-GASB75-2020	04/10/2022	2020 GASB 75 VALUATION	100-707-52019	2,793.00
LAWRENCE COMPANY	14948	04/13/2022	UNEMPLOYMENT SERVICES	100-707-52019	100.00
FIFTH ASSEST INC	20220404-135720428	04/13/2022	22 IMPLEMENTATION CHARGE...	100-707-52019	8,775.00
AT&T MOBILITY	287302289330X03232022	04/13/2022	287302289330 POLICE PHONES	100-705-52010	3,327.42
DAHLGREN'S DO IT BEST BUIL...	3.25.2022	04/13/2022	BUILDING MATERIALS ACCT 1...	100-708-52001	1,264.79
DAHLGREN'S DO IT BEST BUIL...	3.25.2022	04/13/2022	BUILDING MATERIALS ACCT 1...	100-708-52001	147.79
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	100-705-52001	323.99
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	100-705-52001	43.02
MIDWEST TAPE	501841655	04/13/2022	DVD / ABD 2000010011	100-706-52034	124.22
MIDWEST TAPE	501841655	04/13/2022	DVD / ABD 2000010011	100-706-52035	318.90
MIDWEST TAPE	501873706	04/13/2022	DVD / ABD 2000010011	100-706-52034	184.95
MIDWEST TAPE	501873706	04/13/2022	DVD / ABD 2000010011	100-706-52035	281.86
INGRAM LIBRARY SERVICES	58429471	04/13/2022	BOOKS 20C7921	100-706-52033	13.75
INGRAM LIBRARY SERVICES	584929473	04/13/2022	BOOKS 20C7921	100-706-52033	86.66
OREGON PATROL SERVICE	8009	04/13/2022	COURT SERVICES	100-704-52019	814.80
CODE PUBLISHING	GC0006694	04/13/2022	MUNI CODE WEB UPDATE	100-702-52019	1,100.25
BUSINESS RADIO LICENSING	INV0002502	04/13/2022	BUSINESS RADIO LIC	100-705-52001	110.00
NATIONAL BUSINESS FURNITU...	MK576401	04/13/2022	CREDENZA / BOX FILE	100-707-52001	161.80
NATIONAL BUSINESS FURNITU...	MK576401	04/13/2022	CREDENZA / BOX FILE	100-707-52001	288.80
A + ENGRAVING LLC	1311	04/14/2022	PLATE K LAWRENCE	100-703-52001	48.00
STAPLES BUSINESS CREDIT	1641178916	04/14/2022	OFFICE SUPPLES	100-715-52001	340.52

Expense Approval Register **Packet: APPKT00**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
ACE HARDWARE - ST. HELENS	3.31.22 60176	04/14/2022	MATERIALS ACE ACCT 60176 - ...	100-708-52001	108.88
SAFEGUARD FIRE EXTINGUISH...	34165	04/14/2022	FIRE EXTINGUISHER SERVICE L...	100-706-52023	24.85
SAFEGUARD FIRE EXTINGUISH...	34165	04/14/2022	FIRE EXTINGUISHER SERVICE P...	100-708-52019	99.40
SAFEGUARD FIRE EXTINGUISH...	34165	04/14/2022	FIRE EXTINGUISHER SERVICE C...	100-715-52023	53.25
SAIF CORPORATION	4.1.2022	04/14/2022	A RAETHKE	100-705-51015	167.45
COLUMBIA COUNTY TREASUR...	4.11.2022	04/14/2022	COUNTY ASSESSMENT	100-000-20900	553.45
COLUMBIA COUNTY TREASUR...	4.11.2022	04/14/2022	JAIL ASSESSMENT	100-000-20900	42.01
COLUMBIA COUNTY TREASUR...	4.11.2022	04/14/2022	CITY COURT COSTS DEDUCTED	100-000-36002	-59.55
OREGON HUMANE SOCIETY	4.13.2022	04/14/2022	RESTITUTION NORMA STEVENS	100-000-21000	25.00
ROSS DENISON LAW	4.8.2022	04/14/2022	PROFESSIONAL SERVICES COU...	100-704-52019	450.00
METRO PLANNING INC	5434	04/14/2022	WEB GIS	100-710-52001	62.50
VERIZON	9902326667	04/14/2022	CRYSTAL KING	100-701-52010	46.15
VERIZON	9902326667	04/14/2022	CRYSTAL KING	100-701-52010	40.01
VERIZON	9902326667	04/14/2022	MAYOR SCHOLL IPAD	100-703-52001	40.01
VERIZON	9902326667	04/14/2022	PD JETPACK2	100-705-52010	40.01
VERIZON	9902326667	04/14/2022	PD JETPACK1	100-705-52010	40.01
VERIZON	9902326667	04/14/2022	CAMERON PAGE	100-708-52010	36.15
VERIZON	9902326667	04/14/2022	TORY SHELBY	100-708-52010	36.15
VERIZON	9902326667	04/14/2022	REC PHONE	100-709-52010	36.99
VERIZON	9902326667	04/14/2022	RECREATION CENTER	100-709-52010	40.01
VERIZON	9902326667	04/14/2022	RECREATION CENTER	100-709-52010	49.93
VERIZON	9902326667	04/14/2022	MIKE DEROIA	100-711-52010	73.33
VERIZON	9902326667	04/14/2022	JOHN HICKS	100-711-52010	49.93
VERIZON	9902326667	04/14/2022	BUILDING DEPT IPAD	100-711-52010	40.01
VERIZON	9902326667	04/14/2022	DARIN COX - BUILDING DEPT I...	100-711-52010	59.93
VERIZON	9902326667	04/14/2022	CONSTRUCTION INSPECTOR	100-711-52010	40.01
METRO PRESORT	IN642482	04/14/2022	UB BILL PRINTING	100-707-52008	4,248.63
DEPARTMENT OF TRANSPORT...	L0032930236	04/14/2022	DMV SERVICES ACCT 67431	100-705-52019	4.00
				Fund 100 - GENERAL FUND Total:	**32,945.17**
Fund: 201 - VISITOR TOURISM					
CITY OF ST. HELENS	3.22.2022	04/10/2022	01-00178-001 MASONIC BUILD..	201-000-52003	45.83
				Fund 201 - VISITOR TOURISM Total:	**45.83**
Fund: 202 - COMMUNITY DEVELOPMENT					
OREGON DEPT. OF STATE LAN...	25298	04/10/2022	WATERWAY LEASE FEE FLAT R...	202-722-52060	457.51
OREGON DEPT. OF STATE LAN...	25299	04/10/2022	WATERWAY LEASE FEE FLAT R...	202-722-52060	1,007.27
MAUL FOSTER ALONGI INC	46904	04/13/2022	WWTP LAGOON ON CALL SERV..	202-726-52019	2,410.00
OREGON DEQ BUSINESS OFFICE	HSRAF22-2005	04/13/2022	BOISE VENEER PLAN 163815-00	202-721-52019	277.93
MAUL FOSTER ALONGI INC	46903	04/14/2022	BWP ON CALL SERVICES	202-722-52019	1,067.25
MAUL FOSTER ALONGI INC	46905	04/14/2022	PUBLIC ENGAGEMENT	202-721-52019	277.50
JH KELLY LLC	TH301616	04/14/2022	COL PAC FOOD BANK RENO	202-721-52096	5,787.12
				Fund 202 - COMMUNITY DEVELOPMENT Total:	**11,284.58**
Fund: 203 - COMMUNITY ENHANCEMENT					
CAROLOS M SPISAK	010	04/10/2022	YOUTH NIGHT EVENT	203-709-52028	227.50
				Fund 203 - COMMUNITY ENHANCEMENT Total:	**227.50**
Fund: 205 - STREETS					
DAHLGREN'S DO IT BEST BUIL...	3.25.2022	04/13/2022	BUILDING MATERIALS ACCT 1...	205-000-52001	25.40
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	205-000-52001	24.99
SUNSET EQUIPMENT	88496	04/14/2022	CROSSROAD / KILLZALL	205-000-52001	202.99
PORTLAND GENERAL ELECTRIC	INV0002513	04/14/2022	4854421000	205-000-52003	42.50
				Fund 205 - STREETS Total:	**295.88**
Fund: 302 - WATER SDC					
DONOVAN ENTERPRISES INC	1437	04/10/2022	CALLS WITH MATT SHARON S...	302-000-52019	6,290.00
				Fund 302 - WATER SDC Total:	**6,290.00**
Fund: 601 - WATER					
SUE NELSON	001	04/10/2022	RESERVOIR MEDIATION / 2MG...	601-000-53001	756.60
ONE CALL CONCEPTS INC	2030491	04/10/2022	REGULAR / MODEM DELIVERY ...	601-731-52019	68.09
NORTHSTAR CHEMICAL	219906	04/10/2022	SODIUM HYDROXIDE 25%	601-732-52083	8,310.22
STEVEN R. WABSCHALL	4.10.2022	04/10/2022	DRC WFF	601-732-52019	1,500.00

Expense Approval Register **Packet: APPKT00**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
LAWRENCE OIL COMPANY	CFSI-7569	04/10/2022	247752 WATER	601-732-52022	180.87
H.D FOWLER COMPANY	I6052828	04/10/2022	TRAFFIC REPAIR KIT	601-731-52001	334.27
DAHLGREN'S DO IT BEST BUIL...	3.25.2022	04/13/2022	BUILDING MATERIALS ACCT 1...	601-732-52001	180.12
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	601-731-52001	14.17
NORTHSTAR CHEMICAL	220526	04/14/2022	SODIUM HYPOCHLORITE 12.5%	601-732-52083	766.80
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	601-731-52001	47.55
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	601-731-52001	109.98
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	601-731-52001	37.92
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	601-731-52001	16.58
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	601-731-52001	30.97
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	601-731-52001	42.32
CITY OF COLUMBIA CITY	3.26.2022	04/14/2022	001754-001	601-732-52003	84.93
ACE HARDWARE - ST. HELENS	3.31.2022 60180	04/14/2022	MATERIALS ACE ACCT 60180	601-732-52001	116.04
ACE HARDWARE - ST. HELENS	3.31.2022 60180	04/14/2022	MATERIALS ACE ACCT 60180	601-732-52001	24.38
ACE HARDWARE - ST. HELENS	3.31.22 60174	04/14/2022	ACE MATERIALS ACCT 60174	601-731-52001	49.99
VERIZON	9902326667	04/14/2022	JOHN SAVAGE	601-732-52010	46.60
				Fund 601 - WATER Total:	**12,718.40**
Fund: 603 - SEWER					
HUDSON GARBAGE SERVICE	11958704S046	04/10/2022	8333- TRASH WWTP 451 PLY...	603-736-52023	141.40
HUDSON GARBAGE SERVICE	11958704S046	04/10/2022	8333- TRASH WWTP 451 PLY...	603-737-52023	141.40
ONE CALL CONCEPTS INC	2030491	04/10/2022	REGULAR / MODEM DELIVERY ...	603-735-52019	68.08
COLUMBIA RIVER PUD	4.4.2022	04/10/2022	38633 594 S 9 ST POWER	603-737-52003	13,625.18
MAILBOXES NORTHWEST	4.1.2022	04/13/2022	POSTAGE	603-736-52001	36.42
MAILBOXES NORTHWEST	4.1.2022	04/13/2022	POSTAGE	603-737-52001	36.42
RITZ SAFETY	6270141	04/13/2022	CAL GAS GAS BLEND	603-735-52001	221.20
RSP SUPPLY LLC	INV2623	04/13/2022	TECO WESTINGHOUSE	603-000-53001	1,229.35
NATIONAL BUSINESS FURNITU...	MK576401	04/13/2022	CREDENZA / BOX FILE	603-735-52001	664.90
NATIONAL BUSINESS FURNITU...	MK576401	04/13/2022	CREDENZA / BOX FILE	603-735-52001	195.00
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	603-738-52001	53.98
ACE HARDWARE - ST. HELENS	3.31.2022 60180	04/14/2022	MATERIALS ACE ACCT 60180	603-735-52001	23.98
ACE HARDWARE - ST. HELENS	3.31.2022 60180	04/14/2022	MATERIALS ACE ACCT 60180	603-735-52001	26.15
ACE HARDWARE - ST. HELENS	3.31.2022 60180	04/14/2022	MATERIALS ACE ACCT 60180	603-736-52001	11.99
ACE HARDWARE - ST. HELENS	3.31.2022 60180	04/14/2022	MATERIALS ACE ACCT 60180	603-737-52001	12.00
SAFEGUARD FIRE EXTINGUISH...	34165	04/14/2022	FIRE EXTINGUISHER SERVICE ...	603-736-52023	35.50
SAFEGUARD FIRE EXTINGUISH...	34165	04/14/2022	FIRE EXTINGUISHER SERVICE ...	603-737-52023	35.50
CENTURY LINK	4.2.2022	04/14/2022	688	603-736-52010	25.50
CENTURY LINK	4.2.2022	04/14/2022	600	603-736-52010	22.51
CENTURY LINK	4.2.2022	04/14/2022	654	603-736-52010	22.51
CENTURY LINK	4.2.2022	04/14/2022	293	603-736-52010	63.94
CENTURY LINK	4.2.2022	04/14/2022	488	603-736-52010	63.86
CENTURY LINK	4.2.2022	04/14/2022	600	603-737-52010	22.51
CENTURY LINK	4.2.2022	04/14/2022	654	603-737-52010	22.51
CENTURY LINK	4.2.2022	04/14/2022	293	603-737-52010	63.93
CENTURY LINK	4.2.2022	04/14/2022	688	603-737-52010	25.50
CENTURY LINK	4.2.2022	04/14/2022	488	603-737-52010	63.85
EUROFINS TEST AMERICA ASL	7800001738	04/14/2022	TESTING ALGAE CERIDAPHINIA	603-737-52064	4,407.50
VERIZON	9902326667	04/14/2022	STEWART HARTLEY	603-736-52010	12.04
VERIZON	9902326667	04/14/2022	AARON KUNDERS	603-736-52010	12.05
VERIZON	9902326667	04/14/2022	SAM ORTIZ	603-736-52010	16.63
VERIZON	9902326667	04/14/2022	AARON KUNDERS	603-737-52010	12.04
VERIZON	9902326667	04/14/2022	SAM ORTIZ	603-737-52010	16.66
VERIZON	9902326667	04/14/2022	STEWART HARTLEY	603-737-52010	12.05
VERIZON	9902326667	04/14/2022	AARON KUNDERS	603-738-52010	12.06
VERIZON	9902326667	04/14/2022	SAM ORTIZ	603-738-52010	16.64
VERIZON	9902326667	04/14/2022	STEWART HARTLEY	603-738-52010	12.06
SCAPPOOSE CHIROPRACTIC PC	INV0002514	04/14/2022	CDL PHYSICALS	603-736-52019	62.50
SCAPPOOSE CHIROPRACTIC PC	INV0002514	04/14/2022	CDL PHYSICALS	603-737-52019	62.50
RSP SUPPLY LLC	INV2642	04/14/2022	NAE	603-000-53001	504.52
DEPARTMENT OF ENVIRONM...	WQ22DOM-0967	04/14/2022	ANNUAL COMP DETERMINATI...	603-737-52066	23,383.00
				Fund 603 - SEWER Total:	**45,497.32**

Expense Approval Register **Packet: APPKT00 22**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
Fund: 605 - STORM					
SUNSET EQUIPMENT	88229	04/10/2022	PERF PIPE	605-000-52001	47.20
EAGLE STAR ROCK PRODUCTS ...	41090	04/13/2022	ROCK STIMSON BUILDING	605-000-52001	513.94
SUNSET EQUIPMENT	88414	04/14/2022	PERF PIPE DEG ELBOW	605-000-52001	99.42
SUNSET EQUIPMENT	88703	04/14/2022	PERF PIPE	605-000-52001	165.20
				Fund 605 - STORM Total:	**825.76**
Fund: 702 - INFORMATION SYSTEMS					
COMCAST	3.21.2022	04/10/2022	COMCAST CABLE 8778108990...	702-000-52003	1,620.01
CENTURY LINK	3.25.2022	04/10/2022	966B	702-000-52010	338.14
MORE POWER TECHNOLOGY ...	13308	04/14/2022	PREMIUM AGREEMENT MON...	702-000-52019	10,684.15
COMCAST BUSINESS	144049765	04/14/2022	FIBER INTERNET ACCT 934571...	702-000-52003	4,510.61
CENTURY LINK	4.2.2022	04/14/2022	909	702-000-52010	45.02
CENTURY LINK	4.2.2022	04/14/2022	579	702-000-52010	45.02
CENTURY LINK	4.2.2022	04/14/2022	130	702-000-52010	127.02
CENTURY LINK	4.2.2022	04/14/2022	798	702-000-52010	83.94
CENTURY LINK	4.2.2022	04/14/2022	162	702-000-52010	375.08
CENTURY LINK	4.2.2022	04/14/2022	967	702-000-52010	41.26
CENTURY LINK	4.2.2022	04/14/2022	699	702-000-52010	86.29
CENTURY LINK	4.2.2022	04/14/2022	228	702-000-52010	88.98
CENTURY LINK	4.5.2022	04/14/2022	632B	702-000-52010	40.14
VERIZON	9902326667	04/14/2022	MATT FUNK	702-000-52010	63.03
VERIZON	9903044758	04/14/2022	CELL SERVICE ACCT 242060134..	702-000-52010	357.56
				Fund 702 - INFORMATION SYSTEMS Total:	**18,506.25**
Fund: 703 - PW OPERATIONS					
ST. HELENS AUTO CENTER	10861	04/10/2022	LAMP ASY	703-734-52099	322.48
HUDSON GARBAGE SERVICE	11958832S046	04/10/2022	7555- TRASH PW 984 OR ST	703-734-52023	87.65
HUDSON GARBAGE SERVICE	11959345S046	04/10/2022	CASCADES TISSUE SITE	703-734-52023	135.96
COLUMBIA RIVER FIRE AND RE...	22-03 MARCH	04/10/2022	SHARED COST JOINT MAINT	703-734-52099	1,438.12
COLUMBIA RIVER MOTORSPO...	4382913	04/10/2022	CARB ASSY / GASKET	703-734-52099	76.58
LAWRENCE OIL COMPANY	CFSI-7569	04/10/2022	247751 ENGINEERING	703-733-52022	119.71
LAWRENCE OIL COMPANY	CFSI-7569	04/10/2022	247748 PUBLIC WORKS	703-734-52022	2,290.39
LAWRENCE OIL COMPANY	CFSI-7569	04/10/2022	247750 PUBLIC WORKS	703-734-52022	93.33
DAHLGREN'S DO IT BEST BUIL...	3.25.2022	04/13/2022	BUILDING MATERIALS ACCT 1...	703-734-52001	21.17
DAHLGREN'S DO IT BEST BUIL...	3.25.2022	04/13/2022	BUILDING MATERIALS ACCT 1...	703-734-52023	184.17
DAHLGREN'S DO IT BEST BUIL...	3.25.2022	04/13/2022	BUILDING MATERIALS ACCT 1...	703-734-52023	5.25
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	58.81
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	724.53
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	216.24
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	3.32
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	-36.00
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	294.90
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	7.92
SUNSET AUTO PARTS INC - NA...	3.31.2022	04/13/2022	AUTO PARTS ACCT 6355	703-734-52099	22.49
CINTAS	8405602523	04/13/2022	FIRST AID CABINET SERVICE	703-734-52019	88.13
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	703-734-52001	35.55
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	703-734-52023	50.96
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	703-734-52023	13.18
ACE HARDWARE - ST. HELENS	3.10.22 60181	04/14/2022	ACE MATERIALS ACCT 60181	703-734-52047	13.18
SAFEGUARD FIRE EXTINGUISH...	34165	04/14/2022	FIRE EXTINGUISHER SERVICE ...	703-734-52019	230.20
SAFEGUARD FIRE EXTINGUISH...	34165	04/14/2022	FIRE EXTINGUISHER SERVICE ...	703-734-52019	21.30
RYAN POWERS-	4.6.2022	04/14/2022	OAWU WATER TRE CEERT REV...	703-734-52018	399.35
METRO PLANNING INC	5434	04/14/2022	WEB GIS	703-733-52006	87.50
VERIZON	9902326667	04/14/2022	TIM UNDERWOOD	703-733-52010	49.93
VERIZON	9902326667	04/14/2022	SHARON DARROUX	703-733-52010	51.52
VERIZON	9902326667	04/14/2022	BUCK TUPPER	703-734-52010	76.33
VERIZON	9902326667	04/14/2022	PW SPARE	703-734-52010	40.01
VERIZON	9902326667	04/14/2022	ETHAN STERLING	703-734-52010	49.93
VERIZON	9902326667	04/14/2022	KEITH CERNAC	703-734-52010	49.93
VERIZON	9902326667	04/14/2022	ROGER STAUFFER	703-734-52010	49.93
VERIZON	9902326667	04/14/2022	BRETT LONG	703-734-52010	49.93

Expense Approval Register **Packet: APPKT00 22**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
VERIZON	9902326667	04/14/2022	MOUHAMAD ZAHER	703-734-52010	49.93
VERIZON	9902326667	04/14/2022	DAVE ELDER	703-734-52010	49.93
VERIZON	9902326667	04/14/2022	PW SPARE 3	703-734-52010	40.01
VERIZON	9902326667	04/14/2022	SCOTT HARRINGTON	703-734-52010	18.01
VERIZON	9902326667	04/14/2022	PW SPARE 4	703-734-52010	40.01
VERIZON	9902326667	04/14/2022	ALEX BIRD	703-734-52010	49.93
VERIZON	9902326667	04/14/2022	CURT LEMONT	703-734-52010	18.01
VERIZON	9902326667	04/14/2022	SCOTT WILLIAMS	703-734-52010	49.93
VERIZON	9902326667	04/14/2022	PW SPARE2	703-734-52010	40.01
SCAPPOOSE CHIROPRACTIC PC	INV0002515	04/14/2022	CDL PHYSICALS	703-734-52019	125.00
SCAPPOOSE CHIROPRACTIC PC	INV0002516	04/14/2022	CDL PHYSICALS	703-734-52019	125.00
				Fund 703 - PW OPERATIONS Total:	**8,029.65**
Fund: 704 - FACILITY MAJOR MAINTNANCE					
EAGLE STAR ROCK PRODUCTS ...	40943	04/13/2022	ROCK - CHARGING STATION	704-000-53018	167.83
ACE HARDWARE - ST. HELENS	3.31.2022 60180	04/14/2022	MATERIALS ACE ACCT 60180	704-000-53025	52.98
ACE HARDWARE - ST. HELENS	3.31.22 60174	04/14/2022	ACE MATERIALS ACCT 60174	704-000-53018	28.99
ACE HARDWARE - ST. HELENS	3.31.22 60174	04/14/2022	ACE MATERIALS ACCT 60174	704-000-53018	9.99
				Fund 704 - FACILITY MAJOR MAINTNANCE Total:	**259.79**
				Grand Total:	**136,926.13**

Fund Summary

Fund	Expense Amount
100 - GENERAL FUND	32,945.17
201 - VISITOR TOURISM	45.83
202 - COMMUNITY DEVELOPMENT	11,284.58
203 - COMMUNITY ENHANCEMENT	227.50
205 - STREETS	295.88
302 - WATER SDC	6,290.00
601 - WATER	12,718.40
603 - SEWER	45,497.32
605 - STORM	825.76
702 - INFORMATION SYSTEMS	18,506.25
703 - PW OPERATIONS	8,029.65
704 - FACILITY MAJOR MAINTNANCE	259.79
Grand Total:	**136,926.13**

Account Summary

Account Number	Account Name	Expense Amount
100-000-20900	County Assessment	595.46
100-000-21000	Court Restitution Paymen…	25.00
100-000-36002	Fines - Court	-59.55
100-701-52010	Telephone	86.16
100-702-52001	Operating Supplies	6.00
100-702-52019	Professional Services	1,100.25
100-703-52001	Operating Supplies	88.01
100-704-52019	Professional Services	1,273.60
100-705-51015	Other Benefits	167.45
100-705-52001	Operating Supplies	785.01
100-705-52010	Telephone	3,407.44
100-705-52019	Professional Services	4.00
100-705-52023	Facility Maintenance	188.30
100-706-52003	Utilities	80.93
100-706-52023	Facility Maintenance	24.85
100-706-52033	Printed Materials	1,598.38
100-706-52034	Visual Materials	483.10
100-706-52035	Audio Materials	648.05
100-707-52001	Operating Supplies	450.60
100-707-52008	Printing	4,248.63
100-707-52019	Professional Services	12,320.00
100-708-52001	Operating Supplies	1,650.43
100-708-52010	Telephone	72.30
100-708-52019	Professional Services	99.40
100-708-52022	Fuel	1,302.56
100-708-52023	Facility Maintenance	805.43
100-709-52010	Telephone	126.93
100-709-52023	Facility Maintenance	252.29
100-710-52001	Operating Supplies	62.50
100-711-52010	Telephone	263.21
100-715-52001	Operating Supplies	354.52
100-715-52023	Facility Maintenance	433.93
201-000-52003	Utilities	45.83
202-721-52019	Professional Services	555.43
202-721-52096	CDBG Grant Expenses	5,787.12
202-722-52019	Professional Services	1,067.25
202-722-52060	Waterway Lease	1,464.78
202-726-52019	Professional Services	2,410.00
203-709-52028	Projects & Programs	227.50
205-000-52001	Operating Supplies	253.38
205-000-52003	Utilities	42.50
302-000-52019	Professional Services	6,290.00
601-000-53001	Capital Outlay	756.60

Account Summary

Account Number	Account Name	Expense Amount
601-731-52001	Operating Supplies	683.75
601-731-52019	Professional Services	68.09
601-732-52001	Operating Supplies	320.54
601-732-52003	Utilities	84.93
601-732-52010	Telephone	46.60
601-732-52019	Professional Services	1,500.00
601-732-52022	Fuel	180.87
601-732-52083	Chemicals	9,077.02
603-000-53001	Capital Outlay	1,733.87
603-735-52001	Operating Supplies	1,131.23
603-735-52019	Professional Services	68.08
603-736-52001	Operating Supplies	48.41
603-736-52010	Telephone	239.04
603-736-52019	Professional Services	62.50
603-736-52023	Facility Maintenance	176.90
603-737-52001	Operating Supplies	48.42
603-737-52003	Utilities	13,625.18
603-737-52010	Telephone	239.05
603-737-52019	Professional Services	62.50
603-737-52023	Facility Maintenance	176.90
603-737-52064	Lab Testing	4,407.50
603-737-52066	Permit Fees	23,383.00
603-738-52001	Operating Supplies	53.98
603-738-52010	Telephone	40.76
605-000-52001	Operating Supplies	825.76
702-000-52003	Utilities	6,130.62
702-000-52010	Telephone	1,691.48
702-000-52019	Professional Services	10,684.15
703-733-52006	Computer Maintenance	87.50
703-733-52010	Telephone	101.45
703-733-52022	Fuel	119.71
703-734-52001	Operating Supplies	56.72
703-734-52010	Telephone	671.83
703-734-52018	Professional Development	399.35
703-734-52019	Professional Services	589.63
703-734-52022	Fuel	2,383.72
703-734-52023	Facility Maintenance	477.17
703-734-52047	Marine Board	13.18
703-734-52099	Equipment Operations	3,129.39
704-000-53018	Capital Outlay - City Hall	206.81
704-000-53025	Capital Outlay - Sr Center	52.98
	Grand Total:	**136,926.13**

Project Account Summary

Project Account Key		Expense Amount
None		136,926.13
	Grand Total:	**136,926.13**

St. Helens, OR

Expense Approval Register

Packet: APPKT00527 - AP 4.22.2022

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
Fund: 100 - GENERAL FUND					
HR ANSWERS	50787	04/15/2022	PROF SERVICES FIN DIR SAL SUR	100-707-52019	432.00
TRUVIEW BSI	7200073777	04/15/2022	REPORT CHARGES	100-708-52014	25.00
TYLER TECHNOLOGIES INC	025-374899	04/18/2022	INSITE TRANSACTION FEES UB	100-707-52019	10,898.75
PAULSON PRINTING CO.	237-2	04/18/2022	500 BUS CARDS J EDWARDS	100-707-52001	55.00
TROTTER & MORTON FACILITY ..	79048	04/18/2022	C11165 HVAC POLICE	100-705-52023	1,083.00
TROTTER & MORTON FACILITY ..	79419	04/18/2022	G10115 LIBRARY HVAC	100-706-52023	2,215.65
COLUMBIA COUNTY SHEFIFFS ...	MARCH 22-SHPD	04/18/2022	FIRING RANGE USAGE	100-705-52018	100.00
STRUCTURAL NEXUS LLC	1146	04/19/2022	AMERICAN MART REVIEW	100-711-52019	810.00
THE RADAR SHOP INC	14036	04/19/2022	ON SITE RADAR RE CERT	100-705-52021	925.00
THE RADAR SHOP INC	14038	04/19/2022	ON SITE RADAR RE CERT	100-705-52021	70.00
COLUMBIA COUNTY COMM. J...	20223CSH	04/19/2022	WORK CREW	100-708-52019	1,875.00
MIDWEST TAPE	501890204	04/19/2022	DVD / ABD 2000010011	100-706-52034	23.24
MIDWEST TAPE	501904678	04/19/2022	DVD / ABD 2000010011	100-706-52034	37.48
MIDWEST TAPE	501904679	04/19/2022	DVD / ABD 2000010011	100-706-52034	11.24
AMY LINDGREN LAW LLC	529	04/19/2022	JUDICIAL SERVICES	100-704-52019	5,000.00
COUNTRY MEDIA INC	567010	04/19/2022	PUBLIC NOTICE	100-710-52011	193.75
INGRAM LIBRARY SERVICES	58607565	04/19/2022	BOOKS 20C7921	100-706-52033	16.96
INGRAM LIBRARY SERVICES	58607566	04/19/2022	BOOKS 20C7921	100-706-52033	137.51
INGRAM LIBRARY SERVICES	58607567	04/19/2022	BOOKS 20C7921	100-706-52033	43.80
INGRAM LIBRARY SERVICES	58607568	04/19/2022	BOOKS 20C7921	100-706-52033	9.51
INGRAM LIBRARY SERVICES	58607569	04/19/2022	BOOKS 20C7921	100-706-52033	24.44
INGRAM LIBRARY SERVICES	58607570	04/19/2022	BOOKS 20C7921	100-706-52033	16.43
INGRAM LIBRARY SERVICES	58660820	04/19/2022	BOOKS 20C7921	100-706-52033	11.49
INGRAM LIBRARY SERVICES	58660821	04/19/2022	BOOKS 20C7921	100-706-52033	33.64
INGRAM LIBRARY SERVICES	58660822	04/19/2022	BOOKS 20C7921	100-706-52033	544.80
ADVENTISIT HEALTH OCCUPAT...	93343	04/19/2022	AUDIO VAN SET UP / AUDIOG...	100-705-52019	1,012.50
METRO PRESORT	IN642835	04/19/2022	MONTHLY E SERVICE CHARGES	100-707-52008	50.00
SECURE PACIFIC CORPORATION	INV0002519	04/19/2022	150 S 13TH ST	100-705-52023	99.06
SECURE PACIFIC CORPORATION	INV0002519	04/19/2022	375 S 18TH ST	100-706-52023	132.15
SECURE PACIFIC CORPORATION	INV0002519	04/19/2022	475 S 18TH	100-708-52023	133.65
ICMA MEMBERSHIP RENEWALS	INV0002520	04/19/2022	MEMBERSHIP 945676	100-707-52018	1,048.00
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	UNITARY	100-000-20700	58.58
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	STATE DUII DIVERSION	100-000-20700	315.00
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	STATE DUII CONVICTION FEE	100-000-20700	1,140.00
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	STATE VIOLATION	100-000-20800	1,483.07
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	STATE COURT FACILITY	100-000-20800	7.00
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	MISD SURCHARGE	100-000-20800	6.62
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	LEMLA	100-000-20800	5.00
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	STATE MISD	100-000-20800	220.00
OREGON DEPARTMENT OF RE...	MARCH 2022	04/19/2022	STATE	100-000-20800	171.25
CINTAS	8405646652	04/20/2022	PARKS FIRST AID CABINET SER...	100-708-52001	127.25
CINTAS	8405646653	04/20/2022	CITY HALL FIRST AID CABINET ...	100-715-52001	108.98
MCNULTY WATER	1.26.2022	04/22/2022	MILLARD WETLANDS/HOSPITA...	100-715-52003	12.00
PAULSON PRINTING CO.	243	04/22/2022	BOOKLET COLOR COVER	100-706-52028	624.00
NW NATURAL GAS	4.14.2022	04/22/2022	5638	100-705-52003	1.00
NW NATURAL GAS	4.14.2022	04/22/2022	7673	100-706-52003	587.42
NW NATURAL GAS	4.14.2022	04/22/2022	8563	100-708-52003	25.61
NW NATURAL GAS	4.14.2022	04/22/2022	3047	100-708-52003	43.75
NW NATURAL GAS	4.14.2022	04/22/2022	6430	100-709-52003	254.61
NW NATURAL GAS	4.14.2022	04/22/2022	0109	100-709-52003	155.26
NW NATURAL GAS	4.14.2022	04/22/2022	5285	100-715-52003	140.96
NW NATURAL GAS	4.14.2022	04/22/2022	2848	100-715-52003	102.54
PETTY CASH - DAWN RICHARD...	4.22.2022	04/22/2022	PETTY CASH LIBRARY	100-706-52001	13.93

Expense Approval Register **Packet: APPKT005** **22**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
PETTY CASH - DAWN RICHARD...	4.22.2022	04/22/2022	PETTY CASH LIBRARY	100-706-52033	63.08
INGRAM LIBRARY SERVICES	58891384	04/22/2022	BOOKS 20C7921	100-706-52033	67.96
INGRAM LIBRARY SERVICES	58891385	04/22/2022	BOOKS 20C7921	100-706-52033	18.00
INGRAM LIBRARY SERVICES	58891386	04/22/2022	BOOKS 20C7921	100-706-52033	232.78
INGRAM LIBRARY SERVICES	58891387	04/22/2022	BOOKS 20C7921	100-706-52033	5.92
INGRAM LIBRARY SERVICES	58891388	04/22/2022	BOOKS 20C7921	100-706-52033	35.92
INGRAM LIBRARY SERVICES	58891390	04/22/2022	BOOKS 20C7921	100-706-52033	35.87
INGRAM LIBRARY SERVICES	58891390	04/22/2022	BOOKS 20C7921	100-706-52033	-11.51
INGRAM LIBRARY SERVICES	58949742	04/22/2022	BOOKS 20C7921	100-706-52033	23.94
INGRAM LIBRARY SERVICES	58949743	04/22/2022	BOOKS 20C7921	100-706-52033	733.74
INGRAM LIBRARY SERVICES	58961338	04/22/2022	BOOKS 20C7921	100-706-52033	11.87
L.N CURTIS AND SONS	INV563946	04/22/2022	POLICE UNIFORMS	100-705-52002	97.00
L.N CURTIS AND SONS	INV565540	04/22/2022	POLICE UNIFORMS	100-705-52002	111.11
L.N CURTIS AND SONS	INV569087	04/22/2022	POLICE UNIFORMS	100-705-52002	130.00
L.N CURTIS AND SONS	INV570134	04/22/2022	POLICE UNIFORMS	100-705-52002	85.00
L.N CURTIS AND SONS	INV570549	04/22/2022	POLICE UNIFORMS	100-705-52002	20.00
				Fund 100 - GENERAL FUND Total:	**34,333.56**
Fund: 201 - VISITOR TOURISM					
MERINA + CO	13457	04/18/2022	PROF SERVICES AGREED UPON...	201-000-52019	7,562.50
WESTERN DISPLAY FIREWORK...	22-7018	04/19/2022	FIREWORKS SHOW 1ST INSTAL...	201-000-52019	5,000.00
MASONIC BUILDING LLC	3.25.2022	04/19/2022	LEASE PAYMENT APRIL MAY J...	201-000-52028	15,000.00
NW NATURAL GAS	4.14.2022	04/22/2022	7764	201-000-52003	94.49
NW NATURAL GAS	4.14.2022	04/22/2022	9614	201-000-52003	220.90
COLUMBIA RIVER PUD	4.21.2022	04/22/2022	94111	201-000-52003	62.08
E2C	4463	04/22/2022	MONTHLY MARKETING TINA ...	201-000-52019	10,000.00
				Fund 201 - VISITOR TOURISM Total:	**37,939.97**
Fund: 202 - COMMUNITY DEVELOPMENT					
MAYER REED INC	13403	04/15/2022	ST HELENS RIVERWALK	202-723-52055	6,198.43
MACKENZIE	1077327	04/19/2022	BUSINESS PARK INFRASTRUCT...	202-722-52019	14,956.88
CITY OF ST. HELENS	3.19.22	04/19/2022	PERMIT FREEZER COOLER FO...	202-721-52096	361.52
COLUMBIA PACIFIC EDD	12	04/20/2022	GRANT ADMIN JAN 2022- MA...	202-721-52096	803.00
PORTLAND GENERAL ELECTRIC	INV0002521	04/20/2022	1650931000	202-722-52003	25.66
				Fund 202 - COMMUNITY DEVELOPMENT Total:	**22,345.49**
Fund: 203 - COMMUNITY ENHANCEMENT					
TRUE POINT SOLUTIONS	22-0343	04/19/2022	DIGEPLAN IMP SERVICES	203-711-35020	750.00
HOPE WIRTA	4.22.2022	04/22/2022	PAINTING CLASS	203-709-52028	615.00
				Fund 203 - COMMUNITY ENHANCEMENT Total:	**1,365.00**
Fund: 205 - STREETS					
MASONS SUPPLY	896168-00	04/22/2022	QUICKRETE	205-000-52001	610.72
				Fund 205 - STREETS Total:	**610.72**
Fund: 305 - PARKS SDC					
MAYER REED INC	13403	04/15/2022	PLAYGROUND	305-000-52019	13,303.20
				Fund 305 - PARKS SDC Total:	**13,303.20**
Fund: 601 - WATER					
U.S BANK ST. PAUL	1973854	04/18/2022	239773000 REFUNDING OBLI...	601-000-55001	454,999.23
U.S BANK ST. PAUL	1973854	04/18/2022	239773000 REFUNDING OBLI...	601-000-55002	59,925.00
PEAK ELECTRIC GROUP LLC	23400	04/18/2022	INTRUSIONS SWITCHES	601-731-52019	1,502.28
TEAM CONSTRUCTION	INV0002518	04/19/2022	HYDRANT MEER RENTAL REFU...	601-000-37004	169.53
SECURE PACIFIC CORPORATION	INV0002519	04/19/2022	1215 4TH PL	601-732-52023	165.06
HACH	12985639	04/20/2022	REAGENT SET CHLORINE FREE ...	601-731-52001	83.79
HACH	12985639	04/20/2022	REAGENT SET CHLORINE FREE ...	601-732-52001	155.61
NW NATURAL GAS	4.14.2022	04/22/2022	2942	601-732-52003	419.94
EAGLE STAR ROCK PRODUCTS ...	41103	04/22/2022	ROCK 8TH ST WATER	601-731-52001	333.94
EAGLE STAR ROCK PRODUCTS ...	41112	04/22/2022	ROCK KELLY ST WATER	601-731-52001	159.87
EAGLE STAR ROCK PRODUCTS ...	41118	04/22/2022	ROCK UMATILLA	601-731-52001	327.81
H.D FOWLER COMPANY	I6054424	04/22/2022	DIP SPOOS FLG	601-731-52001	556.05
				Fund 601 - WATER Total:	**518,798.11**

Expense Approval Register **Packet: APPKT005 22**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
Fund: 603 - SEWER					
U.S BANK ST. PAUL	1973854	04/18/2022	239773000 REFUNDING OBLI...	603-000-55001	455,000.00
U.S BANK ST. PAUL	1973854	04/18/2022	239773000 REFUNDING OBLI...	603-000-55002	59,925.00
SECURE PACIFIC CORPORATION	INV0002519	04/19/2022	451 PLYMOUTH ST	603-736-52023	49.46
SECURE PACIFIC CORPORATION	INV0002519	04/19/2022	451 PLYMOUTH ST	603-737-52023	49.45
ALS GROUP USA CORP	35-51-578009-0	04/20/2022	NH3 AMMONIA SELECTIVE EL...	603-736-52064	50.00
ALS GROUP USA CORP	35-51-578009-0	04/20/2022	NH3 AMMONIA SELECTIVE EL...	603-737-52064	50.00
HASA	803904 C	04/20/2022	MULTI CHLOR	603-736-52083	201.06
NW NATURAL GAS	4.14.2022	04/22/2022	5750	603-736-52003	69.92
NW NATURAL GAS	4.14.2022	04/22/2022	5750	603-737-52003	69.91
				Fund 603 - SEWER Total:	**515,464.80**
Fund: 605 - STORM					
EAGLE STAR ROCK PRODUCTS ...	41107	04/22/2022	ROCK SHOP	605-000-52001	162.19
				Fund 605 - STORM Total:	**162.19**
Fund: 702 - INFORMATION SYSTEMS					
ISSQUARED INC	005504	04/18/2022	FORTINET FG61F	702-000-52006	2,606.08
				Fund 702 - INFORMATION SYSTEMS Total:	**2,606.08**
Fund: 703 - PW OPERATIONS					
TRUVIEW BSI	7200073777	04/15/2022	REPORT CHARGES	703-734-52014	15.00
TROTTER & MORTON FACILITY ..	79362	04/18/2022	C10245	703-734-52023	264.00
SUNSET EQUIPMENT	87998	04/18/2022	VERSACUT SAW CHAIN	703-734-52001	16.13
ADVENTISIT HEALTH OCCUPAT...	93342	04/19/2022	HEARING TESTS PW	703-734-52019	1,012.50
SECURE PACIFIC CORPORATION	INV0002519	04/19/2022	984 OR ST	703-734-52023	98.85
CINTAS	8405646651	04/20/2022	FIRST AID CABINET SERVICE	703-734-52019	94.97
CARQUEST AUTO PARTS STOR...	3.31.2022	04/22/2022	AUTO PARTS ACCT 315752	703-734-52099	255.73
NW NATURAL GAS	4.14.2022	04/22/2022	7720	703-734-52003	16.06
NW NATURAL GAS	4.14.2022	04/22/2022	8675	703-734-52003	69.87
				Fund 703 - PW OPERATIONS Total:	**1,843.11**
Fund: 704 - FACILITY MAJOR MAINTNANCE					
TROTTER & MORTON FACILITY ..	79419	04/18/2022	G10115 LIBRARY HVAC	704-000-53013	1,477.10
COLUMBIA NW HEATING INC	78544322	04/20/2022	COMMERCIAL MANITENANCE ...	704-000-53025	508.00
				Fund 704 - FACILITY MAJOR MAINTNANCE Total:	**1,985.10**
Fund: 706 - PUBLIC SAFETY					
MACKENZIE	1077440	04/19/2022	PUBLIC SAFETY BUILDING	706-000-52019	85,327.54
MACKENZIE	1077441	04/19/2022	PUBLIC SAFETY BUILDING	706-000-52019	26,736.25
				Fund 706 - PUBLIC SAFETY Total:	**112,063.79**
				Grand Total:	**1,262,821.12**

Fund Summary

Fund	Expense Amount
100 - GENERAL FUND	34,333.56
201 - VISITOR TOURISM	37,939.97
202 - COMMUNITY DEVELOPMENT	22,345.49
203 - COMMUNITY ENHANCEMENT	1,365.00
205 - STREETS	610.72
305 - PARKS SDC	13,303.20
601 - WATER	518,798.11
603 - SEWER	515,464.80
605 - STORM	162.19
702 - INFORMATION SYSTEMS	2,606.08
703 - PW OPERATIONS	1,843.11
704 - FACILITY MAJOR MAINTNANCE	1,985.10
706 - PUBLIC SAFETY	112,063.79
Grand Total:	**1,262,821.12**

Account Summary

Account Number	Account Name	Expense Amount
100-000-20700	State Surcharge	1,513.58
100-000-20800	State Assessment Court	1,892.94
100-704-52019	Professional Services	5,000.00
100-705-52002	Personnel Uniforms Equi…	443.11
100-705-52003	Utilities	1.00
100-705-52018	Professional Development	100.00
100-705-52019	Professional Services	1,012.50
100-705-52021	Equipment Maintenance	995.00
100-705-52023	Facility Maintenance	1,182.06
100-706-52001	Operating Supplies	13.93
100-706-52003	Utilities	587.42
100-706-52023	Facility Maintenance	2,347.80
100-706-52028	Projects & Programs	624.00
100-706-52033	Printed Materials	2,056.15
100-706-52034	Visual Materials	71.96
100-707-52001	Operating Supplies	55.00
100-707-52008	Printing	50.00
100-707-52018	Professional Development	1,048.00
100-707-52019	Professional Services	11,330.75
100-708-52001	Operating Supplies	127.25
100-708-52003	Utilities	69.36
100-708-52014	Recruiting Expenses	25.00
100-708-52019	Professional Services	1,875.00
100-708-52023	Facility Maintenance	133.65
100-709-52003	Utilities	409.87
100-710-52011	Public Information	193.75
100-711-52019	Professional Services	810.00
100-715-52001	Operating Supplies	108.98
100-715-52003	Utilities	255.50
201-000-52003	Utilities	377.47
201-000-52019	Professional Services	22,562.50
201-000-52028	Projects & Programs	15,000.00
202-721-52096	CDBG Grant Expenses	1,164.52
202-722-52003	Utilities	25.66
202-722-52019	Professional Services	14,956.88
202-723-52055	Riverwalk Project	6,198.43
203-709-52028	Projects & Programs	615.00
203-711-35020	Building Technology Fee	750.00
205-000-52001	Operating Supplies	610.72
305-000-52019	Professional Services	13,303.20
601-000-37004	Miscellaneous	169.53
601-000-55001	Principle	454,999.23

Account Summary

Account Number	Account Name	Expense Amount
601-000-55002	Interest	59,925.00
601-731-52001	Operating Supplies	1,461.46
601-731-52019	Professional Services	1,502.28
601-732-52001	Operating Supplies	155.61
601-732-52003	Utilities	419.94
601-732-52023	Facility Maintenance	165.06
603-000-55001	Principle	455,000.00
603-000-55002	Interest	59,925.00
603-736-52003	Utilities	69.92
603-736-52023	Facility Maintenance	49.46
603-736-52064	Lab Testing	50.00
603-736-52083	Chemicals	201.06
603-737-52003	Utilities	69.91
603-737-52023	Facility Maintenance	49.45
603-737-52064	Lab Testing	50.00
605-000-52001	Operating Supplies	162.19
702-000-52006	Computer Maintenance	2,606.08
703-734-52001	Operating Supplies	16.13
703-734-52003	Utilities	85.93
703-734-52014	Recruiting Expenses	15.00
703-734-52019	Professional Services	1,107.47
703-734-52023	Facility Maintenance	362.85
703-734-52099	Equipment Operations	255.73
704-000-53013	Capital Outlay - Library	1,477.10
704-000-53025	Capital Outlay - Sr Center	508.00
706-000-52019	Professional Services	112,063.79
	Grand Total:	**1,262,821.12**

Project Account Summary

Project Account Key	Expense Amount
None	1,262,821.12
Grand Total:	**1,262,821.12**

St. Helens, OR

Expense Approval Register

Packet: APPKT00534 - AP 4.29.2022

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
Fund: 100 - GENERAL FUND					
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	150 S 13TH ST- POLICE	100-705-52003	117.05
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	150 S 13 ST POLICE STATION 7...	100-705-52003	435.98
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	375 S 18TH ST COLUMBIA CEN...	100-706-52003	654.74
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	475 S 18 ST METER 10220167	100-708-52003	90.43
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	162 MCMICHAEL ST - CAMPBE...	100-708-52003	87.74
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	200 N 7TH ST - PARK	100-708-52003	28.74
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	299 N 6TH ST - PARKS	100-708-52003	28.36
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	264 STRAND ST- COL VIEW PA...	100-708-52003	51.76
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	265 STRAND ST. - SPLASH PAD...	100-708-52003	29.06
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	475 S 18TH ST- MCCORMICK E...	100-708-52003	28.67
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	50 PLAZA SQ- PLAZA OUTLETS	100-708-52003	38.43
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	475 S 18TH ST	100-708-52003	131.57
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	475 S 18TH ST	100-708-52003	119.26
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	475 S 18TH ST - MCCORMICK ...	100-708-52003	66.64
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	120 WHITE WAY - WALNUT TR...	100-708-52003	28.28
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	200 N RIVER ST - GREY CLIFFS ...	100-708-52003	68.64
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	2625 GABLE RD REC CENTER	100-709-52003	134.17
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	275 STRAND ST- CITY HALL UB ...	100-715-52003	99.87
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	277 STRAND ST- CITY HALL UB...	100-715-52003	71.53
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	265 STRAND ST- CITY HALL MA...	100-715-52003	559.18
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	265 STRAND ST- CITY HALL UP	100-715-52003	125.88
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	277 STRAND ST -	100-715-52003	29.60
MIDWEST TAPE	501937171	04/26/2022	DVD / ABD 2000010011	100-706-52034	44.98
MIDWEST TAPE	501937172	04/26/2022	DVD / ABD 2000010011	100-706-52034	14.99
MIDWEST TAPE	501970767	04/26/2022	DVD / ABD 2000010011	100-706-52034	22.49
MIDWEST TAPE	501970768	04/26/2022	DVD / ABD 2000010011	100-706-52034	25.99
LAND DEVELOPMENT SERVICES	FEB 2022	04/26/2022	INSPECTIONS FOR ST. HELENS ...	100-711-52015	867.50
PORTLAND GENERAL ELECTRIC	INV0002571	04/26/2022	0153585940	100-709-52003	174.12
LAND DEVELOPMENT SERVICES	MAR 2022	04/26/2022	INSPECTIONS	100-711-52015	750.00
TYLER TECHNOLOGIES INC	025-375420	04/27/2022	TRAINING PERSONNEL MGMT	100-703-52018	650.00
RICOH USA INC	106073980	04/27/2022	POLICE EQUIPMENT LEASE 14...	100-705-52001	253.70
JORDAN RAMIS PC ATTORNEYS..	191146	04/27/2022	GENERAL LEGAL	100-701-52019	1,499.50
JORDAN RAMIS PC ATTORNEYS..	191146	04/27/2022	GENERAL LEGAL	100-703-52019	1,610.00
JORDAN RAMIS PC ATTORNEYS..	191146	04/27/2022	GENERAL LEGAL	100-709-52019	440.00
JORDAN RAMIS PC ATTORNEYS..	191147	04/27/2022	EMPLOYMENT MATTERS	100-703-52019	175.00
JORDAN RAMIS PC ATTORNEYS..	191147	04/27/2022	EMPLOYMENT MATTERS	100-703-52019	1,835.00
COLUMBIA COUNTY CLERK	193542	04/27/2022	COPIES ACCT 1036	100-710-52011	33.00
WESTERN COLLECTION BURE...	28328	04/27/2022	COLLECTIONS	100-706-52019	94.37
THE WESTERN AGENCY	28474	04/27/2022	COLLECTIONS LIB 001536	100-706-52019	115.15
ROSS DENISON LAW	4.21.2022	04/27/2022	PROFESSIONAL SERVICES COU...	100-704-52019	650.00
LISA STOCKWELL	4.22.2022	04/27/2022	RESTITUTION	100-000-21000	50.00
COLUMBIA 911 COMMUNICAT...	4.8.2022	04/27/2022	NETMOTION MAINT	100-705-52001	1,724.24
GEO TERRA INC	220004-1	04/28/2022	AERIAL ACQUISITION AND SU...	100-710-52028	22,500.00
				Fund 100 - GENERAL FUND Total:	**36,555.61**
Fund: 201 - VISITOR TOURISM					
JORDAN RAMIS PC ATTORNEYS..	191146	04/27/2022	GENERAL LEGAL	201-000-52019	1,795.00
COLUMBIA RIVER PUD	INV0002573	04/27/2022	94111	201-000-52003	174.85
				Fund 201 - VISITOR TOURISM Total:	**1,969.85**
Fund: 202 - COMMUNITY DEVELOPMENT					
PORTLAND GENERAL ELECTRIC	INV0002570	04/26/2022	7357701000	202-722-52003	37.70
COLUMBIA PACIFIC EDD	12-2	04/27/2022	BALANCE OWED JAN -MARCH ...	202-721-52096	4,831.95

Expense Approval Register **Packet: APPKT005 22**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
JORDAN RAMIS PC ATTORNEYS..	191146	04/27/2022	GENERAL LEGAL	202-721-52019	1,035.00
				Fund 202 - COMMUNITY DEVELOPMENT Total:	**5,904.65**
Fund: 203 - COMMUNITY ENHANCEMENT					
CAROLOS M SPISAK	INV0002572	04/26/2022	TEEN VR NIGTH	203-709-52028	172.90
LISA HILLS	INV0002574	04/27/2022	DANCING LINE CLASS	203-709-52028	266.00
				Fund 203 - COMMUNITY ENHANCEMENT Total:	**438.90**
Fund: 205 - STREETS					
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	715 S COLUMBIA RIVER HWY -...	205-000-52003	73.70
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	495 S 18TH ST - LIGHT SIGNAL	205-000-52003	47.80
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	2198 COLUMBIA BLVD - SIGNAL	205-000-52003	41.63
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	58651 COL HWY GATEWAY ART	205-000-52003	29.00
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	1370 COLUMBIA BLVD.- FOUN...	205-000-52003	41.09
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	191 N MILTON WAY - SIGNAL	205-000-52003	37.97
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	1800 COLUMBIA BLVD - SIGNAL	205-000-52003	108.53
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	191 N MILTON WAY- LANDSC...	205-000-52003	28.51
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	265 STRAND ST	205-000-52003	3,747.39
COLUMBIA RIVER PUD	3000679	04/28/2022	STREET LIGHT MAINTENANCE	205-000-52003	98.37
				Fund 205 - STREETS Total:	**4,253.99**
Fund: 601 - WATER					
ROGERS MACHINERY COMPA...	1313774	04/26/2022	SERVICE	601-732-52019	1,516.04
PEAK ELECTRIC GROUP LLC	24317	04/26/2022	WATER RES ELECTRIC WORK	601-731-52019	805.00
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	END OF KESTREL VIEW DRIVE	601-731-52003	128.73
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	62420 COLUMBIA RIVER HWY -..	601-731-52003	243.04
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	2300 STRAND ST - WELL 2	601-731-52003	598.02
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	57500 OLD PORTLAND RD - W...	601-731-52003	62.32
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	1680 1 ST -	601-731-52003	1,892.94
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	35261 PITTSBURG RD- PW WA...	601-731-52003	30.63
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	1215 FOURTH ST - WFF	601-732-52003	4,741.87
JORDAN RAMIS PC ATTORNEYS..	191149	04/27/2022	WPI LITIGATION	601-731-52019	18,391.00
LAWRENCE OIL COMPANY	CFSI-7867	04/28/2022	247752 WATER	601-732-52022	67.41
				Fund 601 - WATER Total:	**28,477.00**
Fund: 603 - SEWER					
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	240 CLARK ST PUMP STATION	603-735-52003	28.67
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	451 PLYMOTH ST - WWTP LA...	603-736-52003	1,387.36
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	451 PLYMOTH ST - WWTP LA...	603-737-52003	1,387.36
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	58791 58725 COL RIV HWY P...	603-738-52003	39.60
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	134 N 1ST- PS 2 8873519	603-738-52003	135.87
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	58360 OLD PORTLAND RD - PS...	603-738-52003	197.13
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	35120 MAPLE ST. - PS 11	603-738-52003	115.97
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	110 S 4TH ST - PS 3	603-738-52003	42.02
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	240 MADRONA CT	603-738-52003	182.32
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	169 S 4TH ST WATER FLOW M...	603-738-52003	67.27
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	318 S 1ST ST- PS #1 8805564	603-738-52003	174.28
				Fund 603 - SEWER Total:	**3,757.85**
Fund: 605 - STORM					
SUNSET EQUIPMENT	88929	04/27/2022	DEG ELBOW	605-000-52001	5.02
CASCADE CONCRETE PRODUC...	84056	04/28/2022	CLOVER SLOTTED	605-000-52001	495.00
				Fund 605 - STORM Total:	**500.02**
Fund: 702 - INFORMATION SYSTEMS					
INFLOW COMMUNICATIONS I...	19994	04/27/2022	SHORETEL CONNECT UPGRADE	702-000-52006	4,812.50
CENTURY LINK BUSINESS SERV...	288742282	04/27/2022	ACCT 88035002	702-000-52010	168.45
MORE POWER TECHNOLOGY ...	13328	04/28/2022	MICROSOFT 365 BUS STANDA...	702-000-52006	1,988.00
				Fund 702 - INFORMATION SYSTEMS Total:	**6,968.95**
Fund: 703 - PW OPERATIONS					
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	1230 DEER ISLAND RD - PW	703-734-52003	138.79
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	984 OREGON ST - PW SHOP	703-734-52003	30.70
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	650 OREGON ST -LEMONT PU...	703-734-52003	260.24
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	984 OREGON ST	703-734-52003	429.57

Expense Approval Register **Packet: APPKT005 22**

Vendor Name	Payable Number	Post Date	Description (Item)	Account Number	Amount
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	264 STRAND ST- COL VIEW PA...	703-734-52046	51.79
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	264 STRAND ST- PARKS/ GAZE...	703-734-52046	38.12
COLUMBIA RIVER PUD	4.14.2022	04/26/2022	265 STRAND ST. - DOCKS	703-734-52046	367.86
LAWSON PRODUCTS	9309450832	04/26/2022	MATERIALS	703-734-52099	185.57
JORDAN RAMIS PC ATTORNEYS..	191148	04/27/2022	PUBLIC WORKS ENGINEERING	703-733-52019	1,020.00
PAULSON PRINTING CO.	269	04/27/2022	BUS CARDS S DARROUX	703-733-52001	55.00
SCAPPOOSE CHIROPRACTIC PC	4.25.2022	04/27/2022	DOT PHYSICAL -TIM ILLIAS	703-734-52019	125.00
SUPERIOR TIRE SERVICE	6579557	04/27/2022	TIRES	703-734-52099	129.90
LAWRENCE OIL COMPANY	CFSI-7867	04/28/2022	247750 PUBLIC WORKS	703-734-52022	90.79
LAWRENCE OIL COMPANY	CFSI-7867	04/28/2022	247748 PUBLIC WORKS	703-734-52022	1,761.28
				Fund 703 - PW OPERATIONS Total:	**4,684.61**
Fund: 704 - FACILITY MAJOR MAINTNANCE					
ARCIFORM LLC	22017	04/27/2022	REPAIR WORK	704-000-53028	14,000.00
PEAK ELECTRIC GROUP LLC	23524	04/27/2022	FLAG POLE LIGHT	704-000-53025	1,426.70
				Fund 704 - FACILITY MAJOR MAINTNANCE Total:	**15,426.70**
				Grand Total:	**108,938.13**

Fund Summary

Fund	Expense Amount
100 - GENERAL FUND	36,555.61
201 - VISITOR TOURISM	1,969.85
202 - COMMUNITY DEVELOPMENT	5,904.65
203 - COMMUNITY ENHANCEMENT	438.90
205 - STREETS	4,253.99
601 - WATER	28,477.00
603 - SEWER	3,757.85
605 - STORM	500.02
702 - INFORMATION SYSTEMS	6,968.95
703 - PW OPERATIONS	4,684.61
704 - FACILITY MAJOR MAINTNANCE	15,426.70
Grand Total:	**108,938.13**

Account Summary

Account Number	Account Name	Expense Amount
100-000-21000	Court Restitution Paymen…	50.00
100-701-52019	Professional Services	1,499.50
100-703-52018	Professional Development	650.00
100-703-52019	Professional Services	3,620.00
100-704-52019	Professional Services	650.00
100-705-52001	Operating Supplies	1,977.94
100-705-52003	Utilities	553.03
100-706-52003	Utilities	654.74
100-706-52019	Professional Services	209.52
100-706-52034	Visual Materials	108.45
100-708-52003	Utilities	797.58
100-709-52003	Utilities	308.29
100-709-52019	Professional Services	440.00
100-710-52011	Public Information	33.00
100-710-52028	Projects & Programs	22,500.00
100-711-52015	Intergovernmental Servic…	1,617.50
100-715-52003	Utilities	886.06
201-000-52003	Utilities	174.85
201-000-52019	Professional Services	1,795.00
202-721-52019	Professional Services	1,035.00
202-721-52096	CDBG Grant Expenses	4,831.95
202-722-52003	Utilities	37.70
203-709-52028	Projects & Programs	438.90
205-000-52003	Utilities	4,253.99
601-731-52003	Utilities	2,955.68
601-731-52019	Professional Services	19,196.00
601-732-52003	Utilities	4,741.87
601-732-52019	Professional Services	1,516.04
601-732-52022	Fuel	67.41
603-735-52003	Utilities	28.67
603-736-52003	Utilities	1,387.36
603-737-52003	Utilities	1,387.36
603-738-52003	Utilities	954.46
605-000-52001	Operating Supplies	500.02
702-000-52006	Computer Maintenance	6,800.50
702-000-52010	Telephone	168.45
703-733-52001	Operating Supplies	55.00
703-733-52019	Professional Services	1,020.00
703-734-52003	Utilities	859.30
703-734-52019	Professional Services	125.00
703-734-52022	Fuel	1,852.07
703-734-52046	Dock Services	457.77
703-734-52099	Equipment Operations	315.47
704-000-53025	Capital Outlay - Sr Center	1,426.70

Account Summary

Account Number	Account Name	Expense Amount
704-000-53028	Capital Outlay - Bennet Bu...	14,000.00
	Grand Total:	**108,938.13**

Project Account Summary

Project Account Key		Expense Amount
None		108,938.13
	Grand Total:	**108,938.13**