

WATER SYSTEM

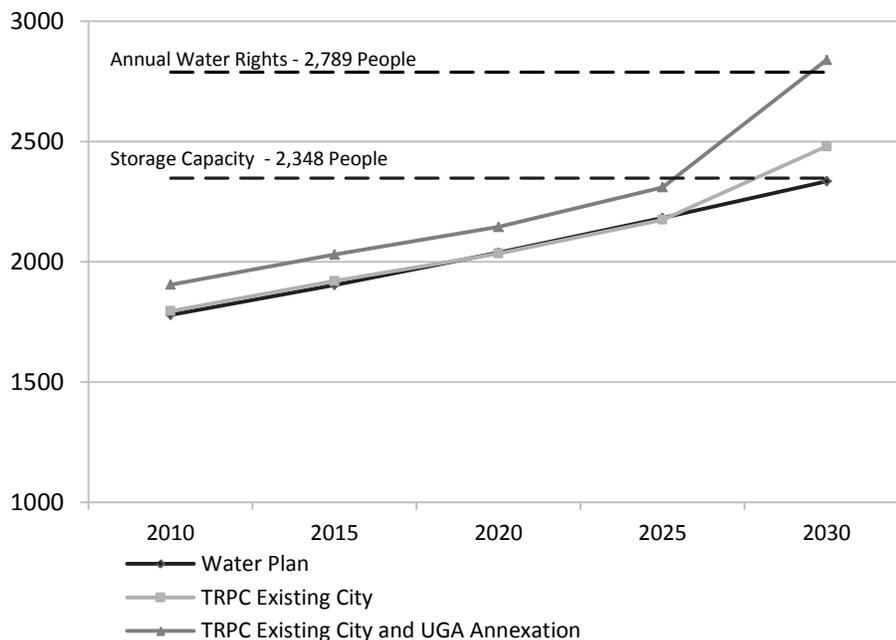
The City of Rainier water system provides water to Rainier and portions of its Urban Growth Area.⁵ As of 2009, Rainier provided water to 686 connections in the City and twenty-three homes outside the city limits.

Projected Water Demand

The City has water rights for 318.7 acre-feet per year of water with an instantaneous pumping rate of 590 gallons per minute. These water rights are projected to be sufficient to serve the City until at least 2025, given land use and population projections.

To project water demand through the year 2030, it is necessary to forecast the number of people anticipated over the planning period. Projections are derived from the population projections included in the Land Use Element of the Comprehensive Plan, however, some variability exists due to the lack of certainty about when a sewer system will be constructed (which may significantly boost or lower anticipated population). Thurston Regional Planning Council's 2012 population estimate, which assumes that Rainier will have sewer between 2020 and 2025, projects that the City will have 2,480 individuals in 2030 (see Figure WTR-1). This level is higher than the projection shown in the Comprehensive Water System Plan, which projects a constant rate of population growth for water system customers, even with sewer. A third line that shows TRPC's estimate for the entire City and Urban Growth Area is also shown.

Figure WTR-1: Rainier Water System Limitations



Source: Comprehensive Water System Plan and 2012 Thurston Regional Planning Council Profile.

Assumes an average use of 182 gallons per day for an equivalent residential unit and 102 gallons per day per capita. Utilizes historical water use rates to determine equivalent residential units, which includes a distribution system leakage rate of 26.3 percent. If distribution system leakage were reduced to 10 percent, water demand projections could be reduced by approximately 18 percent.

⁵ For a complete description of the water system, please see the latest adopted version of the Comprehensive Water System Plan adopted herein by reference.

Given these projections, the capacity of the water storage system and the existing annual water rights may become limitations on future development over the next twenty years. The City of Rainier will monitor water use, population growth and the proportion of lost or unaccounted-for water to evaluate the need for additional water storage and rights.

System Characteristics and Deficiencies

Water Source – The City of Rainier has six wells that provide water to the City. Three of these wells (Wells 3, 4 and 6) are in good condition and are used regularly (the location of the wells is shown in Map WTR-1). Wells 1 and 2 are used only in the case of emergency and Well 5 is used only for irrigation. Table WTR-1 provides information about the sources of water present in the City.

Table WTR-1: Well Characteristics

Data	Well No. 1	Well No. 2	Well No. 3	Well No. 4	Well No. 5	Well No. 6
Year Drilled	1920	1920	1970	1975	1910	1995
Depth Drilled, Feet bgs	120	120	135 ³	305	186	250 ³
Water Right Instantaneous Rate, gpm	50	50	200	50	40	200
Primary Water Right Annual Rate, ac-ft/yr	80.6 ¹	80.6 ¹	50 ²	72	30	5.5
Current Operating Capacity, gpm	50	50	200	50	Unknown	200
Treatment	None	None	pH Adjustment for Corrosion Control, if Necessary	None	None	pH Adjustment for Corrosion Control, if Necessary

Source: City of Rainier Comprehensive Water System Plan prepared by Gray & Osborne, Inc.

¹ Water right does not specify annual amount. Total is the maximum amount possible for the claim based on continuous pumping at the claimed pumping rate of 50 gpm.

² Water right has 110 acre/feet per year supplemental to primary right. See the City of Rainier Comprehensive Water System Plan for further details.

³ Though Wells 3 and 6 are located a mere 40 feet apart, the wells tap into two different sources of water. Well 3 taps into a relatively shallow aquifer beneath the community, and Well 6 taps into a deeper source of water.

Bgs – Below Ground Surface

GPM – Gallons per Minute

Ac-ft/yr – Acre feet per Year

Water Storage – The city has three water reservoirs (the location of these reservoirs is shown in Figure WTR-1). These reservoirs store water and help provide needed water pressure to portions of the City. Characteristics of the reservoirs are presented in Table WTR-2.

Table WTR-2: Rainier Reservoir Characteristics

Data	Reservoir 1	Reservoir 2	Reservoir 3
Year Installed	1920s 1985- Rehabilitation 2003-Seismic Upgrade	1988	2011
Material	Welded Steel	Cast-in-place concrete	Cast-in-place concrete
Nominal Volume, gallons	100,000	300,000	250,000
Gross Volume, gallons	124,600	296,200	264,500
Height, feet	53	56	50

These reservoirs are generally considered to be in good condition and are anticipated to provide sufficient storage capacity until at least 2025.

Distribution – The water distribution system consists primarily of polyvinyl chloride (PVC) and asbestos cement (AC) pipe with 12-inch mains, and lines of 10, 8, 6, 4, and 2 inches (for a depiction of the location of existing water lines, please see Map WTR-1). Service lines are 2 inches, 1 ½ inch, and 1 inch in size.

Over the next six to twenty years, the city will work to remedy the following deficiencies in the water system:

- From 2007 to 2009, 26.3 percent of the water pumped by the City of Rainier was lost or unaccounted-for. While this loss was not entirely associated with leakage, annual leak detection, leak repair, routine service meter replacement, and improved water use accounting will help reduce unaccounted-for water. This reduction will help assure sufficient water is present through the twenty-year planning horizon and decrease the City’s pumping costs.
- Insufficient fire flow is present in certain portions of the Rainier planning area. These areas will require water main improvements (primarily borne by new development) over the twenty year planning horizon.

Booster Stations – The City of Rainier operates three booster pump stations (see Map WTR-1). These stations add pressure to water lines to ensure sufficient pressure is available to the upper portions of the City of Rainier during times of standard water use and peak fire events.

Two of the booster stations were constructed since 2000 and are not anticipated to require significant

upgrades over the next twenty years. However, one station (the booster that adds pressure during times of normal water use to the northern portion of the community) is anticipated to require upgrades to at least a portion of the structure over the next twenty years. This portion is small (approximately 10 by 12 feet in size) and contains a variety of pipes, pumps, and tanks that must be climbed over to service any of the facilities. The City of Rainier will work to expand the facility to create additional space to service potential leaks and/or repair failed pumps. A new roof will also be added to the structure over the next 20 years.

Level of Service

Level of service standards for the water system are presented within the Comprehensive Water System Plan for the City of Rainier, adopted herein by reference, and the City of Rainier Municipal Code.

Proposed Projects and Sources of Funding

Main Improvements to Meet Fire Flow Standards – Over the next 20 years, the City of Rainier will seek to improve mains throughout the water system to enhance fire flow. Projects are anticipated on or near Binghampton Street, 133rd Avenue, Charm Lane, Hubbard Street, and through the commercial portion of Trotter Downs (for the location of these projects, please see Map WTR-2). Funding options and the complete project list are provided within the Six-Year Capital Improvements Program, located at the beginning of this chapter.

Improvements Necessary for New Development – In addition to these main enhancements, new development will require additional mains and service lines. These water system enhancements will primarily be borne by new development.

Booster Station Enhancements – The City of Rainier will also work to expand a portion of the booster station on the north portion of the community. This expansion will improve the safety and ease of maintaining pipes and pumps within the facility.

Distribution System Leakage – Lastly, the City of Rainier will seek to reduce of leakage and unaccounted-for water within the water system. This project is a high priority of the City of Rainier, and the City will monitor progress towards this goal.

Conservation of the Water Supply

Beyond these items, the City of Rainier will promote water conservation as a means to expand the population that is able to be served by its current water rights. Several potential water conservation measures are discussed below.

- Include consumption history on water bills – Showing the increase or decrease in water use allows customers to track their water use and take steps towards conservation.
- Improve accounting of unmetered or under-accounted for water – Accurately showing water use by various customers often encourages a reduction in use. The City currently believes that a significant portion of the distribution system leakage or unaccounted-for water is associated with

un- or under-accounted water. Improving the accounting of existing water use would better monitor available water supplies and uses.

- Set water rates to encourage conservation – Setting water rates to reflect the amount of water used encourages conservation. The city has established incrementally increasing water rates to promote decreased consumption.
- Reduce system loss – Identifying and fixing leaks helps eliminate water loss and reduces overall operation costs. The city has established a leak detection and control program to identify needed repairs.
- Reduce system pressure – Installing pressure reducing valves in areas of high pressure reduces the amount of flow through plumbing fixtures, decreasing overall use.
- Residential retrofit kits – Installing water saving devices, such as toilet dams, toilet tank leak detection dye, showerhead flow restrictors, faucet aerators, etc., helps to reduce water consumption.
- Incentives for new construction – Establishing incentives for efficiency in new construction encourages less water use.
- Low-water use landscape – Installing landscapes with low watering needs helps reduce the need for watering during peak summer periods.
- Public education – Distributing information through mailings, as part of school programs, at demonstration projects, or at workshops assists in communicating the importance of water conservation. Literature is available from the Department of Health and the Department of Ecology.

Goals and Policies

The following are goals and policies for the water system in Rainier.

Goal CF.WTR-1: Ensure sufficient water rights are available to accommodate the anticipated growth of Rainier.

Policy 1.1: As the need for increased capacity arises, seek water rights and construct additional wells as needed.

Policy 1.2: Seek water rights as needed for meeting the long range demand for the city's potable water supplies and fire protection.

Goal CF.WTR-2: Maintain a high-quality of drinking water.

Policy 2.1: Continue to implement Rainier's wellhead protection plan as a means to preserve the community's drinking water supply.

Policy 2.2: Pursue the development of a wastewater treatment system to limit the potential of contamination of the water supply by improperly functioning septic systems.

Goal CF.WTR-3: Work to construct water system improvements to enhance fire flow and safety within Rainier.

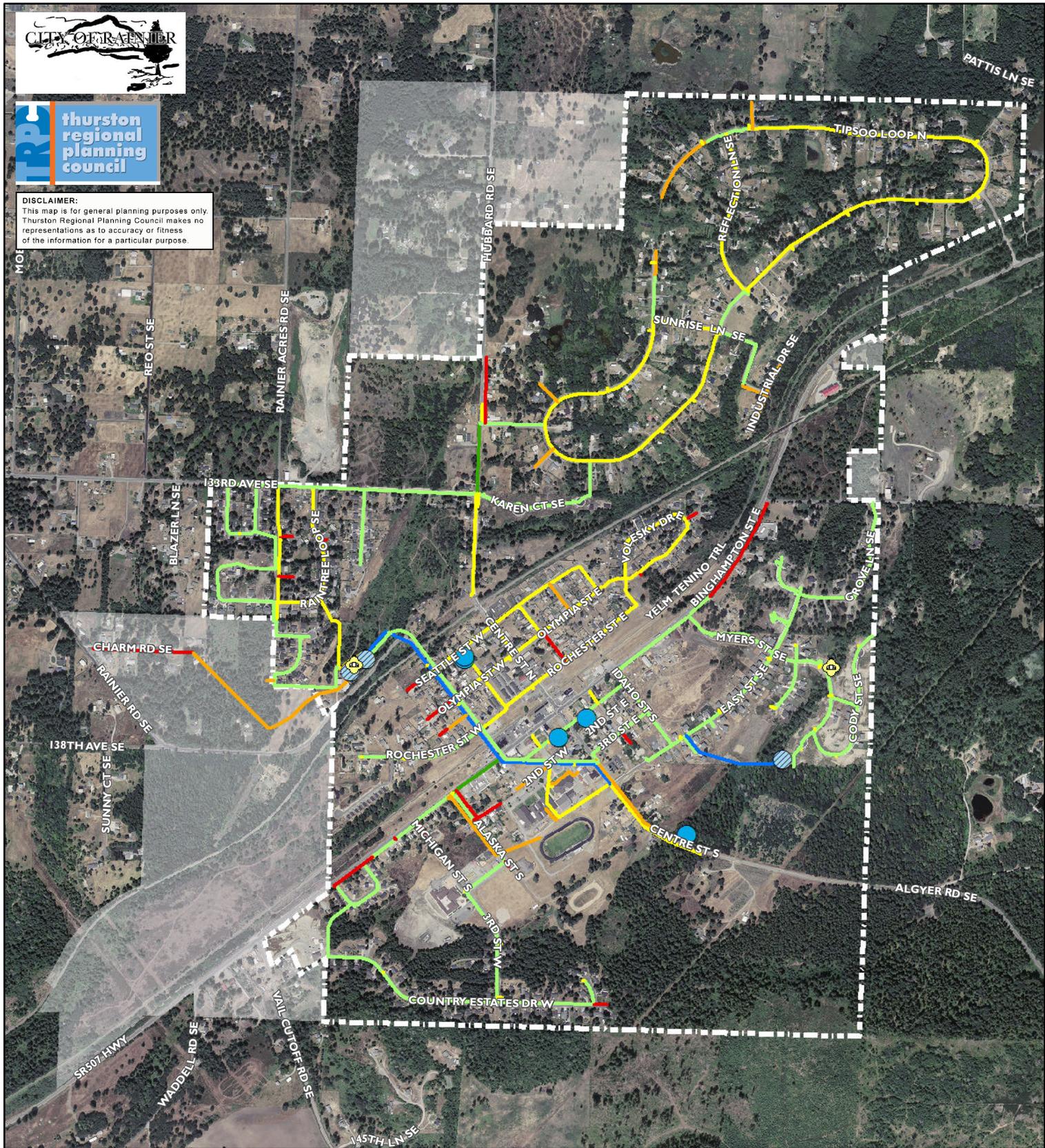
Policy 3.1: Require private developers to extend and/or loop water lines when the water lines primarily benefit their property. Utilize latecomer agreements when these lines will be utilized by other properties in the future.

Policy 3.2: Construct new water lines and/or loops in areas (shown on Figure WTR-2) that will enhance the performance of existing water system and will not likely be constructed as part of future development.

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



Rainier Water Lines



2 Inch Lines

8 Inch Lines

Booster Stations

City Limits

4 Inch Lines

10 Inch Lines

Reservoirs

UGA

WTR-1

6 Inch Lines

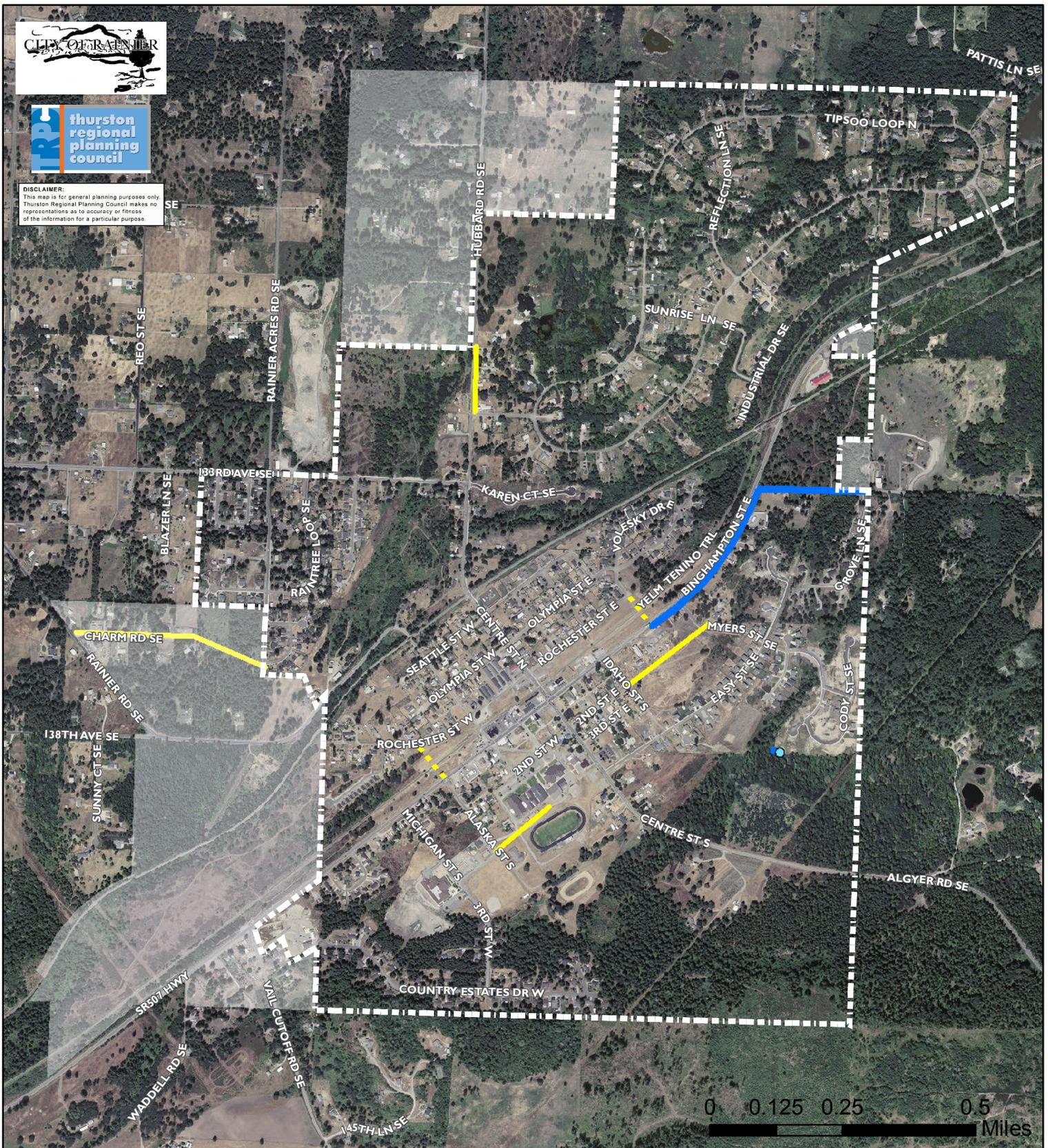
12 Inch Lines

Well Sites





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Rainier Water System Improvements

-  Future Reservoir
-  Proposed 12 Inch (Development Priority)
-  Proposed 8 Inch (Development Priority)
-  Proposed 8 Inch (City Construction Priority)



WTR-2