



Seattle
Public
Utilities

2019 WATER SYSTEM PLAN



Our Water. Our Future.

APPENDICES

Volume 2
August 2019

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Seattle Public Utilities

2019 Water System Plan

Revised Final
August 2019

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**SEATTLE PUBLIC UTILITIES
2019 WATER SYSTEM PLAN
APPENDIX D**

MISCELLANEOUS

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SEATTLE PUBLIC UTILITIES
2019 WATER SYSTEM PLAN

D. MISCELLANEOUS

APPENDIX D-1
Distribution System Analyses

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Fire Flow Analysis

1 INTRODUCTION

Seattle Public Utilities (SPU) has developed a set of hydraulic network models of its water distribution system to analyze system performance. These models are used to:

- Model available fire flow in support of design of water system improvements or additions.
- Identify and prioritize fire flow improvements under certain operating conditions.
- Support operational response and public notification during a system disruption.
- Compare results of hydrant flow tests performed for customers to modeled flow, for model calibration purposes.
- Analyze distribution system performance in a seismic event.
- Identify low pressure areas needing upgrades (completed in 2009).
- Plan and stage unidirectional flushing.
- Provide system performance information to the Washington Surveying and Rating Bureau.¹
- Analyze water age in distribution system.

This document summarizes the methods and results of recent analysis of the SPU water distribution system performance and fire flow availability under certain operating conditions. The results are meant to guide planning decisions for future SPU water distribution system improvements. It is important to note that the results are not site-specific analyses nor are they meant for fire protection system design.

2 HYDRAULIC NETWORK MODELS

Due to its size and complexity, the SPU water distribution system is divided into 11 separate pressure zone hydraulic network models. This section summarizes how these models are configured and calibrated.

2.1 MODELING SOFTWARE

SPU's hydraulic models were originally created and calibrated in EPANET 2.0. Since 2014, SPU has used InfoWater v. 12 as its primary hydraulic modeling software.

¹ This analysis contributes to a Protection Class Grading for communities across Washington State. WSRB evaluates communities in four major areas: Water Supply, Fire Department, Emergency Communications and Fire Safety Control. As a result of this evaluation, the community is assigned a score of 1 through 10, where 1 indicates exemplary fire protection capabilities, and 10 indicates the capabilities, if any, are insufficient for insurance rating credit. The recent ratings for the Seattle Fire Department, King County Fire District #2 and North Highline Fire District rated SPU's water supply relatively high. The 2016 Community Protection Class Grade for the City of Seattle was 2, which is the highest for any community in Washington State.

2.2 CONFIGURATION OF MODELS

The models are full-detail, containing all water mains, storage facilities, pump stations, control valves, and fire hydrant locations in each pressure zone (see Figure 1 below). Connections to the surrounding water system (transmission pipelines and other pressure zones) are modeled by fixed-head reservoirs. Table 1, below, provides details for the models.

Table 1. SPU Water Distribution System Models

Model Name	Pressure Zone(s)	Number of Pipes	Number of Nodes
326	326 (North and South), Magnolia 330	19,900	18,600
430	Maple Leaf 430, Volunteer 430, Olympic Hills 510	11,400	10,400
BA484	Barton 484	860	840
BL509	Bitter Lake 509	1,800	1,700
CRPL Zones	Beacon 460, Skyway 500, Augusta 500/550	4,000	3,800
ML550	Maple Leaf 550	1,400	1,300
QA530 + MG480	Queen Anne 530, Magnolia 480	3,000	2,800
RH590	Richmond Highlands 590	5,100	4,700
VL530 + FH530	Volunteer 530, First Hill 530	1,300	1,200
WS498	West Seattle 498	3,600	3,400
WS585	West Seattle 585	3,500	3,300
Total (11 models, 18 pressure zones)		55,900	52,000

2.3 WATER DEMANDS

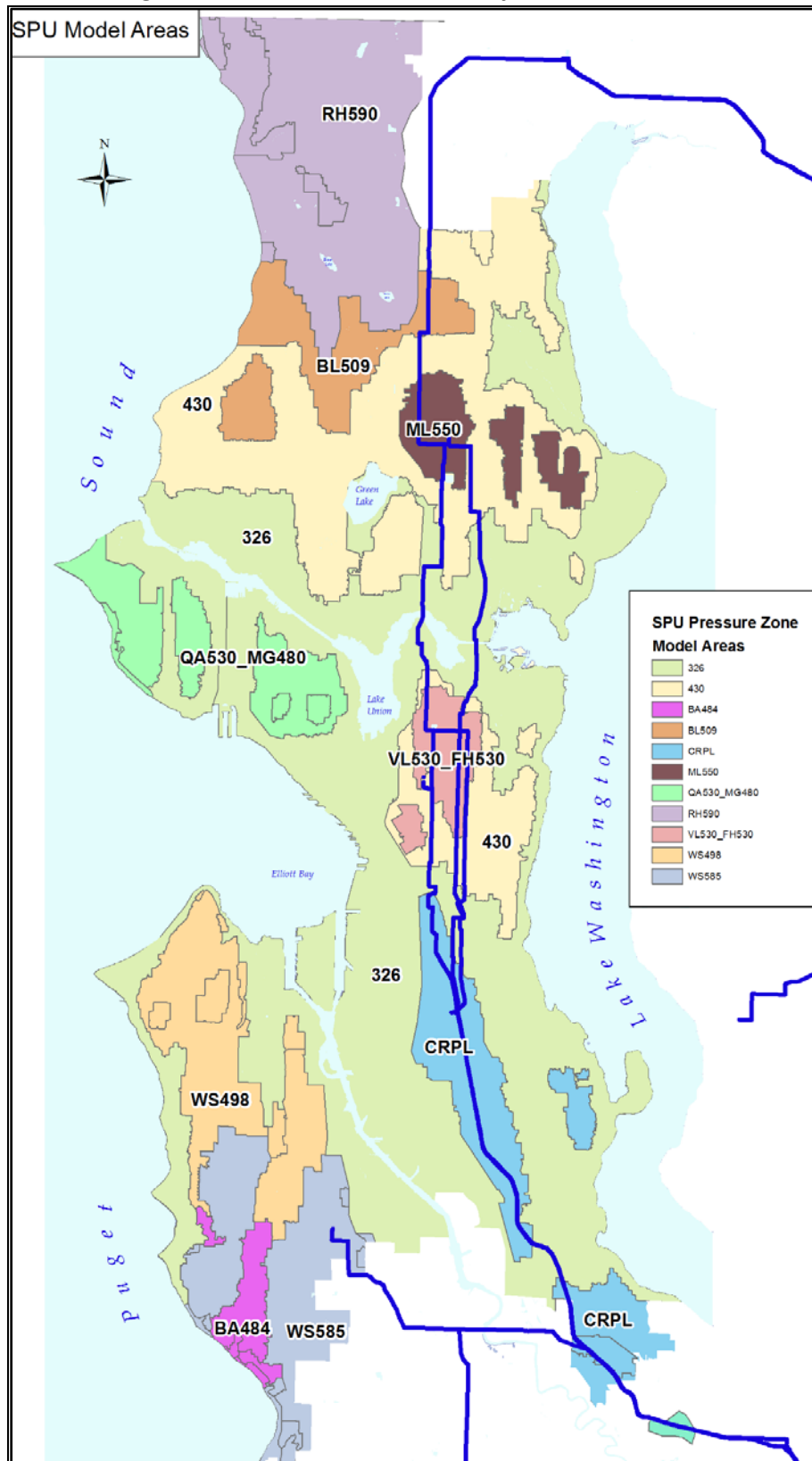
Water demand is distributed throughout each model based on total annual billed consumption for SPU's 200,000 retail service connections. Model consumption is updated annually for each model using the following process:

- Using GIS tools, annual consumption for each service line in the pressure zone(s) represented by the model is allocated to the nearest endpoint of the water line to which the service is connected.
- The aggregated annual consumption for each GIS water line point is converted from hundred cubic feet (CCF) to gallons per minute.
- Using GIS tools, the aggregated consumption at each water line node is assigned to the closest hydraulic model node. Corrections are made as necessary for geographical barriers such as freeways, water bodies, and steep slopes.
- The consumption is aggregated at each model node to determine its base demand.

Peaking factors are applied to the annual consumption data globally throughout the models. The three peaking factors used are as follows:

- Average Day Demand (ADD) – Peaking factor 1.0
- Maximum Day Demand (MDD) – Peaking factor 1.8
- Peak Hourly Demand (PHD) – Peaking factor 2.7

Figure 1. SPU Water Distribution System Model Areas



2.4 MODEL CALIBRATION AND UPDATES

2.4.1 Initial Model Setup and Calibration

SPU's water pressure zone hydraulic network models were originally created in 1998-9 through direct conversion of GIS pipe data. From the pipe data, node data was populated through geographical assignment of water consumption (from the year 1994) and topographical elevation data. Errors such as missing or misidentified pipes and unconnected pipes were corrected manually via visual observation. Finally, each model was made operational by adding volume curves for storage facilities (reservoirs and tanks) and pump curves for booster pump stations.

At the time the models were originally created, there was no data on either the internal pipe roughness (friction factor) for SPU's unlined cast iron water mains nor the exact extent of unlined cast iron pipe in SPU's water distribution system. Because of this, an extensive model calibration effort was performed involving hydrant flow testing and direct pipe roughness measurements. Over 130 hydrant flow tests were conducted between 1999 and 2003. The field calibration effort yielded important information, including typical pipe roughness values (Hazen-Williams C-Factors) for lined and unlined pipes of 120 and 40, respectively. The testing effort also confirmed the year (1940) when Seattle transitioned from unlined to lined cast iron water mains, based on simulations of hydrant flow test results.

Following the pipe roughness calibration effort, each pressure zone model was calibrated for a 24-hour extended period simulation of the peak water consumption day of 1998 (July 15, 1998). This peak day had a total systemwide consumption of 264 million gallons². By adjusting the peak day diurnal demand pattern over a 24-hour extended-period simulation, each model successfully simulated the 1998 peak day.

SPU is currently calibrating the pressure zone hydraulic models using results of hydrant fire flow tests conducted over the past 10 years. SPU expects to complete this calibration by late 2018.

2.4.2 Model Updates

SPU regularly updates its pressure zone hydraulic models to reflect current system conditions and improve model performance. The following tasks are performed to update the models:

- Base water demands are updated annually from billed water consumption using the procedure described above.
- Model pipe and junction data are manually updated annually based on updates to SPU GIS water pipe data. New pipes are assigned a Hazen-Williams C-factor of 120.
- Pipe roughness factors for unlined cast iron water mains are calibrated when verifying field hydrant flow test results. This is done by adjusting Hazen-Williams C-factors of unlined CI water mains in the area surrounding the test until the modeled pressure drop at the witnessed hydrant matches the results from the test.

It should be noted that hydrant flow tests are required by SPU for new development projects that are to be reviewed by the Seattle Fire Marshal's office, if there are no recent hydrant flow tests in the immediate area. Modeled hydrant flow data is not used for this purpose. After new hydrant flow tests

² Total systemwide peak day demand is forecast to remain below this amount through 2032.

are completed, the results are compared to the modeled data to determine if the model needs any re-calibration in that area.

3 FIRE FLOW ANALYSES

This section describes two system-wide fire flow analyses, one performed in 2011-12 and one performed in 2017. The 2011-12 analysis resulted in nine fire flow improvement projects that were completed in 2012-2016. The 2017 analysis incorporates the completed fire flow improvement projects and identifies additional areas for possible fire flow improvement projects.

3.1 2011-12 FIRE FLOW ANALYSIS

3.1.1 Fire Flow Targets

In 2011, SPU and the Seattle Fire Department (SFD) developed operational fire flow performance targets for parcels in the City of Seattle. The targets were developed to help identify and prioritize water system improvements in areas with longstanding fire flow performance issues. The targets involve providing zoning-specific fire flows to hydrants located within a 1,000-foot fire hose length of all developed properties. (SFD brings at least 1,000 feet of fire hose to fire responses.) The fire flow targets, which are based on land used zoning, are as follows:

- Single Family Residential – 1,000 gpm
- Multi-Family Residential – 1,500 gpm
- Commercial – 3,000 gpm
- Downtown/Industrial – 8,000 gpm

3.1.2 Fire Flow Analysis

The 2011-12 fire flow analysis was run using each of the pressure zone models under Year 2010 Average Day Demand (ADD), which had a total of 54.3 mgd of retail consumption³. Available fire flow was determined with a 20 psi residual pressure at the test hydrant and no pressure or velocity restrictions elsewhere in the system. The 1,000-foot fire hose length was approximated by using a 900-foot straight line distance between hydrants and center points of parcels to account for bends in the hose around structures and other obstructions. Spreadsheet tools were then used to determine for each parcel the hydrant with the highest flow within the specified distance. Spot checks were made to exclude unpassable connections such as freeways, water bodies, and steep slopes.

3.1.3 Results of Analysis

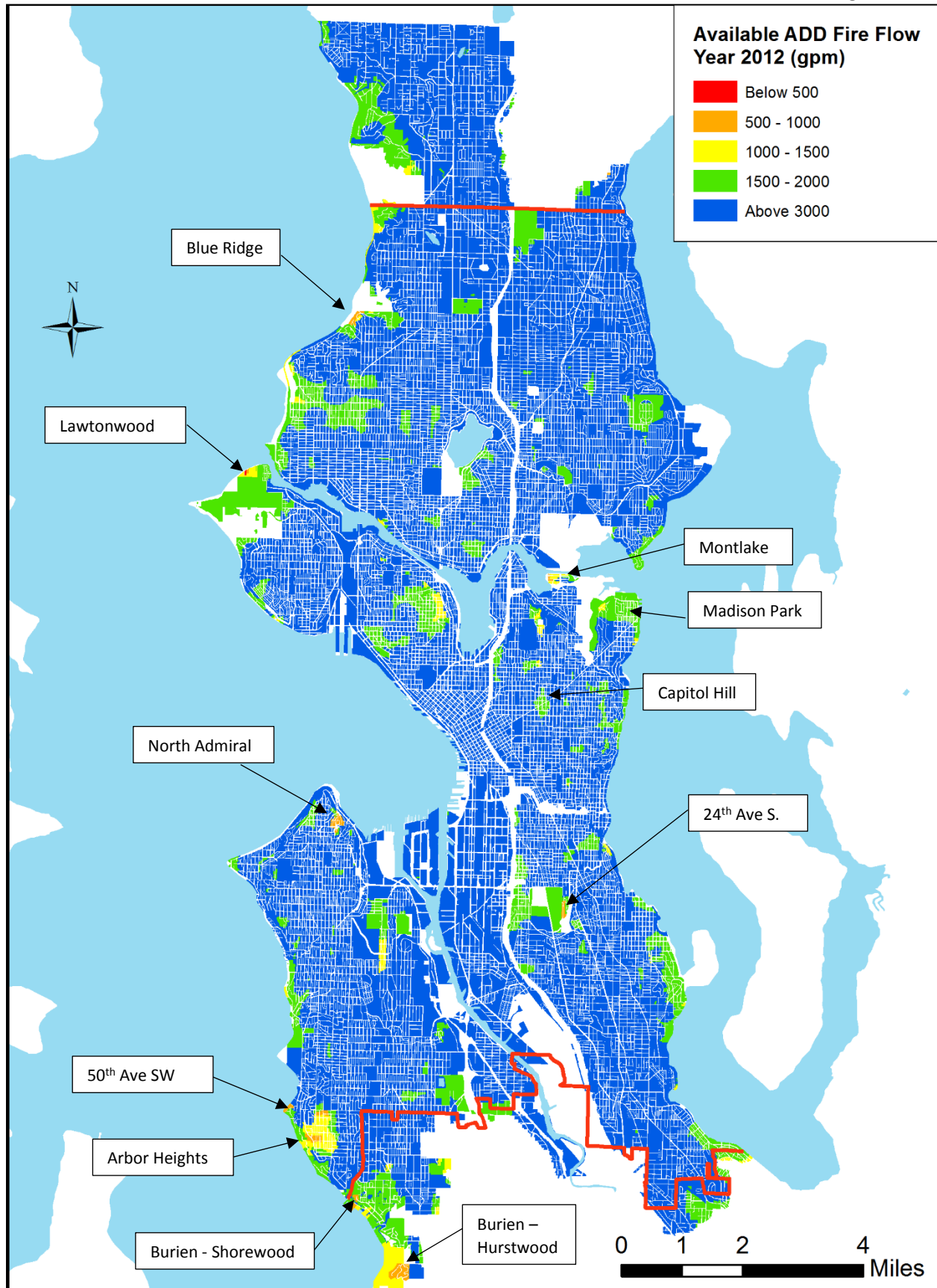
The analysis found that the majority of the over 190,000 parcels in SPU's retail service area met or exceeded the fire flow performance target, with 11 areas having less than target flow. (Eight of these areas are in Seattle and two are in the City of Burien.) The areas are listed in Table 2, below.

³ Retail consumption is forecast to stay below this level through 2035.

Table 2. Areas Not Meeting Fire Flow Performance Targets

Area	Zoning	Fire Flow Target (gpm)	No of Parcels < Target
Blue Ridge	Single Family	1,000	30
Lawtonwood	Single Family	1,000	5
Montlake	Single Family	1,000	8
Madison Park	Commercial	3,000	13
Capitol Hill	Commercial	3,000	17
North Admiral	Single Family	1,000	44
24 th Ave S	Single Family	1,000	51
50 th Ave SW	Single Family	1,000	12
Arbor Heights	Single Family	1,000	127
Burien – Shorewood	Single Family	1,000	18
Burien – Hurstwood	Single Family	1,000	123

The ADD 1,000-foot fire flow results and areas not meeting the performance target are shown in the map below.



3.1.4 Fire Flow Improvement Projects

SPU has completed nine fire flow improvement projects since the 2011-12 fire flow analysis. These projects are listed in Table 3, below.

Table 3. Fire Flow Improvement Projects Completed in 2012-16

Project Name	Land Use Zoning	Improvements	Year Completed
Arbor Heights Fire Flow Improvements	Single Family	8" replacement - 3,700 LF	2012
24 th Ave S. Fire Flow Improvements	Single Family	8" CIPP ⁽¹⁾ – 1,340 LF	2015
50 th Ave SW Fire Flow Improvements	Single Family	8" replacement – 300 LF	2015
Blue Ridge Fire Flow Improvements	Single Family	6" replacement – 550 LF 6" CIPP – 690 LF 8" replacement – 110 LF PRV station ²	2015
North Admiral Fire Flow Improvements	Commercial	8" replacement – 300 LF PRV station ⁽²⁾	2015
Burien-Shorewood Fire Flow Improvements	Single Family	PRV station ⁽²⁾	2015
Capitol Hill Fire Flow Improvements	Commercial	8" CIPP – 1,030 LF	2016
Madison Park Fire Flow Improvements	Commercial	8" CIPP – 730 LF	2016
SW Cambridge Fire Flow Improvements	Single Family	8" extension – 140 LF PRV station ⁽²⁾	2016

1) CIPP = Cured-in-place pipe lining – improves internal roughness of cast iron pipes

2) PRV station = New pressure-reducing valve station providing supplemental fire flow from adjacent pressure zone

The three remaining areas not meeting the performance target (Lawtonwood, Montlake, and Burien-Hurstwood) are waiting on external agency actions/projects before any improvements can be made. For the Lawtonwood area, SPU constructed an intertie with the Discovery Park water system and is waiting for an overall asset transfer and operations agreement with Seattle Parks and Recreation to activate it. For Montlake, SPU is waiting for WSDOT to construct their own fire flow improvements as part of the SR 520 project. For Burien-Hurstwood, SPU is waiting on a nearby private development that will construct a water main extension in Seattle's system consistent with SPU's watermain extension requirements for developers.

As an aside, the information from this analysis was added to SPU's internal GIS layers, for operational planning purposes only. The information was also made available to the Seattle Fire Department. The name of the field is "MHADDGPM20," for modeled hydrant flow at average day demand at 20 psi.

3.2 2017 FIRE FLOW ANALYSIS

3.2.1 Fire Flow Analysis Parameters

The 2017 analysis incorporates the recently completed fire flow improvement projects described in Section 3.1.4. It also utilizes the greater analytical capabilities of InfoWater versus EPANET. Based on WAC requirements and criteria used by the Washington Surveying and Rating Bureau (WSRB), the fire flow analysis was completed using the following parameters:

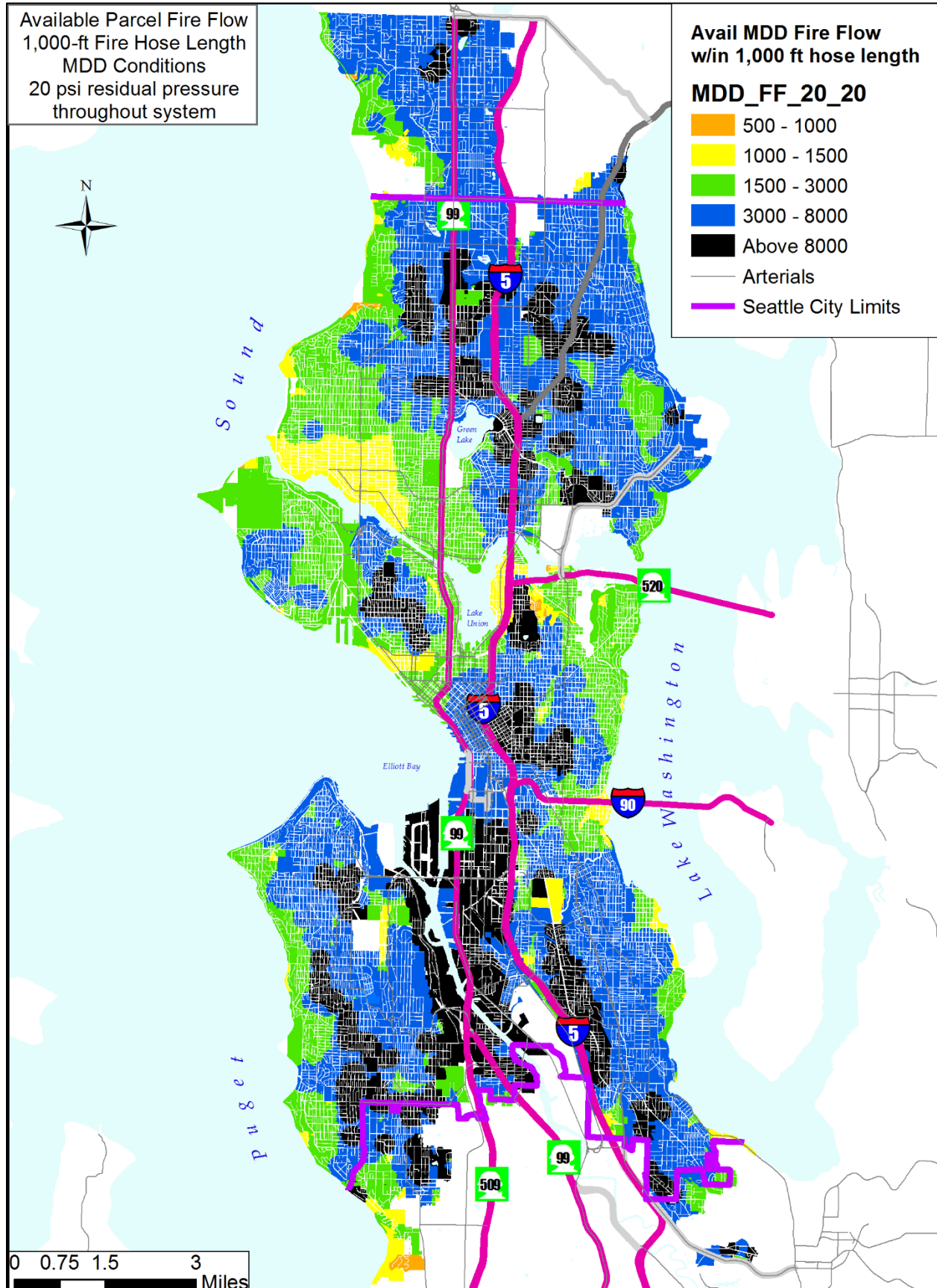
- Maximum Day Demand (MDD), or 1.8 times 2010 or 2015 average daily consumption, depending on model used.
- Maintaining a minimum 20 psi residual pressure in the system.
- Distribution storage water levels set at 5 feet below maximum (equal to the bottom of the operating storage layer). Note that the equalizing storage component is not needed in the SPU system because of multiple supply sources being available to each pressure zone.
- Steady-state mode.

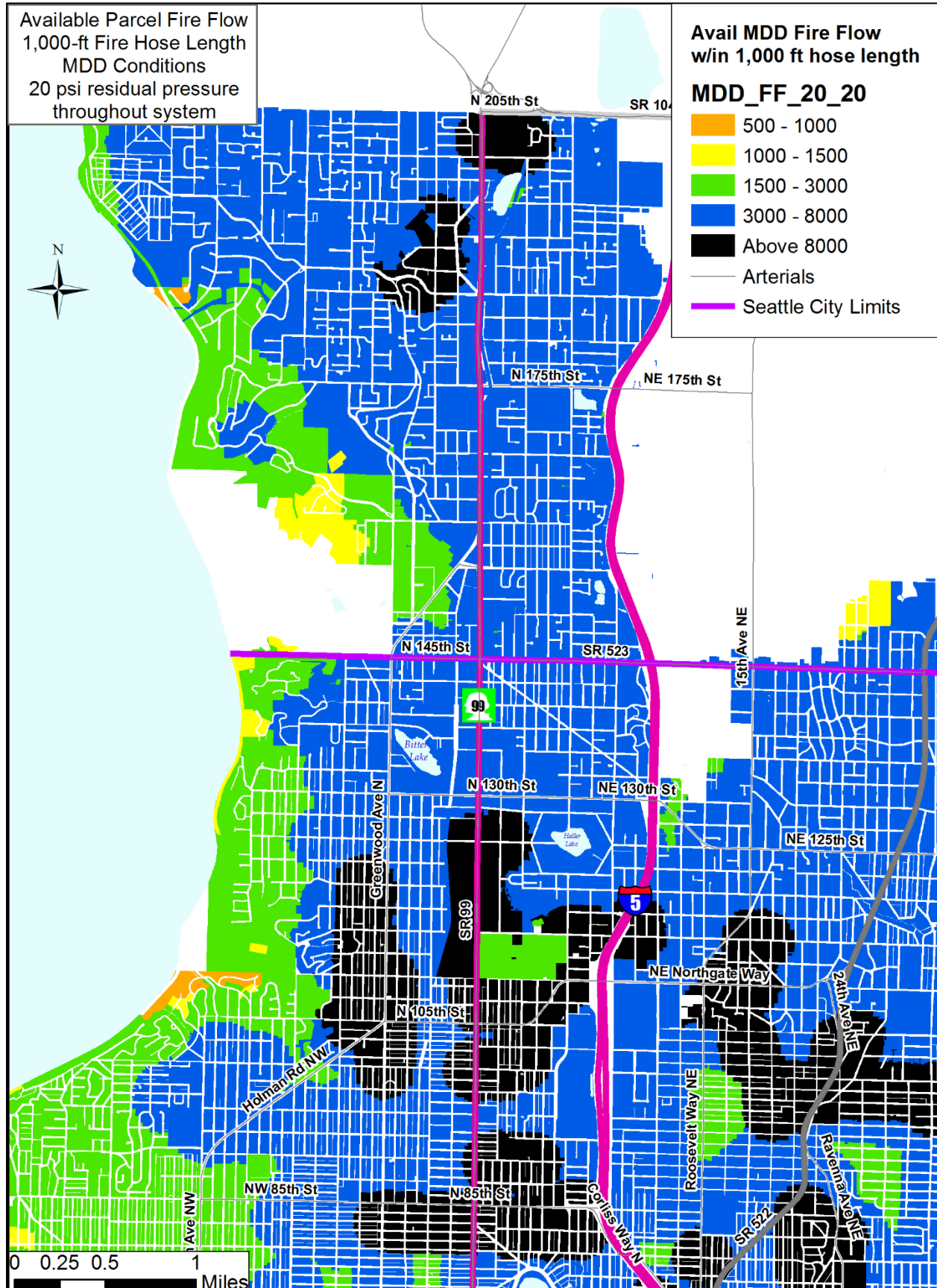
3.2.2 Results of Analysis

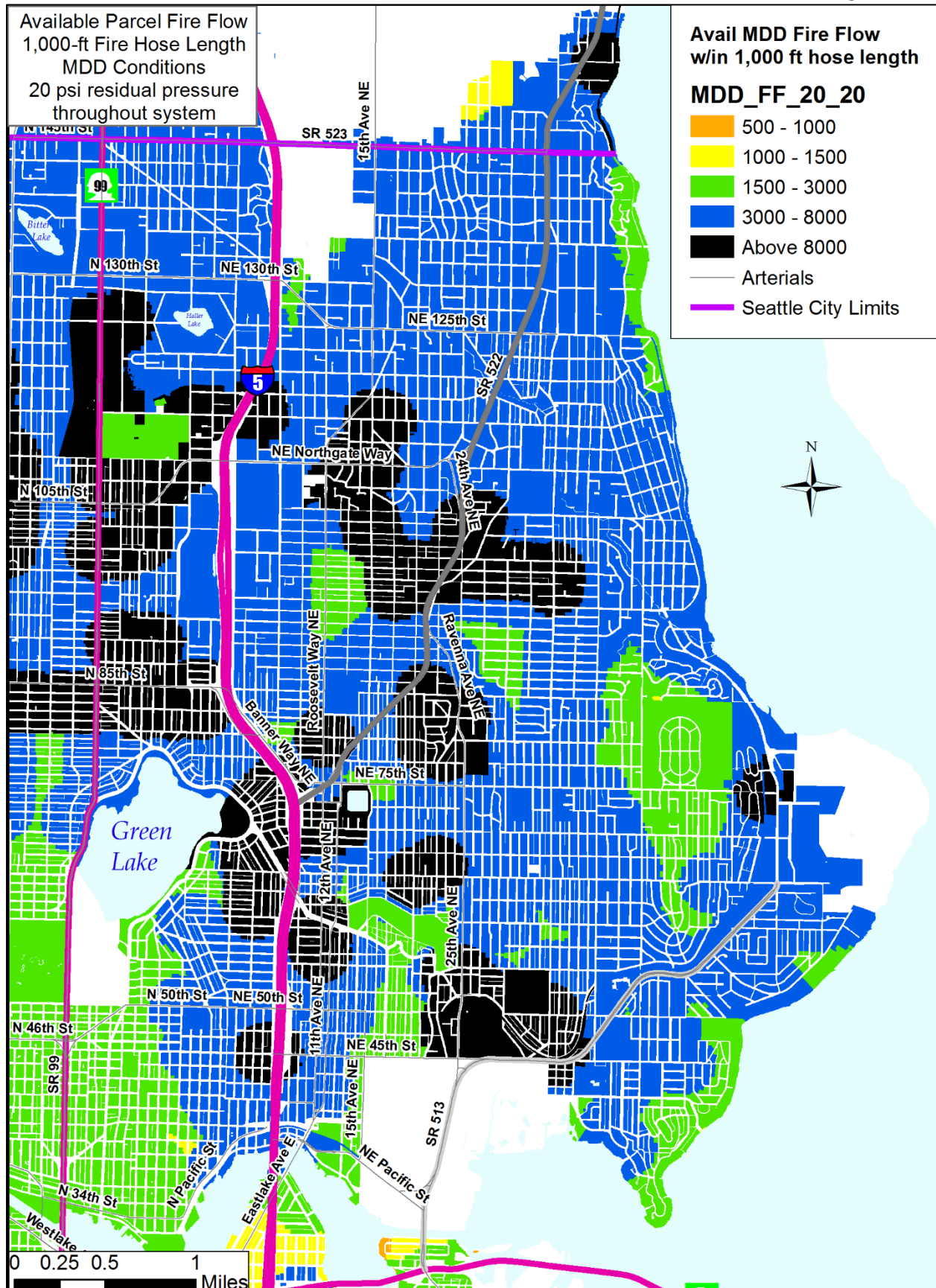
The 2017 Fire Flow Analysis Results are shown on the maps on the following pages. The maps show the modeled available fire flow to each parcel in the SPU direct service area (DSA) within a 1,000-foot fire hose length during MDD conditions. The results are shown on an overall system map and on maps of six sub-areas.

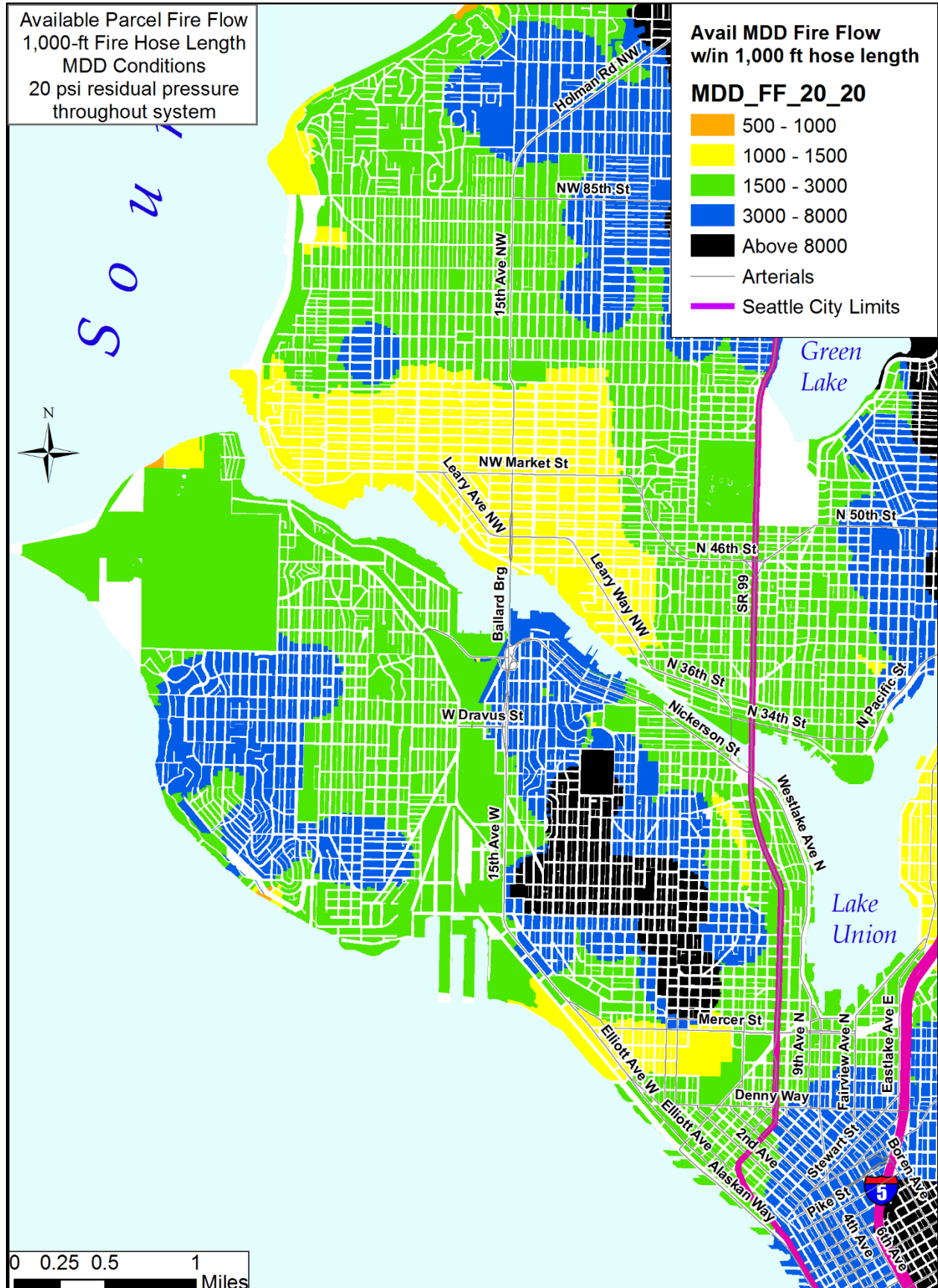
List of Fire Flow Maps

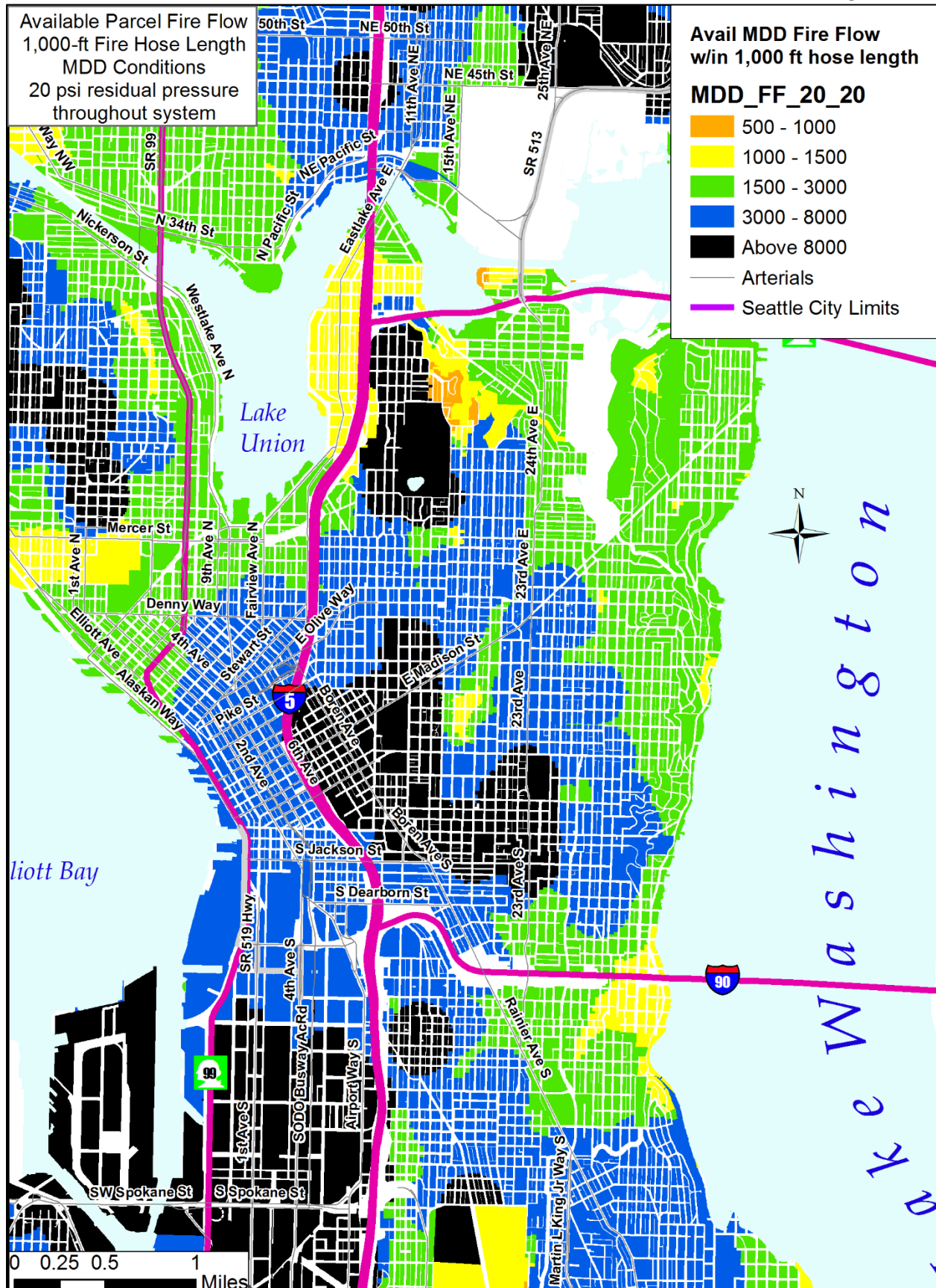
- Entire direct service area (DSA)
- Northwest DSA
- Northeast DSA
- West/Central DSA
- East/Central DSA
- Southwest DSA
- Southeast DSA

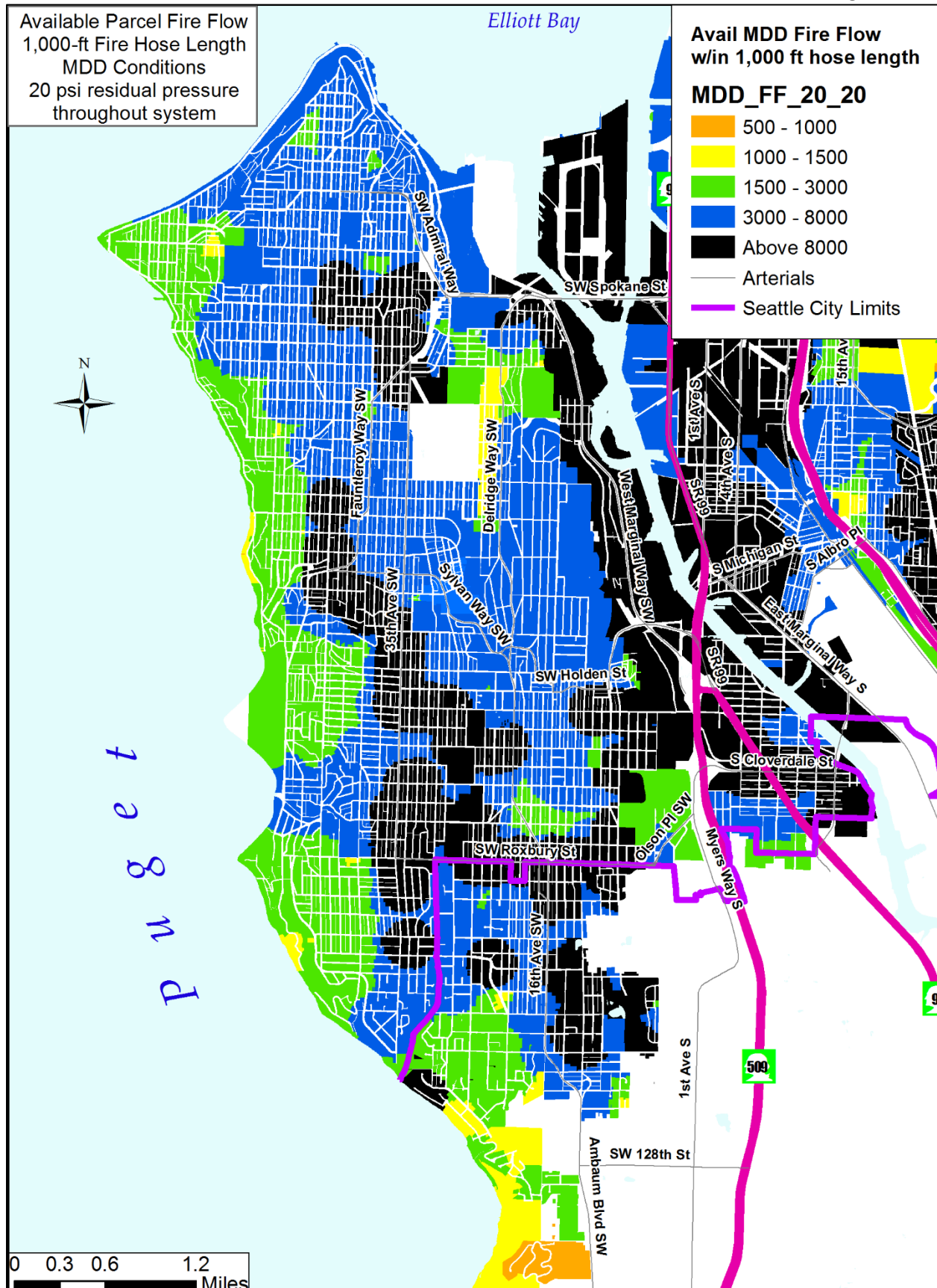














3.2.3 Areas Not Meeting Fire Flow Performance Targets

The 2017 fire flow analysis identified nine areas not meeting fire flow performance targets.

- Shoreline – Innis Arden
- Blue Ridge
- Montlake
- North Capitol Hill
- Burien – Shorewood
- Burien - Hurstwood
- Ballard 326 Area
- Lower Queen Anne 326 Area
- Eastlake 326 Area

Descriptions of each area are listed in Table 4 and on maps on the following pages.

3.2.4 Solutions to Fire Flow Deficiencies

The areas not meeting the fire flow performance target will be addressed in the following ways:

- For areas with undersized and/or unlined water mains, explore options for upsizing, water main cleaning and lining, and/or other targeted improvements (such as installation of pressure reducing valve stations to provide supplemental fire flow).
- For areas where the fire flow restrictions are due to high points in the system, explore options for eliminating the high points such as pressure zone boundary adjustments and/or water main extensions or replacements.
- Explore options for implementing the fire flow improvements, including stand-alone fire flow improvement projects, projects installed in coordination with other agencies, or through developer-installed water main extensions.

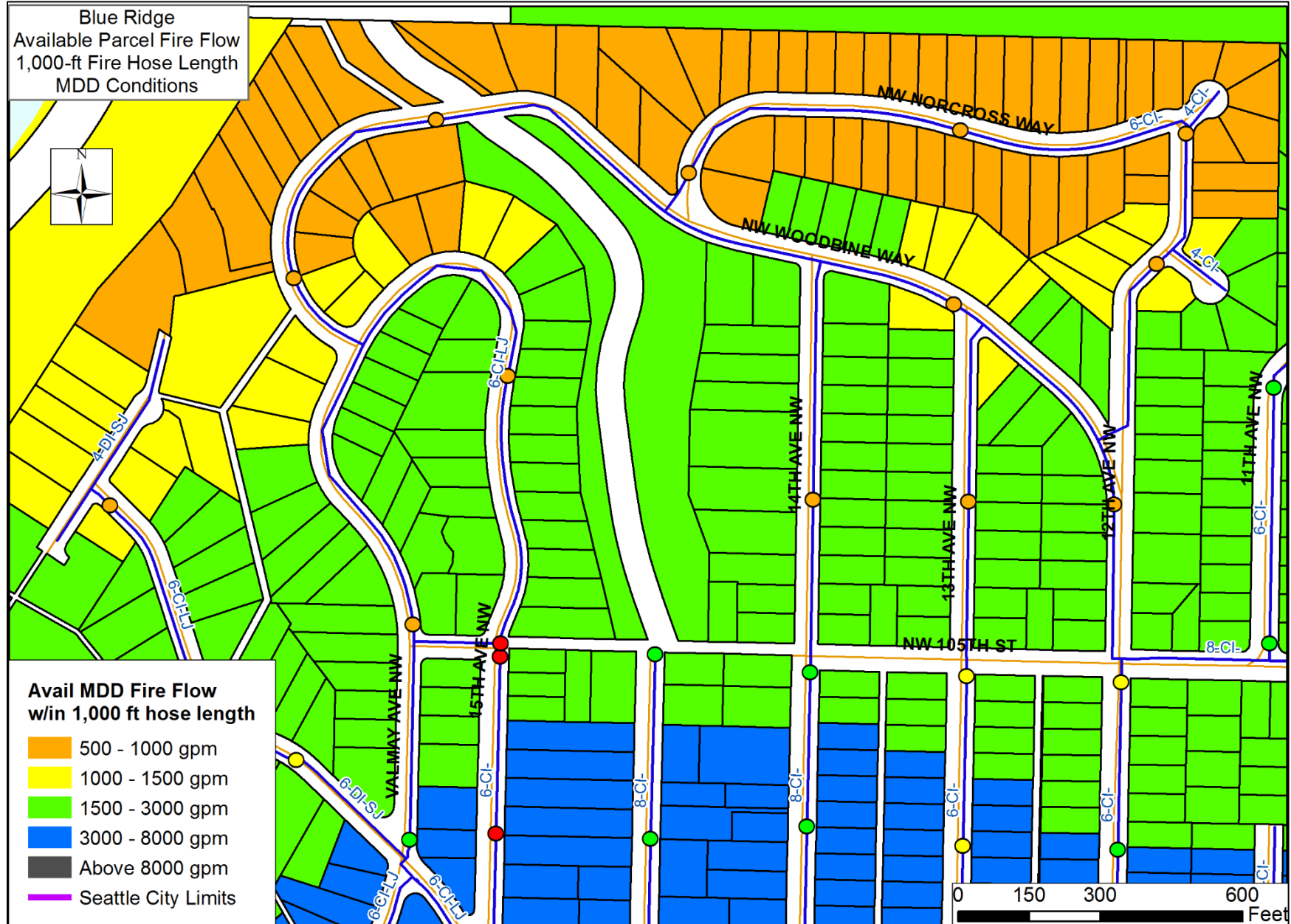
Table 4 shows the possible solutions that are applicable for each of the areas.

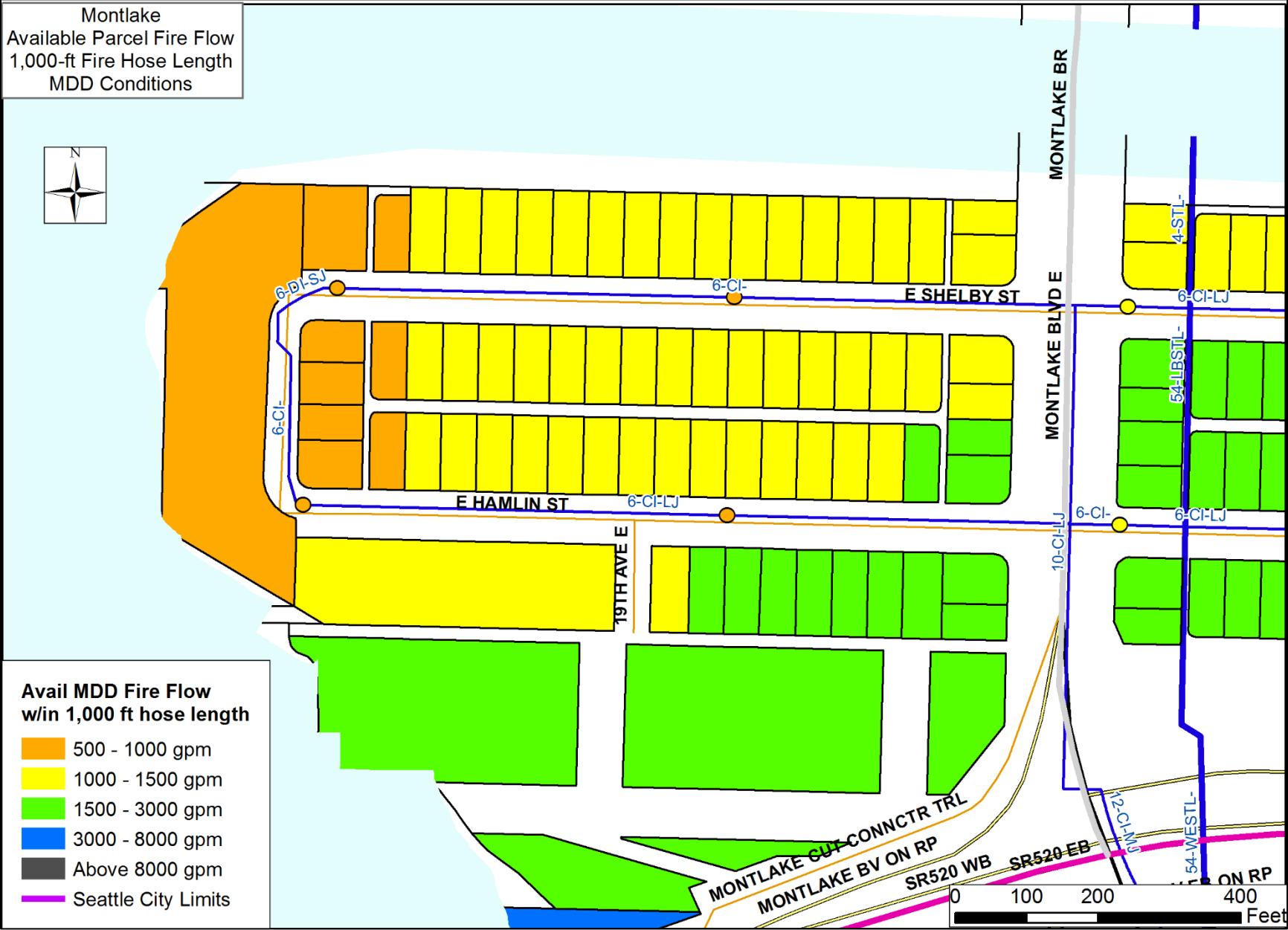
Table 4. Fire Flow Deficiency Areas Identified in 2017 Fire Flow Analysis

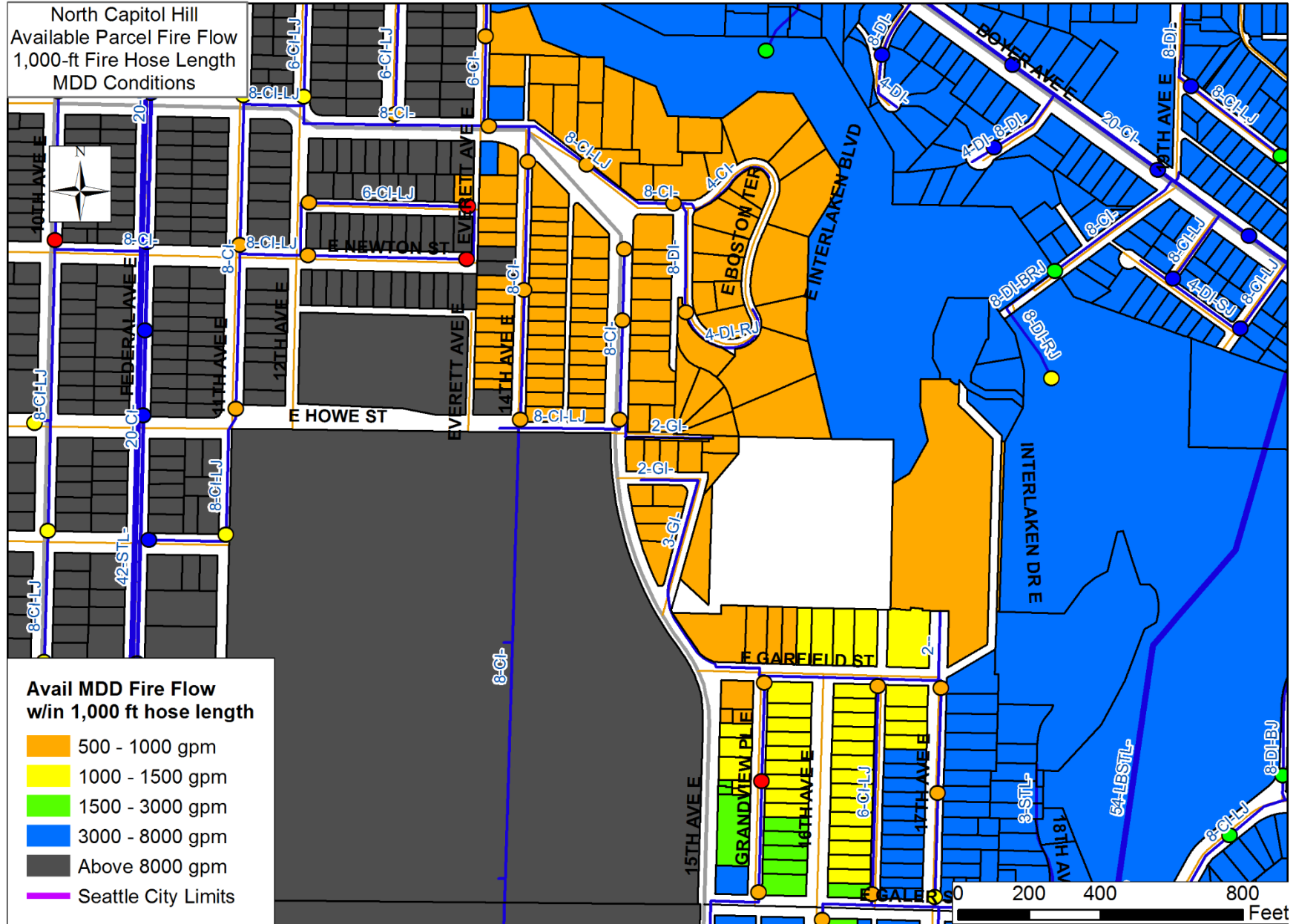
Area Name	Fire Flow Targets Not Met	Number of Parcels Not Meeting Target	Reasons for Fire Flow Deficiencies	Possible Fire Flow Solutions
Shoreline – Innis Arden	Single Family	6	Undersized water mains	Upsize water mains
Blue Ridge	Single Family	75	Undersized & unlined water mains	Upsize and/or clean and line water mains
Montlake	Single Family	20	Undersized & unlined water mains	Upsize and/or clean and line water mains
North Capitol Hill	Single Family	106	Undersized & unlined water mains	Upsize and/or extend water mains
Burien – Shorewood	Single Family	8	Undersized water mains	Upsize water mains
Burien - Hurstwood	Single Family	126	Undersized water mains	Upsize and/or extend water mains
Ballard 326	Commercial/ Multi-Family/ Industrial	23 ¹	High points restrict flow at 20 psi	Expand adjacent higher-head pressure zone (Maple Leaf 430) to serve affected parcels
Lower Queen Anne 326	Commercial/ Multi-Family/ Industrial	35 ¹	High points restrict flow at 20 psi	Expand adjacent higher-head pressure zones (Queen Anne 530, Volunteer 430) to serve affected parcels
Eastlake 326	Commercial/ Multi-Family/ Industrial	0 ²	High points restrict flow at 20 psi	Provide supplemental fire flow from adjacent Volunteer 530 feeder water main.

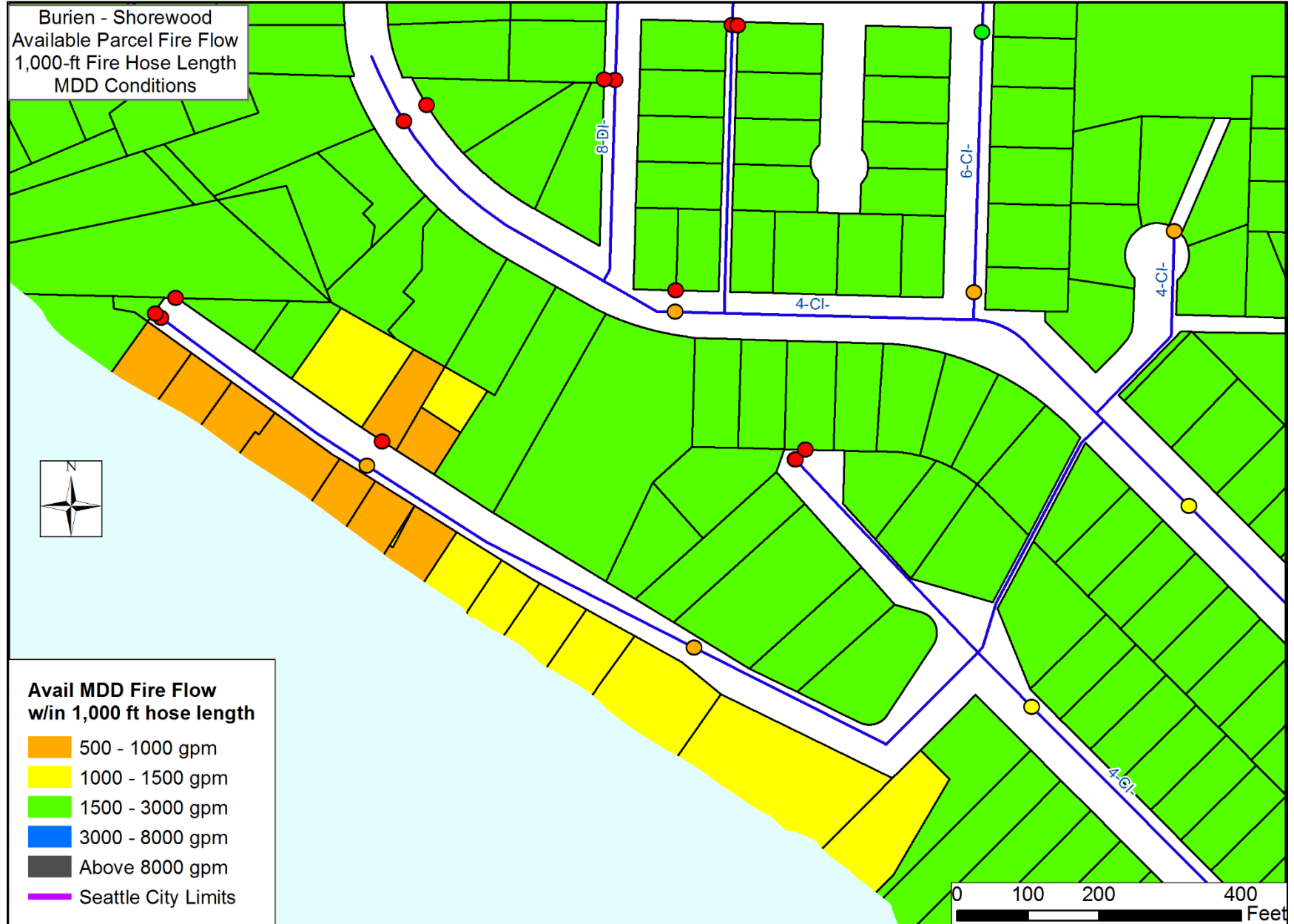
1. Number of high-elevation parcels dropping below 20 psi during fire flow events elsewhere in the pressure zone.
2. Feeder main not directly serving any parcels.

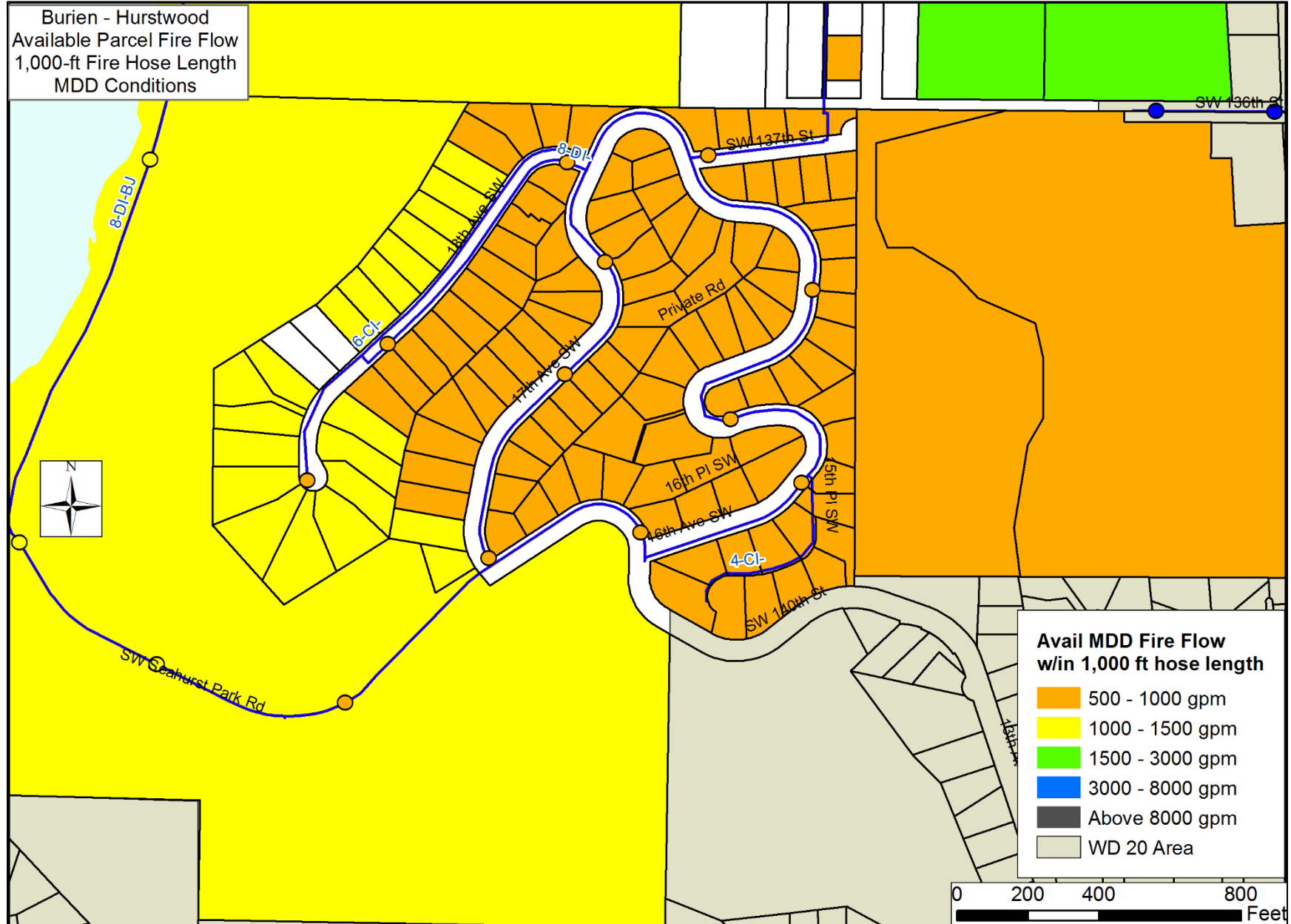


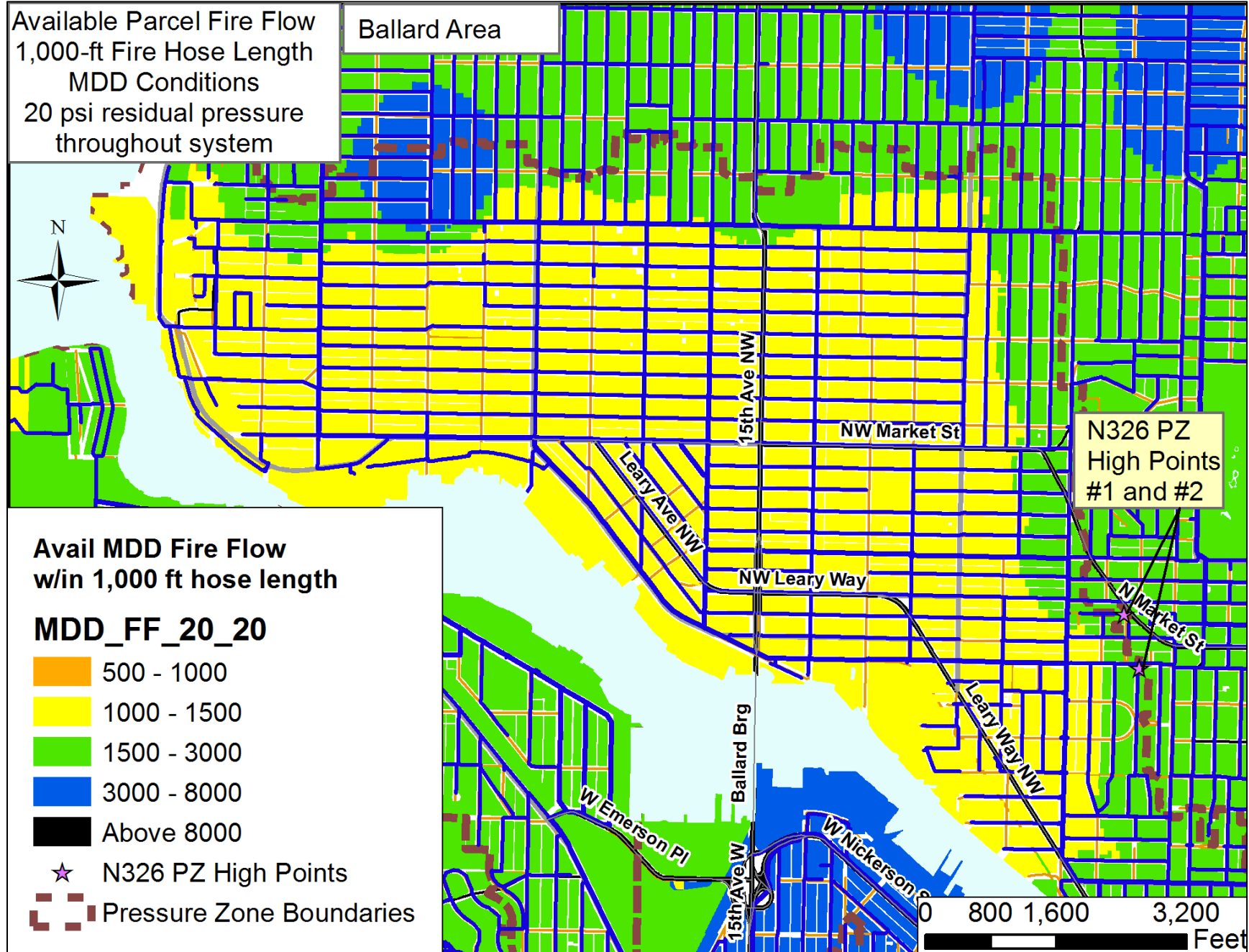


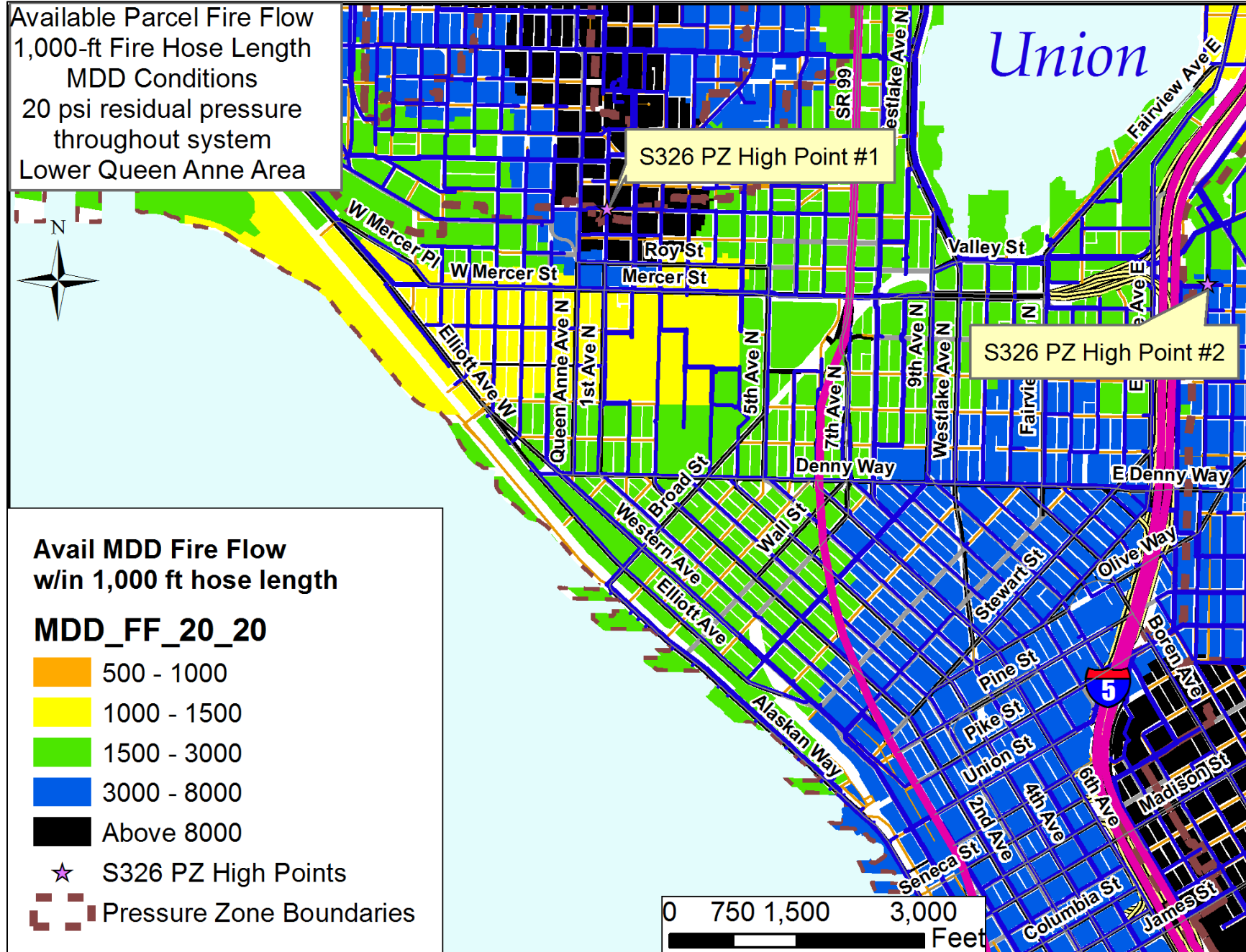


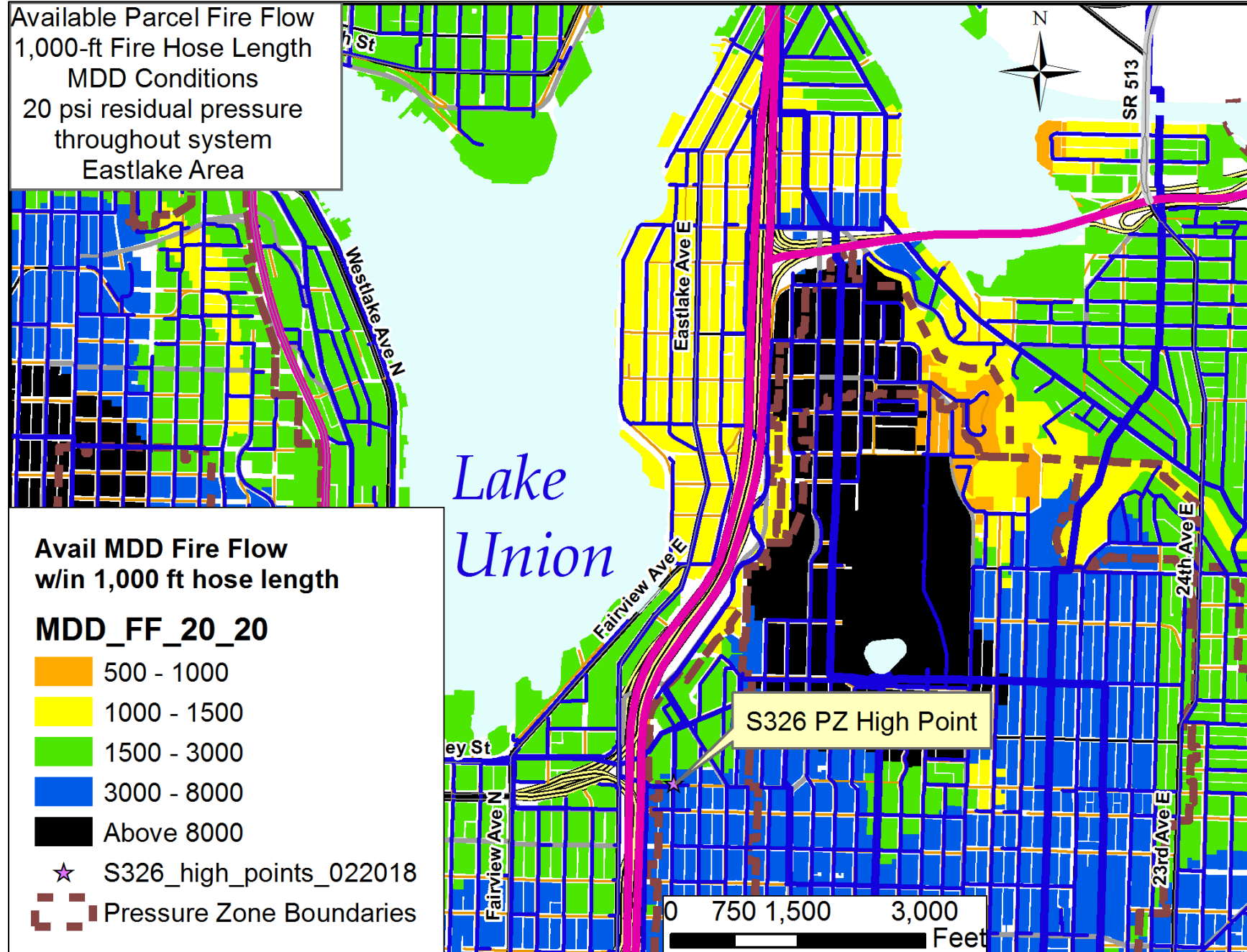












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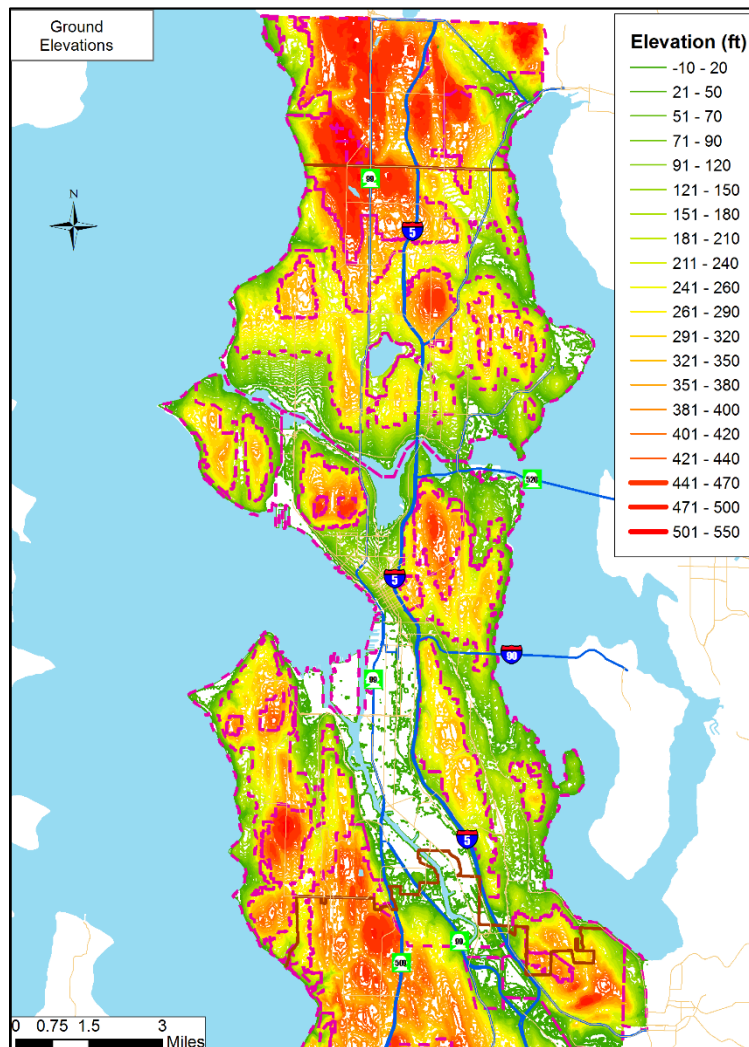
High Pressure Areas

1 INTRODUCTION

This document describes areas with static water pressure greater than 80 pounds per square inch (psi) in the Seattle Public Utilities (SPU) water distribution system.

2 TOPOGRAPHY OF SPU WATER DISTRIBUTION SYSTEM

The SPU Water distribution system serves areas with elevations between 12 and 532 feet (NAVD-88 datum). The SPU system is divided into 11 pressure zones and multiple sub-zones to provide water pressures to customers within an acceptable range. A topographic map of the SPU water distribution system is shown below.



3 SPU POLICY ON HIGH WATER PRESSURE

SPU's policy on high water pressure states the following:

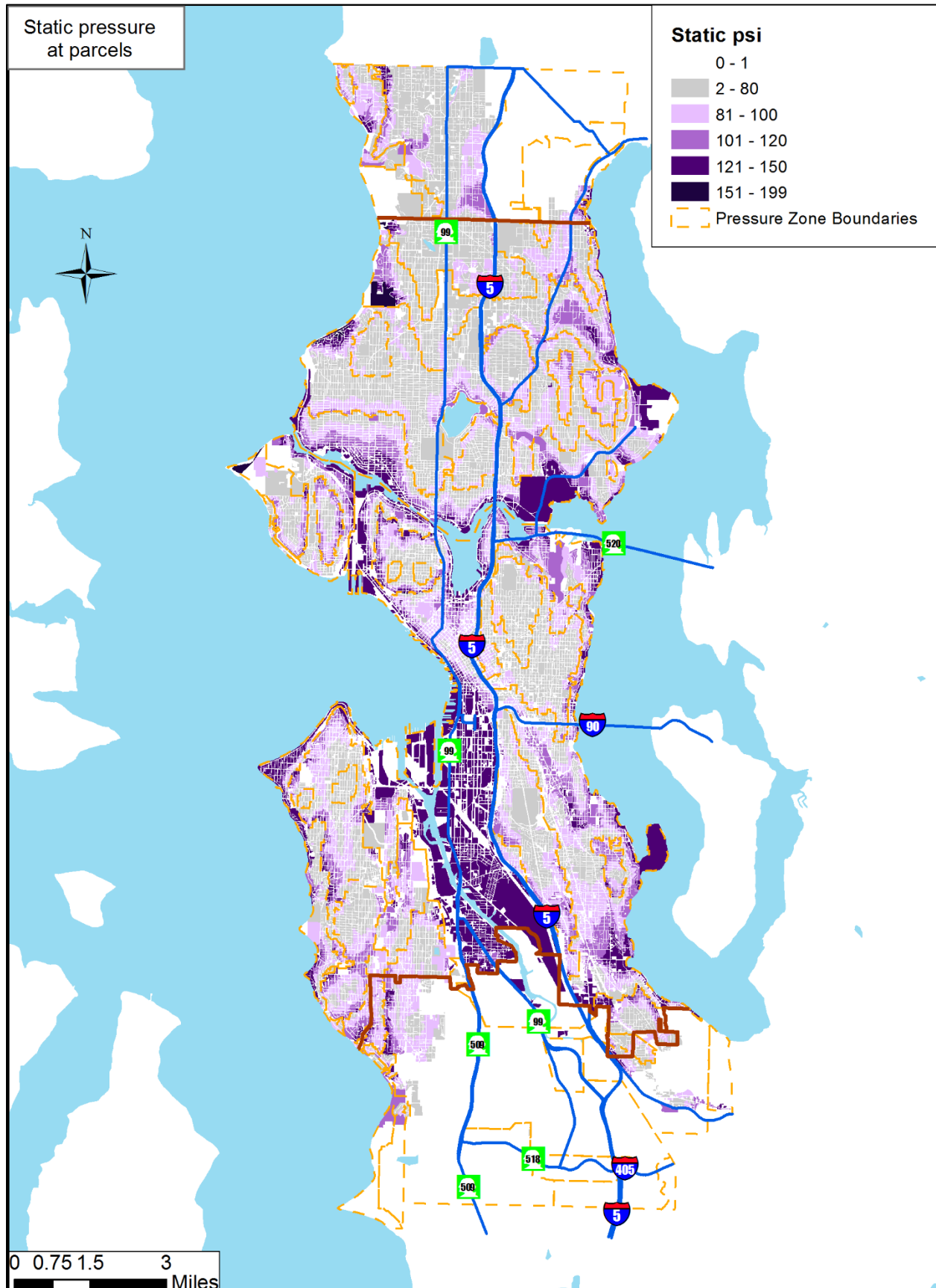
- There is no maximum pressure limit in the SPU distribution system.
- Customers with water pressure greater than 80 psi are advised to follow Uniform Plumbing Code guidelines for installing pressure reducing valves on property.
- Installation of pressure reducing valves on property is the responsibility of customers and at their cost, with the exception of when an SPU-initiated pressure increase of 10 psi or greater raises customer's static water pressure from below 80 psi to at or above 80 psi. In such cases, SPU will reimburse customers for reasonable costs for installation of pressure reducing valves.

4 HIGH WATER PRESSURE ANALYSIS

An analysis of high water pressure in the SPU water distribution system was performed using the following data:

- Nominal static head for SPU water pressure zones (either water storage overflow elevations or nominal pipeline/pump discharge heads).
- Nearest 2-foot elevation contour line to the point of connection of water service lines to water mains.

Static pressure was determined by subtracting the service line elevation from the nominal static head and multiplying the resulting value by 0.433. For display purposes, the static pressure at the service line was assigned to the parcel served by the service line. The high pressure analysis results are shown in the map on the following page.



High Pressure Analysis Summary

Static water pressure is summarized by pressure zone in the table below.

Pressure Zone	Number of Parcels Served	Pressure at Water Main (psi)		
		Minimum	Maximum	Average
Augusta 500/550	701	54	107	77
Barton 484	2,173	29	139	92
Beacon 460	8,175	48	145	87
Bitter Lake 509	7,727	39	157	75
First Hill 530	167	71	113	87
Magnolia 330	3,061	43	136	84
Magnolia 480	4,112	42	194	88
Maple Leaf 430	37,120	25	168	75
Maple Leaf 550	6,458	34	127	81
North 326	21,044	29	134	86
Olympic Hills 510	327	66	101	85
Queen Anne 530	4,997	33	167	88
Richmond Highlands 590	15,268	35	176	71
Skyway 500	2,630	43	142	86
South 326	34,060	31	136	95
Volunteer 430	9,273	29	146	68
Volunteer 530	3,818	33	130	67
West Seattle 498	13,958	31	149	84
West Seattle 585	10,995	30	151	86
Entire System	186,064	25	194	82

- Static water pressures greater than 80 psi are present in nearly every pressure zone in the SPU water distribution system.
- The South 326 pressure zone contains the most widespread areas with static pressure over 80 psi with elevations near Sea Level having static pressures above 120 psi.
- There are approximately 180 parcels with static pressures over 150 psi. Most of these are in the Maple Leaf 430 pressure zone along Puget Sound.
- The parcel with the highest static water pressure is the King County wastewater treatment plant at West Point, which has 194 psi.

Seattle Retail Service Area Pump Stations Allocation

						Pump Stations													
						North City PS	Foy PS	Bitter Lake PS	Volunteer PS	BroadWay PS	First Hill at Jesserson	Warren Avenue PS	Lincoln PS	Interbay High Service	Spokane PS	West Seattle PS	Highland Park PS	Trenton Turbines	Burien PS
				Pump 1, gpm		6,500	6,000	4,000	4,000	4,700	2,800	4,000	3,900	3,500	4,000	4,500	5,500	1,000	2,000
Peak Day to Average Day: 1.8				Pump 2, gpm		6,500	4,440	4,000	4,000	2,800	4,900	4,000			4,000	4,500	5,500	3,000	3,000
Peak Hour to Peak Day: 2.0				Pump 3, gpm			4,440	4,000		4,000							1,400		6,000
				Total		13,000	14,880	12,000	8,000	11,500	7,700	8,000	3,900	3,500	8,000	9,000	12,400	4,000	11,000
				Total less Largest Pump		6,500	8,880	8,000	4,000	6,800	2,800	4,000	-	-	4,000	4,500	6,900	1,000	5,000
Pressure Zones		ERUs	ADD (MGD)	PDD (MGD)	PHD (gpm)														
	Richmond Highlands 590	27,191	3.95	7.12	9,884	23,380													
	Bitter Lake 509	11,471	1.67	3.00	4,170														
	Maple Leaf 430	53,200	7.69	13.84	19,220														
	Maple Leaf 550	7,774	1.13	2.03	2,826														
	North 326	46,529	6.77	12.18	16,914														
	Magnolia 330	4,975	0.72	1.30	1,809														
	Magnolia 480	5,653	0.82	1.48	10,946				17,600										
	Queen Anne 530	8,301	1.21	2.17															
	Volunteer 530	10,321	1.50	2.70															
	First Hill 530	5,837	0.85	1.53															
	Volunteer 430	22,566	3.28	5.91	8,203														
	Beacon 460	11,379	1.65	2.98	4,136														
	Skyway/Augusta 500	4,260	0.52	0.93	1,288														
	West Seattle 498	18,574	2.70	4.86	6,752										8,500				
	West Seattle 585	13,720	1.99	3.59	4,987												12,900		
	Barton 484	3,067	0.45	0.80	1,115														
	South 326 (less Alki 326)	120,500	17.55	31.59	43,875														
	Alki 326	6,500	0.95	1.71	2,373														

Notes:

- Colored zones are supplied 100% by pumping whereas the rest are supplied by gravity.
- The ERU and ADD determinations used in the storage and pump station analyses are based on 2009 billed retail consumption records, which according to the current water demand forecast, is not expected to be reached again until 2040. To determine average daily water use per ERU the 2009 annual consumption of all ¼-inch services systemwide was added up and then divided by their number, yielding 145.4 gallons per day per ERU after unit conversion. The average day demand for each pressure zone was determined by adding up the annual consumption of all services in the zone, then converted to MGD. The number of ERU in each pressure zone was determined by dividing the average day demand in the zone by the previously calculated 145.4 gallons per ERU per day.
- Additional PHD of approx 2,000 gpm for whole sale customers in the Richmond Highlands 590 Zone (PDD:ADD = 2.0, PHD : PDD = 1.3).
- Additional PHD of approx 5,120 gpm for whole sale customers in the West Seattle 585 Zone. (PDD:ADD = 2.0, PHD : PDD = 1.3)

Seattle Retail Service Area Standby Storage Allocation

				Storage Facilities																											
				Lake Forest Park Reservoir	Richmond Highlands Tank No. 1	Richmond Highlands Tank No. 2	Foy Standpipe	Bitter Lake Reservoir	View Ridge Reservoir	Maple Leaf Reservoir	Volunteer Reservoir	Roosevelt Reservoir	Queen Anne Standpipe	Volunteer Standpipe	Magnolia Tank	Magnolia Reservoir	Lincoln Reservoir	Beacon Reservoir	Charlestow n Standpipe	Myrtle Reservoir	Myrtle Tank No. 1	Myrtle Tank No. 2	Beverly Park Tank	West Seattle Reservoir	Trenton Standpipe (North)	Trenton Standpipe (South)	Barton Standpipe	Riverton Reservoir	Soos Reservoirs	Cedar Clearwells	
Nominal HGL (ft)				550		590		509	276	430			530	530	480	330	326	326	498	498		585	585	440				465	640	527	
Total Volume (MG)				60		2.0	1.0	21.3	2.5	60.0			1.9	0.9	1.0	5.5	12.7	50.0	1.3	5.0		1.0	2.0	30.0	2.4			20.1	13.0	20.0	
Depth (ft)				25		35		25	20	25			58.5	60	25	20	15	26	64	27		26	35	20				30	30	27	
Operating Band, (ft)				7		10		7	5	7			10	10	10	7	7	5	10	7		10	10	7				7	15	10	
Operating Storage, (MG)				95.7		0.6		7.2	0.6	16.8			0.3	0.1	0.4	2.0	5.2	10.0	0.2	1.2		0.4	0.4	10.8				4.7	6.5	9.1	
Storage below 20 psi (MG)				6.0	0.0	0.7		0.0	0.0	0.0			1.4	0.4	0.0	0.0	0.0	0.0	0.9	1.5		0.2	0.9	0.0				0.0	0.0	0.0	
Available Standby Storage (MG)				208.5	40.9		0.8	14.1	1.9	43.2			0.2	0.3	0.6	3.5	7.5	40.0	0.2	2.2		0.5	0.7	19.2				15.4	6.5	10.9	
Pressure Zones		ERUs	Available SBS, gal/ERU																												
	Richmond Highlands 590	27,191	213			0.8		5.0																							
	Bitter Lake 509	11,471	218					2.5																							
	Maple Leaf 430	53,200	207							11.0																					
	Maple Leaf 550	7,774	206	1.6																											
	North 326	46,529	204							5.5							4.0														
	Magnolia 330	4,975	201												1.0																
	Magnolia 480	5,653	200												0.6														0.5		
	Queen Anne 530	8,301	202									0.2																		1.5	
	Volunteer 530	10,321	203										0.3																	1.8	
	First Hill 530	5,837	206							1.2																					
	Volunteer 430	22,566	204							4.6																					
	Beacon 460	11,379	202																								2.3				
	Skyway/Augusta 500	4,260	211																											0.9	
	West Seattle 498	18,574	210															0.2	2.2				1.5								
	West Seattle 585	13,720	200																		0.5	0.7	1.3				0.3				
	Barton 484	3,067	212																				0.7								
	South 326 (less Alki 326)	120,500	203													3.5	21.0														
Alki 326	6,500	215														1.4															
Total Allocated SBS (MG)		78.5	1.6		0.8		7.5	22.3			0.2	0.3	0.6	1.0	7.5	22.4	0.2	2.2		0.5	0.7	3.5					2.6	0.0	4.7		
Allocated SBS as a Percentage of Total Volume (%)			3%		40%		35%	37%			10%	34%	60%	18%	59%	45%	16%	44%		50%	35%	12%				13%	0%	24%			
Unallocated SBS (MG)		128.1	39.3		0.0		6.6	20.9			0.0	0.0	0.0	2.5	0.0	17.6	0.0	0.0		0.0	0.0	15.7	0.0	0.0		12.9	6.5	6.2			

Notes:

Storage only available via pump stations without permanent backup power was not included in this analysis

Decommissioned or planned to be decommissioned storage facilities

Available via Bitter Lake PS diesel engine driven pump

Available via Lincoln Turbine

Available via Trenton Turbines

Available via Burien PS diesel engine driven pump

Not allocated, only available via electric pumps without backup power

Soos Reservoir available as Cedar Treatment Facility extended clearwell

Unallocated SBS for wholesale and retail customers as needed and as available

The ERU determinations are based on 2009 billed retail consumption records, which according to the current water demand forecast, is not expected to be reached again until 2040. To determine average daily water use for the ERU the 2009 annual consumption of all 3½-inch services systemwide was added up and then divided by their number, yielding 145.4 gallons per day per ERU after unit conversion. The average daily demand for each pressure zone was determined by adding up the annual consumption of all services in the zone. The number of ERU in each pressure zone was determined by dividing the average daily demand in the zone by the previously calculated 145.4 gallons per ERU per day.

SEATTLE PUBLIC UTILITIES
2019 WATER SYSTEM PLAN

D. MISCELLANEOUS

APPENDIX D-2
Capital Facilities Plan

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Seattle Public Utilities - 2019 Water System Plan
Capital Facilities Plan
2017 Dollars (1000s)

Business Area	Project /Program	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Water Resources	Regional Water Conservation	\$1,406	\$1,045	\$1,045	\$1,045	\$1,045	\$1,045	\$1,045	\$1,045	\$1,045	\$1,045	\$1,045	\$0	\$0
	Seattle Low Income Conservation Program	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697
	Water Supply Resiliency	\$0	\$0	\$0	\$0	\$0	\$0	\$168	\$410	\$5,605	\$78	\$0	\$0	\$0
	Dam Safety	\$798	\$224	\$511	\$1,074	\$1,083	\$1,832	\$673	\$821	\$4,404	\$4,297	\$381	\$372	\$363
Water Resources Total		\$2,901	\$1,966	\$2,253	\$2,816	\$2,825	\$3,575	\$2,584	\$2,974	\$11,752	\$6,117	\$2,124	\$1,069	\$1,060
Water Quality and Treatment	Reservoir Upgrades/Improvements	\$2,061	\$5,584	\$18,582	\$1,666	\$6,620	\$16,901	\$8,497	\$821	\$801	\$781	\$3,811	\$3,718	\$725
	Water Quality & Treatment Improvements	\$244	\$238	\$446	\$136	\$133	\$0	\$0	\$0	\$0	\$0	\$2,972	\$0	\$3,990
Water Quality and Treatment Total		\$2,305	\$5,822	\$19,028	\$1,802	\$6,753	\$16,901	\$8,497	\$821	\$801	\$781	\$6,783	\$3,718	\$4,715
Transmission	Tank Improvements	\$409	\$1,396	\$3,052	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Water System Dewatering	\$26	\$29	\$31	\$32	\$32	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34
	Purveyor Meter Replacements	\$208	\$207	\$207	\$91	\$88	\$86	\$86	\$86	\$86	\$86	\$86	\$86	\$86
	Transmission Pipelines Upgrades	\$7,139	\$8,409	\$6,291	\$8,833	\$2,652	\$1,725	\$1,773	\$4,150	\$7,555	\$5,067	\$7,894	\$1,844	\$1,946
	Seismic Upgrades - Transmission	\$0	\$0	\$232	\$226	\$442	\$431	\$1,750	\$7,250	\$7,250	\$7,250	\$7,250	\$11,250	\$11,250
	Cathodic Protection	\$1,929	\$2,010	\$572	\$2,102	\$552	\$2,094	\$538	\$2,043	\$1,333	\$5,060	\$1,301	\$4,936	\$1,269
	Replace Air Valve Chambers	\$124	\$124	\$123	\$118	\$115	\$112	\$123	\$123	\$123	\$123	\$123	\$123	\$123
Transmission Total		\$9,835	\$12,176	\$10,508	\$11,401	\$3,880	\$4,482	\$4,305	\$13,686	\$16,382	\$17,620	\$16,688	\$18,274	\$14,709
Distribution	Service Renewals	\$5,694	\$4,715	\$4,710	\$4,705	\$4,699	\$4,694	\$4,694	\$4,488	\$4,288	\$4,093	\$3,902	\$3,717	\$3,535
	Hydrant Replacement/Relocation	\$211	\$210	\$209	\$208	\$207	\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$206
	Water Main Extensions	\$841	\$837	\$833	\$829	\$793	\$789	\$690	\$690	\$690	\$690	\$690	\$690	\$690
	New Hydrants	\$13	\$13	\$13	\$12	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13
	New Taps	\$8,800	\$8,757	\$8,715	\$8,672	\$8,630	\$8,588	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730
	Distribution System Improvements	\$502	\$504	\$501	\$498	\$504	\$500	\$496	\$501	\$496	\$500	\$503	\$498	\$501
	Seismic Upgrades - Distribution	\$1,455	\$3,621	\$3,457	\$3,385	\$3,314	\$3,677	\$7,188	\$8,438	\$8,438	\$8,808	\$8,808	\$8,808	\$9,256
	Water Main Rehabilitation	\$12,109	\$4,481	\$3,218	\$3,238	\$3,252	\$3,704	\$24,995	\$24,986	\$24,977	\$24,968	\$24,958	\$24,949	\$24,901
	Multiple Utility Relocations	\$493	\$476	\$464	\$453	\$442	\$431	\$431	\$431	\$431	\$431	\$431	\$431	\$431
	Tank Improvements	\$302	\$1,218	\$2,043	\$725	\$1,821	\$3,665	\$2,675	\$2,667	\$1,882	\$344	\$267	\$1,502	\$3,250
	Pump Station Improvements	\$1,561	\$1,428	\$260	\$453	\$442	\$431	\$421	\$421	\$421	\$421	\$421	\$421	\$421
	In-Line Gate Valve Improvements	\$336	\$335	\$333	\$331	\$330	\$328	\$421	\$421	\$421	\$421	\$421	\$421	\$421
	Air Valve Chamber Upgrades	\$28	\$28	\$28	\$28	\$27	\$328	\$28	\$28	\$28	\$28	\$28	\$28	\$28
	Distribution System Modifications	\$112	\$103	\$103	\$102	\$102	\$101	\$101	\$101	\$101	\$101	\$101	\$101	\$101
	Meter Replacements/AMR	\$586	\$579	\$571	\$472	\$470	\$467	\$564	\$564	\$564	\$564	\$564	\$564	\$564
	Transportation-Related Projects	\$32,931	\$28,896	\$23,155	\$11,231	\$8,078	\$7,867	\$9,002	\$9,004	\$9,000	\$8,999	\$9,001	\$8,997	\$9,002
Distribution Total		\$65,974	\$56,201	\$48,612	\$35,341	\$33,122	\$35,790	\$58,654	\$59,689	\$58,686	\$57,316	\$57,043	\$58,074	\$60,049
Major Watersheds	Watershed Roads and Bridges	\$954	\$80	\$153	\$95	\$57	\$65	\$766	\$111	\$281	\$252	\$19	\$818	\$725
	Hatchery and Fish Ladder Improvements	\$5,151	\$12,892	\$743	\$226	\$221	\$431	\$0	\$0	\$0	\$0	\$762	\$0	\$0
	Habitat Conservation Program	\$1,912	\$1,758	\$1,343	\$1,363	\$1,231	\$1,133	\$705	\$778	\$612	\$270	\$341	\$209	\$209
Major Watersheds Total		\$8,016	\$14,730	\$2,239	\$1,684	\$1,509	\$1,629	\$1,471	\$889	\$893	\$521	\$1,122	\$1,027	\$935
Other*	Water System Plans	\$293	\$48	\$0	\$0	\$0	\$0	\$0	\$0	\$155	\$522	\$321	\$58	\$0
	In-Town Facilities	\$5,707	\$5,856	\$4,599	\$4,890	\$1,667	\$830	\$9,632	\$10,547	\$8,288	\$6,211	\$5,792	\$2,491	\$2,249
	Regional Facilities	\$5,316	\$705	\$2,020	\$3,986	\$1,724	\$1,897	\$7,361	\$6,566	\$4,644	\$3,672	\$3,392	\$892	\$1,596
	Integrated Control/Monitoring Program	\$351	\$343	\$334	\$326	\$318	\$310	\$310	\$310	\$310	\$310	\$310	\$310	\$310
	Security Improvements	\$866	\$1,356	\$1,207	\$849	\$829	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121
	Heavy Equipment Purchases	\$3,858	\$1,904	\$1,857	\$1,907	\$1,856	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811
	1% for Arts	\$167	\$232	\$337	\$201	\$156	\$251	\$251	\$251	\$251	\$251	\$251	\$251	\$251
	Technology	\$6,859	\$5,220	\$3,907	\$3,842	\$3,749	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657
Other* Total		\$23,418	\$15,664	\$14,262	\$16,002	\$10,298	\$9,878	\$24,144	\$24,263	\$20,238	\$17,555	\$16,655	\$10,592	\$10,995
GRAND TOTAL		\$112,449	\$106,558	\$96,902	\$69,047	\$58,387	\$72,254	\$99,654	\$102,321	\$108,751	\$99,910	\$100,416	\$92,753	\$92,463

* Other includes Water System Plans, Facilities, SCADA, Security, Heavy Equipment, 1% for Arts and Technology

2018 shown for completeness

Seattle Public Utilities - 2019 Water System Plan
Capital Facilities Plan
2017 Dollars (1000s)

Business Area	Project /Program	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2019-2028 Total	2019-2040 Total
Water Resources	Regional Water Conservation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,455	\$10,455
	Seattle Low Income Conservation Program	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$697	\$6,970	\$15,335
	Water Supply Resiliency	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,262	\$6,262
	Dam Safety	\$354	\$345	\$337	\$329	\$321	\$313	\$305	\$298	\$290	\$283	\$15,299	\$19,208
Water Resources Total		\$1,051	\$1,042	\$1,034	\$1,026	\$1,018	\$1,010	\$1,002	\$995	\$987	\$980	\$38,986	\$51,259
Water Quality and Treatment	Reservoir Upgrades/Improvements	\$708	\$690	\$674	\$657	\$641	\$626	\$610	\$595	\$581	\$567	\$64,063	\$74,856
	Water Quality & Treatment Improvements	\$2,477	\$967	\$2,627	\$2,366	\$1,282	\$2,502	\$0	\$0	\$0	\$0	\$3,925	\$20,136
Water Quality and Treatment Total		\$3,185	\$1,657	\$3,301	\$3,023	\$1,923	\$3,128	\$610	\$595	\$581	\$567	\$67,988	\$94,991
Transmission	Tank Improvements	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,448	\$4,448
	Water System Dewatering	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$330	\$744
	Purveyor Meter Replacements	\$86	\$86	\$86	\$86	\$86	\$86	\$86	\$86	\$86	\$86	\$1,111	\$2,146
	Transmission Pipelines Upgrades	\$5,193	\$9,096	\$1,940	\$1,793	\$4,294	\$7,292	\$1,794	\$1,293	\$1,293	\$1,293	\$54,347	\$93,419
	Seismic Upgrades - Transmission	\$11,250	\$11,250	\$11,250	\$11,250	\$11,250	\$11,250	\$11,250	\$12,250	\$12,250	\$12,250	\$32,082	\$170,082
	Catholic Protection	\$4,816	\$1,238	\$4,699	\$1,208	\$4,584	\$1,178	\$4,472	\$1,150	\$4,363	\$1,122	\$17,604	\$52,638
	Replace Air Valve Chambers	\$123	\$123	\$123	\$123	\$123	\$123	\$123	\$123	\$123	\$123	\$1,208	\$2,686
Transmission Total		\$21,503	\$21,828	\$18,133	\$14,495	\$20,372	\$19,965	\$17,760	\$14,937	\$18,150	\$14,909	\$111,129	\$326,162
Distribution	Service Renewals	\$3,358	\$3,186	\$3,017	\$2,853	\$2,693	\$2,536	\$2,384	\$2,235	\$2,090	\$1,948	\$44,989	\$78,540
	Hydrant Replacement/Relocation	\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$2,073	\$4,549
	Water Main Extensions	\$690	\$690	\$690	\$690	\$690	\$690	\$690	\$690	\$690	\$690	\$7,529	\$15,807
	New Hydrants	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$126	\$276
	New Taps	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$6,730	\$77,012	\$157,774
	Distribution System Improvements	\$502	\$497	\$498	\$499	\$500	\$500	\$500	\$500	\$500	\$499	\$5,005	\$11,000
	Seismic Upgrades - Distribution	\$8,256	\$8,256	\$8,256	\$3,256	\$3,256	\$3,705	\$3,705	\$3,705	\$3,705	\$3,705	\$59,133	\$127,005
	Water Main Rehabilitation	\$24,887	\$24,873	\$24,858	\$24,843	\$24,828	\$24,753	\$24,733	\$24,712	\$24,691	\$24,670	\$142,779	\$440,476
	Multiple Utility Relocations	\$431	\$431	\$431	\$431	\$431	\$431	\$431	\$431	\$431	\$431	\$4,422	\$9,596
	Tank Improvements	\$1,875	\$3,874	\$2,499	\$1,623	\$122	\$244	\$1,471	\$2,947	\$244	\$113	\$17,306	\$37,071
	Pump Station Improvements	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$5,117	\$10,165
	In-Line Gate Valve Improvements	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$3,760	\$8,808
	Air Valve Chamber Upgrades	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$576	\$907
	Distribution System Modifications	\$101	\$101	\$101	\$101	\$101	\$101	\$101	\$101	\$101	\$101	\$1,018	\$2,234
	Meter Replacements/AMR	\$564	\$564	\$564	\$564	\$564	\$564	\$564	\$564	\$564	\$564	\$5,377	\$12,143
	Transportation-Related Projects	\$9,002	\$8,997	\$9,000	\$8,997	\$9,002	\$9,001	\$9,001	\$9,002	\$8,998	\$8,999	\$124,232	\$232,231
Distribution Total		\$57,486	\$59,286	\$57,733	\$51,677	\$50,005	\$50,344	\$51,398	\$52,706	\$49,831	\$49,538	\$500,454	\$1,148,582
Major Watersheds	Watershed Roads and Bridges	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,878	\$3,421
	Hatchery and Fish Ladder Improvements	\$7,077	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,234	\$15,276	\$28,587
	Habitat Conservation Program	\$310	\$218	\$216	\$292	\$210	\$163	\$235	\$155	\$151	\$218	\$9,534	\$12,119
Major Watersheds Total		\$7,387	\$218	\$216	\$292	\$210	\$163	\$235	\$155	\$151	\$6,452	\$26,688	\$44,127
Other*	Water System Plans	\$0	\$0	\$0	\$0	\$0	\$156	\$522	\$321	\$58	\$0	\$1,046	\$2,160
	In-Town Facilities	\$2,282	\$2,838	\$3,378	\$5,093	\$2,725	\$2,033	\$1,983	\$2,545	\$1,321	\$779	\$58,311	\$88,030
	Regional Facilities	\$1,557	\$483	\$135	\$131	\$128	\$281	\$427	\$1,221	\$2,265	\$397	\$35,966	\$45,480
	Integrated Control/Monitoring Program	\$310	\$310	\$310	\$310	\$310	\$310	\$310	\$310	\$310	\$310	\$3,184	\$6,909
	Security Improvements	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$1,121	\$10,967	\$24,419
	Heavy Equipment Purchases	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$1,811	\$18,389	\$40,119
	1% for Arts	\$251	\$251	\$251	\$251	\$251	\$251	\$251	\$251	\$251	\$251	\$2,433	\$5,446
	Technology	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$3,657	\$38,661	\$82,548
Other* Total		\$10,990	\$10,472	\$10,663	\$12,375	\$10,004	\$9,621	\$10,083	\$11,237	\$10,795	\$8,326	\$168,957	\$295,111
GRAND TOTAL		\$101,601	\$94,503	\$91,079	\$82,888	\$83,531	\$84,229	\$81,089	\$80,625	\$80,496	\$80,772	\$914,201	\$1,960,232

* Other includes Water System Plans, Facilities, SCADA, Security, Heavy E

2018 shown for completeness

**SEATTLE PUBLIC UTILITIES
2019 WATER SYSTEM PLAN**

D. MISCELLANEOUS

**APPENDIX D-3
Land Use and Zoning Maps**

LAND USE AND ZONING MAPS

Land Use Zoning Maps provided here were downloaded on September 22, 2017 from the following websites, except as noted. The City of Seattle Zoning map was downloaded on February 23, 2018 and the City of Lake Forest Park map was downloaded on June 6, 2018. For maps not provided, please refer to the website listed below.

City of Seattle

Generalized Zoning Map (attached):

<http://www.seattle.gov/dpd/research/GIS/webplots/smallzonemap.pdf>

Zoning Maps Online: <http://www.seattle.gov/dpd/toolsresources/zoningmapbooks/default.htm>

City of Shoreline

Zoning 2016 (attached):

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/gis/maps/Zoning.pdf>

Comprehensive Plan (attached):

<https://s3.amazonaws.com/CityMaps/complu.pdf>

Zoning Maps Online: <http://www.shorelinewa.gov/government/departments/public-works/maps-gis/frequently-requested-maps>

City of Lake Forest Park

Zoning (attached):

<https://www.cityoflfp.com/DocumentCenter/View/27/LFP-Zoning-2015>

Zoning Maps Online: <https://www.cityoflfp.com/161/Maps>

City of Burien

Zoning (attached):

https://burienwa.gov/UserFiles/Servers/Server_11045935/Image/maps/Zoning_Address_091517.pdf

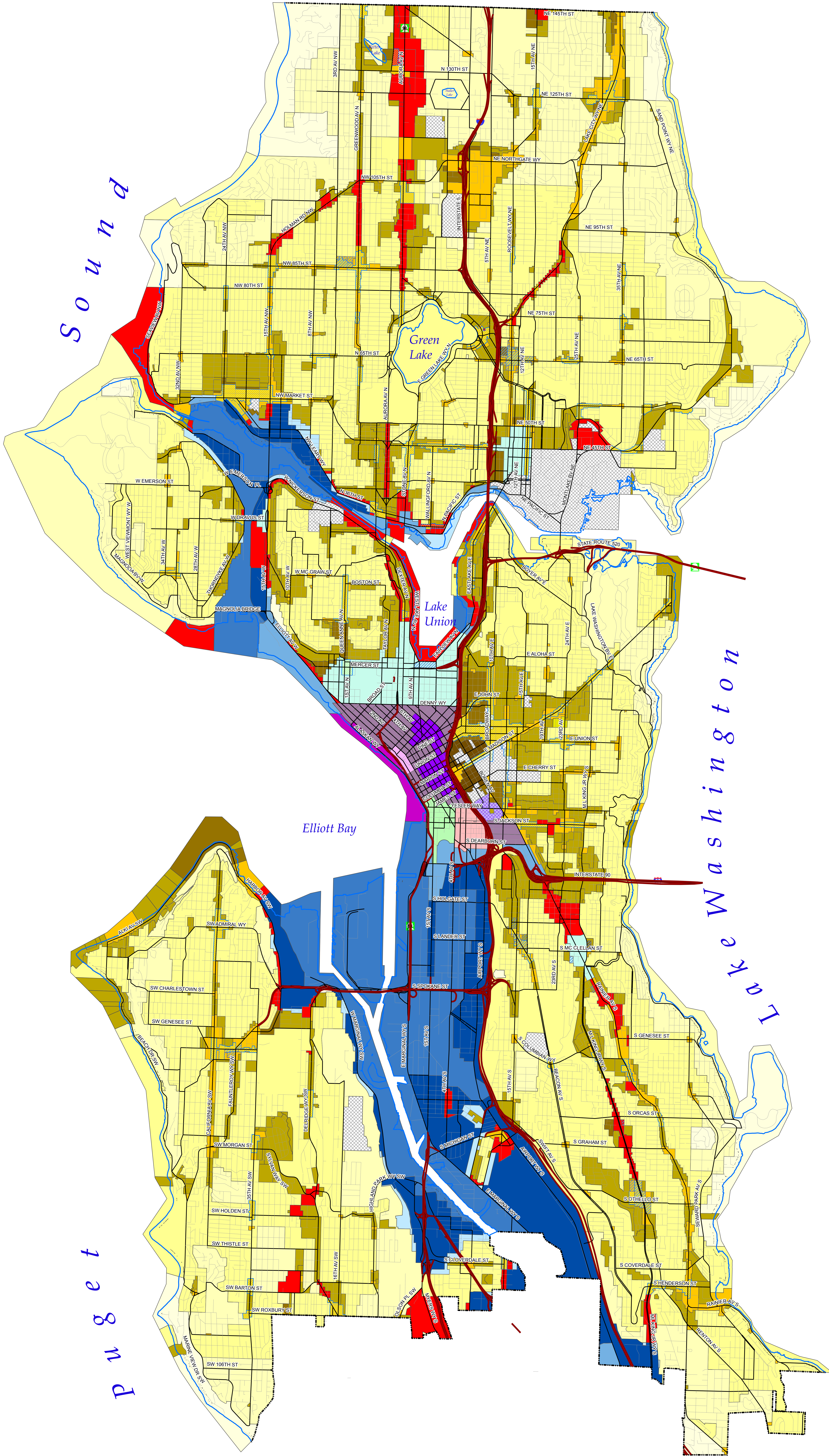
Zoning Maps Online: https://burienwa.gov/city_hall/laws_regulations/zoning

King County

Zoning:

<http://www.kingcounty.gov/depts/permitting-environmental-review/gis/ZoningAtlas.aspx>

The paper Zoning Atlas has been replaced by an interactive web application called iMap, made available to the public by the KCGIS Center at above link.



City of Seattle

Generalized Zoning

as of November 10, 2017

Legend

- Incentive Zones
- Single Family 5000
- Single Family 7200
- Single Family 9600
- Residential Small Lot
- Lowrise
- Midrise
- Highrise
- Seattle Mixed
- Neighborhood Commercial
- Commercial
- Downtown Office Core
- Downtown Harborfront
- Downtown Mixed
- International District
- Pike Market Mixed
- Pioneer Square Mixed
- Industrial Buffer
- Industrial Commercial
- Industrial General 1
- Industrial General 2
- Major Institution
- Master Planned Community
- Pedestrian Areas

Note: This map is a view of generalized zoning only.
For precise zoning information, please call or visit the
Seattle Municipal Tower, Seattle Department of Construction
and Inspections SDCl at 700 5th Ave Suite 2000, 206-684-8850.

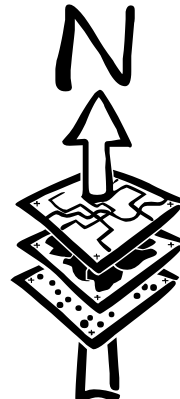


0 1 2 Miles

Prepared by:
Seattle Department of Construction and
Inspections - SDCl

No warranties of any sort, including
accuracy, fitness, or merchantability
accompany this product.


















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All rights reserved



Zoning 2016

Shows amendments through
October 31, 2016.

Zoning

- | Planned Action District | |
|--|---|
| TC-1 to TC-4; Town Center |  |
| MUR-70; Mixed Use Residential (70' height) |  |
| MUR-45; Mixed Use Residential (45' height) |  |
| MUR-35; Mixed Use Residential (35' height) |  |
| MB; Mixed Business |  |
| CB; Community Business |  |
| NB; Neighborhood Business |  |
| PA 3; Planned Area 3 |  |
| C; Campus |  |
| CZ; Contract Zone |  |
| R-48; Residential, 48 units/acre |  |
| R-24; Residential, 24 units/acre |  |
| R-18; Residential, 18 units/acre |  |
| R-12; Residential, 12 units/acre |  |
| R-8; Residential, 8 units/acre |  |
| R-6; Residential, 6 units/acre |  |
| R-4; Residential, 4 units/acre |  |

Zoning Phase

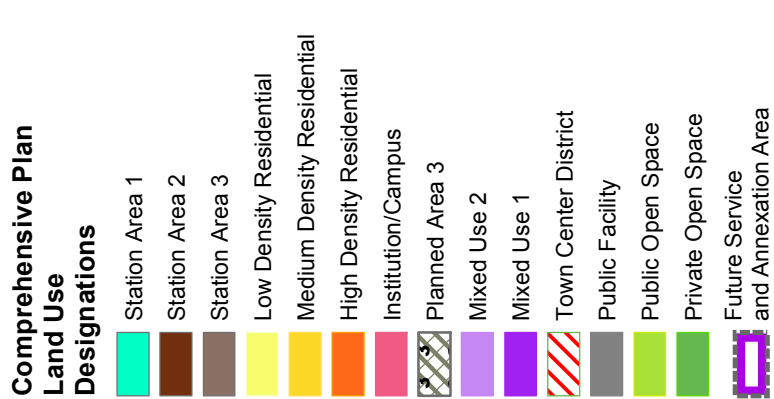
- 2, Unlock 2021
3, Unlock 2033

- ## Other Map Features

- Outside Shoreline
 Interstate
 Principal Arterial
 Minor Arterial
 Collector Arterial
 Neighborhood Collector
 Open Water
 Unclassified Right of Way
 City Boundary

No warranties of any sort, including accuracy, fitness, or merchantability, accompany this product.





See LU20-LU43 for light rail station study area policies



This map is not an official map. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

Land Use

Updated December, 2016



City of Burien Zoning

Revised by ORD. 675 - Effective August 29, 2017

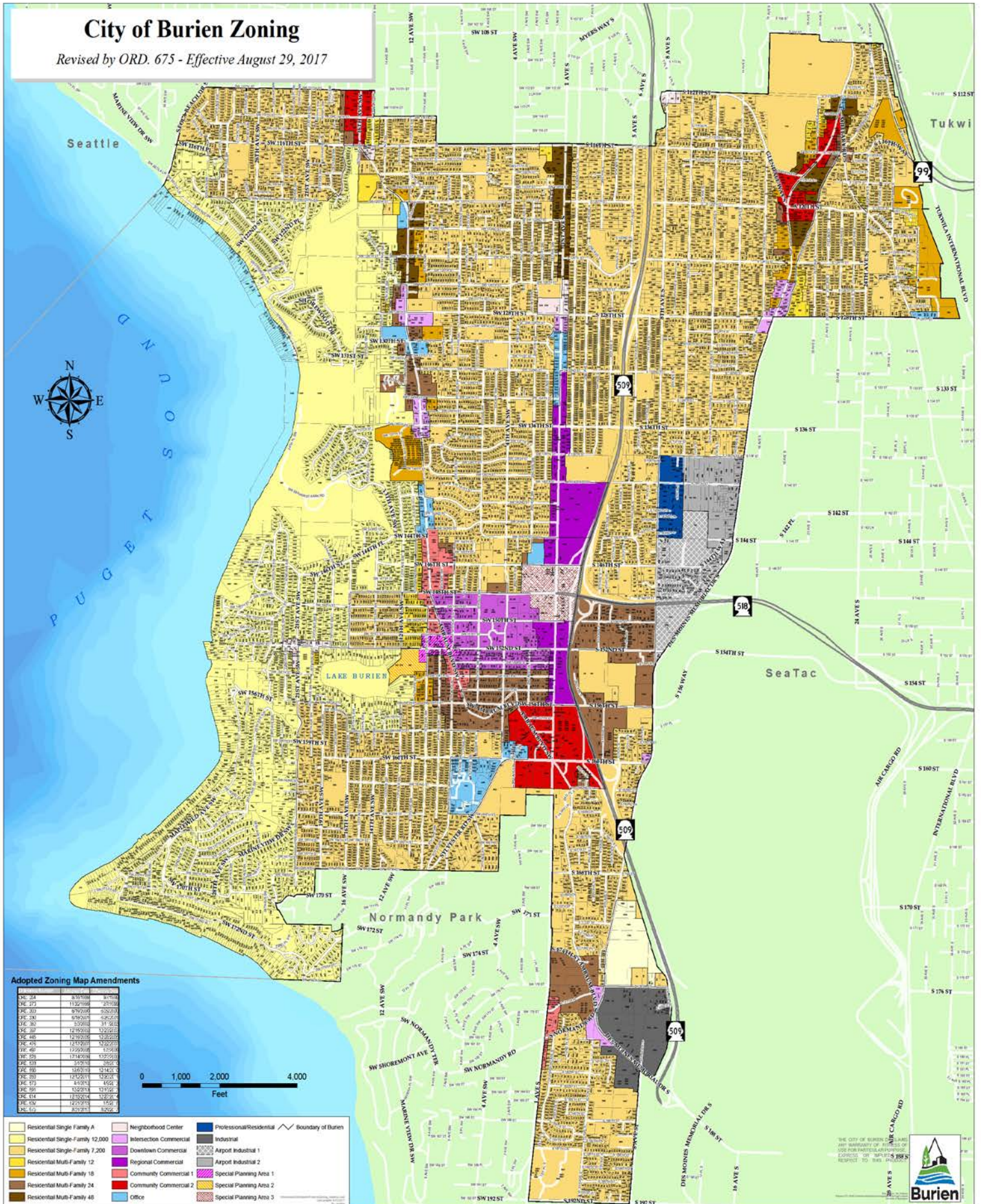
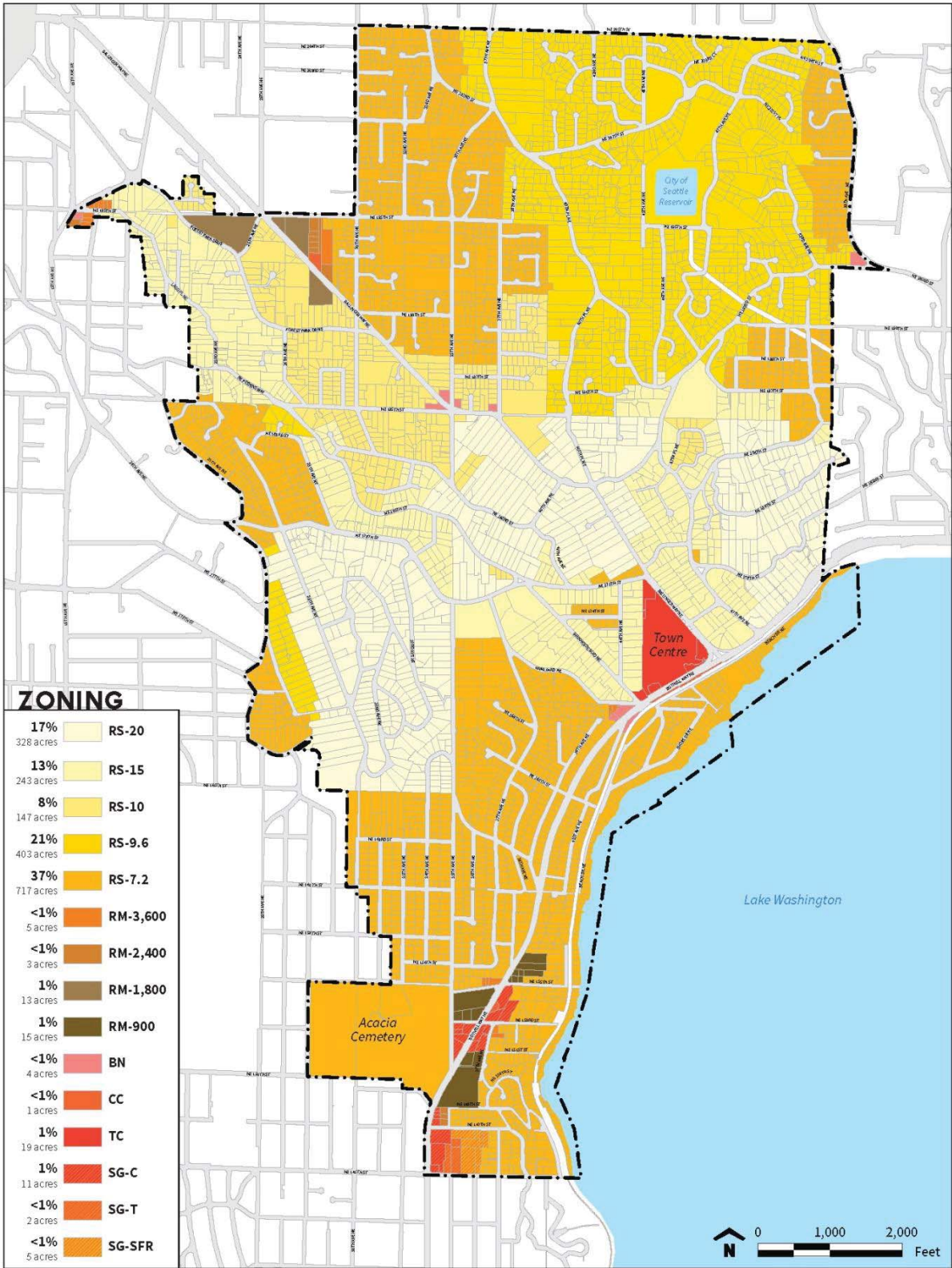


Figure 4. Lake Forest Park Zoning Designations and Acreage



Source: Map created by Studio 3MW using data provided by the City of Lake Forest Park in 2014.

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SEATTLE PUBLIC UTILITIES
2019 WATER SYSTEM PLAN

D. MISCELLANEOUS

APPENDIX D-4

Plan Content and Consistency Review Checklists

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Seattle Public Utilities
2019 Water System Plan
Plan Content Checklist
August 2019

Water System Planning Handbook Chapter	Water System Plan	
	Section	Comments
Chapter 1 - Description of Water System		
Ownership and Management		
System Name	1.1, B-1	
Type of Ownership	1.1, B-1	
Management Structure	B-2	
Water Facilities Inventory Report Form	B-1	
System Background		
History of Water System Development and Growth	1.1	
Geography	1.1	
Neighboring/Adjacent Purveyors	1.4.2.5	
Ordinances/By Laws	1.2 7.1	
Inventory of Existing Facilities		
Description of Facilities and Major Components	2.3 3.3 4.3 5.3 B-4	
Number of Service Connections (Existing and Approved)	2.3 5.3.1.4 B-4	Approved number of connections is not applicable.
Existing Interties	2.3.1.3 B-4	SPU does not use interties as a normal source of supply.
Related Plans		
List of Related Plans	1.4.2	
Comments From Agencies and Adjacent Purveyors		Comments from agencies and public sent under separate cover
Responses to Comments		Sent separately
Existing Service Area and Characteristics		
Existing Service Area Map	1.1 2.3	See Figures 1-1 and 2-1.
Zoning and Land Use	D-3	
Future Service Area		
Future Service Area Map	2.3	
Zoning and Land Use	D-3	
Service Area Agreements	2.3.1.3	Wholesale water contracts provided to WDOH under separate cover, as they become available.
Service Area Policies	1.2	Service Area Policy from 2007 WSP carried forward.
Satellite Management	1.1.2	Not applicable.
Condition of Service Policies	1.2 C-3, C-4, C-6, C-7	Service Area Policy from 2007 WSP carried forward.

Water System Planning Handbook Chapter	Water System Plan	
	Section	Comments
Complaints		
Policy	3.3.7.3	
Recordkeeping	5.3.3.5	
Chapter 2 - Basic Planning, Data and Water Demand Forecasting		
Current Population, Service Connections, Water Use, and Equivalent Residential Units		
Current Population	2.3	
Total Service Connections	2.3	
Water Use Data Collection	2.3.2 A-1 A-4	
Equivalent Residential Units		Not applicable
Projected Land Use, Future Population, and Water Demand		
Projected Land Use	2.4.1.2 A-1 D-3	
Projected Population	A-1	
Projected Non-Residential Water Needs	2.4.1.2 A-1	
Projected Non-Revenue Water	A-1	
Water Rates and Rate Impacts on Water Demand	2.4.1.2 A-1	
Water Demand Forecasting	2.4.1.2 A-1	
Chapter 3 – System Analysis		
System Design Standards	C-2	City of Seattle Standard Plans and Specifications sent separately when updated
Water Quality Analysis		
Historical Review of Trends	3.3	
Future Requirements	3.4	
System Description and Analysis		
Source	2.3 – 2.4 A-3 A-4	
Water Treatment	3.3 – 3.4 B-3, B-4	
Storage	3.3.6 5.3.3 B-4 D-1	
Distribution System/Hydraulic Analysis	5.3 – 5.4 D-1	
Identification of System Improvements	2.4 – 2.5	
Assessment of Alternatives	3.3 – 3.5	
Prioritizing Improvements	4.4 – 4.5	
Selection of Alternatives	5.4 – 5.5	

Water System Planning Handbook Chapter		Water System Plan
	Section	Comments
Chapter 4 - Conservation Program, Water Right Analysis, System Reliability and Interties		
Conservation Program Development and Implementation		
Required Measures For All Systems Other Measures and Level of Implementation Conservation Program Outline Regional Conservation Programs	2.4.1.1	
Source of Supply Analysis		No new water rights to be pursued in next 20 years
Enhanced Conservation Measures	2.4.1.1	
Water Right Changes	2.3.4.2 A-2	
Interties		SPU has no plans to use interties for normal supply purposes.
Artificial Recharge		Not applicable for pending water right permit application
Use of Reclaimed Water, Reuse, and other Non-potable Sources	2.4.1.4 A-5	
Treatment	3.3.5 3.4 B-3 B-4	
Water Right Evaluation		
Permits, Certificates, Claims and Applications – Narrative Existing Water Right(s) Status Forecasted Water Right(s) Status Water Rights, Current Water Usage and Projected Needs Assessment of Need for Additional Water Rights	2.3.4.2 A-2	
Water Reservations		Not applicable
Water Supply Reliability Analysis		
Summary of System Reliability Efforts	2.3.4.3	
Water Shortage Response Planning	2.3.5.3 A-6	
Monitoring Well Levels	A-3	
Interties		
Existing Interties	2.3.1.3 B-4	
New Intertie Proposals	.	See 2007 WSP; no change in policy.
Intertie Agreements	2.3.1.3	Wholesale water contracts provided to WDOH under separate cover, as they become available.
Identification of System Improvements Assessment of Alternatives Prioritizing Improvements Selection of Alternatives	2.4 – 2.5 6	

Water System Planning Handbook Chapter	Water System Plan	
	Section	Comments
Chapter 5 - Source Water Protection		
Wellhead Protection Program	3.3.3.2	See also Seattle Public Utilities, <i>Highline Wellfield Wellhead Protection Program</i> , 2000. Unchanged since approval with 2001 WSP, except for potential contaminant inventory updated every other year.
Watershed Control Program	3.3.3.1	See also Seattle Public Utilities, <i>Watershed Protection Plan</i> , November 2017, covering Cedar River Municipal Watershed, South Fork Tolt Municipal Watershed, Lake Youngs Reservation, which was approved April 2018.
Identification of System Improvements Assessment of Alternatives Prioritizing Improvements Selection of Alternatives	3.4	Refer also to Wellhead Protection and Watershed Protection Plans, above.
Chapter 6 - Operation and Maintenance Program		
Water System Management and Personnel	B-2	
Operator Certification	B-2	
System Operations and Control		See Seattle Public Utilities, <i>System Operations and Control</i> , 2018.
Identification of Major System Components	2.3 3.3 4.3 5.3 B-4	
Routine System Operation	2.3.5 3.3.7 4.3.2 5.3.2	See Seattle Public Utilities, <i>System Operations and Control</i> , 2018.
Preventative Maintenance Program	2.3 3.3.8 4.3.3 5.3.3	
Equipment, Supplies and Chemical Listing	B-3 B-4	
Comprehensive Monitoring (Regulatory Compliance) Plan	3.3.7.1 C-1	
Emergency Response Program Water System Personnel Emergency Call-Up List Notification Procedures Vulnerability Analysis Contingency Operational Plan		Sent separately.
Safety Procedures		See 2007 WSP; no significant changes.
Cross-Connection Control Program	3.3.7.2	
Customer Complaint Response Program	3.3.7.3	

Water System Planning Handbook Chapter		Water System Plan
	Section	Comments
Recordkeeping and Reporting	5.3.3.5	
O & M Improvements	2.3 - 2.5	
Identification of System Improvements	3.3 – 3.5	
Assessment of Alternatives	4.4 – 4.5	
Prioritizing Improvements	5.3 – 5.5	
Selection of Alternatives		
Chapter 7 - Distribution Facilities Design and Construction Standards		
Project Review Procedures		
Policies and Requirements for Outside Parties	5.4.5 C-2, C-3, C-4, C-6, C-7	
Design Standards (Performance Standards and Sizing Criteria)		
Construction Standards (Materials and Methods)	C-2	City of Seattle Standard Plans and Specifications sent separately when updated
Construction Certification and Follow-up Procedures	C-3	
Identification of System Improvements	5.4 – 5.5	
Assessment of Alternatives		
Prioritizing Improvements		
Selection of Alternatives		
Chapter 8 - Improvement Program		
Improvement Schedule	6 D-2	
Chapter 9 - Financial Program		
Water Systems with 1,000 or More Connections (Not Regulated by UTC)		
Past and Present Financial Status	7.2	
Available Revenue Sources	7.2 7.3	
Allocation of Revenue Sources	7.4	
Program Justification	7.4 7.5	
Assessment of Rates	7.3	
Chapter 10 - Miscellaneous Documents		
Supportive Documents		
State Environmental Policy Act		Separately bound
Other Documents	D-4	Local government consistency certifications
Agreements		Sent separately
Comments on WSP from County		Sent separately
Comments on WSP from Adjacent Utilities		Sent separately

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Local Government Consistency Determination Form

Water System Name: Seattle Public Utilities PWS ID: 77050 Y

Planning/Engineering Document Title: 2019 Water System Plan Plan Date: March 2018

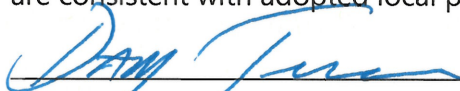
Local Government with Jurisdiction Conducting Review: City of Burien

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	Chapter 1, Section 1.4.2 & Appendix D-3	<u>YES</u>
b) The <u>growth projection</u> used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Chapter 1, Section 2.4.1.2 & Appendix A-1	<u>YES</u>
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Appendix C-6 & C-7	<u>N/A</u>
d) <u>Service area policies</u> for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Appendix C-6 & C-7	<u>YES</u>
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Chapter 1, Section 1.4.2; Chapter 6; Appendix A-5; & Appendix D-2	<u>YES</u>

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.


Signature
DAVID JOHANSON, AICP, SENIOR PLANNER, BURIEN

3/27/18
Date

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

- a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.
- b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*
- d) All **service area policies** for how new water service will be provided to new customers.
- e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

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Local Government Consistency Determination Form

Water System Name: Seattle Public Utilities PWS ID: 77050 Y

Planning/Engineering Document Title: 2019 Water System Plan Plan Date: March 2018

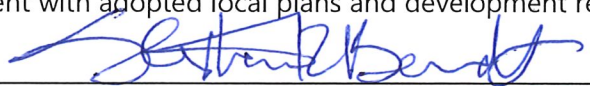
Local Government with Jurisdiction Conducting Review: City of Lake Forest Park

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system Identify the page(s) in submittal	For use by local government Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	Chapter 1, Section 1.4.2 & Appendix D-3	Yes ⁽¹⁾
b) The <u>growth projection</u> used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Chapter 1, Section 2.4.1.2 & Appendix A-1	Yes ⁽²⁾
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Appendix C-6 & C-7	Not Applicable
d) <u>Service area policies</u> for new service connections conform to the adopted local plans and adopted development regulations of all <u>LFP cities and counties with jurisdiction</u> over the service area.	Appendix C-6 & C-7	Yes
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Chapter 1, Section 1.4.2; Chapter 6; Appendix A-5; & Appendix D-2	Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature: 

Date: 6/8/18

Printed Name, Title, & Jurisdiction: Steve Bennett, Plg. Dir of Lake Forest Park

(1) and (2) - see attached page for footnotes

Attachment to Local Government Consistency Determination Form for SPU 2019 Water System Plan

Review agency: Lake Forest Park

Footnotes:

- (1) Answer to (a) is yes provided that SPU updates the zoning map in Appendix D-3 of the draft plan to be the 2015 zoning map (<https://www.cityoflfp.com/DocumentCenter/View/27>)
- (2) Answer to (b) is yes with the caveat that growth projections used by SPU probably did not take into account rezoning in the southern part of LFP associated with the Southern Gateway Subarea Plan adopted in 2013 (<https://www.cityoflfp.com/384/Southern-Gateway-Development>) but, given SPU's service area, the discrepancy may not be significant.

Local Government Consistency Determination Form

Water System Name: Seattle Public Utilities PWS ID: 77050 Y

Planning/Engineering Document Title: 2019 Water System Plan Plan Date: March 2018

Local Government with Jurisdiction Conducting Review: City of Seattle

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Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	Chapter 1, Section 1.4.2 & Appendix D-3	<i>yes</i>
b) The <u>growth projection</u> used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Chapter 1, Section 2.4.1.2 & Appendix A-1	<i>N/A see attachment</i>
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Appendix C-6 & C-7	<i>yes</i>
d) <u>Service area policies</u> for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Appendix C-6 & C-7	<i>yes</i>
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Chapter 1, Section 1.4.2; Chapter 6; Appendix A-5; & Appendix D-2	<i>yes</i>

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature

Tom Hauger
TOM HAUGER, COMPREHENSIVE PLAN MGR., Seattle

Printed Name, Title, & Jurisdiction

Date

6/7/18

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

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For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

- a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.
- b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*
- d) All **service area policies** for how new water service will be provided to new customers.
- e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

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Attachment to Local Government Consistency Determination Form

City of Seattle Water System Plan

There is a discrepancy between the demographic forecasts used in the water demand forecast model and the growth assumed in Seattle's most recent comprehensive plan. As is explained below however, no changes are being proposed.

The City of Seattle adopted its comprehensive plan, "Seattle 2035 – Comprehensive Plan: Managing Growth to Become an Equitable and Sustainable City 2015-2035" in October 2016. On page 431, it states, "Seattle's growth assumptions for the period from 2015 through 2035 are 70,000 net new housing units and 115,000 net new jobs." The primary source of the housing unit numbers is Puget Sound Regional Council's (PSRC) recent Land Use Vision (LUV) forecast of population and households. This forecast was released after SPU had finalized its water demand forecast using an earlier PSRC demographic forecast (Land Use Baseline or LUB) which, unlike the Land Use Vision forecast, provides projections of households disaggregated into single family and multifamily categories and employment, three major inputs for the water demand forecast model.

For SPU's retail service area (the City of Seattle plus smaller areas outside the city limits), the LUB forecast projects total household growth of 47,600 between 2015 and 2035. This is considerably less than the 70,000 new housing units over the same period assumed in the Seattle Comprehensive Plan for the City of Seattle. At first glance, it appears that SPU's water demand forecast may not be consistent with the SCP. However, a closer look at how that projected growth is spread over time suggests the two demographic forecasts are not so far apart over most of the forecast period.

The table below shows the two forecasts of total households in SPU's retail water service area. The first column is based on PSRC's Land Use Baseline forecast used by SPU and the second on the Land Use Vision forecast which was the used as the data source for the comprehensive plan. Both forecasts were provided at the census tract level and were apportioned to SPU's retail service area by SPU staff. The LUV forecast calls for 70,359 new households between 2015 and 2035 while the LUB forecast has considerably less growth with just 47,576 new households. However, the difference is all in the first 5 years when the LUV forecast has more than twice the growth. The LUV forecast of growth is more accurate in the short term and reflects Seattle's phenomenal spike in growth the past 4 years. Between 2000 and 2013, Seattle's population grew at an average rate of 0.8% per year. Since 2014, annual growth has averaged 3.3%! The newer LUV forecast takes this higher recent growth into account whereas the LUB forecast was completed in 2014 and did not anticipate the 2014-2017 spike in Seattle growth. For the rest of the forecast period (2020-2035), the two forecasts are almost identical: 29,771 compared to 29,087 new households.

**Two Forecasts of Total Households
In SPU's Retail Service Area**

	Total Households	
	LUB	LUV
2010	304,815	304,815
2015	322,301	334,910
2020	340,791	375,498
2025	348,772	387,141
2030	356,941	393,903
2035	369,878	405,269
2040	383,284	423,661
Growth		
2015-2035	47,576	70,359
2015-2020	18,490	40,587
2020-2035	29,087	29,771

For the following reasons, we are not recommending that SPU revise its water demand forecast with the newer LUV forecast of households:

- It is now 2018, well into the 2015-2020 period, and the water demand forecast has been closely tracking *actual* demand. Specifically, retail residential water consumption is still in synch with the forecast. If the LUB household forecast were to be replaced by the LUV forecast in the demand forecast model, that would bump the forecast of Seattle water demand above actual its demand over the first few years. Given that it appears likely that the demand forecast and actual demand will remain close through 2020, and that the LUB and LUV forecasts of household growth are near identical post-2020, there's no advantage to switching to the LUV forecast.
- While the LUV forecast of households does exceed the LUB forecast for Seattle, that is not the case for SPU's *wholesale* service area and the rest of King County. Much of the county has not shared in Seattle's recent growth so that the total forecasted household growth for King County *net of Seattle* is actually less in the LUV forecast than in the LUB forecast. SPU is forecasting water demand for it's entire service area – retail and wholesale – and the differences between the LUV and LUB demographic forecasts are somewhat offsetting in the aggregate.
- The LUV forecast is for population and total households only. It does not forecast employment nor disaggregate households into single family and multifamily as required by the water demand forecast model.

Local Government Consistency Determination Form

Water System Name: Seattle Public Utilities PWS ID: 77050 Y

Planning/Engineering Document Title: 2019 Water System Plan Plan Date: March 2018

Local Government with Jurisdiction Conducting Review: City of Shoreline

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	Chapter 1, Section 1.4.2 & Appendix D-3	YES MAPS CURRENT
b) The <u>growth projection</u> used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Chapter 1, Section 2.4.1.2 & Appendix A-1	YES STATION AREA GROWTH PLANS COORD. WITH SPU AND KC, PSRC, OFM
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Appendix C-6 & C-7	N/A - City is not a water provider.
d) <u>Service area policies</u> for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Appendix C-6 & C-7	YES - in SPU WSP Appendix C6 & C7
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Chapter 1, Section 1.4.2; Chapter 6; Appendix A-5; & Appendix D-2	YES - In SPU WSP Chapt 1, Section 1.4.2, Chapter 6 & Appendix A5 & D2

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Randy WITT
Signature
Randy WITT, Public Works Director
Printed Name, Title, & Jurisdiction

3/28/18
Date

RIL. CL, PCD, Planning Manager

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

- a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.
- b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*
- d) All **service area policies** for how new water service will be provided to new customers.
- e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).