Chapter 7

CAPITAL IMPROVEMENT PROGRAM

7.1 Introduction

This chapter combines the various projects that were recommended in previous chapters of the Water System Plan (Plan) for the City of Tumwater's (City's) water system and presents a comprehensive capital improvement program (CIP). The purpose of the CIP is to provide the City with a guideline for the planning and budgeting of its water system. The CIP consists of schedule and cost estimates for each project. Project phasing is described as either short-term (2019 - 2028), or long-term (2029 - 2038). Detailed descriptions of each project, which include the cost estimates and implementation timing, are included in Appendix R.

7.1.1 Capital Project Categories

Capital projects were categorized by the nature of the infrastructure involved. These include:

- Distribution (D).
- Supply (S).
- Storage (ST).
- Miscellaneous (M).

The above abbreviations were used as the initial letter in the Project Identification and aid in delineating the project category. Distribution projects contain new pipe, pipe upsizing, and pipe repair and replacement (R&R) projects. Supply and storage to serve these customers are included in the respective categories. Miscellaneous projects include all other proposed CIP projects.

7.1.2 Capital Project Types

Projects were allocated into three types to support development of rates and standard development charge (SDC) charges:

1. **Capacity** – Projects that provide additional system capacity to meet future demand growth. These projects are typically funded by connection fees and the developer community.
2. **Repair & Replacement** – Non-capacity-related projects that involve replacing or maintaining existing infrastructure without increasing capacity or level-of-service. These projects are typically funded by rates.
3. **System Improvements** – Projects that increase level-of-service (i.e., redundant pumping, backup power, fire flow, system reliability, etc.) of existing infrastructure. In some cases the City's current fire flow standards are higher than those in place when the existing pipes were installed. Projects that upsize pipes to be able to convey current fire flow volume requirements are considered system improvements. These projects are typically funded by rates.

Projects may include elements of multiple capital project types. Each project was defined as one or more of the three project types by assigning a percentage of the total project cost to each project type. The allocations between multiple types were made based on professional judgment.

7.2 Cost Estimating Assumptions

7.2.1 Cost Estimate Level

The CIP cost estimates presented in this chapter are Class 4 estimates. Class 4 estimates are budget level estimates. Actual costs may vary from these estimates by -15 percent to +30 percent. These costs were determined based on the City's perception of current conditions at the project locations.

All costs are in 2019 dollars. The Engineering News-Record (ENR) U.S. 20-City Construction Cost Index for March 2019 is 11228. The estimates are subject to change as the project design matures. Cost of labor, materials, equipment may vary in the future.

7.2.2 Pipeline Unit Costs

Pipeline unit cost assumptions are shown in Table 7.1. These costs were developed from recent construction costs of various water pipelines. To be conservative, these unit costs assume open-trench construction in improved areas. If trenchless construction is possible for some projects, the cost estimates may need to be modified. Costs include pavement cutting, excavation, hauling, shoring, pipe materials and installation, backfill material and installation, and pavement replacement. The unit costs are for "typical" field conditions with construction in stable soil at a depth ranging between 3 to 5 feet.

Table 7.1 Pipeline Unit Costs

Pipe Diameter (Inches)	Pipeline Unit Cost ($/LF)(1)
6	$250
8	$275
12	$300
16	$330
20	$360
24	$400

Notes:
(1) $/LF: dollars per linear foot.
(2) Due to market fluctuations, pipeline unit costs may vary.

7.2.3 Supply Costs

Table 7.2 outlines the supply unit cost assumptions. New supply project costs were developed based on typical costs from past projects and by the City. Contingencies were assumed to already be included in any costs provided by the City.

Table 7.2 Supply Unit Costs

Supply	Cost (unit)(1)	Notes
New Groundwater Well	$1,500 (per gpm)	Based on engineer estimate and previous projects. Includes a production well, site work, a structure, all mechanical and electrical equipment, and a back-up generator.

Note:
(1) gpm: gallons per minute.

7.2.4 Treatment Costs

The treatment cost assumption is shown in Table 7.3. The cost for expanded treatment was developed based on typical costs from past projects and by the City. This unit cost was used as a baseline cost, which was then adjusted by the City.

Table 7.3 Treatment Unit Costs

Treatment	Cost (per gpd)(1)	Notes
Expand Ground Water Treatment	$1.5	Typical for iron and manganese treatment (green sand filter)

Note:
(1) gpd: gallons per day.

7.2.5 Storage Costs

The new storage project cost was developed based on typical costs from past projects. Conceptual costs for reservoirs vary by type: ground, standpipe, and elevated. The cost is an estimate based on reservoir volume in gallons (gal), as presented in Table 7.4. Unit construction cost includes site work, a structure, mechanical and electrical equipment, and piping to connect to the distribution system. Storage costs are sensitive to site-specific geotechnical and seismic considerations; therefore, it is recommended that a reservoir siting study that addresses these issues be conducted at the initiation of a new storage project. This unit cost was used as a baseline cost, which was then adjusted by the City.

Table 7.4 Reservoir Unit Costs

Reservoir Type	Cost per gallon ($/gal)
Standpipe	$2

Note:
(1) Reservoir unit costs are for construction only.

7.2.6 Miscellaneous Costs

Additional costs for the CIP included costs for projects that have been included in previous chapters and that the City has included in their Capital Facilities Plan; Table 7.5 outlines these miscellaneous costs. Contingencies are not included in these assumptions.

Table 7.5 Miscellaneous Costs

Type	Unit Cost
Generator(1)	$75,000 each
Seismic Resilience Study(2)	$250,000 each

Notes:
(1) Generator based on 50 kilowatt (kW), 15 horsepower (hp) motor, including concrete pad, mechanical and electrical equipment.
(2) Resilience Study can vary depending on number of facilities to evaluate. Unit cost does not include contingencies.

7.2.7 Seismic Backbone Costs

Table 7.6 outlines the pipeline unit costs assumptions for seismically resilient pipeline. The seismically resilient pipeline costs are 30 percent above the pipeline unit costs outlined in Table 7.1.

Table 7.6 Seismic Backbone Pipeline Cost Assumptions

Pipe Diameter (Inches)	Pipeline Unit Cost ($/LF)
8	$360
12	$390
16	$430
24	$520

7.2.8 Contingency Costs

To estimate a total project cost, contingencies are added to the construction costs. Table 7.7 summarizes the contingency costs used for the cost estimate. The total project costs include an additional 30 percent for contingency and 25 percent for engineering, legal, administrative, and planning costs. For specific projects that required heavy traffic control, the contingency was increased according to City estimates. The engineering, legal, administrative, and planning contingency for seismic backbone pipeline projects is 50 percent due to the increased complexity of the pipeline projects.

Table 7.7 Contingency Costs

Contingency	Percent of Subtotal Cost
General Contingency	30%
Engineering/Legal/Admin/Planning	25%
Engineering/Legal/Admin/Planning – Seismic Backbone Pipeline	50%

7.3 CIP Project Sheets and Cost Summary

CIP projects were identified based on the analyses presented in previous chapters. The CIP projects summarized in Table 7.8 are in 2019 dollars and have not been escalated. The table presents the costs for the short-, and long-term planning horizons. Additionally, the table separates project costs between the capital project types (i.e., Capacity, R&R, and Update). The table provides a total cost and average annual cost for all CIP projects.

An individual project sheet was generated for each CIP project and includes project identifiers, descriptions, costs, project types, timeline, and comments to aid in future implementation. To aid in finding individual projects, project sheets have been separated by project category. The project sheets are included in Appendix R. Summaries of costs by project category and type are presented at the end of this section.

Table 7.8 CIP Project Summary

Capital Improvement Program Summary (2019 Dollars)																				
Project	Change Cost Type:	Total CIP Cost Estimate	Cost for Developer Driven Projects	CIP Phasing (2019 Dollars)										Short-term (2019-2028)	Long-term (2029-2038)	Project Type		
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028			Capacity	Repair & Replacement	Upgrade
Supply		$22,950,000		$0	$390,000	$4,960,000	$2,210,000	$0	$0	$0	$0	$2,600,000	$3,510,000	$13,670,000	$9,280,000			
S-1	Lathrop Water System Improvements	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	100%	0%	0%
S-2	Tumwater Golf Course Well	$5,290,000		$0	$0	$0	$0	$0	$0	$0	$0	$2,100,000	$1,090,000	$3,190,000	$2,100,000	100%	0%	0%
S-3	Brewery Wellfield	$7,150,000		$0	$250,000	$4,800,000	$2,100,000	$0	$0	$0	$0	$0	$0	$7,150,000	$0	100%	0%	0%
S-4	Well 15 Auxiliary Generator	$110,000		$0	$0	$0	$110,000	$0	$0	$0	$0	$0	$0	$110,000	$0	0%	0%	100%
S-5	Future Source	$5,740,000		$0	$0	$0	$0	$0	$0	$0	$0	$500,000	$2,420,000	$2,920,000	$2,820,000	100%	0%	0%
S-6	NE Wellfield	$4,360,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$4,360,000	100%	0%	0%
S-7	Brewery Wellfield Decommission of Existing Infrastructure	$300,000		$0	$140,000	$160,000	$0	$0	$0	$0	$0	$0	$0	$300,000	$0	100%	0%	0%
Distribution		$30,010,000		$350,000	$1,320,000	$790,000	$630,000	$530,000	$1,690,000	$530,000	$3,670,000	$1,780,000	$0	$11,290,000	$18,720,000			
Capacity																		
D-10	Hoadly St SE Pipe Upsize (Various Locations)	$1,640,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,640,000	100%	0%	0%
D-14	Palermo Wellfield Pipe Upsize (Various Locations)	$3,070,000		$0	$0	$0	$0	$0	$0	$0	$1,290,000	$1,780,000	$0	$3,070,000	$0	100%	0%	0%
D-15	Linwood Ave SW	$350,000		$350,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$350,000	$0	100%	0%	0%
D-16	Hansen St SE	$620,000		$0	$0	$0	$0	$0	$0	$0	$620,000	$0	$0	$620,000	$0	100%	0%	0%
D-23	Bush Middle School Wells and Kimmie St. Pipe Upsize	$760,000		$0	$0	$0	$0	$0	$0	$0	$760,000	$0	$0	$760,000	$0	100%	0%	0%
D-30	SE Water Tank Pipe Extension	$1,160,000		$0	$0	$0	$0	$0	$1,160,000	$0	$0	$0	$0	$1,160,000	$0	100%	0%	0%
D-29	Capital Blvd Pipe Upsize	$850,000		$0	$10,000	$260,000	$100,000	$0	$0	$0	$0	$0	$0	$370,000	$480,000	100%	0%	0%
D-33	Custer Way Extension - Boston to Capitol	$1,200,000		$0	$1,200,000	$0	$0	$0	$0	$0	$0	$0	$0	$1,200,000	$0	100%	0%	0%
Fire Flow																		
D-2	Looping Project at 26th Ave SW (Various Locations)	$720,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$720,000	0%	0%	100%
D-3	Tumwater Hill	$670,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$670,000	0%	0%	100%
D-4	Grant St Pipe Upsize (Various Locations)	$690,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$690,000	0%	50%	50%
D-5	N 3rd Ave SW New Pipe (Various Locations)	$760,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$760,000	0%	0%	100%
D-6	Clark St SW Upsize Pipe (Various Locations)	$440,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$440,000	0%	0%	100%
D-7	Deschutes Pkwy Upsize (Various Locations)	$2,760,000		$0	$0	$0	$0	$0	$0	$0	$1,000,000	$0	$0	$1,000,000	$1,760,000	0%	50%	50%
D-8	Sunset Way SE Pipe Upsize (Various Locations)	$2,390,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,390,000	0%	50%	50%
D-9	Mountain View Pl SE New Pipe	$110,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$110,000	0%	0%	100%
D-12	48th Ave SW Pipe Upsize	$770,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$770,000	0%	0%	100%
D-17	Lloyd St SE	$40,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$40,000	0%	0%	100%
D-19	Pinehurst St SW Pipe Upsize	$710,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$710,000	0%	0%	100%
D-25	Arab Dr SE Pipe Upsize	$460,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$460,000	0%	0%	100%
D-31	Bush Mountain/Antsen New Pipe/Upsize Pipe	$3,280,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,280,000	0%	0%	100%
Repair and Replacement																		
D-32	Watermain Replacement Program	$6,560,000		$0	$110,000	$530,000	$530,000	$530,000	$530,000	$530,000	$0	$0	$0	$2,760,000	$3,800,000	0%	100%	0%
Developer Driven																		
D-1	North of 29th Ave SW Pipe Upsize		$207,900													100%	0%	0%
D-11	Black Lake New Pipe (Various Locations)		$3,969,000													100%	0%	0%
D-13	Trosper Rd Pipe Upsize		$714,000													100%	0%	0%
D-18	Kirsop Rd SW New Pipe		$2,226,000													100%	0%	0%
D-20	Henderson Blvd SE Pipe		$4,930,800													100%	0%	0%
D-21	Littlerock Rd SW & Bishop Rd New Pipe		$5,188,400													100%	0%	0%
D-22	Littlerock Rd SW & Prine Dr SW New Pipe		$10,141,600													100%	0%	0%
D-24	83rd Ave SW New Pipe		$672,000													100%	0%	0%
D-26	Old Highway 99 SE New Pipe (Various Locations)		$9,932,300													100%	0%	0%
D-27	93rd Ave SW New Pipe (A)		$785,400													100%	0%	0%
Storage		$8,050,000		$0	$600,000	$5,350,000	$2,100,000	$0	$0	$0	$0	$0	$0	$8,050,000	$0			
ST-1	SE Reservoir	$8,050,000		$0	$600,000	$5,350,000	$2,100,000	$0	$0	$0	$0	$0	$0	$8,050,000	$0	100%	0%	0%
Miscellaneous		$14,029,000		$60,000	$910,000	$867,000	$887,000	$8,594,000	$194,000	$194,000	$194,000	$344,000	$344,000	$12,588,000	$1,441,000			
M-1	Seismic Resiliency Plan	$250,000		$0	$0	$0	$250,000	$0	$0	$0	$0	$0	$0	$250,000	$0	0%	0%	100%
M-2	Seismic Upgrades	$1,345,000		$0	$0	$0	$0	$84,000	$84,000	$84,000	$84,000	$84,000	$84,000	$504,000	$841,000	0%	0%	100%
M-3	Emerging Projects/Oversizing	$1,450,000		$60,000	$310,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$850,000	$600,000	50%	50%	0%
M-4	Operation and Maintenance Facility	$9,000,000		$0	$0	$240,000	$360,000	$8,400,000	$0	$0	$0	$0	$0	$9,000,000	$0	0%	100%	0%
M-5	WSP Update	$300,000		$0	$0	$0	$0	$0	$0	$0	$0	$150,000	$150,000	$300,000	$0	0%	0%	100%
M-6	Water Rights Acquisitions	$1,350,000		$0	$600,000	$400,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$1,350,000	$0	100%	0%	0%
M-7	ERP System	$334,000		$0	$0	$167,000	$167,000	$0	$0	$0	$0	$0	$0	$334,000	$0	0%	100%	0%
CIP Total (2019 Dollars)		$75,039,000	$19,383,700	$410,000	$3,220,000	$11,967,000	$5,827,000	$9,124,000	$1,884,000	$724,000	$3,864,000	$4,724,000	$3,854,000	$45,598,000	$29,441,000	$42,615,000	$19,539,000	$12,885,000
Annual Cost (2019 Dollars)		$3,752,000												$4,560,000	$2,944,000	$2,131,000	$977,000	$644,000

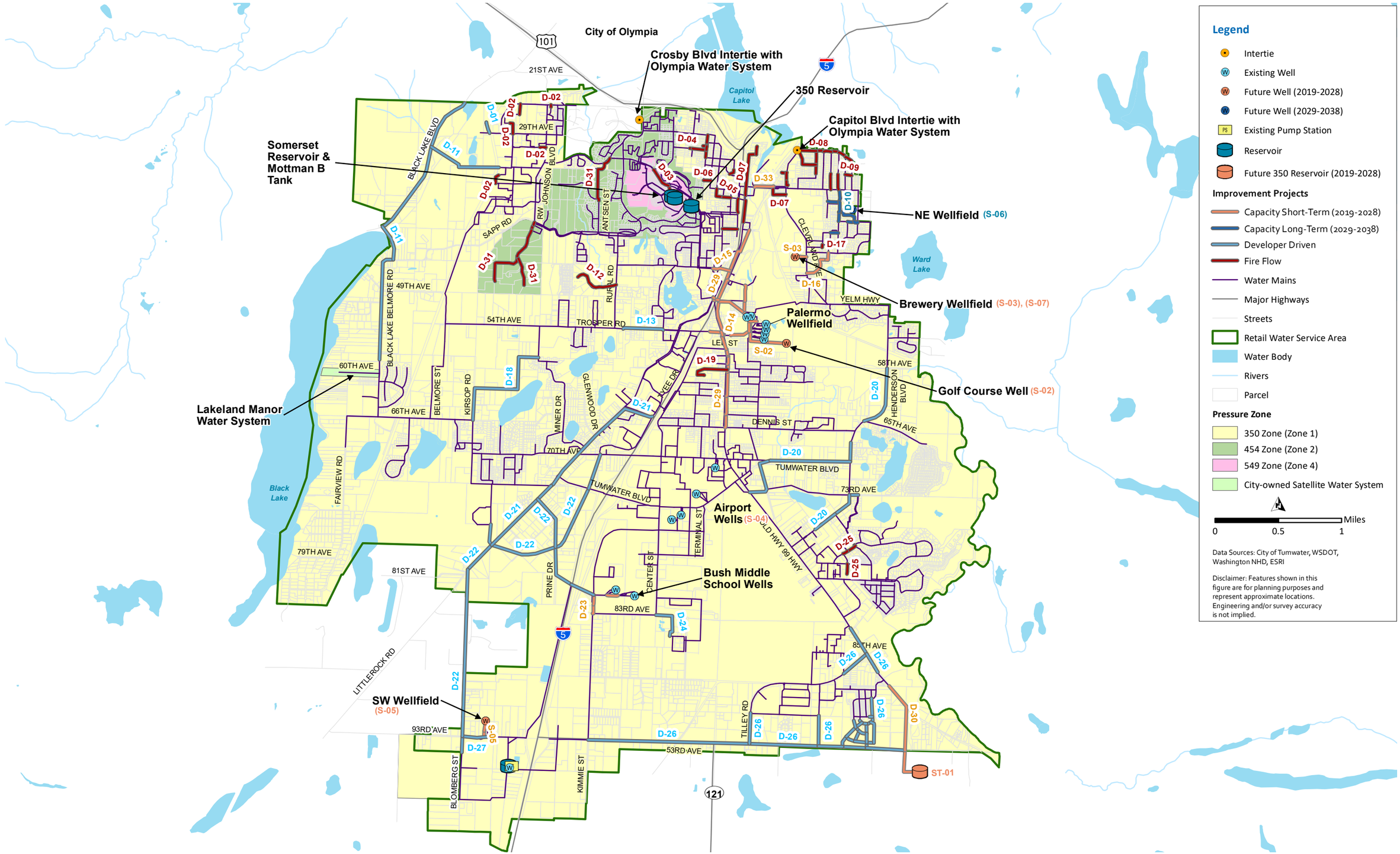

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Figure 7.1 Capital Improvement Program Projects

7.3.1 Supply Project Sheets

The following supply projects were identified by the City and are described in detail in the individual project sheets in Appendix R:

- **S-01, Lathrop Water System Improvements:** Install new water main and connections to transfer all users from the existing Lathrop Water System to the City system. This project was completed in 2019 so no costs are associated with this project.
- **S-02, Tumwater Golf Course Well:** Conversion of the Golf Course Water Right and Well to potable water supply. This project requires conversion of water right from irrigation to municipal use. The well will require disinfection and additional yard piping. Treatment for manganese and hydrogen sulfide will likely be necessary as well.
- **S-03, Brewery Wellfield:** The City's portion of the development of the Brewery Wellfield. The Strategic Plan (RH2 2016) identified the completion of two wells, disinfection, and potentially manganese treatment. The City is partnered with the Cities of Lacey and Olympia on this project. Distribution and transmission are recommended.
- **S-04, Well 15 Auxiliary Generator:** Install auxiliary generator to reliably power Well 15.
- **S-05, Future Source:** Obtain water rights and develop a future source. The water right application requested four wells be developed with a maximum day demand (MDD) of 2,300 gpm. A mitigation plan will likely be necessary as well.
- **S-06, Northeast (NE) Wellfield:** Obtain water rights and develop the NE Wellfield. The water right application requested four wells be developed with an MDD of 2,000 gpm.
- **S-07, Brewery Wellfield Decommission of Existing Infrastructure:** City's share of decommissioning the existing infrastructure at the Brewery Wellfield. This includes decommissioning the existing tank and wells. The Cities of Lacey and Olympia are partnered with the City to decommission and develop the Brewery Wellfield.

7.3.2 Storage Project Sheets

The 350 Zone storage project was identified by the City and is recommended based on the system analysis in Chapter 5:

- **ST-01, 350 Zone Tank:** To address the 350 Pressure Zone storage deficit, the City plans to build a new storage tank in the southeast corner of the 350 Pressure Zone. The location of the storage tank in the extreme southeast corner of the Pressure Zone will result in several feet of headloss as the tank supplies the system. Further analysis will need to be performed to precisely size the tank. For planning purposes, it is assumed that a tank with a total capacity of approximately 3 million gallons (MG) will be necessary to include the additional operational storage needed to account for headloss.

Further detailed description, including cost estimate, can be found on the individual project sheets provided in Appendix R.

7.3.3 Distribution Project Sheets

The Distribution projects were identified in Chapter 5, as shown in Figure 7.1, and are described in detail in the individual project sheets in Appendix R. The individual project sheets include the project cost estimate, triggers for the project, and proposed project timing. The Distribution project names and descriptions are listed below:

- **D-01, North of 29th Ave SW Pipe Upsize:** Upsize 540 linear feet (LF) of 6-inch pipe to 8-inch pipe, north of 29th Ave SW and west of railroad. Project to provide fire flow when property is developed for industrial use. This project is developer driven.

- **D-02, Looping Project at 26th Ave SW (Various Locations):** Install 1,100 LF of 8-inch and 700 LF of 12-inch pipe at the following locations:
  - East end of 26th Ave SW north to Mottman Rd SW (12-inch).
  - 29th Ave SW from Ferguson St SW north to connect to existing pipe (8-inch).
  - Parking lot east of RW Johnson Blvd SW north to Mottman Rd SW (8-inch).
  - Across RW Johnson Blvd SW from South Puget Sound Community College west to existing pipe (12-inch).
  - West end of Crites St SW north to existing pipe (8-inch).

  This is a looping project to provide industrial/commercial and public fire flows in the area.
- **D-03, Tumwater Hill:** Install 1,600 LF of 12-inch pipe at Tumwater Hill on Barnes Blvd SW from Vista Loop SW south to 454/549 Zone Reservoirs. This is a new pipe project to provide fire flow on Barnes Blvd SW and Vista Loop SW parallel to the existing pipe.
- **D-04, Grant St Pipe Upsize (Various Locations):** Upsize 1,800 LF of 4-inch pipe to 8-inch pipe at the following locations:
  - Grant St SW from N 9th Ave SW to N 7th Ave SW.
  - N 7th Ave SW from Ferry St SW to Irving St SW.
  - Alley between Grant St SW and Hayes St SW west of N 7th Ave SW.

  This is a pipe upsize project to provide single-family residential (SFR) fire flow to the area.
- **D-05, N 3rd Ave SW New Pipe (Various Locations):** Install 1,800 LF of 8-inch pipe at the following locations:
  - N 5th Ave SW from Bates St SW to Division St SW; Division St SW from N 5th Ave SW to N 3rd Ave SW.
  - E St SW from S 4th Ave SW to S 2nd Ave SW.

  This is a looping project to provide SFR fire flows in the area.
- **D-06, Clark St SW Upsize Pipe (Various Locations):** Upsize 950 LF of 6-inch pipe to 8-inch at the following locations:
  - Clark St SW between N 6th Ave SW and N 7th Ave SW.
  - S 2nd Ave SW from Division St SW to C St SW.

  This is a pipe upsize project to lower velocity and provide fire flow in pipe. Part of this project overlaps the proposed seismic backbone pipe.
- **D-07, Deschutes Pkwy Upsize (Various Locations):** Upsize 6,100 LF of 4-inch and 6-inch pipe to 12-inch pipe at the following locations:
  - Deschutes Pkwy SW from Boston St SE to Grant St SW; Grant St SW from Deschutes Pkwy SW to Deschutes St SE; Deschutes St SE to end of pipe.
  - Deschutes Way SW from D ST SW north to I-5 pipe crossing.
  - Clark Place SE from Custer Way SE to Bates St SE; Bates St SE from Clark Place SE to Cleveland Ave SE.
  - Cleveland Ave SE from Custer Way SE to E Emerson St; and E Emerson St from Cleveland Ave SE to Capitol Blvd.

  This is a pipe upsize project to provide industrial/commercial fire flows in the area and to provide fire flow to Tumwater Historical Park. Part of this project overlaps the proposed seismic backbone pipe.

  Historically, the City has pulled water from the Deschutes River to fight fires in the area. Note that as an alternative emergency fire flow source, the City can pull water from the Deschutes River.

- **D-8, Sunset Way SE Pipe Upsize (Various Locations):** Upsize 6,200 LF of 4-inch and 6-inch pipe to 8-inch pipe at the following locations:
  - Sunset Way SE from Capitol Blvd to Burnaby Ave SE; Fairfield Rd SE from Sunset Way SE to Vista Ave SE; Vista Ave SE from Fairfield Rd SE to Maringo Rd SE; Maringo Rd SE from Carlyon Ave SE to 3201 Maringo Rd SE; Carlyon Ave SE from Capitol Blvd to Quince St SE.
  - Moore St SE from North St SE north to 3498 Moore St SE.
  - Hoadly St SE from North St SE north to 3307 Hoadly St SE.

  This is a pipe upsize project to provide SFR fire flow to the area.
- **D-9, Mountain View Place SE New Pipe:** Install 280 LF of 8-inch pipe on Mountain View Place SE from Pear St SE to Quince St SE. This is a looping project to provide SFR fire flows in the area.
- **D-10, Hoadly St SE Pipe Upsize (Various Locations):** Upsize 3,970 LF of 4-inch and 6-inch pipe to 2,100 LF of 8-inch pipe, 870 LF of 12-inch, and 1,000 LF of 16-inch pipe at the following locations:
  - Hoadly St SE from North St SE to McDonald St SE (8-inch); Hoadly St SE from McDonald St SE to Middle St SE (12-inch); McDonald St SE from Hoadly St SE to Lorne St SE (8-inch); Middle St SE from Southglen Ave SE to Hawthorne St SE (8-inch); Hoadly Loop SE from Hoadly St SE to Middle St SE (16-inch).
  - Barclift Ln SE from Armstrong Ave SE to Hoadly St SE (8-inch).

  This is a pipe upsize project to provide transmission capacity when the NE Wellfield is online. May want to expand extent of project to replace aging asbestos cement (AC) and polyvinyl chloride (PVC) pipe in the area. This project is to be completed in conjunction with project S-6.
- **D-11, Black Lake New Pipe (Various Locations**): Install 18,900 LF of 12-inch pipe at the following locations:
  - West from 32nd Ave SW to Regal Park Ln SW and continuing to Black Lake Blvd SW.
  - Black Lake Blvd SW from City boundary south to Black Lake Belmore Rd SW.
  - Black Lake Belmore Rd SW from Black Lake Blvd SW to connect to existing pipe at Dooley Ln SW.
  - Sapp Rd SW from Black Lake Belmore Rd SW east to Union Pacific Railroad.

  This project is developer driven as water system expands.
- **D-12, 48th Ave SW Pipe Upsize:** Upsize 2,000 LF of 6-inch pipe to 8-inch at 48th Ave SW from Rural Rd SW west to end of street. This is a pipe upsize project to provide SFR fire flow to customers at dead end pipe. A detailed analysis is recommended to evaluate alternatives, including looping the pipe to Lambskin St SW instead of upsizing the pipe on 48th Ave SW, when the project goes to design.
- **D-13, Trosper Rd Pipe Upsize**: Upsize 1,700 LF of 8-inch pipe to 12-inch at Trosper Rd SW from Commander Dr SW to Lake Park Rd SW. This is a pipe upsize project proposed by City.
- **D-14, Palermo Wellfield Pipe Upsize (Various Locations):** Upsize 5,520 of 6-inch, 8-inch, 10-inch, and 12-inch pipe to 8-inch, 12-inch, and 16-inch PVC pipe at the following locations:
  - Pipe from Palermo Wellfield northwest to Q St (16-inch) and northwest to Capitol Blvd (12-inch).
  - Pipe from Palermo Wellfield southwest to Linda St SE (16-inch).
  - Capitol Blvd from M St SE to Linda St SE (16-inch).

  - Trosper Rd SW from Capitol Blvd west to I-5 (12-inch).
  - Capitol Blvd from La Quinta Inn & Suites south to pipe cross of I-5 (16-inch).
  - Pipe crossing of I-5 and west to Little St SW (16-inch).
  - Palermo Ave SE from O St NE north to M St SE (12-inch) and north to pipe between Capitol Blvd and Tumwater Valley Dr SE (8-inch).

  This is a pipe upsize project to provide transmission capacity when Golf Course Well is online. This project is to be completed in conjunction with S-2. Part of this project overlaps with proposed seismic backbone pipe.
- **D-15, Linwood Ave SW:** Install 2,000 LF of 16-inch pipe and 740 LF of 24-inch pipe at Linwood Ave SW from S 5th Ave SW to Capitol Blvd (24-inch); and Capitol Blvd from Linwood Ave SW to E St SW (16-inch). This is a new pipe project proposed by City.
- **D-16, Hansen St SE:** Upsize 1,600 LF of 4-inch pipe to 8-inch pipe at Hansen St SE from South St SE to Roberts Rd SE. This is a looping project to provide SFR fire flows and to provide transmission capacity when Brewery Wellfield is online. This project is to be completed in conjunction with S-3.
- **D-17, Lloyd St SE:** Install 110 LF of 8-inch pipe on Lloyd St SE from Kelsey St SE to Primrose Ln SE. This is a looping project to provide SFR fire flow in the area.
- **D-18, Kirsop Rd SW New Pipe:** Install 5,300 LF of 12-inch pipe on Kirsop Rd SW from 66th Ave SW north to Miner Dr SW. This project is developer driven as water system expands.
- **D-19, Pinehurst St SW Pipe Upsize:** Upsize 1,700 LF of 6-inch pipe to 12-inch pipe on Pinehurst St SW from Capitol Blvd west end of pipe. This is an upsize project to provide multi-family residential fire flow to customers at dead end pipe. A detailed analysis is recommended to evaluate alternatives, including looping the pipe to Linderson Way instead of upsizing the pipe on Pinehurst St SW, when the project goes to design.
- **D-20, Henderson Blvd SE Pipe (North):** Install new 12-in (2,500 ft) and 16-in pipe (8,400 ft) at the following locations:
  - Henderson Blvd from Pioneer Park to 65th Ave and 68th Ave to Tumwater Blvd (16-inch).
  - Tumwater Blvd from Nikolas St to Israel Extension (12-inch), Israel Extension from Bonniewood on Tumwater Blvd (12-inch), and Tumwater Blvd from Israel Extension to Henderson Blvd (16-inch).
  - Henderson Blvd from west of Trails End to 73rd Ave (12-inch).

  This project is developer driven as the water system expands. Private developers have recently installed pipe in this area including:
  - Henderson Blvd from Dennis St south to 71st Ave SE (10-inch).
  - Henderson Blvd from Israel Rd to 73rd Ave (12-inch)
  - 73rd Ave from Henderson Blvd east to existing pipe (8-inch).
- **D-21, Littlerock Rd SW & Bishop Rd New Pipe:** Install 9,200 LF of 16-inch pipe and 900 LF of new 12-inch pipe at the following locations:
  - Bishop Rd from Tyee Dr SW to Littlerock Rd SW (16-inch).
  - Littlerock Rd SW from Bishop Rd south to AG West Black Hills High School (16-inch).
  - Littlerock Rd SW north to AG West Black Hills High School (12-inch).

  Part of this project overlaps the proposed seismic backbone pipe.

- **D-22, Tyee Dr & Littlerock Rd SW New Pipe:** Install 2,800 LF of 12-inch pipe, 8,400 LF of 16-inch pipe, 5,200 LF of 20-inch pipe, and 4,400 LF of 24-inch pipe in the following areas:
  - Israel Rd SW south to Tumwater Blvd SW (24-inch) and from Tumwater Blvd SW south to Prine Dr SW (24-inch).
  - Prine Dr SW southeast, across, I-5 to Kimmie St SW (20-inch).
  - Prine Dr SW west to Littlerock Rd SW (12-inch).
  - Littlerock Rd SW from Prine Dr SW south to AG West Black Hills High School (12-inch).
  - Littlerock Rd SW from AG West Black Hills High School south to 81st Ave SW and then south along Bloomberg St SW (16-inch).

  This project is developer driven as water system expands.
- **D-23, Bush Middle School Wells and Kimmie St. Pipe Upside:** Upsize 1,400 LF of 12-inch pipe to 16-inch pipe on Kimmie St SW from wells south to 83rd Ave SW and along 83rd Ave SW between Wells 12 and 14. This project is to provide transmission capacity for Bush Middle School wells. This project overlaps with the proposed seismic backbone pipe.
- **D-24, 83rd Ave SW New Pipe:** Install 1,600 LF of 12-inch pipe along 83rd Ave SW from Center St SW south to existing pipe. This project is developer driven as the water system expands.
- **D-25, Arab Dr SE Pipe Upsize:** Upsize 1,130 LF of 6-inch and 8-inch pipe to 450 LF of 8-inch pipe and 680 LF of 12-inch pipe along Arab Dr SE from Trails End Dr SE to 7701 Arab Dr SE (12-inch) and from 77th Trail SE south to end of pipe (8-inch). This project is to provide industrial/commercial fire flow to customers at dead end pipe.
- **D-26, Old Highway 99 SE New Pipe (Various Locations):** Install 7,500 LF of 8-inch pipe, 1,300 LF of 12-inch pipe, and 13,200 LF of 16-inch pipe at the following locations:
  - The Preserve Development, extending to 93rd Ave SE (8-inch).
  - 93rd Ave SE from 1607 93rd Ave SE west to Kimmie St SW (16-inch) and from 93rd Ave north to existing pipe on Select Ct SE (12-inch).

  This project is developer driven as water system expands. The project is necessary for project ST-01. Part of this project overlaps the proposed seismic backbone pipe.
- **D-27, 93rd Ave SW New Pipe (A):** Install 660 LF of 12-inch pipe and 1,100 LF of 16-inch pipe along 93rd Ave SW to Blomberg St S (16-inch); and Blomberg St SW from 93rd Ave SW south to existing Lathrop pipe (12-inch). This is a looping project to provide industrial/commercial fire flows in the area.
- **D-28, 93rd Ave SW New Pipe (B):** Removed.
- **D-29, Capital Blvd Pipe Upsize:** Upsize 7,000 LF of 6-inch and 8-inch pipe to 16-inch pipe along Capitol Blvd from Linwood Ave SW to Dennis St SW. This is a new pipe project proposed by the City. Some pipe overlaps with project S-02. Any overlapping pipe will be designated to project S-02. This project is to be completed in conjunction with S-02. Part of this project overlaps with proposed seismic backbone pipe.
- **D-30, SE Water Tank Pipe Extension:** Install 1,600 LF of 24-inch pipe from 93rd Ave south to new 350 Zone Reservoir. New pipe project corresponding to future 350 Zone storage reservoir. Project is required at the same time as ST-01. This project overlaps the proposed seismic backbone pipe.
- **D-31, Bush Mountain/Antsen New Pipe/Upsize Pipe:** Install and upsize 7,100 LF of 6-inch and 8-inch pipe to 12-inch pipe at the following locations:
  - Bush Mountain St SW from Sapp Rd SW to end of streets.

  - Antsen St SW from Chapparel Dr SW to Somerset Hill Dr SW.

  This is a looping and upsize project to provide redundancy and SFR fire flow to Bush Mt area.
- **D-32, Watermain Replacement Program:** Annual program to replace aging watermains as described in Chapter 6.
- **D-33, Custer Way Extension – Boston to Capitol**: This project will extend the new 12-inch diameter water line from Boston Street to east of Capitol Boulevard. It is part of a joint water and storm project designed in 2019 and titled Custer Way Water and Storm Improvements. This work was originally planned to occur simultaneously with the sewer in this area (the sewer work was completed under a separate project), but due to the amount of roadway reconstruction required, the water component of the project was delayed. Project costs consider material (water main is part of the "seismic backbone" in the Water Comprehensive Plan), removal of concrete slabs within the existing roadway, and project complexity.

7.3.4 Miscellaneous Project Sheets

Two miscellaneous projects were identified in Chapter 5 and include the following projects:

- **M-1, Seismic Resiliency Plan:** Conduct a Seismic Resiliency Plan that will establish Level of Service Goals, update geotechnical hazard maps, perform facility resilience evaluations on critical structures and distribution systems, perform critical interdependencies assessment, and develop an implementation strategy.
- **M-2, Seismic Pipe Upgrades:** This project was developed to determine the approximate cost of replacing pipe along the seismic backbone with seismically resilient pipe. The project cost estimate is divided over a 50-year time period. The proposed seismic backbone is approximately 75,000 feet, and the average pipe diameter is 12-inch.

The City utilizes the Capital Facilities Plan as a planning document that outlines the City's needs for six years into the future for major construction, infrastructure improvements, land acquisitions, and machinery and equipment purchases. The City's 2018-2023 Capital Facilities Plan captures projects that the Water Utility will assist in funding. These projects are captured in the CIP as the following miscellaneous projects:

- **M-3, Emerging Projects/Oversizing:** This funding will be utilized to react to development projects by providing funds for such items as completing "loops" to increase flows, system redundancy, and oversizing costs. The funds could also be used to fund water line improvements and replacements within City street projects in order to avoid road cuts following road resurfacing.
- **M-4, Operation and Maintenance Facility:** The City is constructing a new Operations and Maintenance Facility, which will be located at the former Trails End Arena property. The existing building are in poor condition, present safety and liability risks for the City, and were deemed unsuitable for use. The buildings are being removed in advance of the future development of the property for a new City O&M Facility and a new neighborhood park. This CIP project includes the Water Fund portion of the new O&M Facility.
- **M-5, WSP Update:** 10-year update to the Water System Plan. The City is required by DOH to update the Water System Comprehensive plan every six years. The Water Comprehensive Plan includes an assessment of water rights, wellhead protection area revisions, water conservation program enhancements, recommended capital improvements and incorporates disinfection program requirements.

- **M-6, Water Rights Acquisitions:** As described in Chapter 4, the City needs to develop multiple new supply sources within the next five years and additional large supplies in the 20-year planning horizon. This program includes funding for the purchase and processing of existing water rights to support system growth demands.
- **M-7, Enterprise Resource Planning (ERP) Business System:** This will included assessment and analysis of the current ERP System (Tyler Eden) replacement. The City currently uses Tyler Technology's Eden program. Tyler no longer writes upgrades specific to Eden. Instead it writes generic upgrades that then need to be customized for Eden, one of several of Tyler software systems. Eden also has not provided the Web-based accessibility that the City wished for. The cost of this project will be split approximately 50 percent to the General Fund and 50 percent between the Water, Sewer, and Storm Utilities.

Cost estimates for the miscellaneous projects can be found on the individual project sheets provided in Appendix R.

7.3.5 Cost Summary

CIP projects were summarized by project category and type in Tables 7.9 and 7.10, respectively. The total Water CIP cost over the next 20 years is approximately $75.0 million, which equates to approximately $3.8 million annually. Of the total cost, $45.6 million is budgeted for the short-term phase and approximately $29.4 million is budgeted for the long-term phase.

When considering CIP costs by project type, approximately 57 percent of the CIP costs are capacity projects. System Improvement projects make up approximately 17.2 percent of the CIP costs, and R&R projects make up about 26 percent of the CIP costs. Many projects were categorized as capacity because the City expects the number of developer-driven projects to increase.

When considering CIP costs by project category, as shown in Table 7.10, approximately 40 percent of the CIP costs occur from distribution projects. The other high cost category is supply, at 30 percent of the CIP.

Table 7.9 CIP Summary by Project Type

Project Type	Total CIP Cost Estimate	CIP Phasing	
		Short-term (2019 – 2028)	Long-term (2029 – 2038)
Capacity	$ 42,615,000	$ 30,915,000	$ 11,700,000
Repair & Replacement	$ 19,539,000	$ 13,019,000	$ 6,520,000
System Improvements	$ 12,885,000	$ 1,664,000	$ 11,221,000
Total Cost	$ 75,039,000	$ 45,598,000	$ 29,441,000
Annual Cost	$ 3,752,000	$ 4,560,000	$ 2,944,000

Table 7.10 CIP Summary by Project Category

Project Category	Total CIP	Percentage
Distribution	$ 30,010,000	40%
Supply	$ 22,950,000	30%
Storage	$ 8,050,000	11%
Miscellaneous	$ 14,029,000	19%
Total	**$ 75,039,000**	**100%**