Location: City Hall – Council Chambers
Date: June 25, 2024
Time: 6:00 PM

City Council Meeting Agenda

Mayor Jason Beebe, Council Members Steve Uffelman, Janet Hutchison,
Shane Howard, Gail Merritt, Scott Smith, Marv Sumner and City Manager Steve Forrester

ATTEND TELEPHONICALLY BY CALLING 346-248-7799 Meeting ID: 947 5839 2608 Passcode: 123456

Call to Order

Flag Salute

Additions to Agenda

Consent Agenda

1. Regular Meeting Brief 6-11-2024
2. Bonito Feast New Liquor License Application

Visitors, Appearances and Requests

Council Presentations

Council Business

3. Republic Disposal Rate Increase **(PUBLIC HEARING)** - Mayor Beebe
4. Adopting Updated Wastewater Master Plan **(PUBLIC HEARING)** - Josh Smith / Casey Kaiser
5. Adopting Updated Water Master Plan **(PUBLIC HEARING)** - Josh Smith / Casey Kaiser
6. Chapter 8 Amendment to the City's Comprehensive Plan (City Facilities) **(PUBLIC HEARING)** Josh Smith / Casey Kaiser
7. Consideration of a Proclamation - July Parks & Recreation Month - Sponsor Councilor Sumner

Staff Reports and Requests

8. City Manager's Report - Steve Forrester

Committee Reports

Ordinances

9. Ordinance No 1291 - Amending the Prineville Zoning Map and Comprehensive Plan Map to Reconcile Discrepancies Between the Two Maps **(SECOND PRESENTATION)** - Josh Smith

Resolutions

10. Resolution No 1597 - Declaring the City of Prineville's Election to Receive State Revenue Sharing **(PUBLIC HEARING)** - Lori Hooper Antram

11. Resolution No 1598 - Establishing Fees and Charges for the City of Prineville for FY 2024-2025 **(PUBLIC HEARING)** - Lori Hooper Antram

12. Resolution No 1599 - Approving a Rate Increase for Solid Waste Franchisee Services - Mayor Beebe

13. Resolution No 1600 - Approving Personal Services Agreement with Divergent Engineering Regarding Prineville Water Treatment Plant Operations - Casey Kaiser

Visitors, Appearances and Requests

Adjourn

Agenda items maybe added or removed as necessary after publication deadline

CITY OF PRINEVILLE
Regular Meeting Brief
387 NE Third Street – Prineville, OR 97754
541.447.5627 ph 541-447-5628 fax

Full Meeting Recordings Available at:
http://cityofprineville.com/meetings/

City Council Meeting Brief
June 11, 2024

Council Members Present:

Marv Sumner	Janet Hutchison
Gail Merritt	Jason Beebe
Shane Howard	Scott Smith

Council Members Absent
Steve Uffelman

Additions to the Agenda

None.

Consent Agenda

1. Regular Meeting Brief 5-28-2024

Councilor Hutchison made a motion to approve consent agenda as presented. Motion seconded. No discussion on motion. Motion carried.

Visitors, Appearances and Requests

No one came forward.

Council Presentations

None.

Council Business

2. **Republic Disposal Rate Increase Request –** Courtney Voss

Jered Reid, City Attorney provided background information on the process of considering a rate increase.

Courtney Voss, Republic Municipal Manager came forward to answer any questions.

There were questions regarding credits for customers if they miss service and if the service levels will continue to improve.

Ms. Voss responded that they have been bringing in extra help to keep service levels up and now they are fully staffed with even extra staff to make sure there are no open routes. They are also bringing in new capital resources.

Discussions continued regarding manning the Prineville office, residents being able to make payments in the office which would be quicker than using the drop box, disposal fees, and creating a recycling station directory.

3. **Intent to Award 2024 Street Rehabilitation Project –** Casey Kaiser

Casey Kaiser, Public Works Director presenting the staff report adding that every year funds are put aside for ongoing street maintenance to keep our pavement condition index (PCI) level up.

There were discussions regarding how the staff sends out notifications including going door to door before work in their area is going to start.

There were no further discussions.

Councilor Sumner made a motion to approve Intent to Award 2024 Street Rehabilitation Project to 7 Peaks Paving in the amount of $565,328.00. Motion seconded. No discussion on motion. All in favor, motion carried.

4. **Intent to award NE Combs Flat Road Extension / OID Ironhorse Piping Project –** Casey Kaiser

Mr. Kaiser presented the staff report and went over the background on how the request for proposals process was conducted. Taylor Northwest received the highest score and was also the lower bidder.

There were discussions regarding Taylor Northwest and their work on Ochoco Irrigation District (OID) pump station project and how well they did on that project despite all of the challenges.

Mr. Kaiser explained that this is the largest single project in Prineville history. The partnership with OID made this project possible and resulted in a cost savings of $5-6M for not having to construct bridges over the irrigation canal.

Councilor Merritt made a motion to approve the Intent to Award the NE Combs Flat Road Extension / OID Ironhorse Piping Project to Taylor Northwest in the amount of $13,580,212.53. Motion seconded. No discussion on motion. All in favor, motion carried.

Mr. Kaiser pointed out what a big moment this is to finally be able to do this project.

Staff Reports and Requests:

5. **City Manager's Report–** Steve Forrester

Steve Forrester, City Manager presented his Managers report highlighting activity in each department.

There were discussions regarding the Peters Road Sidewalk project.

There were no further discussions.

Councilor Smith was excused from the remainder of the meeting at 6:39 P.M.

Committee Reports

Mayor Beebe announced that he was invited to give remarks on Friday at noon regarding the Fallen Hero Dedication ceremony at Ochoco Creek Park. Mayor Beebe added that it is also Flag Day and the Army's 247^{th} birthday.

There were no other reports.

Ordinances:

6. **Ordinance No. 1291 – Amending the Prineville Zoning Map and the Comprehensive Plan Map to Reconcile Discrepancies Between the Two Maps and Existing Land Use (FIRST PRESENTATION) –** Josh Smith

Josh Smith, Planning Director provided the background information stating that there have been no changes or comment received since the Planning Commission recommendation was presented to Council at the last meeting.

There were no questions.

Councilor Howard made a motion to approve the first presentation of Ordinance No. 1291. Motion seconded. No discussion on motion. All in favor, motion carried.

Resolutions

None.

Visitors, Appearances and Requests:

No one came forward.

Adjourn

Councilor Sumner made a motion to adjourn the meeting. Motion seconded. No discussion on motion. All in favor, motion carried.

Meeting adjourned at 6:44 P.M.

Motions and Outcomes:

Motion:	Outcome	Beebe	Howard	Hutchison	Merritt	Smith	Sumner	Uffelman
Consent Agenda as Presented	PASSED	Y	Y	Y	Y	-	Y	-
Intent to Award 2024 Street Rehabilitation Project to 7 Peaks Paving in the amount of $565,328.00.	PASSED	Y	Y	Y	Y	Y	Y	-
Intent to Award the NE Combs Flat Road Extension / OID Ironhorse Piping Project to Taylor Northwest in the amount of $13,580,212.53.	PASSED	Y	Y	Y	Y	Y	Y	-
Ordinance No. 1291 – Amending the Prineville Zoning Map and the Comprehensive Plan Map to Reconcile Discrepancies Between the Two Maps and Existing Land Use **(FIRST PRESENTATION)**	PASSED	Y	Y	Y	Y	-	Y	-
Adjourn Meeting	PASSED	Y	Y	Y	Y	-	Y	-

Public Records Disclosure

Under the Oregon public records law, all meeting information, agenda packets, ordinances, resolutions, audio and meeting briefs are available at the following URL: https://www.cityofprineville.com/meetings .

OREGON LIQUOR & CANNABIS COMMISSION

LIQUOR LICENSE APPLICATION

Instructions

1. **Complete and sign** this application.
2. Prior to submitting this application to the OLCC, send the completed application to **the local government for the premises address** to obtain a recommendation.
   - If the premises street address is within a city's limits, the local government is the city.
   - If the premises street address is not within a city's limits, the local government is the county.
3. You can submit the application to the OLCC if:
   1. You have WRITTEN documentation showing the date the local government received the application or;
   2. The local government has provided you their recommendation.

ALL forms and documents must be a **PDF** attachment

4. **Email the PDF application that contains the local government recommendation or proof of submission** to: OLCC.LiquorLicenseApplication@oregon.gov.
5. **Do not** include any license fees with your application packet (fees will be collected at a later time).
   When it's time to pay the license fee you must pay the full yearly fee for the current license year (the license fee will not be prorated). If you pay in the last quarter of your license year you must also pay the yearly fee for the next license year.

License Request Options - *Please see the general definitions of the license request options below:*

- **New Outlet:** The licensing of a business that does not currently hold an active liquor license.
- **Change of Ownership:** The request to completely change the licensee of record at a licensed business.
- **Greater Privilege:** The request to change from an Off-Premises to a Limited or Full On-Premises Sales license **OR** from a Limited to Full On-Premises Sales license.
- **Additional Privilege:** The licensee currently holds an active liquor license at the premises and that same licensee would like to request to add an **additional** different liquor license type at that same premises location.

Additional Information

Applicant Identification: Please review OAR 845-006-0301 for the definitions of "applicant" and "licensee" and OAR 845-005-0311 to confirm that all individuals or entities with an ownership interest (other than a waivable ownership interest, per OAR 845-005-0311[6]) in the business have been identified as license applicants on this document. If you have a question about whether an individual or entity needs to be listed as an applicant for the license, discuss this with the OLCC staff person assigned to your application.

Premises Address: This is the physical location of the business and where the liquor license will be posted.

Applicant Signature(s): Each individual listed in the applicant information box on page 2 (entity or individuals applying for the license) must sign the application.
If an applicant listed in the applicant information box on page 2 is an entity (such as a corporation or limited liability company), at least one member or officer of the entity must sign the application.

Applicant/Licensee Representative(s): In order to make changes to a license or application or to receive information about a license or application by someone other than the applicant/licensee you must:
– Complete the Authorized Representative and submit with the application.

For help with this application or any related documents or processes, email olcc.alcohollicensing@oregon.gov.

LIQUOR LICENSE APPLICATION

Check the appropriate license request option:

☒ New Outlet | ☐ Change of Ownership | ☐ Greater Privilege | ☐ Additional Privilege

Select the license type you are applying for.

More information about all license types is available online.

Full On-Premises

☒ Commercial

☐ Caterer

☐ Public Passenger Carrier

☐ Other Public Location

☐ For Profit Private Club

☐ Nonprofit Private Club

Winery

☐ Primary location

Additional locations: ☐2nd ☐3rd ☐4th ☐5th

Brewery

☐ Primary location

Additional locations: ☐2nd ☐3rd

Brewery-Public House

☐ Primary location

Additional locations: ☐2nd ☐3rd

Grower Sales Privilege

☐ Primary location

Additional locations: ☐2nd ☐3rd

Distillery

☐ Primary location

Additional tasting locations: (Use the DISTT form **HERE**)

☐ **Limited On-Premises**

☐ **Off Premises**

☐ **Warehouse**

☐ **Wholesale Malt Beverage and Wine**

LOCAL GOVERNMENT USE ONLY

LOCAL GOVERNMENT
After providing your recommendation, return this form to the applicant **WITH** the recommendation marked below

Name of City OR County (not both)

City of Prineville

Please make sure the name of the Local Government is printed legibly or stamped below

Date application received:

Optional: Date Stamp Received Below

6-17-2024

☐ Recommend this license be granted

☐ Recommend this license be denied

☐ No Recommendation/Neutral

Printed Name ____________ Date ____________

Signature ____________

Trade Name Bonito Feast

LIQUOR LICENSE APPLICATION

APPLICANT INFORMATION

Identify the applicants applying for the license. This is the entity (example: corporation or LLC) or individual(s) applying for the license. Please add an additional page if more space is needed.

Name of entity or individual applicant #1: Yoshi Sushi LLC	Name of entity or individual applicant #2: Victor Rodriguez
Name of entity or individual applicant #3: Pattraporn Rodriguez	Name of entity or individual applicant #4:

BUSINESS INFORMATION

Trade Name of the Business (name customers will see):
Bonito Feast

Premises street address (The physical location of the business and where the liquor license will be posted):
380 N Main ST Prineville OR 97756

City: Prineville	Zip Code: 97756	County: Crook

Business phone number: 541-903-5614	Business email: bonitofeast@yahoo.com

Business mailing address (where we will send any items by mail as described in OAR 845-004-0065[1].):
380 N Main ST

City: Prineville	State: OR	Zip Code: 97756

Does the business address currently have an OLCC liquor license? ☒Yes ☐No	Does the business address currently have an OLCC marijuana license? ☐Yes ☒No

APPLICATION CONTACT INFORMATON – Provide the point of contact for this application. If this individual is <u>not</u> an applicant or licensee, the Authorized Representative Form must be completed and submitted with this application.

Application Contact Name: Pattraporn Rodriguez

Phone number: [redacted]	Email: [redacted]

LIQUOR LICENSE APPLICATION

TERMS

- "Real property" means the real estate (land) and generally whatever is erected or affixed to the land (for example, the building) at the business address.
- "Common area" is a privately owned area where two or more parties (property tenants) have permission to use the area in common. Examples include the walking areas between stores at a shopping center, lobbies, hallways, patios, parking lots, etc. An area's designation as a "common area" is typically identified in the lease or rental agreement.

ATTESTATION – OWNERSHIP AND CONTROL OF THE BUSINESS AND PREMISES

- Each applicant listed in the "Application Information" section of this form has read and understands OAR 845-005-0311 and attests that:

1. At least one applicant listed in the "Application Information" section of this form has the legal right to occupy and control the real property proposed to be licensed as shown by a property deed, lease, rental agreement, or similar document.

2. No person not listed as an applicant in the "Application Information" section of this form has an ownership interest in the business proposed to be licensed, unless the person qualifies to have that ownership interest waived under OAR 845-005-0311.

3. The licensed premises at the premises street address proposed to be licensed either:
   a. Does not include any common areas; or
   b. Does include one or more common areas; however, only the applicant(s) have the exclusive right to engage in alcohol sales and service in the area to be included as part of the licensed premises.
      - In this circumstance, the applicant(s) acknowledges responsibility for ensuring compliance with liquor laws within and in the immediate vicinity of the licensed premises, including in portions of the premises that are situated in "common areas" and that this requirement applies at all times, even when the business is closed.

4. The licensed premises at the premises street address either:
   a. Has no area on property controlled by a public entity (like a city, county, or state); or
   b. Has one or more areas on property controlled by a public entity (like a city, county, or state) and the public entity has given at least one of the applicant(s) permission to exercise the privileges of the license in the area.

Applicant Signature(s): Each individual listed in the applicant information box on page 2 (entity or individuals applying for the license) must sign the application.

If an applicant listed in the applicant information box on page 2 is an entity (such as a corporation or limited liability company), at least one member or officer of the entity must sign the application.

- Each applicant listed in the "Application Information" section of this form has read and understands OAR 845-006-0362 and attests that:

1. Upon licensure, each licensee is responsible for the conduct of others on the licensed premises, including in outdoor areas.
2. The licensed premises will be controlled to promote public safety and prevent problems and violations, with particular emphasis on preventing minors from obtaining or consuming alcoholic beverages, preventing over-service of alcoholic beverages, preventing open containers of alcoholic beverages from leaving the licensed premises unless allowed by OLCC rules, and preventing noisy, disorderly, and unlawful activity on the licensed premises.

I attest that all answers on all forms and documents, and all information provided to the OLCC as a part of this application, are true and complete.

Applicant name	Signature	Date
Victor Rodriguez	[signature]	06/14/24
Pattrapom Rodriguez	ภัทราภรณ์ รอดริเกซ	06/14/24

Applicant/Licensee Representative(s): If you would like to designate a person/entity to act on your behalf you must complete the Authorized Representative Form. You may submit the form with the application or anytime thereafter. The form must be received by the OLCC before the representative can receive or submit information for the applicant.

Please note that applicants/licensees are responsible for all information provided, even if an authorized representative submits additional forms on behalf of the applicant.

City of

Prineville, Oregon

Wastewater Facilities Plan

2024

anderson perry

3818 SW 21st Street - Suite 302
Redmond, Oregon 97756
(541) 362-8682
www.andersonperry.com

WASTEWATER FACILITIES PLAN

FOR

CITY OF PRINEVILLE, OREGON

MARCH 2024

ANDERSON PERRY & ASSOCIATES, INC.

La Grande, Redmond, Hermiston, and Enterprise, Oregon
Walla Walla, Washington

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APPENDICES

Executive Summary

This Wastewater Facilities Plan (WWFP) has been developed to provide the City of Prineville, Oregon, with an up-to-date review of its wastewater collection system, wastewater treatment facility (WWTF), and the financial components of the entire wastewater system. Specifically, this WWFP evaluates the overall condition and performance of the wastewater collection system and the WWTF, describes alternatives to improve the system and facilities to meet the short- and long-term needs of the community and to ensure compliance with the conditions set forth in the National Pollutant Discharge Elimination System (NPDES) Permit, and provides a Capital Improvements Plan (CIP) schedule for recommended medium- and long-term improvements projects. The following summarizes the existing conditions, describes the WWTF and collection system evaluation, and briefly discusses improvements. Detailed discussions are provided in the individual sections of this WWFP. Appendices A through L contain documentation used in preparation of this WWFP and should be referenced as needed.

Existing Wastewater Collection System Description and Evaluation

The majority of the City's wastewater collection system was constructed in 1960. The gravity collection system is composed of pipes ranging in size from 4 to 48 inches in diameter, the majority being 8 inches in diameter, and eight lift stations. Six of the lift stations are City-owned, and two are privately owned. The two privately owned lift stations are outside the scope of this report and are not discussed further. Older pipe sections are either asbestos cement or concrete, and newer wastewater piping is predominately polyvinyl chloride. Additionally, forcemains transport wastewater from the eight lift stations to the gravity main lines, then the wastewater enters the WWTF lagoons.

Infiltration and inflow (I/I) is unwanted flows entering the wastewater collection system. I/I can occur in a collection system during precipitation events or periods with high groundwater levels. The 2018 WWFP identified I/I in the collection system as a recommended priority. In response to this recommendation, the City initiated collection system improvements and maintenance activities that have resulted in a significant reduction of I/I. A desktop evaluation of I/I determined the City likely has some degree of delayed inflow. Both inflow and infiltration are not considered excessive but have been identified as a concern for the City.

Further details regarding the evaluation of the collection system can be found in Sections 2 and 3.

Existing Wastewater Treatment Facility Description and Evaluation

The original WWTF began operation in 1960. The City's wastewater system is regulated by NPDES Permit No. 101433 (see Appendix A for a copy of the NPDES Permit, Permit Modification, and Permit Fact Sheet). Table ES-1 shows the outfalls identified in the NPDES Permit along with their location.

TABLE ES-1
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT-IDENTIFIED OUTFALLS

Outfall Number	Location
001	Crooked River Mile 46.8 (Direct River Discharge)
002	Meadow Lakes Golf Course
003	Land Irrigation (Pasture Area)
004	Wetland Discharge

Initially, the 1960 treatment system consisted of evaporative lagoons, with the WWTF receiving upgrades in 1992, 2005, and 2017. Improvements included increasing the capacity of the existing lagoons (Plant 1) and installing a second partially aerated facultative lagoon system, referred to as Plant 2. Wastewater is collected via a gravity flow collection system and is pumped to the treatment lagoons from an influent pump station. Disposal is completed via evaporation and controlled seepage from constructed wetlands for indirect discharge into the Crooked River, with the remainder stored in effluent storage ponds for disposal by irrigation reuse on City-owned pastureland and the Meadow Lakes Golf Course. See Figure 2-2 in Section 2 for an aerial photograph of the existing WWTF.

In 2017, the City constructed wastewater system improvements (WWSI) based on the 2005 WWFP and 2010 WWFP Update identifying the potential to outgrow the current WWTF capacity due to higher-than-anticipated municipal growth. The 2017 WWSI project converted a portion of the City's existing irrigated pastureland into a wastewater treatment and disposal wetland system. The conversion has increased treatment capacity for the WWTF, benefited local wildlife and aquatic organisms, and reduced groundwater temperatures where they interact with the Crooked River. As the treated effluent enters the Crooked River, it also provides augmented flows that improve the river environment for fish and other species. Additionally, the Crooked River Wetlands Complex has added an outdoor recreational space with walking trails, wildlife viewing, and educational opportunities for City residents and surrounding communities that has become quite popular.

The existing WWTF is composed of two partially aerated facultative lagoon treatment plants. Site piping allows cross-connection between plants. Influent from the main collection system passes through the influent screen on the north side of the river (installed as part of the 2017 upgrade) and then into the influent pump station. Influent from the airport industrial area, which is mostly cooling water effluent, passes through an influent screen on the south side of Pond 1 of Plant 1, where it enters the lagoon at the end of the aeration zone.

Plant 1 is the City's original lagoon system and received upgrades in 1992, 2005, and 2017. Plant 1 includes aerated and facultative lagoons, rock filters, and disinfection that produces Class C treated effluent. Effluent from Plant 1 is utilized for irrigation of the Meadow Lakes Golf Course.

Plant 2 consists of three treatment lagoons operated in a series that produce Class D treated effluent. Wastewater from an influent pump station travels through an aerated lagoon before passing sequentially through a partially aerated lagoon and then a facultative lagoon. Effluent is then disinfected in a chlorine contact chamber. The treated effluent is stored in the effluent storage pond (kidney pond) before it is utilized as irrigation for City-owned pastureland or discharged to the 15 constructed lined and unlined wetlands. See Section 2 for more detailed information on the existing wastewater system.

Since 2018, the City has completed aeration system improvements to Pond 1 of Plant 1 and Pond 1 of Plant 2 that replaced the surface-mounted aspirating aerators with fine bubble diffused aeration. Surface-mounted aspirating aerators continue to perform aeration in the partially aerated Pond 2 at Plant 2. Both fine bubble diffused aeration systems have diesel generators to provide backup emergency power in the event of a utility power failure.

Currently, the WWTF maintains compliance with the NPDES Permit. The use of two parallel lagoon treatment systems provides adequate redundancy and capacity. However, improvements to the WWTF have been identified to help improve operating efficiency, safety, and treatment quality. A wastewater system flow schematic for the existing facilities is shown on Figure 2-3 in Section 2. Further details regarding the evaluation of the WWTF can be found in Sections 2 and 3.

Improvements Prioritization and Funding

Capital Improvements Plan

Improvements identified under the CIP category include capital improvements projects that need to be completed to address existing system deficiencies irrespective of growth.

After a review of the City's wastewater collection and treatment facilities deficiencies, improvements were prioritized and the CIP was developed to help organize necessary improvements over the 20-year planning period. The CIP is divided into two phases: medium- and long-term. The medium- and long-term improvements should be completed in 0 to 10 years and 10 to 20 years, respectively, with portions of the medium-term improvements completed annually, such as the collection system inspection and evaluation, cured-in-place pipe (CIPP) lining, and manhole rehabilitation. A summary of the costs associated with the CIP is shown on Table ES-2.

TABLE ES-2
SUMMARY OF CAPITAL IMPROVEMENTS PROJECT PHASES (2023 DOLLARS)

Project Element	Project Purpose/Description	Total Estimated Project Cost
Medium-Term Improvements - 0 to 10 years		
Influent Screen Replacement	Replace the existing main influent screen.	$1,156,500
Update Headworks	Install new headworks influent pumps, electrical, and controls.	$576,000
System-wide Supervisory Control and Data Acquisition (SCADA) Upgrade	Upgrade the wastewater collection and treatment SCADA systems.	$427,000
Lift Station Improvements	Upgrades to the lift station pumps, equipment, electrical, and controls.	$380,500
Collection System Improvements - Annual I/I Reduction Program	Annually install 500 linear feet of CIPP lining. The total project cost of $855,000 is based on an annual budget of $150,000 to complete in six years.	$855,500
Manhole Rehabilitation Program	Repair/replace manholes as identified through inspection/evaluation.	$382,000
Collection System Inspection	Annual television inspection and evaluation of the existing collection system (footage per year to be determined).	$292,000
Upsize Existing Main Line from 10th Street to the North Side of Lamonta	Upsize existing pipe to remove the bottleneck in the collection system from northeast Prineville.	$2,276,800
Upsize Existing Main Line on Main Street from Lynn Boulevard to 1st Street	Upsize existing pipe that is currently 18 inches upstream, bottlenecks to 12 inches, then becomes 21 inches. Remove 12-inch bottleneck.	$1,293,500
TOTAL ESTIMATED COST OF MEDIUM-TERM IMPROVEMENTS		**$7,639,800**
Long-Term Improvements - 10 to 20 years		
Long-Term WWTF Improvements	Remove lagoon biosolids.	$541,000
TOTAL ESTIMATED COST OF LONG-TERM IMPROVEMENTS		**$541,000**

The estimated CIP costs listed above are provided in 2023 dollars for comparison. The recommended medium-term improvements projects are anticipated to be advertised for bid and awarded in 2026. The City and any potential funding agencies should recognize that, due to the recent escalation of inflation and construction costs, total relative project costs, including construction, administrative, legal, engineering, and contingencies, together with other project costs, will continue to increase until such time that the project is awarded. Therefore, costs for medium-term improvements have been inflated by 6.5 percent per year to 2026 dollars. The estimated year 2026 dollar amount is the amount of funds the City should apply for to cover actual project costs at the time the project is anticipated to be awarded. Table ES-3 shows the anticipated 2026 total project cost for the recommended medium-term improvements is $9,228,500.

TABLE ES-3
2026 TOTAL PROJECT COST FOR RECOMMENDED MEDIUM-TERM CAPITAL IMPROVEMENTS PLAN IMPROVEMENTS

Medium-Term Improvements (2023 Dollars)	$7,639,800
Assumed Annual Construction Cost Index Inflation Rate	6.5 percent
Total Estimated Project Cost (2026 Dollars)	**$9,228,500**

System Development Charge Plan

Improvements identified under the System Development Charge (SDC) category were developed to address those needs in the system to specifically support growth and associated increased system demands.

After a review of the City's wastewater collection and treatment facilities deficiencies, improvements were prioritized and the SDC Plan was developed to help organize necessary improvements over the 20-year planning period. The SDC improvements are not listed in any order of priority. Improvements will be completed based on where growth and development occur.

Table ES-4 lists the proposed SDC improvements as identified by a collection system evaluation completed for this WWFP and information provided by the City of Prineville Planning Department regarding potential growth areas.

TABLE ES-4
SUMMARY OF SYSTEM DEVELOPMENT CHARGE PROJECT PHASES (2023 DOLLARS)

Project Element	Project Purpose/Description	Total Estimated
WWTF Chlorination Conversion	Convert the existing chlorination system from gas chlorine to a bulk sodium hypochlorite system.	$652,000
Upsize Existing Main Line from 10th Street to the North Side of Lamonta	Cost difference to increase pipe size; used in conjunction with CIP 8 (discussed in Section 4).	$932,500
WWTF Operations Building and Laboratory	Construct an operations building with restrooms, showers, an employee locker room, offices, storage, conference space, kitchen, and laboratory.	$1,747,500
Main Line Extension North of Existing Main Line along Canal	To serve potential development on Rhoden property.	$325,250

Project Element	Project Purpose/Description	Total Estimated
Extend Pressure Sewer Main Line North on Highway 26 from N. Gardner Road	To serve future development north of Prineville along Highway 26.	$520,250
Upsize Existing Main Line on Main Street from Lynn to 1st Street	Cost difference to increase pipe size; used in conjunction with CIP 9 (discussed in Section 4).	$350,000
Extend Existing 18-inch Sewer Main Line South on Main Street	To serve future development south of Prineville along Main Street.	$1,772,500
Extend Combs Flat Interceptor to the East	To serve future development east of Prineville.	$2,330,750
Connect Williamson Area to Gravity Sewer. Remove Williamson Lift Station	To serve future development east of Prineville, remove the Williamson Lift Station, and serve the area by gravity.	$611,250
Melrose/Willowdale Sewer Main Line Installation	Install main lines and manholes to facilitate future connection of Melrose/Willowdale residents.	$3,169,500
	TOTAL ESTIMATED COST OF SDC IMPROVEMENTS	**$12,411,500**

The estimated project costs listed above are provided in 2023 dollars for comparison. The preferred improvements projects would be advertised for bid and awarded as growth dictates. For comparison, costs for the medium-term improvements have been inflated by 6.5 percent per year to 2026 dollars. Since SDC projects are directly related to growth, and location and timing of growth is unknown, the time frame for the improvements on Table ES-4 is unknown. Table ES-5 shows the anticipated 2026 total project cost for the SDC improvements.

TABLE ES-5
2026 TOTAL PROJECT COST FOR RECOMMENDED SYSTEM DEVELOPMENT CHARGE IMPROVEMENTS

SDC Improvements (2023 Dollars)	$12,411,500
Assumed Annual Construction Cost Index Inflation Rate	6.5 percent
TOTAL ESTIMATED PROJECT COST (2026 DOLLARS)	**$14,992,500**

Development and Evaluation of Improvement Alternatives

Only the lift stations and WWTF have alternatives that warrant evaluation. Improvements to the collection system are general in nature and should be completed as needed to maintain the system. More detailed information on the evaluation of improvement alternatives, as well as the proposed collection system improvements, is included in Sections 4 and 5.

Lift Stations

The six City-owned and operated lift stations were evaluated based on comments and information obtained from Public Works personnel and a field review of the lift stations by Anderson Perry & Associates, Inc.. Based on the information obtained, it was determined the lift stations are in good condition structurally; however, improvements to pumps, pumping mechanical equipment, electrical, and control systems are needed. Two alternatives were developed for the lift stations:

- Alternative 1 - No action.
- Alternative 2 - Replace existing pumping equipment and install new remote monitoring, electrical, and instrumentation and controls.

Wastewater Treatment Facility

The WWTF has adequate capacity and redundancy to meet the needs of the planning period while meeting NPDES Permit requirements. Recommended improvements are intended to improve operational efficiency, safety, reliability, expandability, and consistency.

Four conceptual WWTF improvements alternatives were evaluated during preparation of this WWFP:

- Alternative 1 - No action.
- Alternative 2 - Replace existing pumping equipment and electrical components.
- Alternative 3 - Replace existing pumping equipment, improve the main influent screen, and convert the gas chlorination system to sodium hypochlorite.
- Alternative 4 - Replace existing pumping equipment, improve the main influent screen, upgrade SCADA systems, convert the gas chlorination system to sodium hypochlorite, complete biosolids removal, and construct a new operations and laboratory building.

Development and Evaluation of Financial Status

The annual cost of operating and maintaining the wastewater system is summarized on Table 2-13 in Section 2. The annual cost includes all costs for the wastewater system such as operation, maintenance, and replacement; staff payroll; and existing debt service. A graphical plot of the City's sewer system budget, both revenue and expenditures, is shown on Chart 2-1 in Section 2. By plotting a "trend" line for the expenditures, the expenditures in a future year can be estimated, assuming no changes to the wastewater system occur. The trend line for the City's O&M expenditures suggests expenditures will be approximately $2,677,390 in the budget year 2024-25, not including debt service. An evaluation of the City's sewer system fund was used to determine the City's potential loan capacity for the City's recommended medium-term improvements.

Total revenue, total costs, and the net difference from fiscal years 2016-17 to 2020-21 were used to determine the potential annual loan repayment the City could afford.

To determine the City's ability to fund a WWSI project, Figures 6-2 and 6-3 in Section 6 were prepared. This WWFP shows how much the City would need to raise sewer rates to fund a project from strictly loan funds. The data shown on Figure 6-2 in Section 6 provide a general idea of the amount of debt the City could afford to service at various average monthly sewer rates.

Table ES-6 presents the approximate loan amounts the City could assume based on the City's current monthly sewer rate of $55.61 and using only loans without any grant assistance.

TABLE ES-6
ESTIMATED LOAN CAPACITY AT EXISTING SEWER RATE

Current City Monthly Sewer Rate	Water/Wastewater Loan Funding Capacity (2.53 Percent, 25-Year Term)[1]	CWSRF Loan Capacity (1.33 Percent, 15-Year Term)[2, 3]	CWSRF Loan Capacity (1.92 Percent, 30-Year Term)[2, 3]
$55.61	$10,000,000	$11,705,000	$19,608,000

[1] *Maximum loan amount*

[2] *Loan terms are further described in Section 6 of this WWFP. Loan capacities are rounded to the nearest $1,000.*

[3] *Does not include an annual fee of 0.5 percent of the remaining loan amount.*

If the City were to fund the selected WWSI projects identified in Section 5 of this WWFP without any grants, monthly sewer rates would need to be raised to approximately $62 per month assuming a 15-year loan term with a 1.33 percent interest rate or $57 per month assuming a 30-year loan term with a 1.92 percent interest rate.

If the City were to fund improvements using property taxes, Figure 6-3 provides a general idea of the impact to property taxes for varying interest rates and loan amounts if the debt payment is supported only by property taxes. Assuming that funding is provided by the Oregon Department of Environmental Quality (DEQ) Clean Water State Revolving Fund (CWSRF) with a 30-year loan term and 1.92 percent interest rate, the City would need to raise property taxes by approximately $28.99 per $1,000 assessed value.

A significant financial commitment will be required on the City's part to implement the improvements outlined in this WWFP. Based on the estimated cost of the improvements, the City will need to obtain low-interest loans coupled with grants to fund the improvements. The most likely sources of loan and grant funding are the Business Oregon Water/Wastewater Financing Program, the DEQ CWSRF, and the U.S. Department of Agriculture's Rural Development (RD) programs.

Project Implementation

The following action items and implementation steps, which are general in nature, need to be taken by the City of Prineville to implement the recommended medium- and long-term WWSI.

Action Items

- The City will need to formally adopt this WWFP, which will address review comments from the DEQ. A formally adopted WWFP is required by state and federal funding and regulatory agencies if the City wishes to pursue funding from these agencies to complete the improvements.
- The City will need to consult and initiate funding discussions with funding agencies (Business Oregon, DEQ, and RD) to ensure the best possible funding package is developed and obtained for the improvements. The City will need to contact the Business Oregon regional coordinator to start the intake process and, as necessary, complete the intake form and submit it to Business Oregon to initiate funding discussions.
- The City will need to prepare and submit funding applications to appropriate funding agencies.

- The City will need to investigate if authorization to incur debt for the WWSI is required by City charter. If authorization is required, the City will need to decide how to obtain the authorization to incur debt. Once decided (revenue bond or general obligation bond), a bond attorney should be consulted, and the appropriate resolution paperwork should be prepared and considered for implementation.
- The City will need to hold public information meetings to inform its citizens of the needs and scope of the project, answer questions, and generate support for the required sewer rate increase.

Implementation Schedule

Should the City wish to proceed with the recommended WWSI, the following implementation schedule outlines the key steps the City would need to undertake. The implementation steps and stated completion dates are presented as general guidance only and provide the estimated time needed to complete projects of this complexity and magnitude. The dates are subject to change and will depend on economic conditions within the community; implementation of the improvements could be delayed due to economic conditions.

Item No.	Implementation Item	Time Frame
1.	Submit draft WWFP to the City and agencies for review.	September 2023
2.	Finalize and adopt the WWFP.	December 2023
3.	Review and update the City's Comprehensive Plan with the WWFP as required.	Winter 2023-24
4.	Attend One Stop meeting.	Winter 2023-24
5.	Prepare and submit funding application(s) to appropriate agency(ies).	Spring 2024
6.	Finalize project funding.	Summer 2024
7.	Design system improvements.	Summer 2024 through Summer 2025
8.	Submit design documents for agency(ies) review.	Summer 2025
9.	Advertise, bid, and award construction project.	Winter 2025-26
10.	Project construction.	Spring 2026 through Winter 2026-27
11.	Project startup and construction completion.	Spring 2027
12.	Project closeout.	Summer 2027
13.	Monitor system performance to determine the impact of improvements and report impacts to the DEQ.	Two years after project closeout

The key to implementing the WWSI, as outlined in this WWFP, is the City's ability to acquire Business Oregon and/or DEQ low-interest loans coupled with grant funding. In addition, it is vital that the City supports the improvements and contributes their appropriate share of the cost. All improvements will likely not be economically feasible for the City unless grant funds can be obtained. The City will have to work closely with its citizens to inform them of the system needs and the necessity for increased sewer rates.

WWSI as outlined in this WWFP will provide the City with reliable, quality wastewater collection and treatment systems that will meet the City's needs for many years to come. The improved collection system and WWTF will help provide safer, more reliable, and more efficient operation and increased protection of the environment and public health.

Section 1 - Project Planning

General

This Wastewater Facilities Plan (WWFP) is authorized by agreement between the City of Prineville, Oregon, and Anderson Perry & Associates, Inc., dated March 18, 2022. The City completed a WWFP in 2005, a WWFP Update in 2010, and a WWFP in 2018. Due to an unexpected increase in the City's population, the City has requested completion of a new WWFP. This WWFP is intended to replace the 2018 WWFP and provide updated information on which future operation of the City's municipal wastewater systems can be based. This WWFP is also intended to fulfill the requirements of the Oregon Department of Environmental Quality for a current facilities plan for a 20-year planning period.

Location

The City is located in central Oregon at the intersection of Highway 26 (Madras-Prineville Highway) and Highway 126 (Ochoco Highway), adjacent to the Crooked River in Crook County. See Figure 1-1 for location and vicinity maps of the study area. The City of Prineville is the county seat and the only incorporated city in Crook County, with a population of 10,736 at the 2020 Census. The 2021 population for Prineville is 11,042, as estimated by the Population Research Center (PRC) at Portland State University (PSU).

Service Area

The existing wastewater treatment facility and wastewater collection system serve residents living within the urban growth boundary (UGB). Many areas with large tracts of undeveloped land currently exist within the UGB. With a significant area of open, undeveloped land available, the City has the potential for residential, commercial, and large commercial growth.

Topography

The City is located in central Oregon along the Crooked River, a major tributary of the Deschutes River, which flows north into the Columbia River. The valley through which the river flows is bordered on the north and east by the slopes of the Ochoco Mountains and on the south and west by the steep escarpments that rise to an extensive lava plateau. The City is situated in the high desert area east of the Cascade Mountains and west of the Ochoco National Forest with surface elevations ranging from 2,800 to 3,600 feet above mean sea level (AMSL). The City occupies 12.83 square miles and is accessed mainly via Highway 26 or Highway 126.

Land Use

The majority of land in the surrounding vicinity is privately owned, is residential land, or is used for livestock grazing and/or irrigated crop farming. Industries include wood manufacturing, data centers, tire manufacturing and storage, and regional trucking/ground transportation companies.

Zoning

The current zoning in the City is shown on Figure 1-2 and in Appendix B. Sixteen land use designations have been identified within the city limits. The majority of the City is designated for residential use. Areas along Highway 126 are primarily designated as Multipurpose and Airport, while areas along Highway 26 are primarily designated as Outlying Commercial, Core Commercial, and Open Space.

Environmental Resources Present

Water

The Crooked River, Ochoco Creek, Ryegrass Ditch, and several distribution canals are the primary surface waters located in the vicinity of the City. Some of the recommended wastewater system improvements (WWSI) will occur in the vicinity of waterbodies, although impacts to the waterbodies are not anticipated.

Flora and Fauna

Important fish and wildlife habitat in the proposed project area includes the Crooked River, Ochoco Creek, and associated riparian areas. Riparian areas are critical to the health of streams, as riparian vegetation provides shade and temperature regulation of the streams, provides cover for aquatic organisms, and stabilizes streambanks to prevent erosion.

According to a U.S. Fish and Wildlife Service Information for Planning and Consultation website search, bull trout (*Salvelinus confluentus*) and gray wolf (*Canis lupus*) have the potential to be present in the surrounding vicinity. Due to lack of suitable habitat, the gray wolf is unlikely to be present and, thus, is unlikely to be impacted. According to StreamNet, spring Chinook salmon (*Oncorhynchus tshawytscha*), summer steelhead (*Oncorhynchus mykiss*), pacific lamprey (*Entosphenus tridentatus*), and redband trout (*Oncorhynchus mykiss*) utilize the Crooked River and have the potential to be present in the vicinity of the proposed WWSI. Any potential impacts to these species will be mitigated using best management practices during construction activities. No Essential Fish Habitat or Critical Habitat designations are mapped within the surrounding vicinity.

Climate

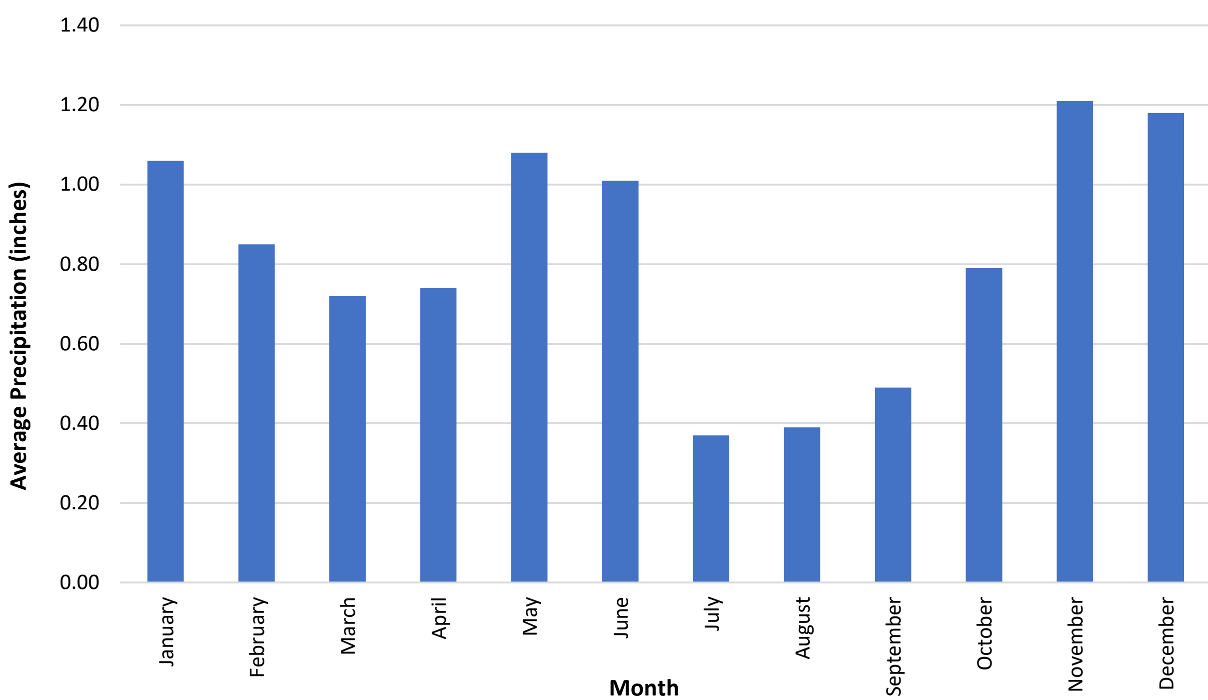
The climate in the summer is typically dry with clear days. Winter brings rain, snow, and frozen soils. Temperatures vary from extremes of negative 30° Fahrenheit (F) in the winter to 120°F in the summer. These extreme temperatures are usually not prolonged. According to the Western Regional Climate Center (WRCC), the average annual temperature for Prineville is approximately 48°F, and the annual average precipitation is approximately 9.8 inches. See Table 1-1, Chart 1-1, and Appendix C.

TABLE 1-1
TEMPERATURE, PRECIPITATION, AND EVAPOTRANSPIRATION SUMMARY

Month	Average Precipitation (inches)[1]		Average Temperature (F)[1]		Average Evapotranspiration (inches)[2]	
	Monthly	Annual	Monthly	Annual	Monthly	Annual
January	1.06	9.8	31.8	47.4	1.1	52.05
February	0.85		36.1		1.47	
March	0.72		40.2		2.79	
April	0.74		45.5		4.01	
May	1.08		52.1		5.95	
June	1.01		58.3		7.68	
July	0.37		64.8		9.55	
August	0.39		63.4		7.96	
September	0.49		56.4		5.41	
October	0.79		48.1		3.26	
November	1.21		39.2		1.70	
December	1.18		32.9		1.18	

[1]Data were obtained from the WRCC Co-op Station Number 356883 (Prineville 4 NW).
[2]Data were obtained from the Powell Butte, Oregon, AgriMet Weather Station (pobo).

CHART 1-1
AVERAGE PRECIPITATION FOR THE CITY OF PRINEVILLE



Floodplains

The Deschutes subbasin is located in central Oregon in the high desert. The Crooked River watershed, within the Deschutes subbasin, is the largest eastside tributary to the Deschutes River. The South Fork Crooked River and Beaver Creek join the North Fork Crooked River east of Prineville. The Crooked River flows immediately south of Prineville and reaches its confluence with the Deschutes River northwest of Prineville and southwest of Madras. The Deschutes River is a tributary of the Columbia River. In total, the Crooked River extends nearly 125 miles east to west from its source to the Deschutes River.

According to the Federal Emergency Management Agency (FEMA) Map Service Center, FEMA Flood Insurance Rate Map Panel Numbers 41013C0400C, 41013C0403C, 41013C0405C, 41013C0412C, 41013C0411C, 41013C0384C, 41013C0415C, and 41013C0416C (dated February 2, 2012) have been assigned to the project area. See Appendix D for the referenced FEMA floodplain maps.

Portions of the recommended WWSI appear to be located within FEMA Zone AE, an area located within the 100-year flood zone, and other flood areas.

Population Trends

To estimate future wastewater system flows, population projections must be made. Projections are usually made based on an annual percentage increase estimated from past growth rates combined with future expectations. In 2013, the Oregon legislature approved assigning coordinated population forecasting to the PRC at PSU. This allows counties to prepare coordinated population forecasts according to “generally accepted” demographic methods. The PRC is the official source of population data available in Oregon between the official Census data generated at the beginning of each decade.

The population projections and average annual growth rate (AAGR) shown on Table 1-2 appear within the anticipated range based on current data and recent historic population increases for Prineville.

TABLE 1-2
HISTORICAL AND FORECASTED POPULATION

Historical[1]		Forecasted[2]		
2010	2020	2021	2042	AAGR (2022 to 2042)
9,253	10,736	11,042	13,743	1.1 percent

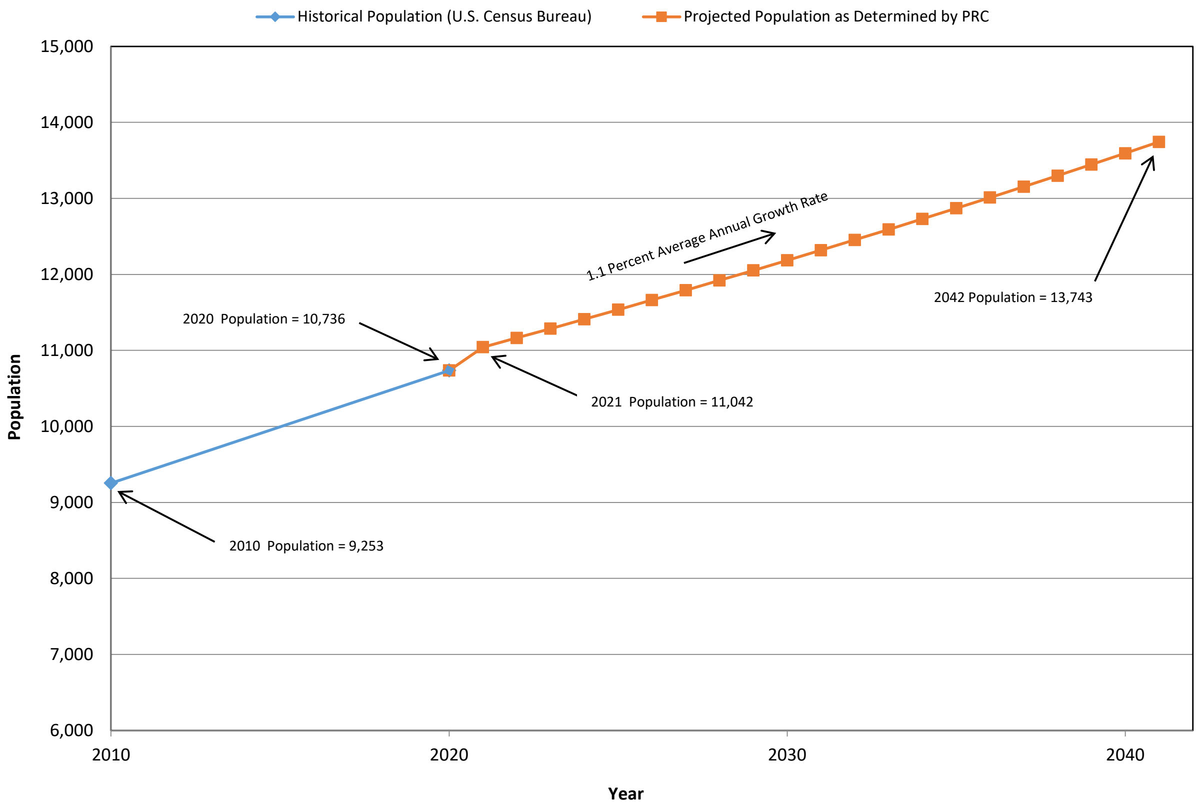
[1] As provided by the U.S. Census Bureau.

[2] As provided by the PRC.

The City’s population from the 2020 Census was 10,736. The certified population estimate by the PRC for 2021 was 11,042 with an AAGR of 1.1 percent between the years 2022 and 2042.

The historical population plus the projected AAGR results in a 20-year (year 2042) population estimate of 13,743. The 20-year design population inside the city limits of 13,743 was used in this WWFP. See Chart 1-2.

CHART 1-2
HISTORICAL AND PROJECTED POPULATION TREND



It is important to note that not all of the existing City population is connected to the wastewater system. In reviewing City records, the connected population was determined to be 10,771. For the purposes of this WWFP, a review of historical wastewater data must be completed using the connected population. Collection system improvements are needed to be able to connect the entire population within the city limits. In addition, there are areas of residential development outside the city limits but within the UGB. If 20 percent of these areas were annexed into the City, the City's population could potentially increase by 1,002 people to 11,773, without any additional people moving into the area.

To obtain a more accurate population that could require service by the wastewater system in the next 20 years, the estimated 2042 City population of 13,743 was added to the assumed 1,002 population from the UGB for a design population of 14,745 in the year 2042.

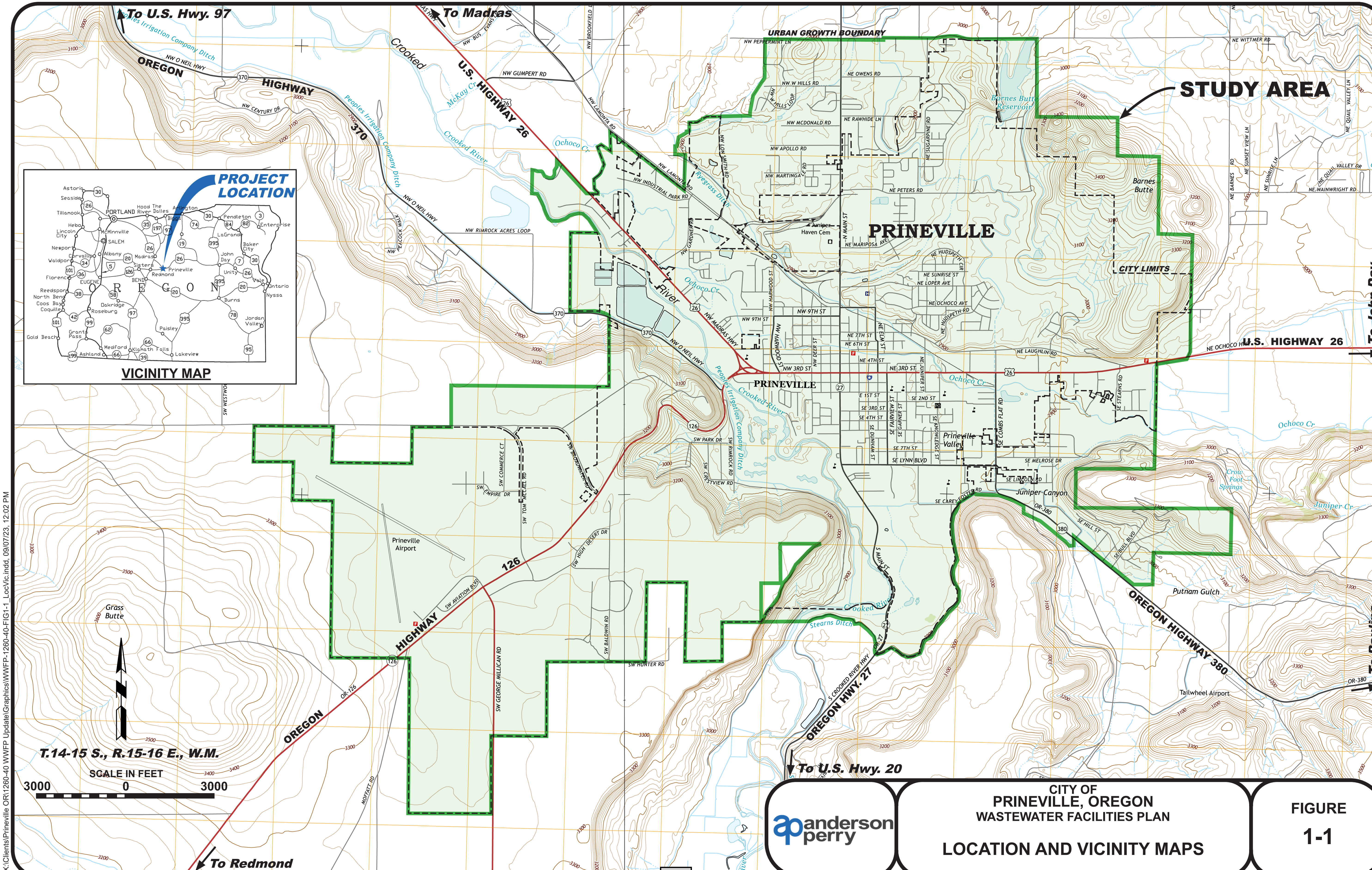
A copy of PSU's *Coordinated Population Forecast 2022 Through 2072 for Crook County* is located in Appendix E.

Community Engagement

WWSI as outlined in this WWFP are intended to provide the City with a reliable, quality wastewater system that will meet the needs of the City for the 20-year planning period and beyond. If the City wishes to implement the WWSI immediately due to rapid growth or aging infrastructure, funding from outside agencies will be needed. However, growth-related improvements can also be funded from the

System Development Charge funding category. All of the options may require sewer rates to be raised to adequately fund the recommended improvements over the 20-year planning period.

No community engagement has been completed prior to the development of this WWFP. However, the City does intend to engage all stakeholders during implementation of this WWFP and the proposed improvements. It will be important for the City to hold public meetings to inform citizens of the need for and scope of the improvements projects, to answer questions, and to explain the need for potential increases in user fees.



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

LOCATION AND VICINITY MAPS

FIGURE 1-1

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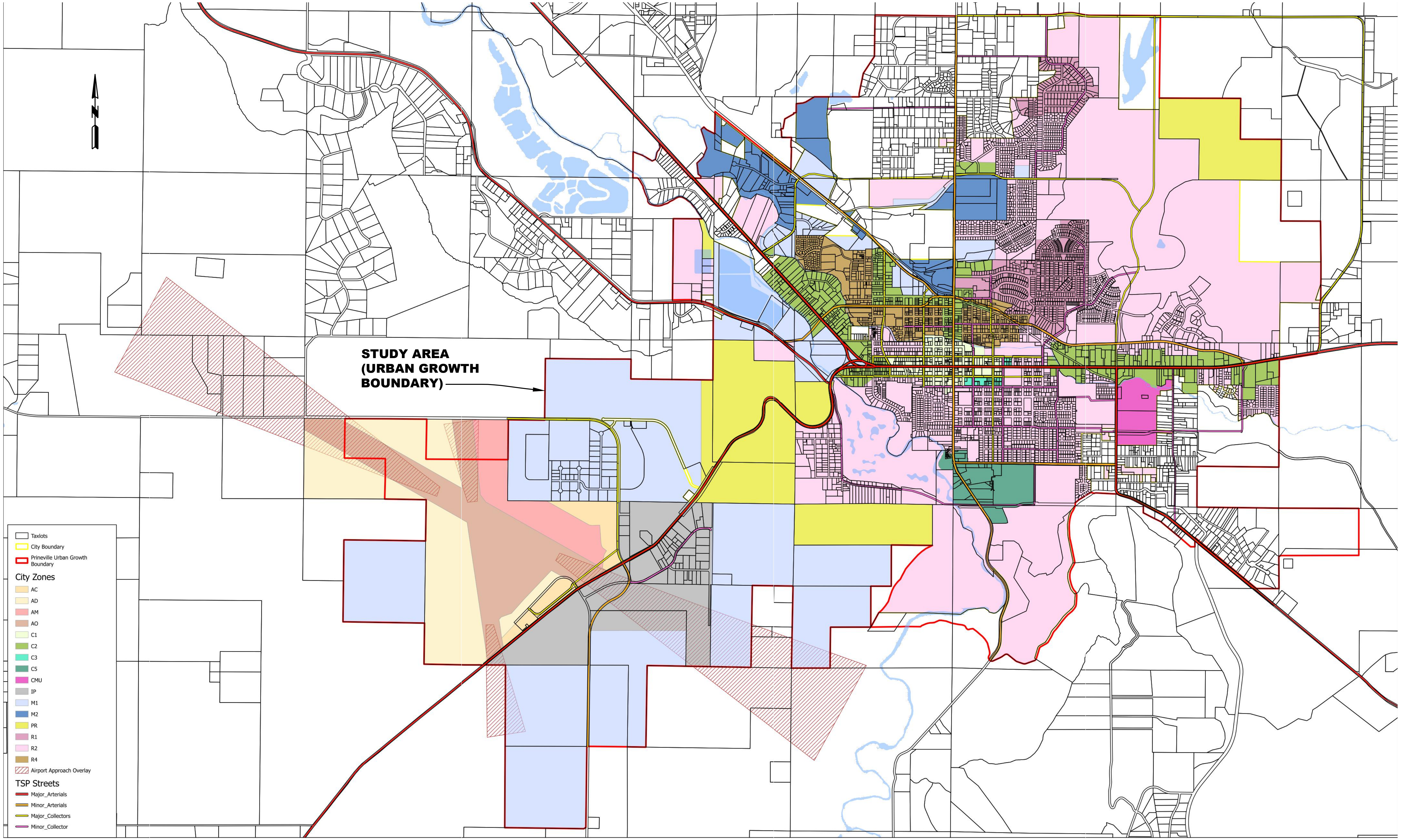

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ZONING MAP OBTAINED FROM CITY OF PRINEVILLE'S W[illegible]E

anderson perry

CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

ZONING MAP

FIGURE
1-2

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Section 2 - Existing Facilities

General

In this section, a description and evaluation of the City of Prineville's wastewater collection and treatment systems are provided. System elements are described, and the capacity of critical units is evaluated and compared to existing and future projected flows and loadings. An assessment of the condition of the equipment and components for each unit process is provided, and deficiencies within the system are identified.

Location Map

The existing wastewater facilities include:

- Approximately 1,291 manholes
- Approximately 339,860 linear feet of gravity main ranging from 4 to 48 inches in diameter
- Eight lift stations (six City-owned) ranging in location from the City's collection system to the wastewater treatment facility (WWTF)
- The WWTF
- Four outfalls (Crooked River Discharge, Golf Course Irrigation, Pasture Irrigation, and Wetland Discharge)

Figure 2-1 provides a map detailing the wastewater collection system in the City, and Figure 2-2 provides a site plan of the WWTF. Specific WWTF components are identified on Figure 2-3.

History

Wastewater Collection System History and Description

The majority of the City's wastewater collection system was constructed in 1960. The wastewater collection system serving the City is shown on Figure 2-1. The gravity collection system is composed of pipes ranging in size from 4 to 48 inches in diameter, the majority being 8 inches in diameter, and eight lift stations. Older pipe sections are either asbestos cement or concrete, and newer wastewater piping is predominately polyvinyl chloride (PVC). Additionally, sewage forcemains transport wastewater from the eight lift stations to the gravity main lines, through the main influent lift station, and then to the WWTF lagoons.

Currently, the collection system provides adequate capacity in the City; however, some bottlenecks exist in the system and extensions and upgrades are needed to support continued growth.

Wastewater Treatment Facility History and Description

The existing WWTF is composed of two partially aerated facultative lagoons, Plants 1 and 2. Site piping allows cross-connection between plants. Influent from the main collection system passes through the influent screen on the north side of the Crooked River, then into the influent pump station. Influent from the airport industrial area, which is mostly cooling water effluent, passes through an influent screen on the south side of Pond 1 of Plant 1, where it enters the lagoon at the end of the aeration zone. This south side effluent is very weak, as it is mostly cooling water effluent from the data centers.

Plant 1 is the City's original lagoon system and received upgrades in 1992, 2005, and 2017. Plant 1 includes aerated and facultative lagoons, rock filters, and disinfection and produces Class C treated effluent. Effluent from Plant 1 is utilized for irrigation of the Meadow Lakes Golf Course.

Plant 2 consists of three treatment lagoons operated in a series that produce Class D treated effluent. Wastewater from an influent pump station travels through an aerated lagoon before passing sequentially through a partially aerated lagoon and then a facultative lagoon. Effluent is then disinfected in a chlorine contact chamber. The treated effluent is stored in the effluent storage pond (kidney pond) before it is utilized as irrigation for City-owned pastureland or discharged to the 15 constructed lined and unlined wetlands.

Since 2018 the City has completed aeration system improvements to Plants 1 and 2 that replaced the surface-mounted aspirating aerators with fine bubble diffused aeration in Pond 1 of Plant 1 and Pond 1 of Plant 2. Surface-mounted aspirating aerators continue to perform aeration in the partially aerated Pond 2 at Plant 2.

A wastewater system flow schematic for the existing facilities is shown on Figure 2-3.

Historical Wastewater Data

A review of the historical wastewater data was performed for the City's WWTF. Information was obtained from the City's Discharge Monitoring Reports (DMRs). Figure 2-4 summarizes all DMR data used in the development of this WWFP. Figures 2-5 through 2-8 illustrate specific components of the DMR data, and Figure 2-9 summarizes the design criteria used in the development of this WWFP. A summary of the DMR data is included in Appendix F.

Wastewater Flows

The historical influent and effluent flows, including maximum, minimum, and average daily flows for the five-year period between January 2017 and December 2021, are shown on Figures 2-5 and 2-6, respectively. According to the influent flow data on Figure 2-5, the maximum monthly flow (MMF) of record occurred in April 2017 and was 1,741,000 gallons per day (gpd), which equates to approximately 193 gallons per capita per day (gpcd) utilizing the 2017 connected population estimate of 9,003. This flow was recorded during a period of rapid snowmelt after the heavy snowfall recorded over the winter of 2016-17 was impacted by a warming trend with above-average rainfall. The average annual flow (AAF) was 1,092,217 gpd during the five-year period between January 2017 and December 2021, which equates to approximately 101 gpcd using the current connected population of 10,771.

U.S. Environmental Protection Agency (EPA) guidelines for infiltration/inflow (I/I) evaluations state that "no further infiltration/inflow analysis will be required if domestic wastewater plus non-excessive infiltration does not exceed 120 gpcd during periods of high groundwater." The maximum monthly per capita flow was approximately 193 gpcd (2017 population). This is higher than the 120 gpcd allowed by the EPA for domestic wastewater during periods of high water. The flows listed above exceed the minimum EPA criteria for wet weather flows; therefore, based on EPA guidelines, continued I/I evaluation should be pursued. I/I evaluation could be of great benefit to the City, as I/I is a significant contributor to the system during high water events. The identification of I/I sources and their subsequent removal from the system through manhole and pipeline repair could reduce the total volume of water the City must treat and dispose of, which could provide long-term cost savings to the City. The 2018 WWFP developed a flow of 111 gpcd based on an average flow of 0.999 million gallons per day (MGD) with a population of 9,003. With current average flows of 1.092 MGD and a population of 10,771, the average flow is 101 gpcd. It should also be noted that the City estimated I/I flows have been reduced since the 2018 WWFP, from 0.340 MGD to 0.162 MGD. This could indicate that City efforts to reduce I/I are effective.

AAFs for small communities in eastern and central Oregon are typically in the range of 200 to 300 gpd per equivalent dwelling unit. Recorded flows for the City equate to approximately 212 gpd per EDU, which is within the typical range.

Wastewater Mass Loadings

Figure 2-7 summarizes historical municipal influent five-day biochemical oxygen demand (BOD_5) concentrations as recorded on the DMRs during the five-year period between January 2017 and December 2021. As indicated on Figure 2-7, the WWTF's average influent BOD_5 mass loading was approximately 2,195 pounds per day (lbs/day) and the maximum monthly lbs/day was 2,953. The City's WWTF, according to the data, achieved an average five-day carbonaceous biochemical oxygen demand ($CBOD_5$) removal of 96 percent with an effluent average mass discharge of 67 lbs/day.

The historical municipal influent total suspended solids (TSS) concentrations, as reported on the DMRs during the during the five-year period between 2017 and 2021, are shown on Figure 2-8. As illustrated on Figure 2-8, the average influent TSS was 213 milligrams per liter (mg/L). The WWTF's average influent TSS mass loading was approximately 1,911 lbs/day, and the maximum monthly lbs/day was 2,723. The City's WWTF, according to the data, achieved an average TSS removal of 90 percent with an effluent average mass discharge of 30 lbs/day.

The recorded BOD_5 and TSS mass loadings are within the expected range of residential-strength wastewater. BOD_5 and TSS per capita contributions typically range from 0.11 to 0.33 pounds per capita day (ppcd), with a normal contribution of approximately 0.20 ppcd. Therefore, for the community's population, mass loading is typical of national averages. For domestic wastewater systems serving mainly residential units, the BOD_5 and TSS concentrations normally range from 190 to 220 mg/L. The City's average concentrations over the historical data period for BOD_5 and TSS were 248 and 213 mg/L, respectively.

Wastewater Influent Flow and Mass Loading Projections (2042)

Typical flow rate design parameters used for sizing process systems of WWTFs are AAF, peak hourly flow, and MMF. Typical mass loading rate design parameters used for sizing process systems of WWTFs are maximum monthly $CBOD_5$ and BOD_5 in lbs/day and maximum month daily TSS in lbs/day.

For the historical data period, the average population used was 10,771. This WWFP has adopted a design year of 2042 with a projected population of 14,745. Projected flows and loadings for the design year were estimated by multiplying historical per capita values by the projected population. These design criteria are summarized on Figure 2-9.

Wastewater Effluent Mass Loading and Regulatory Requirements (2042)

The City is required to have a Recycled Water Use Plan (RWUP) that describes operation of the effluent reuse system and provides the necessary technical information to satisfy the requirements of the City's National Pollutant Discharge Elimination System (NPDES) Permit and Oregon Administrative Rules 340-055. See Appendix G for a copy of the RWUP.

The current NPDES Permit was developed for an AAF with no daily maximum limit and restricts to maximum effluent pollutant concentrations for BOD_5 and TSS between November 1 and April 30 when discharging to the Crooked River (Outfall 001) and between May 1 and October 31 for Outfalls 002, 003, and 004. Assuming the WWTF continues to treat and discharge effluent that meets allowable mass loadings concentrations, changes to the NPDES Permit conditions are not anticipated for the WWTF to continue to discharge to any of the outfalls through the design year of 2042.

Condition of Existing Facilities

The following sections describe the current conditions of the wastewater collection system and treatment facilities.

Wastewater Collection System Description and Evaluation

Collection System Description

The gravity collection system is supplemented with eight lift stations, two of which are privately owned and operated. The system has 1,291 manholes and approximately 64.4 miles of system piping. A detailed breakdown of the collection system piping by size is provided on Table 2-1.

TABLE 2-1
SEWER PIPE SUMMARY

Pipe Description	Footage	Miles
4-inch	1,170	0.22
6-inch	14,140	2.68
8-inch	227,100	43.0
10-inch	22,100	4.19
12-inch	25,050	4.74
14-inch	5,950	1.13
15-inch	8,700	1.65
18-inch	15,000	2.84
21-inch	9,500	1.8
24-inch	5,600	1.06
30-inch	1,900	0.36
36-inch	3,100	0.59
48-inch	550	0.10
TOTAL	**339,860**	**64.36**

Collection System Evaluation

Lift Stations

Airport Lift Station

The Airport Lift Station was constructed in 1997 in a manhole structure 15 feet deep with the pumps mounted on a rail system. The single-phase, 240-volt duplex pump station has a capacity of 76 gpm at 38 feet of total dynamic head (TDH) with one pump running. The forcemain is a 3-inch PVC pipe that discharges to the gravity sewer along the Ochoco Highway. The pump station includes a small backup power generator receptacle with a manual transfer switch. The pump station has been in service for more than 25 years, and a major upgrade, including new pumps and guide rails, level controls, a flowmeter, electrical panel and components, and SCADA upgrades, is recommended. The lift station discharges through a 3-inch PVC pipe to manhole (MH) 515 on the gravity sewer.

Oregon Youth Authority Lift Station

The Oregon Youth Authority constructed a lift station in 1997, which is located north of the Ochoco Highway. The submersible design is constructed in a manhole structure. The lift station is 28 feet deep with the pumps mounted on a rail system. The 3-phase, 460 volt lift station now serves the needs of the National Guard and flows originating from the west side of the Facebook data centers, the U.S. Forest Service air base, and the surrounding industrial park. The forcemain is an 8-inch PVC pipe that discharges to the gravity sewer along the Ochoco Highway. This lift station is equipped with a standby power connection and manual transfer switch and has two 40 horsepower (Hp) motors. The lift station has been in service for more than 25 years and a major upgrade, including new pumps and guide rails, level controls, a flowmeter, an electrical panel and components, and SCADA upgrades, is recommended. The lift station discharges through 8- and 14-inch PVC pipes to MH 538 on the gravity sewer.

Williamson Lift Station

The Williamson Lift Station is located south of the Ochoco Highway at the end of Williamson Drive. The lift station was constructed in 1995 and has a capacity of 225 gallons per minute (gpm) at 47 feet TDH with one pump running. The lift station contains two Hydronix self-primer pumps each with a 3-phase, 460-volt, 7.5 Hp motor. The two pumps and controls are mounted in a reinforced fiberglass pad-mounted enclosure. This enclosure is adjacent to a 12.5-foot deep sump-type wetwell. The wetwell has been set up for expansion. Currently, no electrical issues exist. The City has reported issues with the supervisory control and data acquisition (SCADA) system, and the well cover appears to have some damage. The forcemain is a 4-inch PVC pipe that discharges to MH 723 on the gravity sewer.

Saddle Ridge Lift Station

The Saddle Ridge Lift Station is a 3-phase, 240-volt duplex pump station constructed in 2007. The pumps are 2.9 Hp Hydronix submersible with a guide rail system. The lift station has a small backup power generator receptacle with a manual transfer switch. The lift station is located on N.W. Saddle Ridge Loop on the far north end of the City. The lift station is generally in good condition but could benefit from the installation of a flowmeter as well as an upgrade to the level controls. The lift station discharges to the gravity collection system at the intersection of N.E. Rawhide Lane and North Main Street.

Western Sky Lift Station

The Western Sky Lift Station was constructed in 1996 and is located on N.W. Western Sky Road south of Gardner Road. The pump station is constructed in a manhole structure and has two submersible pumps with an older guide rail system that requires entry into the wetwell to decouple the pumps for removal. The capacity of the lift station is 140 gpm at 30 feet TDH with one pump running. The motors are 3.0 Hp. The single-phase, 240-volt pump has no standby power but has a small backup power generator receptacle with a manual transfer switch. The forcemain is a 4-inch PVC pipe that discharges to the gravity sewer along Highway 26. This lift station has an adjacent wetwell that appears to be abandoned but still collects solids. The purpose of this wetwell is unknown; however, the wetwell may be able to be modified to eliminate the collection of solids and standing wastewater by installing a concrete floor where accumulated materials can be held until removed and disposed of. Needed lift station improvements include an upgraded guide rail system, SCADA upgrades, upgraded level controls, and installation of a flowmeter. The lift station discharges through a 4-inch PVC pipe to the gravity sewer in Highway 26.

McDougal Lift Station

The McDougal Lift Station is a single-phase, 120-volt duplex submersible pump system. It is located in a cul-de-sac off Highway 26 in the northwest part of the City. The 5 Hp lift station has no backup generator power connection. The capacity of the lift station is 100 gpm at 15 feet TDH with one pump running. Upgrades to the pump station were completed in 2014; however, additional upgrades are needed such as pump guide rails, SCADA upgrades, a flowmeter, and upgraded level controls. The lift station discharges through a 4-inch PVC pipe to the gravity sewer in Highway 26.

Infiltration and Inflow

I/I is unwanted flows entering the wastewater collection system. I/I in a collection system can occur during different times of the year. During the winter and early spring, the sources of inflow are normally storm events and spring runoff. During the summer, heavy irrigation and the filling of irrigation ditches and canals can raise groundwater levels, which can lead to inundation of sewer pipes resulting in increased infiltration. Poorly lined irrigation canals and ditches can be a source of infiltration because leaking irrigation water can elevate groundwater levels in the vicinity of wastewater main lines. Specifically, infiltration and inflow are defined as follows:

- Infiltration - Water entering the collection system and service connections from the ground through such means as, but not limited to, defective pipes, pipe joints, and defective service line connections or manhole walls. Infiltration does not include, and is distinguished from, inflow.

- Inflow - Water discharged into a collection system and service connections from such sources as, but not limited to, roof drains, cellars, yard and area drains, foundation drains, sump pumps, drains from springs and swampy areas, manhole covers, cross connections from storm sewers and combined sewers, catch basins, stormwater, surface runoff, and street washes or drainage.
- I/I - The total quantity of water from both infiltration and inflow without distinguishing the source.

Most cities have some I/I contributing to their wastewater collection system. Excessive I/I can be a problem because these flows must be treated along with normal wastewater flows and take up valuable treatment capacity at a treatment plant. Excessive I/I is defined as the quantity of I/I that can be economically eliminated from a collection system by rehabilitation or other means, as determined by a cost analysis that compares the cost effectiveness of correcting the I/I conditions with the total cost for transportation and treatment of I/I.

The EPA's "Guide for Estimating Infiltration and Inflow" outlines a methodology to estimate the amount of I/I entering a collection system. For infiltration analysis, flow data were collected over a six-month dry weather period. The average base flow (ABF) is determined by averaging the minimum daily flow for each year over a five-year period. Due to the large commercial users in Prineville, daily or weekly flow calculations or methodology based on overnight flows are impractical. By using average dry weather flow (ADWF), ABF, and average wet weather flow (AWWF) over a prolonged period, an estimate of I/I can be developed.

Based on a review of DMRs, there appears to be infiltration into the gravity wastewater system. The City appears to be experiencing I/I of approximately 162,000 gpd. This was determined by analyzing influent data in the DMRs (see Figure 2-4). The ADWFs for the last five years were compared to the ABF. A summary of data is provided on Table 2-2 below.

TABLE 2-2
INFILTRATION/INFLOW ANALYSIS SUMMARY

Parameter	Basis of Determination	MGD	gpcd[1]
AAF[2]	DMRs	1.092	101
ADWF[3]	DMRs	1.045	97
AWWF[4]	DMRs	1.140	106
ABF[5]	DMRs	0.930	86
Base I/I	DMRs	0.162	15

[1] The 2021 connected population of 10,771 was used for this analysis.

[2] Average of daily flows over the five-year period from January 2017 to December 2021.

[3] ADWF averaged from dry weather months July through December over the five-year period from 2017 to 2021.

[4] AWWF averaged from wet weather months January through June over the five-year period from 2017 to 2021.

[5] Minimum daily flow per year averaged over the five-year period from 2017 to 2021.

From these calculations, the base I/I flow is determined to be approximately 0.162 MGD. While this amount is not excessive and is an improvement from the 2018 WWFP that estimated I/I to be 0.340 MGD, the City is still pursuing improvements that will continue to reduce I/I flow. More detailed information regarding the collection system can be found in Sections 4 and 5. More detailed information regarding the CIP can be found in Appendix H.

Wastewater Treatment Facility Description and Evaluation

Wastewater Treatment Facility Description

The City of Prineville operates a secondary WWTF. The WWTF was originally constructed in 1960 and is composed of two partially aerated facultative lagoon treatment plants operating in parallel. These types of wastewater treatment lagoons are common throughout eastern Oregon. See Figure 2-2 for an aerial photograph of the WWTF. The process flow schematic is shown on Figure 2-10, and descriptions of the associated WWTF components are provided on Figure 2-11. The WWTF has adequate capacity and redundancy to meet the needs of the planning period while meeting NPDES Permit requirements. Summaries of the performance of the WWTF are provided on Tables 2-3, 2-4, and 2-5 below.

TABLE 2-3
WWTF PERFORMANCE SUMMARY

Effluent Discharge Parameter	Limits	Reported Average
Effluent pH	6.0 to 9.0	8.1
Effluent TSS Removal Efficiency (Outfalls 001, 002, and 003)	Greater than 65 percent	91 percent
Effluent TSS Removal Efficiency (Outfall 004)[1]	Not less than 85 percent monthly average	97 percent
Effluent $CBOD_5$ Removal Efficiency (Outfalls 001, 002, and 003)	Greater than 65 percent	96 percent
Effluent BOD_5 Removal Efficiency (Outfall 004)[1]	Not less than 85 percent monthly average	99 percent
Effluent Total Coliform Bacteria (Outfalls 001, 002, and 003)	7-day median less than 23, no two consecutive over 240	1
Effluent *E. coli* Bacteria (Outfall 004)[1]	Shall not exceed a monthly mean of 126 organisms per 100 milliliters (ml), with no single sample exceeding 406 organisms per 100 ml.	4
pH (Outfalls 001, 002, and 003)	6.0 to 9.0	8.1
pH (Outfall 004)[1]	6.5 to 8.5	7.2

[1]All Outfall 004 reported results are as recorded in the Groundwater Monitoring Report per the approved Groundwater Monitoring Plan.

TABLE 2-4
OUTFALL 001 $CBOD_5$ AND TSS

Parameter	Monthly Average (mg/L)	Monthly Average (lbs/day)	Daily Maximum (pounds)
$CBOD_5$	25	230	460
TSS	40	367	734
Reported Results[1]			
$CBOD_5$	11	61	114
TSS	30	160	370

[1]Sampling and reporting required only when discharging per Schedule A of NPDES Permit No. 101433.

TABLE 2-5
OUTFALL 004 BOD_5 AND TSS

Parameter	Monthly Average (mg/L)	Weekly Average (mg/L)
BOD_5 (May 1 through October 31)	10	15
TSS (May 1 through October 31)	10	15
BOD_5 (November 1 through April 30)	30	45
TSS (November 1 through April 30)	30	45
Reported Results[1]		
BOD_5	3	3
TSS	7	8

[1]Results sampled and reported from groundwater and surface water monitoring locations per Schedule B of NPDES Permit No. 101433 Modification executed on September 25, 2015.

Description and Evaluation of Treatment Process Systems and Components

Influent Screens

All influent from the City's collection system enters the WWTF through two influent screens. The first screen, referred to in this WWFP as the Treatment Plant No. 1 influent screen, is located on the west side of Pond 1 of Plant 1 just beyond the aeration zone. Influent from the airport industrial area enters the WWTF by gravity at this location. The Kusters in-channel fine screw screen, Model ICSS 3/6, has a maximum flow design capacity of 0.85 MGD. The screen is equipped with a totalizing digital flowmeter and is a 1/4-inch perforated rotary drum design with an integral screenings washer compactor installed at a 45-degree incline. The washed and compacted screenings are discharged to an automatic bagger system and hauled to the landfill for disposal. This screen was installed in 2020 and has no identified deficiencies.

The main influent screen system is located east of the influent pump station across the Crooked River as shown on Figure 2-3. The screen is a Huber ROTAMAT® RoK4 700/6 with a maximum flow design capacity of 4.5 MGD. The screen is a perforated basket design with a vertical shaftless screw installed in a vault off from the 48-inch ductile iron (DI) influent main line. The screen unit is equipped with an integral screenings washer/compactor. The washed and compacted screenings are deposited in a dumpster and hauled to the landfill for disposal.

A complete rebuild of the existing main influent screen system is in progress. Once complete, the rebuilt system will be evaluated over time to determine if a different screen system is needed.

Influent Main Lift Station to Wastewater Treatment Facility

The influent main lift station at the WWTF consists of four submersible influent pumps that receive screened wastewater from the 48-inch pipe that transports raw wastewater from the collection system. The pumps are equipped with 25 Hp submersible motors with a motor speed of 1,800 revolutions per minute (RPM) and are designed to pump 1,650 gpm at a TDH of 38.5 feet each. These pumps are currently being updated, with two of the four pumps having recently been replaced with similar pumps. The pumps lift the incoming wastewater into a concrete splitter box that splits flow between Plants 1 and 2 using adjustable weirs. Currently, the flow is fairly evenly split between the plants. Wastewater is then pumped to Plants 1 and 2 using dedicated submersible feed pumps. Each plant pump station has three feed pumps. Both sets of feed pumps have identical 25 Hp pumps designed to pump 1,760 gpm at a TDH of 35.2 feet each. Influent is pumped to Plant 1 via a 10-inch pipe and to Plant 2 via a 12-inch pipe. A Panametrics DF868 strap-on flowmeter is utilized after each plant's feed pumps to measure flows pumped into each plant.

Currently, the City is procuring replacement pumps for the influent lift station main pumps. Additional improvements will include electrical and control system upgrades, followed by similar upgrades to the feed pumps at Plants 1 and 2.

Plant 1

Plant 1 is the original WWTF and has a design influent flow capacity of 1.2 MGD. Plant 1 has a partially aerated primary lagoon with a facultative secondary lagoon. The calculated BOD_5 loading capacity of Plant 1 is approximately 2,690 lbs/day. The primary lagoon is partially aerated with a fine bubble diffuser system. The system uses three centralized 50 Hp blowers (two duty and one standby) that supply four laterals and 160 fine bubble membrane diffusers. The aeration system supplies 100 pounds of oxygen per hour to the lagoon. Wastewater pumped into Plant 1 is directed through the 37-acre primary lagoon, which has a detention time of 62 days at 1.1 MGD and an operating volume of approximately 68 million gallons (MG). After the primary lagoon, the wastewater enters a 10-acre secondary facultative lagoon with a detention time of 15 days at 1.1 MGD and a volume of approximately 16 MG. Information regarding the aeration system is shown on Table 2-6.

TABLE 2-6
PLANT 1 AERATION SYSTEM DESIGN SPECIFICATIONS

System Provider	Nexom
Number of Blowers	3
Blower Model	Aerzen Delta 50-L
Motor	50 Hp
Drive	Direct
Capacity	1,200 SCFM @ 4.0 psi
Number of Diffusers	160
Diffuser Model	HT25-8
Phase	3
Volts	460

psi = pounds per square inch

SCFM = standard cubic feet per minute

After passing through the two treatment lagoons, wastewater is disinfected in a two-basin chlorine contact chamber. Each basin has a volume of 26,600 gallons. This produces a contact time of 70 minutes at 1.1 MGD with both basins in operation.

The data center cooling water discharge enters the plant from a new dedicated pipeline and influent screen to the west side of the treatment plants. The primary discharge point is Pond 1 at Plant 1, at the end of the aeration zone. This location was selected because Plant 1 has more detention time for increased flows and the cooling water has negligible waste loads. This discharge location increases the detention time for the flows with normal waste loads entering Plant 1. Discharge piping has also been installed to connect to Plant 2 as an alternate discharge point if needed.

After disinfection, effluent is routed through the intermediate pump station. This pump station has two 15 Hp pumps with a combined capacity of 2,100 gpm at a TDH of 35 feet. The intermediate pump station allows flow to be routed either to the Plant 2 effluent storage pond (commonly referred to as the kidney pond) or the Plant 1 effluent storage pond (golf course irrigation storage pond). The Plant 1 storage lagoon has a volume of approximately 25 MG and a detention time of 23 days. Effluent is treated and disinfected as required by the NPDES Permit, and then is either pumped through the irrigation pump station for land irrigation or to the treatment and disposal wetlands, or occasionally discharged into the Crooked River. During the summer, some effluent is stored in the golf course irrigation storage pond and utilized for irrigation on the City-owned Meadow Lakes Golf Course. During winter months, effluent can be discharged to the Crooked River. The WWTF is not equipped with a filter system. A filter would normally be recommended for Class C effluent but the WWTF has been meeting the Class C limits without one.

Before discharging to the Crooked River, water from the golf course effluent storage pond needs to have chlorine residuals below the permitted amount. A sulfur burner is available to add sulfur to the water before discharge. When effluent is discharged into the Crooked River, an 18-inch diameter pipe with a three-port diffuser is utilized. The discharge rate is 11.5 feet per second at 1.1 MGD. Due to the construction of the treatment and disposal wetlands, it is unlikely this form of discharge will be utilized in the future; however, the outfall is maintained for the purpose of allowing discharge during unprecedented high flows.

Plant 2

Plant 2 has a design flow capacity of 1.3 MGD. Before wastewater reaches Plant 2, it flows through a diversion box constructed to allow expansion of the lagoons. Currently, the diversion box routes flow to the primary lagoon in Plant 2. Plant 2 consists of three treatment lagoons operated in series lined with a high density polyethylene liner. The first lagoon is an aerated lagoon, followed by a partially aerated facultative lagoon, and finally an unaerated facultative lagoon. The primary lagoon is an aerated basin 3.49 acres in size with a 10-foot operating depth and a volume of 11.4 MG. Aeration in the primary lagoon is performed by a fine bubble diffuser system. The system uses three centralized 75 Hp blowers (two duty and one standby) that supply ten laterals and 180 fine bubble membrane diffusers. The aeration system supplies 100 pounds of oxygen per hour to the lagoon. The second lagoon is equipped with four 10 Hp floating aspirating aerators. The second and third lagoons are both 2.91 acres in size with an operating depth of 6 feet and a combined volume of approximately 11.4 MG. The calculated BOD_5 loading capacity of Plant 2 is approximately 2,890 lbs/day. Information regarding the aeration system is shown on Table 2-7.

TABLE 2-7
PLANT 2 AERATION SYSTEM DESIGN SPECIFICATIONS

System Provider	Nexom
Number of Blowers	3
Blower Model	Aerzen Delta 50-L
Motor	75 Hp
Drive	Direct
Capacity	1,280 SCFM @ 4.0 psi
Number of Diffusers	180
Diffuser Model	HT25
Phase	3
Volts	460

After the three treatment lagoons, wastewater is disinfected in a 42-inch chlorine contact pipe that leads into a 21,500-gallon chlorine contact basin. The 12-inch PVC pipe from the transfer pumps to the effluent storage pond provides additional contact time for disinfection for a total of approximately 60 minutes at 1.2 MGD. Effluent is subsequently stored in the Plant 2 effluent storage pond (kidney pond) after being pumped through the effluent transfer pump station. The effluent transfer pump station has two vertical turbine pumps (VTP) with a capacity of 1,200 gpm and a TDH of 44 feet. Each VTP is equipped with a 20 Hp motor. The 29-acre kidney pond has a volume of 118 MG and a maximum detention time of 98 days. The Class D effluent from Plant 2 is either pumped through the effluent irrigation pump station and utilized for irrigation on City-owned pastureland in summer or processed through the constructed wetland complex and indirectly discharged into the Crooked River through controlled seepage. Additional water for irrigation of pastureland is pumped from the Crooked River using a variable speed VTP with a capacity of 2,400 gpm.

Chlorination System

As outlined in the descriptions of Plants 1 and 2, each plant has its own chlorine contact system. However, both plants are chlorinated from the same location, with the chlorine solution injected upstream into a contact pipe prior to entry into the respective contact chambers. Currently, chlorine gas is used to chlorinate the effluent prior to entry into the contact chambers. The contact chambers at Plant 1 consist of two basins with a volume of 26,600 gallons each, and Plant 2 has a single basin with a volume of 21,500 gallons.

The existing gas chlorination system is reaching the end of its useful life. Additionally, recent supply challenges procuring chlorine gas as well as additional safety requirements have initiated the design of a chlorination conversion project. The proposed project will convert the existing gas chlorination system to a bulk sodium hypochlorite system using two 5,500-gallon bulk sodium hypochlorite storage tanks and two peristaltic pump skids to provide chlorine solution dosing. Currently, the proposed project is at the 90 percent design stage and is identified as System Development Charge (SDC) 1 in the SDC category (see Section 4 for a discussion of SDCs.)

Final Effluent Discharge and Outfall

The City of Prineville's wastewater system is regulated by NPDES Permit No. 101433. Table 2-8 shows outfalls identified in the NPDES Permit and their locations.

TABLE 2-8
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT-IDENTIFIED OUTFALLS

Outfall Number	Location
001	Crooked River Mile 46.8 (Direct River Discharge)
002	Meadow Lakes Golf Course
003	Land Irrigation (Pasture Area)
004	Wetland Discharge

Each outfall has a different beneficial use and, therefore, different permitted water quality limits. For the complete NPDES Permit requirements, see Appendix A for a copy of the current NPDES Permit and Permit Modification. The NPDES Permit was issued in 2012 and the Permit Modification was issued in 2015. Both are scheduled for renewal in 2024. The following summarizes the treatment limits for each outfall.

1. Treated Effluent Outfall 001 - Direct River Discharge
   a. May 1 - October 31: No discharging permitted
   b. November 1 - April 30:
      i. No discharging when daily average flow in the Crooked River is less than 15 cubic feet per second (cfs).
      ii. When discharging, the quality of effluent shall meet the following:

Parameter	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (lbs/day)	Weekly Average (lbs/day)	Daily Maximum (pounds)
$CBOD_5$	25	40	230	345	460
TSS	40	60	367	550	734

iii. Other parameters (year-round):

Total Coliform Bacteria	Shall not exceed a 7-day median of 23 organisms per 100 ml, with no two consecutive samples to exceed 240 organisms per 100 ml.
pH	6.0 to 9.0
$CBOD_5$ and TSS Removal Efficiency	65 percent for monthly average.
Total Chlorine Residual	Monthly average of 0.10 mg/L and daily maximum of 0.16 mg/L.
Effluent Discharge Rate	Not more than 1/15 of Crooked River flows when river flows are between 15 and 25 cfs.

2. Recycled Wastewater Outfall 002 (Golf Course Irrigation)
   a. Class C effluent treatment and disinfection to provide a seven-day median total coliform limit of 23 organisms per 100 ml, with no two consecutive samples exceeding 240 organisms per 100 ml.
3. Recycled Wastewater Outfall 003 (Pasture Irrigation)
   a. Class D effluent treatment and disinfection to provide a 30-day *E. coli* log mean of 126 organisms per 100 ml and no more than 406 organisms per 100 ml in any single sample.

The addition of Outfall 004 (Wetland Discharge) required a modification to the existing NPDES Permit. The following outlines the treatment limits for this outfall.

4. Treated Effluent Outfall 004 (Wetland Discharge)
   a. BOD_5 and TSS

Parameter	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (lbs/day)	Weekly Average (lbs/day)	Daily Maximum (pounds)
BOD_5 (May 1 through October 31)	10	15	100	150	200
TSS (May 1 through October 31)	10	15	100	150	200
BOD_5 (November 1 through April 30)	30	45	280	410	550
TSS (November 1 through April 30)	30	45	300	450	600

   b. Other parameters (year-round):

E. coli Bacteria	Shall not exceed a monthly mean of 126 organisms per 100 ml, with no single sample exceeding 406 organisms per 100 ml.
pH	6.5 to 8.5
BOD_5 and TSS Removal Efficiency	Not less than 85 percent of monthly average.
Total Chlorine Residual	Must not exceed monthly average of 0.10 mg/L and daily maximum of 0.16 mg/L.

The treated and disinfected effluent is irrigated from the effluent storage ponds at the treatment plant on either the golf course or the pasturelands. The golf course is irrigated using an underground sprinkler system, while the pasture is irrigated using pivots. The golf course irrigation system consists of storage, pumps, and underground sprinklers. During the winter of 2020-21, the entire irrigation system at the golf course was upgraded and replaced with new components, and planning operations are underway to replace the golf course irrigation pumps, electrical, and control systems in 2023.

A portion of the treated effluent is disposed of by indirect discharge into the Crooked River through controlled seepage via the treatment and disposal wetlands; this is designated as Outfall 004. Composed of 160 acres, the wetlands are constructed with the treated effluent first passing through a lined treatment wetland train, then into one of the several unlined wetlands varying in size from 15 to 30 acres. The system consists of 15 separate wetlands: eight lined wetlands used for further treatment of the wastewater and seven disposal wetlands. The primary purpose of the wetlands is to reduce the nutrients and total nitrogen concentration in the water leaving the WWTF. The lined wetlands are split into two treatment trains, while disposal wetlands are controlled individually.

The first lined wetland treatment train consists of lined Wetlands 1, 2, 3, and 4. The second treatment train consists of lined Wetlands 5, 6, 7, and 8. The treatment trains are configured so water flows through a shallow aerobic wetland (lined Wetland 1 or 5), then flow is split between one or two deep anoxic wetlands (lined Wetlands 2 and 3 or 6 and 7). Flow from the two deep anoxic wetlands combines and travels through another shallow aerobic wetland (lined Wetland 4 or 8). Once through the second shallow aerobic wetland, the flow from each treatment train combines and can be sent to any of the seven disposal wetlands. A site plan of the wetlands is provided on Figure 2-12.

The wetlands do not have a minimum required detention time. However, the design detention time of the lined wetlands is approximately three days and is monitored to adjust wetland treatment. The wetland detention time varies in each wetland based on the wetland depth and flow through the wetland. The depths of the lined wetlands are controlled by the gate in the control structures directly downstream of each wetland. During operation, the disposal wetlands are monitored periodically to confirm that adequate drainage of the wetlands is occurring. The disposal wetlands are anticipated to reduce the temperature of the water flowing from them to the river. Groundwater monitoring data show July effluent temperatures in monitoring wells to be approximately 13.4° Celsius.

Monitoring data collected during 2022 shows that the shallow groundwater in the vicinity of the constructed wetlands is of moderate quality, with the average total dissolved solids (TDS) concentrations regularly exceeding the Oregon Department of Environmental Quality's groundwater quality guidance level in most of the monitoring wells associated with this project, just as they did in 2016 prior to use of the constructed wetlands. However, groundwater monitoring data collected since the wastewater effluent was first introduced to the constructed wetlands does not show any significant degradation of the groundwater as a result of the constructed wetlands and, in fact, may result in some improvements (e.g., TDS concentrations). A copy of the 2022 Groundwater Monitoring Report is included in Appendix I.

Preliminary engineering is underway to determine the feasibility of a tertiary treatment system to use treated effluent as data center cooling water. Currently, the evaluation is focused on the requested finished water quality, which will determine the type of treatment, quantity of treated effluent needed, quantity of treated effluent available, and discharge water chemistry as returned from the data centers. The preliminary engineering will also evaluate the overall cost to construct and operate the proposed system, which would be funded by private entities to supply their cooling system needs. The beneficial reuse of treated effluent represents an opportunity to reduce the use of existing limited groundwater sources to supply industrial cooling water while allowing treated wastewater to be recycled. While currently in the preliminary stage, the proposed Class A treatment system (proposed Outfall 005) will be owned and operated by the City.

Electrical, Controls, and Instrumentation

Currently, the City has minimal SCADA capabilities in the wastewater treatment and collection systems. Magnetic, ultrasonic, and propeller flowmeters measure flows entering the WWTF, then measure flows to Plants 1 and 2 separately. Flows are recorded daily by Public Works staff. The flowmeters do not have the ability to log flow variations over time. Therefore, only total daily flow readings are recorded at this time.

Irrigation Pump Station - Golf Course (Outfall 002)

During irrigation, stored water is pumped from the golf course effluent storage pond to the golf course irrigation system by an irrigation pump station near the southeast corner of the storage pond. The irrigation pump station is enclosed in a portion of a 40-foot by 24-foot building. The irrigation station is equipped with three irrigation pumps, an irrigation pump control panel, air release valves, control valves, piping, and a flowmeter with a totalizer. The effluent irrigation pump draws its suction from the storage pond through a 36-inch DI pipe into a 72-inch diameter wetwell and discharges through a 10-inch DI pipe into two effluent strainers. The effluent leaves the effluent strainers through an 18-inch DI pipe to the golf course.

Table 2-9 presents the pump station components constructed as part of the 1992 Wastewater System Improvements (WWSI) project:

TABLE 2-9
1992 IRRIGATION PUMP STATION DESIGN SPECIFICATIONS

Manufacturer	PSI Pumps
Number of Pumps	3
Model	12M90A
Motor	100 Hp
Drive	Vertical Turbine
Capacity	1,000 gpm @ 324 feet TDH
RPM	1,800
Cycle	60 Hertz
Phase	3
Volts	460

The pumps are protected from overloads, phase failure, and low voltage. An elapsed timer and start counter have been installed to assist the operator in monitoring the pumps. A backup diesel generator provides emergency power during a utility power outage.

Irrigation Pump Station - Pasture Irrigation (Outfall 003)

Table 2-10 presents the pump station components constructed as part of the 2005 WWSI project:

TABLE 2-10
2005 IRRIGATION PUMP STATION DESIGN SPECIFICATIONS

Manufacturer	FloWay
Number of Pumps	3
Model	11JKM
Motor	75 Hp
Drive	Vertical Turbine
Capacity	775 gpm @ 216 feet TDH
RPM	1,780
Cycle	60 Hertz
Phase	3
Volts	460

During irrigation, stored water is pumped from the kidney pond to one of two pivots by an irrigation pump station near the northwest corner of the storage pond. The irrigation pump station was constructed over a concrete wetwell on a 24-foot by 21-foot fabricated steel platform. The irrigation station is equipped with irrigation pumps, irrigation pump control panel, effluent strainers, control valves, and piping.

Irrigation Distribution System

Effluent in the irrigation system is pumped into an irrigation distribution header located north of the irrigation pump station and irrigation storage pond. From here, the pressurized effluent is distributed to the various irrigation systems and the disposal wetlands, when needed. If necessary, flow to the disposal wetlands can also be delivered to MH 4D where it joins flows from the treatment wetlands.

Hand lines and hard-set K-Pod style irrigation are used on approximately 55 acres of City-owned land directly west and adjacent to the WWTF. Effluent disposal in this location is done on rotation following conventional irrigation application standards for pasture grasses and NPDES Permit requirements.

Two Valley Irrigation center pivot electric drive irrigation systems were installed at the pasture irrigation area as part of the 1992 WWSI project. Between 1992 and 2017, a third Valley Irrigation center pivot irrigation system was added. Refer to Figure 2-12 for a site plan of the pivot irrigation area. Irrigation system operation is visibly checked during each startup cycle. Components not operating as intended are serviced or replaced. The center pivots consist of the following components:

- Buried 12- and 8-inch PVC main lines from the irrigation pump station to the center pivots. The 8-inch main line serves Pivot No. 1, while the 12-inch main line is split into two 8-inch main lines that serve Pivots No. 2 and 3.
- Center pivot irrigation systems
- Rotating drop nozzles with end guns manufactured by Nelson Irrigation
- Center pivot control panel
- Electric control valves at inlet to center pivot
- Center pivot manual stops

Pivot No. 1	
Flow Rate	900 gpm
Radius of Coverage with End Gun	975 feet
Radius of Coverage without End Gun	900 feet
Angle of Coverage	90 degrees
Field Size	17.1 acres
Pivot No. 2	
Flow Rate	900 gpm
Radius of Coverage with End Gun	975 feet
Radius of Coverage without End Gun	900 feet
Angle of Coverage	180 degrees
Field Size	34.3 acres
Pivot No. 3	
Flow Rate	720 gpm
Radius of Coverage with End Gun	725 feet
Radius of Coverage without End Gun	725 feet
Angle of Coverage	184 degrees
Field Size	18.9 acres

Pasture Irrigation Area Soils, Geology, and Groundwater

The soils in the Prineville area are generally considered good for farming and agriculture. The primary soil types in the pasture irrigation area are identified on Tables 2-11 and 2-12. In general, the soils are classified in variations of loam (see Appendix J for the Natural Resources Conservation Service Custom Soil Resource Report for the study area).

TABLE 2-11
PASTURE IRRIGATION AREA SITE SOIL PROFILE

Map Unit Symbol	Soil Type
013	Dryck Loam
014	Powder Silt Loam
015	Metolius Ashy Sandy Loam
016	Crooked-Stearns Complex
020	Boyce Silt Loam

TABLE 2-12
WASTEWATER TREATMENT FACILITY AND PASTURE IRRIGATION AREA
SOIL PROPERTIES AND QUALITIES

Parameter	Description
Depth to Bedrock	More than 80 inches
Drainage Class	Well-drained
Depth to Water Table	More than 80 inches
Available Water Capacity	Approximately 9.9 inches
Frequency of Flooding	Rare
Hazard of Erosion	Slight

No restrictive layers are identified in available soils information for the site. This soil series is not considered hydric.

Financial Status of Any Existing Facilities

The annual revenue received and the costs of operating and maintaining the City's wastewater system are summarized on Table 2-13. The costs presented were obtained from the City's audited financial statements and include all costs for the wastewater system, such as operation and maintenance (O&M), personnel services, materials and services, capital outlay, and debt service. These data are presented to provide insight into the general costs required to operate the City's existing wastewater system. For funding and other financial analysis, it is recommended that the audited financial statements be reviewed in detail to refine the costs prior to considering any available revenue for future debt purposes.

TABLE 2-13
SEWER SERVICE REVENUE

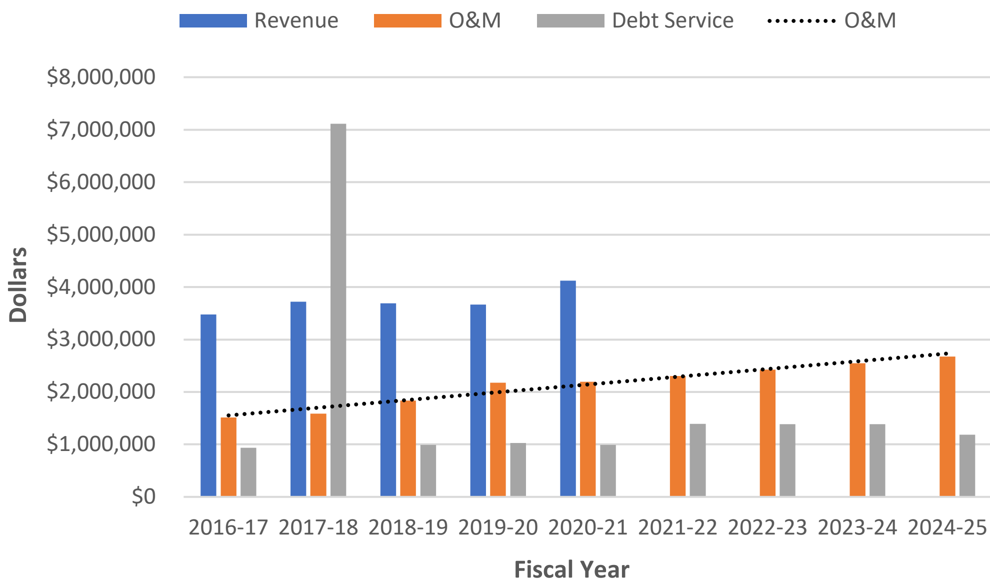
Fiscal Year	Total Revenue	Total Costs*	Net Difference
2016-17	$3,477,701	($1,511,658)	$1,966,043
2017-18	$3,722,627	($1,586,633)	$2,135,994
2018-19	$3,691,237	($1,838,247)	$1,852,990
2019-20	$3,663,030	($2,177,440)	$1,485,590
2020-21	$4,120,995	($2,194,325)	$1,926,670

**Total costs do not include debt service collections.*

Historical and Projected Budget Trends

A graphical plot of the City's wastewater system budget, with revenue and expenditures, is shown on Chart 2-1. O&M costs are projected to the 2024-25 fiscal year (FY) by applying a 5.1 percent inflation rate.

CHART 2-1
HISTORICAL AND PROJECTED BUDGET



The revenue and expenditures shown on Chart 2-1 are variable. O&M costs have increased in conjunction with the increase in standard industry costs. Revenues have also remained relatively constant with deviations well within expected ranges. While general trends can be developed over time, annual revenue and/or costs may vary during a particular year.

The average annual cost of operating and maintaining the City's WWTF over the planning period is anticipated to be $2,140,360. The average annual revenue over the planning period is $3,735,118. Annual wastewater system O&M costs, not including inter-fund transfers, have varied from a low of approximately $1,511,658 in FY 2016-17 to a high of $2,194,325 in FY 2020-21.

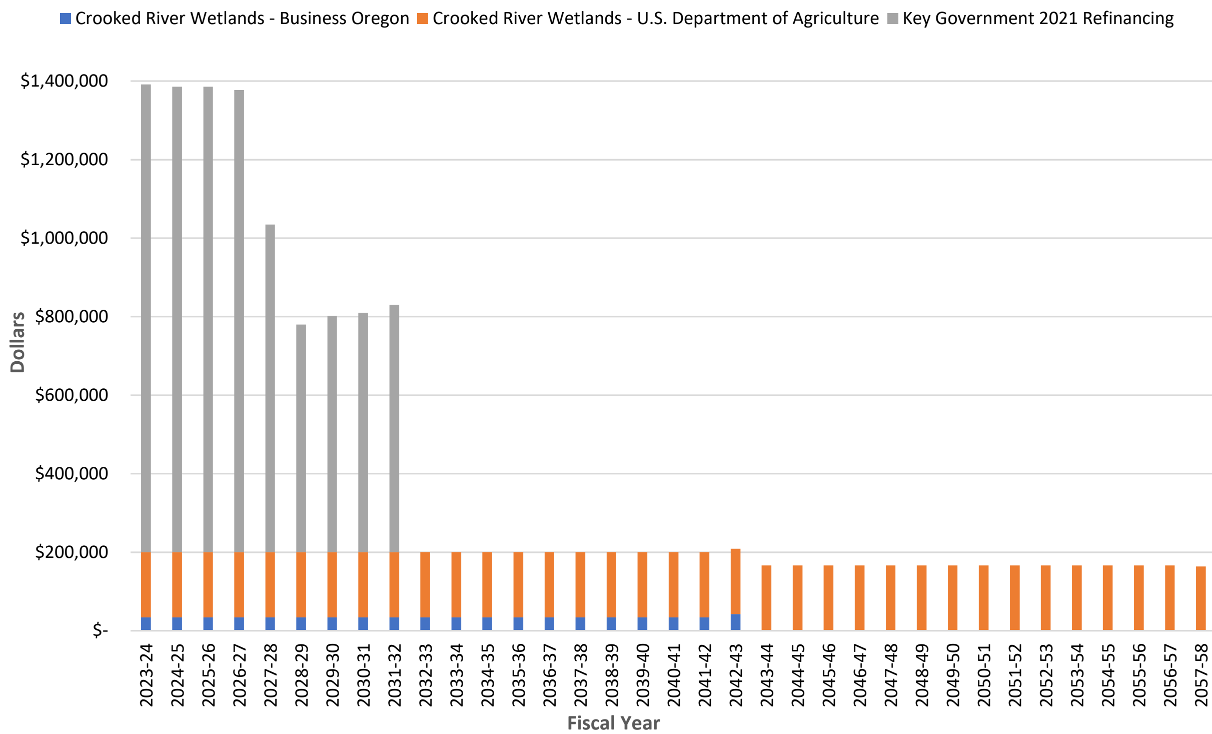
In general, an upward trend of O&M activities is observed. It is typically expected that expenditures should be increasing with time as the costs to own and operate a wastewater system continually increase. Any proposed upgrades to the system are anticipated to be constructed by FY 2025-26, which will add a debt service to the annual expenditures.

Currently, the City budgets reserve account funds for wastewater system operation, maintenance, and replacement costs. Because the City already has a reserve account, it is better prepared to deal with future wastewater system expenses and emergencies. Pump replacement, lagoon liner repairs, pipe repair/replacement, trash screen mechanical breakdowns, etc., are items that require funds from time to time.

Existing Debt

The City will complete repayment of the Key Government Refinancing debt in FY 2031-32, which accounts for $7,995,009 of the City's debt; the Business Oregon loan for the Crooked River Wetlands in FY 2042-43, which accounts for $689,714 of the City's debt; and the U.S. Department of Agriculture loan for the Crooked River Wetlands in 2058, which accounts for $5,813,181 of the City's debt. The annual debt service from 2022 to 2031 averages $1,066,303. From 2031 to 2042, the annual debt service averages $219,199. The annual debt service from 2042 to 2058 averages $166,160. A graphical plot of the City's debt service by FY is provided on Chart 2-2.

CHART 2-2
ANNUAL DEBT SERVICE

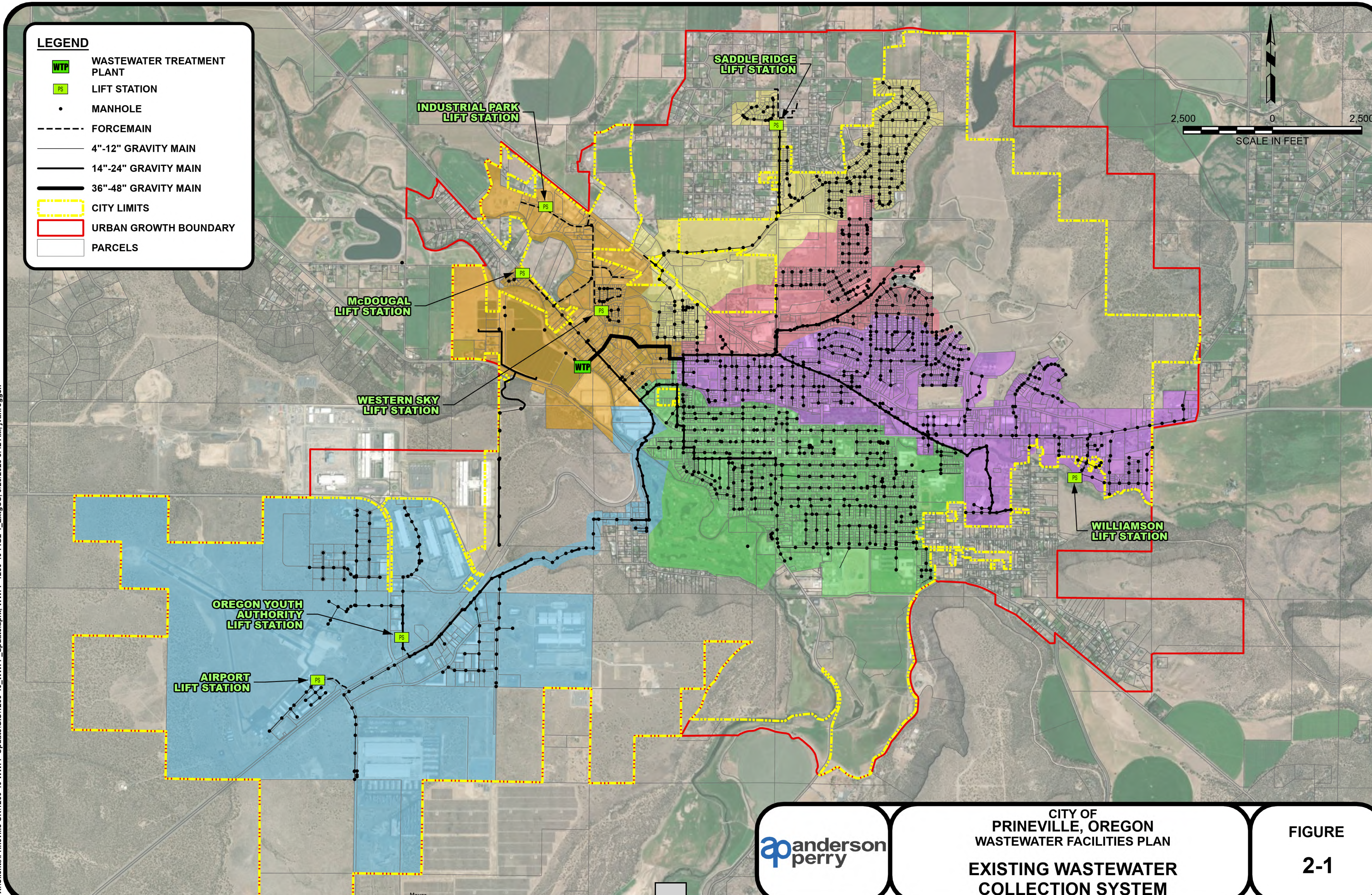


Water/Energy/Waste Audits

Minimal water, energy, or waste audit information is available. However, based on the City's 2021-23 biennial budget, the cost per MGD of electrical use and total cost are shown on Table 2-14.

TABLE 2-14
COST PER MILLION GALLONS PER DAY TREATED

Fiscal Year	2019 Actual	2020 Actual	2021 Actual	2022 Target	2023 Target
Electrical Costs per MGD Treated	$448.15	$450.38	$441.22	$472.37	$472.37
Total Cost per MGD Treated	$1,930.46	$1760.34	$2,288.95	$2,535.19	$2,514.41



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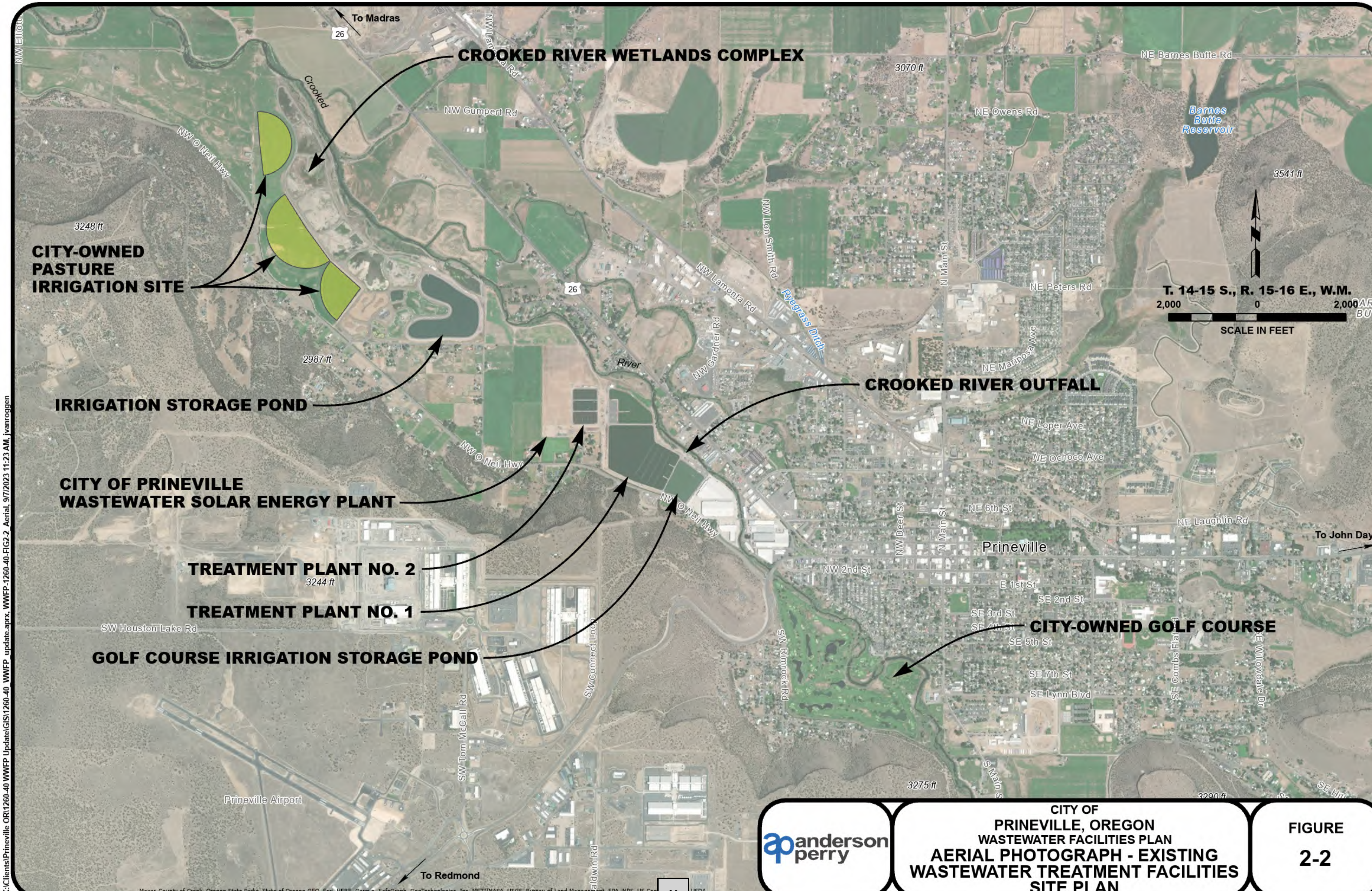
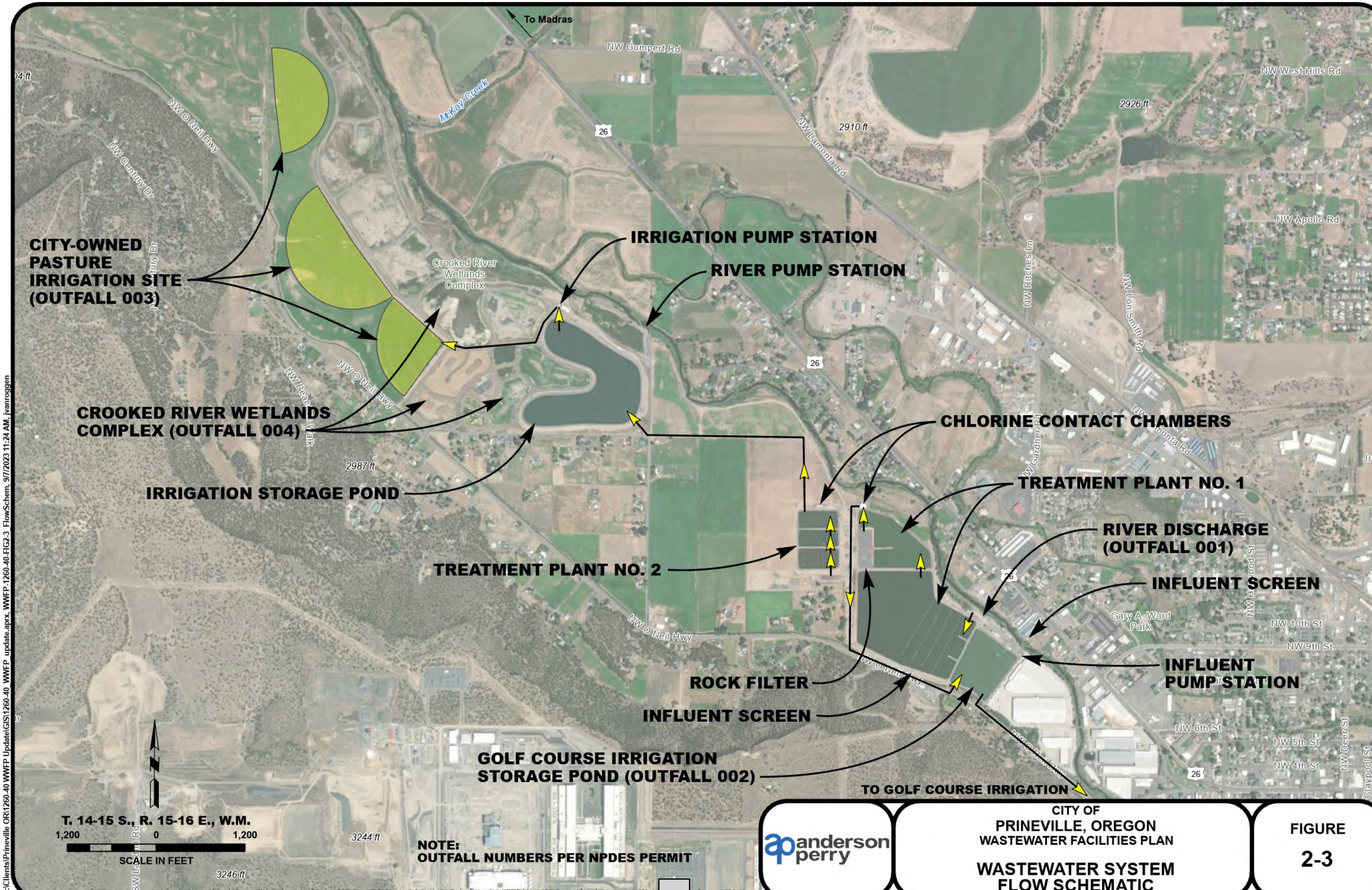


anderson perry

CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
AERIAL PHOTOGRAPH - EXISTING WASTEWATER TREATMENT FACILITIES SITE PLAN

FIGURE 2-2

X:\Clients\Prineville OR\1260-40 WWFP Update\GIS\1260-40_WWFP_update.aprx, WWFP-1260-40-FIG2-2_Aerial, 9/7/2023 11:23 AM, jvanroggen



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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

WASTEWATER SYSTEM FLOW SCHEMATIC

FIGURE
2-3

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CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
SUMMARY OF DISCHARGE MONITORING REPORT DATA
JANUARY 2017 THROUGH DECEMBER 2021

	Influent															
Date	Plant 1 and 2 Influent Maximum Daily Flow (MGD)	Plant 1 and 2 Influent Minimum Daily Flow (MGD)	Plant 1 and 2 Influent Average Monthly Flow (MGD)	Plant 1 Influent Maximum Daily Flow (MGD)	Plant 1 Influent Minimum Daily Flow (MGD)	Plant 1 Influent Average Monthly Flow (MGD)	Plant 2 Influent Maximum Daily Flow (MGD)	Plant 2 Influent Minimum Daily Flow (MGD)	Plant 2 Influent Average Monthly Flow (MGD)	Total Influent Monthly Flow (MG)	Average Monthly BOD_5 (mg/L)	Average Monthly BOD_5 Loading (lbs/day)	Average Monthly $CBOD_5$ (mg/L)	Average Monthly $CBOD_5$ Loading (lbs/day)	Average Monthly TSS (mg/L)	Average Monthly TSS Loading (lbs/day)
Jan-17	1.439	0.583	1.064	1.090	0.182	0.672	0.548	0.000	0.392	32.985			258.0	2289	243.0	2156
Feb-17	1.642	0.674	1.059	1.059	0.125	0.525	0.601	0.458	0.534	29.645			225.0	1987	160.0	1413
Mar-17	1.748	1.090	1.427	1.126	0.591	0.893	0.622	0.456	0.534	44.239			222.0	2642	165.0	1964
Apr-17	1.862	1.632	1.741	1.214	1.053	1.131	0.668	0.560	0.609	52.243						
May-17	1.769	0.904	1.251	1.172	0.456	0.767	0.597	0.414	0.484	38.774						
Jun-17	1.252	1.077	1.130	1.014	0.688	0.746	0.432	0.135	0.384	33.898						
Jul-17	1.250	0.955	1.039	0.812	0.609	0.663	0.438	0.337	0.375	32.203						
Aug-17	1.274	0.996	1.092	0.762	0.618	0.677	0.526	0.363	0.415	33.862						
Sep-17	1.105	0.923	1.007	0.705	0.564	0.627	0.408	0.348	0.381	30.224						
Oct-17	1.084	0.923	1.003	0.667	0.530	0.590	0.477	0.359	0.413	31.094						
Nov-17	1.119	0.957	1.006	0.622	0.522	0.550	0.497	0.435	0.456	30.179						
Dec-17	1.146	0.957	1.021	0.664	0.514	0.561	0.483	0.443	0.460	31.651						
Jan-18	1.101	0.980	1.035	0.614	0.537	0.564	0.542	0.443	0.471	32.098	311.0	2685			207.0	1787
Feb-18	1.076	0.980	1.018	0.593	0.534	0.558	0.483	0.446	0.460	28.495	334.0	2836			276.0	2343
Mar-18	1.095	0.999	1.039	0.589	0.546	0.567	0.506	0.453	0.473	32.220	311.0	2695			244.0	2114
Apr-18	1.153	1.033	1.078	0.633	0.562	0.589	0.520	0.471	0.489	32.336	269.0	2418			247.0	2221
May-18	1.121	0.957	1.039	0.617	0.523	0.570	0.506	0.434	0.470	32.218	266.0	2305			248.0	2149
Jun-18	1.113	0.879	0.974	0.956	0.429	0.554	0.500	0.000	0.420	29.226	248.0	2015			252.0	2047
Jul-18	1.242	0.919	1.016	0.731	0.540	0.597	0.511	0.379	0.419	31.497	299.0	2534			226.0	1915
Aug-18	1.220	0.853	0.974	0.725	0.498	0.572	0.495	0.355	0.402	30.196	218.0	1771			255.0	2071
Sep-18	0.988	0.867	0.917	0.582	0.511	0.540	0.406	0.340	0.377	27.509	245.0	1874			202.0	1545
Oct-18	1.268	0.732	0.936	0.746	0.430	0.550	0.522	0.302	0.386	29.022	271.0	2115			183.0	1429
Nov-18	1.044	0.921	0.951	0.647	0.542	0.561	0.442	0.378	0.390	28.533	202.0	1602			142.0	1126
Dec-18	1.051	0.675	0.976	0.645	0.567	0.585	0.450	0.107	0.392	30.271						
Jan-19	1.113	0.963	1.035	0.665	0.570	0.616	0.448	0.393	0.420	32.092						
Feb-19	1.164	0.969	1.089	0.695	0.575	0.648	0.469	0.394	0.441	30.490						
Mar-19	1.384	1.105	1.213	0.830	0.659	0.725	0.554	0.446	0.488	37.607						
Apr-19	1.349	1.135	1.265	0.823	0.679	0.753	0.542	0.456	0.511	37.951						
May-19	1.438	1.101	1.229	1.024	0.656	0.857	0.547	0.228	0.372	38.110						
Jun-19	1.291	1.054	1.180	0.920	0.718	0.812	0.425	0.201	0.368	35.406						
Jul-19	1.333	1.056	1.139	0.895	0.627	0.720	0.511	0.379	0.419	35.300						
Aug-19	1.251	0.985	1.097	1.109	0.623	0.829	0.464	0.000	0.268	34.020						
Sep-19	1.147	0.944	1.054	0.582	0.511	0.540	0.586	0.407	0.514	31.634						
Oct-19	1.120	0.973	1.036	0.721	0.541	0.679	0.579	0.322	0.357	32.116						
Nov-19	1.065	0.873	0.953	0.647	0.542	0.561	0.458	0.310	0.392	28.580						
Dec-19	1.212	0.996	1.091	0.763	0.627	0.685	0.449	0.369	0.407	33.836						
Jan-20	1.127	1.017	1.056	0.704	0.631	0.660	0.423	0.378	0.396	32.750	228.0	2008			182.0	1603
Feb-20	1.161	1.033	1.087	0.720	0.646	0.682	0.445	0.387	0.405	31.534	205.0	1858			271.0	2457
Mar-20	1.169	1.002	1.071	0.732	0.642	0.671	0.437	0.360	0.400	33.197	240.0	2144			202.0	1804
Apr-20	1.124	1.038	1.070	0.700	0.643	0.667	0.424	0.391	0.403	32.111	243.0	2168			282.0	2517
May-20	1.454	1.018	1.152	1.122	0.636	0.810	0.411	0.227	0.342	35.702	253.0	2431			250.0	2402
Jun-20	1.264	1.032	1.128	0.927	0.759	0.816	0.362	0.273	0.312	33.827	263.0	2474			166.0	1562
Jul-20	1.220	0.995	1.071	0.896	0.735	0.790	0.324	0.260	0.282	33.212	238.0	2126			118.0	1054
Aug-20	1.271	0.914	1.045	0.935	0.713	0.770	0.336	0.201	0.274	33.383	240.0	2092			143.0	1246
Sep-20	1.294	0.945	1.040	0.898	0.570	0.696	0.440	0.263	0.344	31.208	218.0	1891			121.0	1050
Oct-20	1.012	0.916	0.956	0.614	0.554	0.580	0.407	0.362	0.376	29.641	282.0	2248			264.0	2105
Nov-20	1.255	0.973	1.086	0.759	0.592	0.657	0.496	0.381	0.429	32.572	326.0	2953			283.0	2563
Dec-20	1.167	1.025	1.075	0.706	0.407	0.646	0.461	0.407	0.429	33.312	252.0	2259			232.0	2080
Jan-21	1.219	1.049	1.098	0.736	0.627	0.661	0.483	0.421	0.438	34.040	206.0	1886			237.0	2170
Feb-21	1.242	1.106	1.152	0.750	0.667	0.692	0.496	0.437	0.460	32.253			137.0	1316	192.0	1845
Mar-21	1.172	1.008	1.102	0.703	0.599	0.658	0.471	0.409	0.444	34.168	191.0	1755			196.0	1801
Apr-21	1.201	1.069	1.114	0.936	0.640	0.676	0.486	0.157	0.429	33.428	222.0	2063			239.0	2220
May-21	1.401	1.066	1.137	1.000	0.683	0.761	0.502	0.091	0.376	35.235	210.0	1991			131.0	1242
Jun-21	1.762	1.024	1.162	1.133	0.661	0.753	0.629	0.360	0.409	34.863	252.0	2442			281.0	2723
Jul-21	1.845	1.024	1.160	1.183	0.752	0.859	0.662	0.272	0.340	35.971	229.0	2215			214.0	2070
Aug-21	1.323	0.589	1.010	0.979	0.283	0.360	0.261	0.713	0.297	31.305	195.0	1643			143.0	1205
Sep-21	1.196	0.992	1.092	0.873	0.718	0.794	0.330	0.274	0.298	32.748	256.0	2331			268.0	2441
Oct-21	1.390	0.970	1.127	1.002	0.697	0.820	0.388	0.273	0.307	34.946	226.0	2124			196.0	1842
Nov-21	1.370	1.032	1.215	1.033	0.751	0.869	0.409	0.281	0.346	36.463	227.0	2300	210.0	2128	181.0	1834
Dec-21	1.350	1.114	1.153	0.996	0.779	0.856	0.376	0.317	0.335	35.742	248.0	2385	203.0	1952	263.0	2529
Maximum	1.862	1.632	1.741	1.214	1.053	1.131	0.668	0.713	0.609	52.243	334.000	2952.660	258.000	2642.062	283.000	2723.193
Minimum	0.988	0.583	0.917	0.582	0.125	0.360	0.261	0.000	0.268	27.509	191.000	1602.131	137.000	1316.252	118.000	1049.506
Average	1.267	0.976	1.092	0.828	0.590	0.681	0.478	0.337	0.407	33.256	247.765	2195.225	209.167	2052.493	213.289	1911.720

	Plant Effluent													Contact Basin		
Date	Effluent Maximum Daily Flow (MGD)	Effluent Minimum Daily Flow (MGD)	Effluent Average Monthly Flow (MGD)	001/002 Average Total Kjeldahl Nitrogen (mg/L)	001/002 Average No_2+No_3-N	003 Average Ammonia NH_3-N	Average Monthly $CBOD_5$ (mg/L)	Average Monthly $CBOD_5$ Percent Removal	Average Monthly $CBOD_5$ Loading (lbs/day)	Average Monthly TSS (mg/L)	Average Monthly TSS Percent Removal	Average Monthly TSS Loading (lbs/day)	001/002 Average Monthly pH	001 Average Daily Chlorine Residual (mg/L)	001/002 Max Month Geo Mean TC Conc. (organisms/ 100 ml)	003 Max Month Geo Mean TC Conc. (organisms/ 100 ml)
Jan-17	0.772	0.000	0.254			6.9	11	98	23	19	96	40	7.90		538.0	0.0
Feb-17	1.099	0.638	0.833										8.00		0.0	0.0
Mar-17	1.055	0.671	0.853			6.7	16	95	114	52	84	370	9.00		0.0	0.0
Apr-17	3.858	1.813	2.539										8.30	3.4		
May-17	2.020	0.991	1.488										8.43	3.8		
Jun-17	1.830	0.718	1.229										8.05	4.9		
Jul-17	1.664	0.427	1.189										7.70	5.9		
Aug-17	1.737	1.004	1.249										7.86	4.4		
Sep-17	1.386	0.599	0.987										7.80	5.0		
Oct-17	1.537	0.505	0.949										7.82	5.0		
Nov-17	0.974	0.656	0.815										8.17	4.1		
Dec-17	1.054	0.677	0.800										8.25	4.4		
Jan-18	1.245	0.883	1.024												0.0	0.0
Feb-18	1.020	0.821	0.932												0.0	0.0
Mar-18	1.156	0.737	0.893												0.0	1.0
Apr-18	1.246	0.737	0.830	8.0	0.0	6.0									1.0	2.0
May-18	0.825	0.497	0.720	15.0	0.0	12.0							8.00		4.0	0.0
Jun-18	0.805	0.225	0.487	7.0	1.0	4.0							8.30		4.0	1.0
Jul-18	0.467	0.225	0.380	9.0	0.0	3.0							8.50		0.0	2.0
Aug-18	0.552	0.343	0.439	6.0	0.0	2.0							8.70		0.0	0.0
Sep-18	0.699	0.339	0.456	1.0	0.0	0.0									0.0	0.0
Oct-18	0.872	0.505	0.672	7.0	0.0	1.0							8.70		0.0	0.0
Nov-18	0.875	0.586	0.731												0.0	0.0
Dec-18	0.938	0.827	0.867										7.75	4.2		
Jan-19	1.239	0.801	0.964										7.87	3.3		
Feb-19	1.364	0.888	1.042										8.06	3.1		
Mar-19	1.257	0.997	1.140										8.21	5.2		
Apr-19	1.298	0.858	1.126										8.11	5.1		
May-19	1.582	0.559	0.962										8.18	5.9		
Jun-19	1.227	0.477	0.745										7.58	7.9		
Jul-19	0.647	0.349	0.538										7.60	8.1		
Aug-19	1.547	0.252	0.726										7.96	7.0		
Sep-19	0.748	0.342	0.481										8.06	7.7		
Oct-19	0.974	0.376	0.761										7.81	7.7		
Nov-19	1.003	0.610	0.890										7.96	6.0		
Dec-19	1.327	0.886	1.036										7.76	6.3		
Jan-20	1.047	0.819	0.947												0.0	0.0
Feb-20															0.0	0.0
Mar-20	0.914	0.824	0.859												1.0	0.0
Apr-20	0.950	0.753	0.852	13.0	1.0	8.0							8.00		0.0	0.0
May-20	1.326	0.600	0.876	10.0	1.0	8.0							8.20		2.0	5.0
Jun-20	0.887	0.619	0.739	8.0	1.0	3.0							8.00		1.0	2.0
Jul-20	1.220	0.995	1.071	7.0	1.0	0.0							8.20		10.0	8.0
Aug-20	0.716	0.486	0.596	1.0	3.0	1.0							8.30		3.0	2.0
Sep-20	0.854	0.575	0.707	7.0	1.0	3.0							8.50		0.0	2.0
Oct-20	0.865	0.586	0.711	5.0	0.0	3.0							7.60		0.0	0.0
Nov-20	1.238	0.741	1.035	7.0	0.0	4.0							7.80		0.0	0.0
Dec-20	1.148	0.882	1.005	9.0	1.0	5.0							7.60		0.0	0.0
Jan-21	1.307	0.864	1.035	10.0	0.0	6.0							7.80	8.0	0.0	0.0
Feb-21	1.273	0.907	1.096	9.0	1.0	6.0	7	95	64	18	89	165	7.00	6.5	1.0	1.0
Mar-21	1.014	0.751	0.886	5.0	0.0	0.0							8.20	7.0	0.0	0.0
Apr-21	0.523	0.322	0.428	10.0	1.0	6.0							7.90	7.0	0.0	6.0
May-21	0.712	0.327	0.468	9.0	0.0	7.0							8.34	8.0	7.0	1.0
Jun-21	0.781	0.053	0.476	10.0	1.0	6.0							8.25	8.0	1.0	16.0
Jul-21	0.742	0.147	0.542	7.0	1.0	4.0							8.64	9.0	13.0	15.0
Aug-21	0.778	0.122	0.448	6.0	1.0	3.0							8.42	9.0	0.0	8.0
Sep-21	1.254	0.560	0.799	5.0	1.0	2.0							8.50	6.0	3.0	1.0
Oct-21	0.432	0.000	0.129										7.60	9.0	0.0	0.0
Nov-21	1.529	0.981	1.131	6.0	0.0	4.0	4.4	98	42	6.7	96	63	7.90	6.7	2.0	2.0
Dec-21	1.314	0.838	1.071	6.0	1.0	4.0							8.00	7.5		
Maximum	3.858	1.813	2.539	15.000	3.000	12.000	16.000	98.000	113.824	52.000	96.000	369.929	9.000	9.000	538.000	16.000
Minimum	0.432	0.000	0.129	1.000	0.000	0.000	4.400	95.000	23.302	6.700	84.000	40.249	7.000	0.000	0.000	0.000
Average	1.131	0.620	0.846	7.519	0.630	4.297	9.600	96.500	60.653	23.925	91.250	159.477	8.062	5.962	0.000	0.000

Note: Shaded cells indicate months where reuse is permitted.

$CBOD_5$ = five-day carbonaceous biochemical oxygen demand
BOD_5 = five-day biochemical oxygen demand
ft = feet
lbs/day = pounds per day
mg/L = milligrams per liter
MGD = million gallons per day
ml = milliliters
TSS = total suspended solids

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CITY OF
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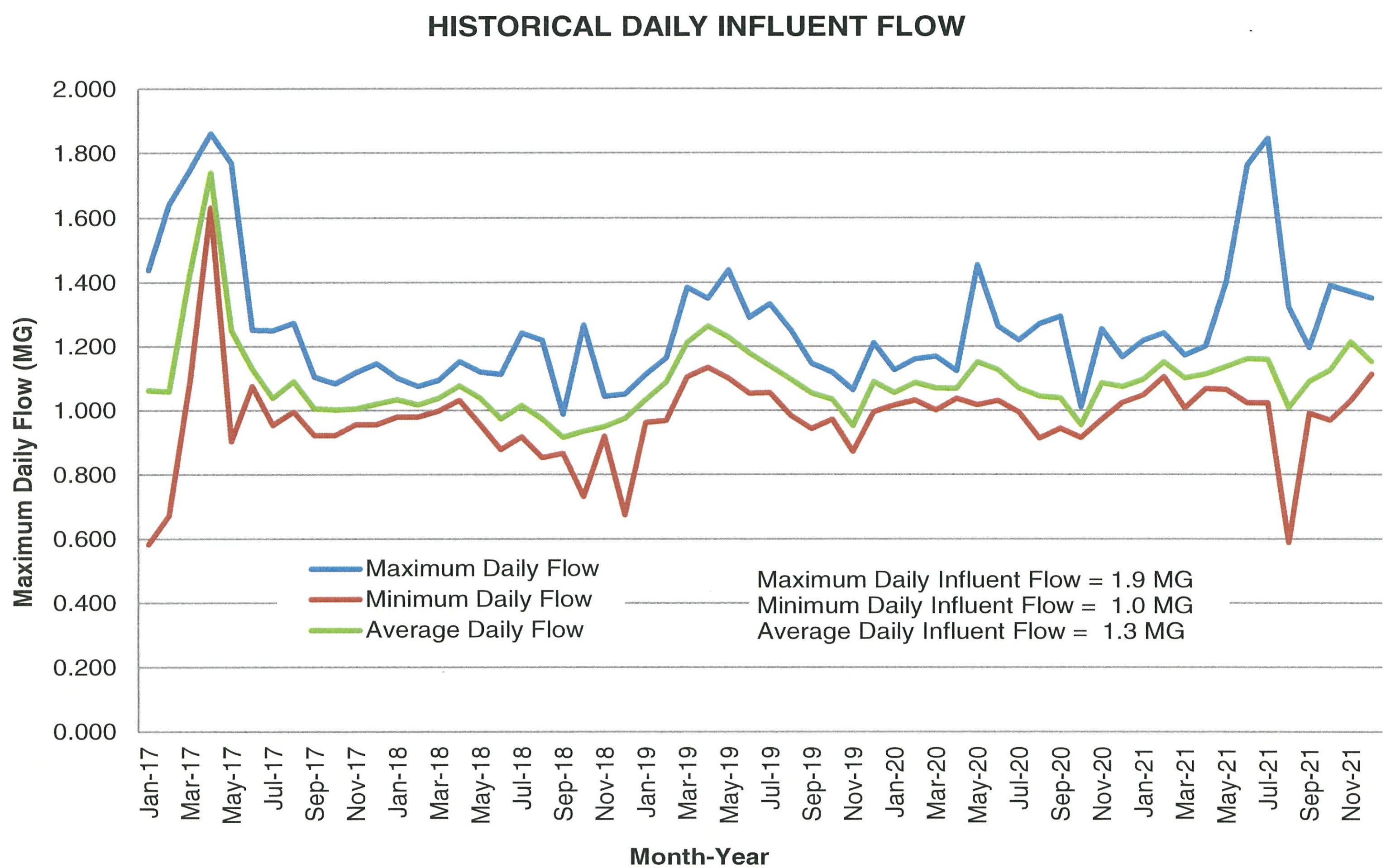
WASTEWATER FACILITIES PLAN
SUMMARY OF DISCHARGE MONITORING REPORT DATA

FIGURE 2-4



MG = million gallons

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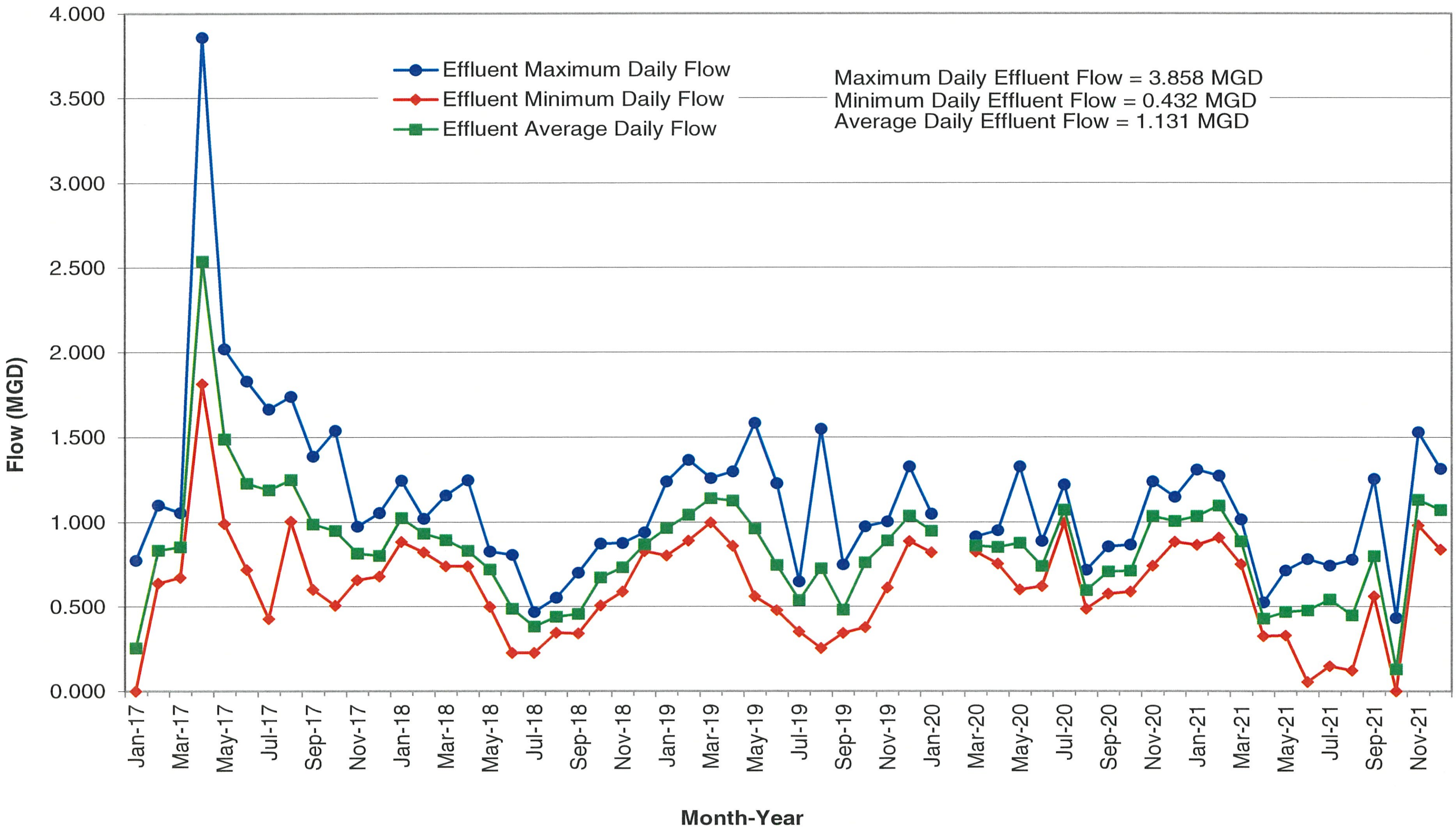
WASTEWATER FACILITIES PLAN
HISTORICAL DAILY INFLUENT FLOW

FIGURE
2-5

HISTORICAL DAILY EFFLUENT FLOW



MGD = million gallons per day

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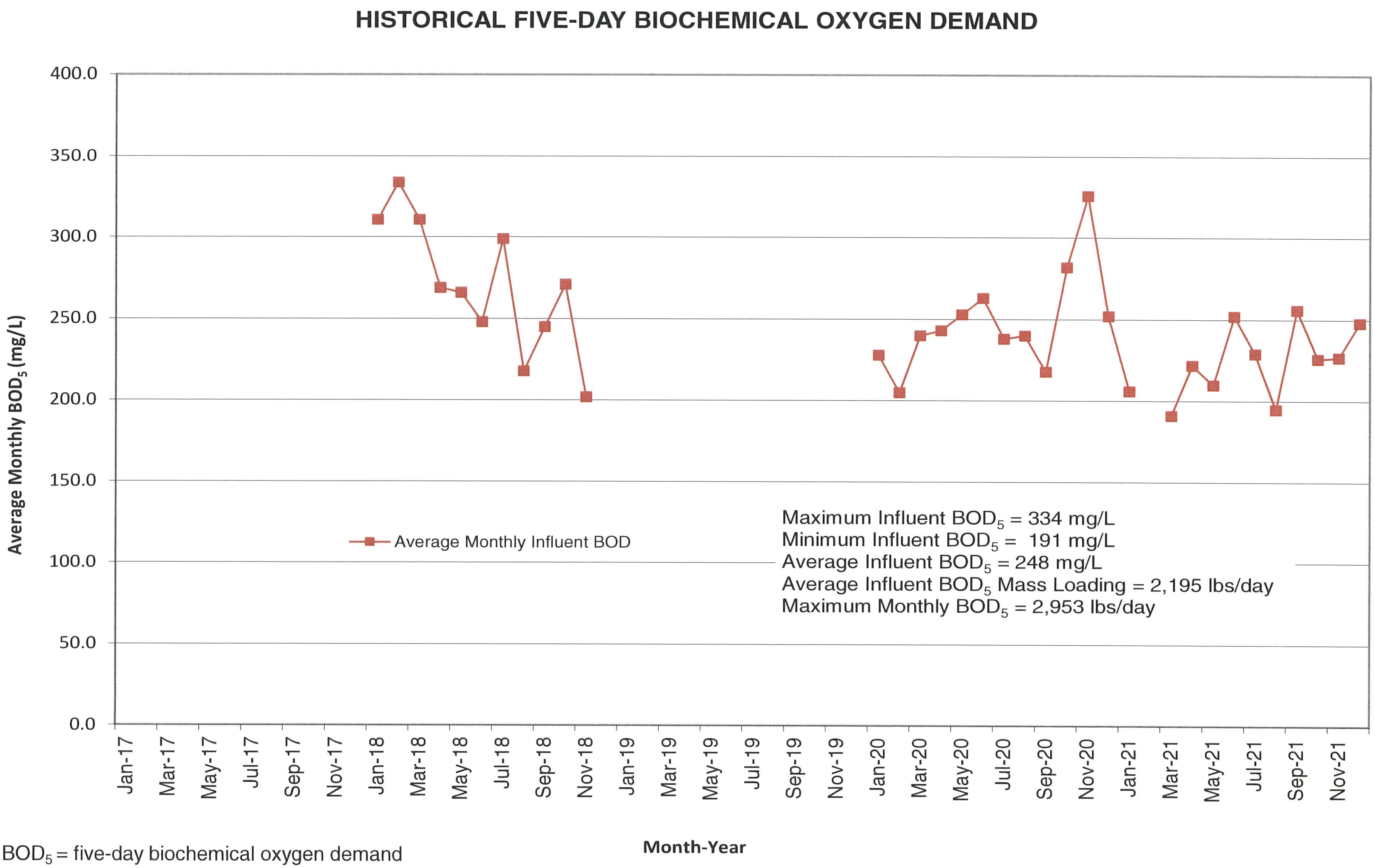
WASTEWATER FACILITIES PLAN

HISTORICAL DAILY EFFLUENT FLOW

FIGURE
2-6



BOD_5 = five-day biochemical oxygen demand
lbs/day = pounds per day
mg/L = milligrams per liter

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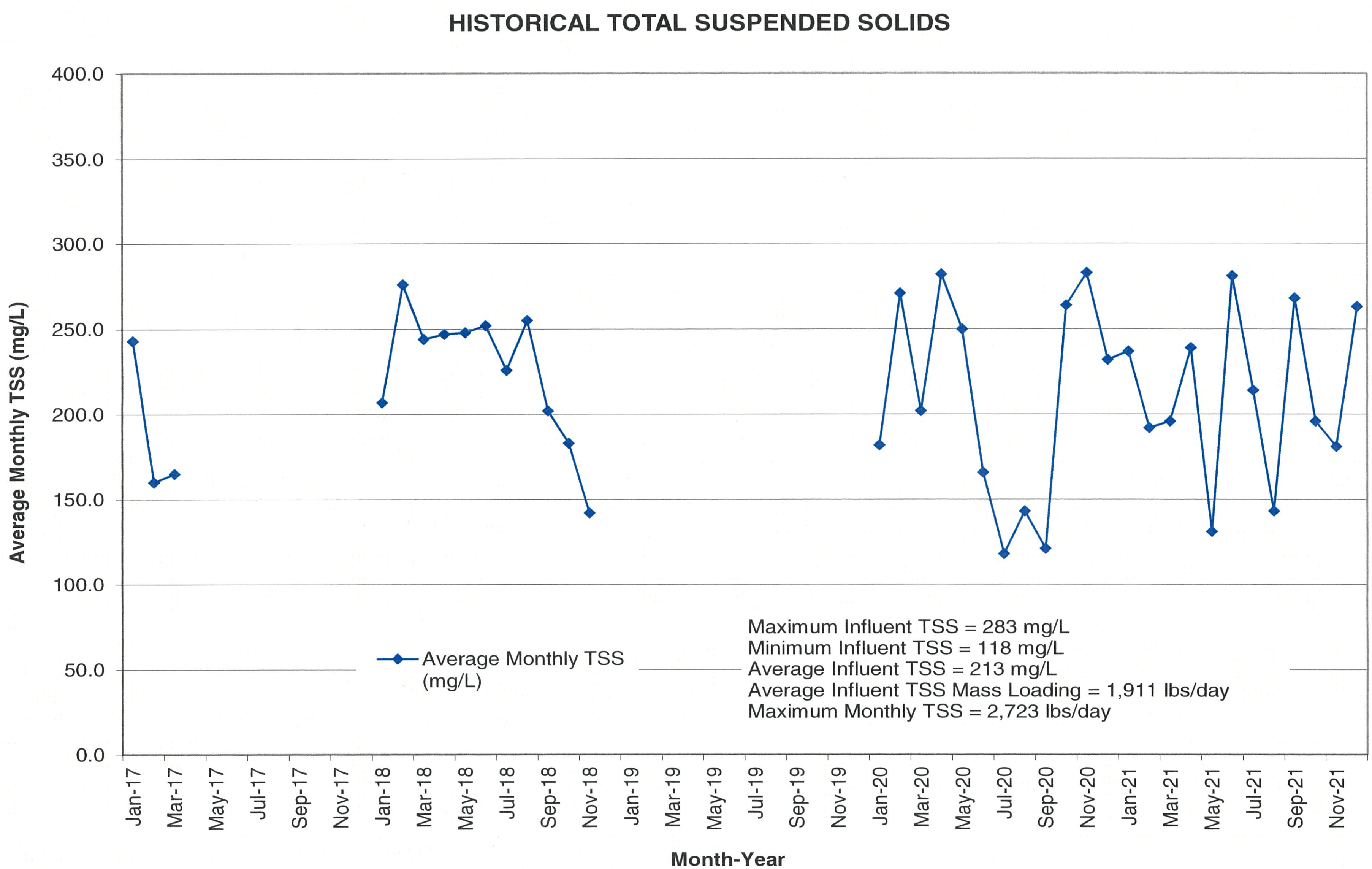
WASTEWATER FACILITIES PLAN

HISTORICAL FIVE-DAY BIOCHEMICAL OXYGEN DEMAND

FIGURE 2-7



lbs/day = pounds per day
mg/L = milligrams per liter
TSS = total suspended solids

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CITY OF
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WASTEWATER FACILITIES PLAN

HISTORICAL TOTAL SUSPENDED SOLIDS

FIGURE
2-8

DESIGN CRITERIA

	EXISTING CONNECTED POPULATION[1] 2022		EXISTING POPULATION WITH IMPROVEMENTS[2] 2022		EXISTING POPULATION WITH IMPROVEMENTS AND ANTICIPATED UGB CONNECTIONS[3] 2022		FUTURE POPULATION WITH IMPROVEMENTS AND ANTICIPATED UGB CONNECTIONS[4] 2042	
	I/I[5]	Total[6]	I/I[7]	Total[8]	I/I[7]	Total[8]	I/I[7]	Total[8]
Population*		10,771		11,288		11,773		14,745
Average Base Flow (ABF), MGD[9]	----	0.930	----	0.975	----	1.017	----	1.273
Per Capita Flow, gpcd	----	86	----	86	----	86	----	86
Average Annual Flow[10] (AAF), MGD	0.162	1.092	0.162	1.137	0.162	1.179	0.162	1.435
Per Capita Flow, gpcd	15	101	14	101	14	100	11	97
Average Dry Weather Flow[10] (ADWF), MGD	0.115	1.045	0.115	1.090	0.115	1.132	0.115	1.388
Per Capita Flow, gpcd	11	97	10	97	10	96	8	94
Average Wet Weather Flow[10] (AWWF), MGD	0.210	1.140	0.210	1.185	0.210	1.227	0.210	1.483
Per Capita Flow, gpcd	19	106	19	106	18	106	14	106
Maximum Month Flow (MMF), MGD	0.811	1.741	0.811	1.786	0.811	1.828	0.811	2.084
Per Capita Flow, gpcd	75	162	72	158	69	155	55	141
Peak Hour Flow (PHF), MGD[11]	----	4.368	----	4.547	----	4.714	----	5.741
Per Capita Flow, gpcd	----	406	----	403	----	400	----	389
Average Influent BOD_5, mg/L	----	248	----	250	----	251	----	258
lbs/day	----	2259	----	2367	----	2469	----	3,092
lbs/capita/day	----	0.21	----	0.21	----	0.21	----	0.21
Average Influent TSS, mg/L	----	213	----	214	----	216	----	222
lbs/day	----	1940	----	2033	----	2120	----	2656
lbs/capita/day	----	0.18	----	0.18	----	0.18	----	0.18
Average Influent TKN[12], mg/L	----	40	----	40	----	40	----	40
lbs/day	----	364	----	379	----	393	----	479
lbs/capita/day	----	0.03	----	0.03	----	0.03	----	0.03

1 Existing connected population was found by utilizing City billing reports to find the number of residences not connected to the sewer (210). According to the PRC at PSU, the average PPH within the City is 2.46. The certified population for 2021 was 11,042 per the PRC. For planning purposes, this population is utilized as the 2022 population. This population also includes the 100 residences that are served outside the city limits. A connected population was estimated utilizing these values.

2 Existing 2022 population with improvements includes all residences within the city limits that could be served.

3 Existing population with improvements and anticipated UGB connections includes all residences currently being served in addition to all residences within the city limits that could be served and subdivisions directly outside the city limits that could be served in the future (roughly 20 percent of current tax lots in the UGB or 197 residences). Population was estimated using a value of 2.46 PPH with 985 homes outside the UGB, not including those already served.

4 The future 2042 population was found by utilizing AAGR values declared by the PRC. The growth values were applied to the existing connected population with improvements along with the anticipated UGB connections.

5 The average contribution from I/I for each flow component (AAF, ADWF, AWWF, and MMF) was estimated by taking the difference of each of the current total flow values and the current base flow.

6 Existing total flows and mass loads are based on historical WWTF operating data (DMRs).

7 For projection purposes, it was assumed that the I/I flows currently being experienced in the system will remain constant throughout the planning period.

8 Future total flow is estimated by taking the sum of the future ABF and I/I (example: AAF = 0.095 MGD + 0.049 MGD = 0.144 MGD).

9 ABF is defined as the daily minimum flow recorded for each year averaged over the five years of available data.

10 The AAF, ADWF, and AWWF were determined by taking the average of the corresponding flows from 2017 through 2021. Wet weather flows were estimated to occur from January through June, and dry weather flows were estimated to occur from July through December.

11 The PHF was determined by multiplying the average annual wastewater flow by a peaking factor of 4.0. The peaking factor is an assumed value as no data exist that allow direct calculation to determine the value.

12 TKN (organic nitrogen and ammonia nitrogen). Assumed concentration based on typical domestic wastewater influent values.

* Population estimate and projections from the PRC at PSU based on a certified population of 11,042 in 2021. Forecast AAGR of 1.1 percent to 2042.

AAGR = average annual growth rate
BOD_5 = five-day biochemical oxygen demand
DMRs = Discharge Monitoring Reports
gpcd = gallons per capita per day
I/I = infiltration and inflow
lbs/capita/day = pounds per capita per day
lbs/day = pounds per day
mg/L = milligrams per liter
MGD = million gallons per day
PPH = person per household
PRC = Population Research Center
PSU = Portland State University
TKN = Total Kjeldahl nitrogen
TSS = total suspended solids
UGB = urban growth boundary
WWTF = wastewater treatment facility

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CITY OF
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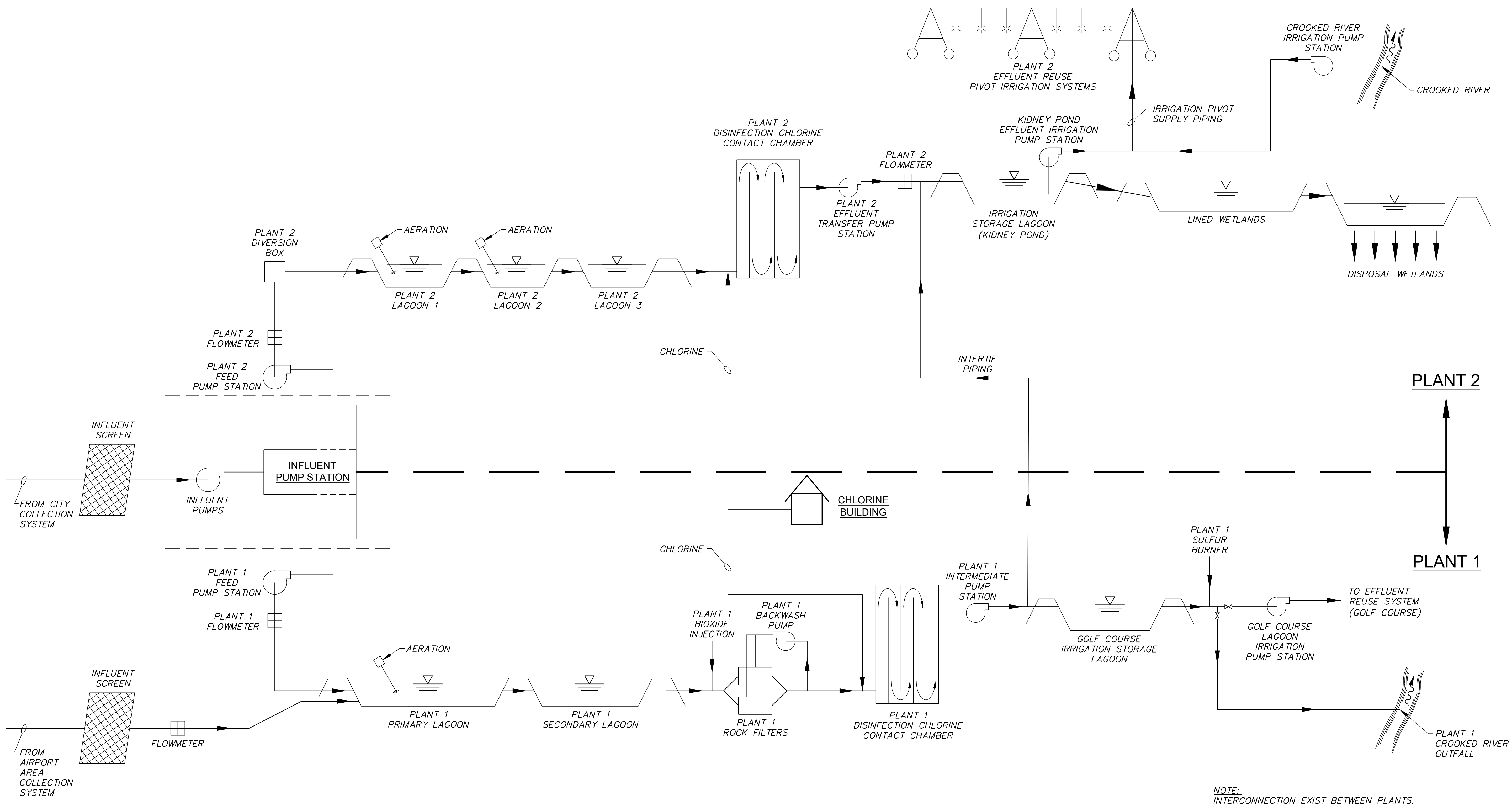
WASTEWATER FACILITIES PLAN

DESIGN CRITERIA

FIGURE
2-9



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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

TREATMENT PROCESS FLOW SCHEMATIC

FIGURE
2-10

Influent Screen

Date Constructed	2017
Capacity	4.5 MGD Max Flow
Type	Huber Rotamat RoK4 700/6 Fine Screen
Motor	230/460 VAC, 3 phase
Horse Power	5

Influent Pump Station

Date Constructed	2005
Pipe to Influent Pump Station	48" RCP San. Sewer
Quantity of Submersible Pumps	4
Model No.	KRT K150-315-310-1160
Discharge Connection	6"
First Operating Point	1650 gpm @ 38.5 feet
Second Operating Point	1750 @ 35.5 feet
Third Operating Point	1760 @ 35.2 feet
Shutoff Head	73.0 feet
Motor Speed	1800 rpm
Horsepower (each)	25

Plant 1 Feed Pump Station

Quantity of Submersible Pumps	3
Capacity	1760 gpm @ 35.2 feet
Horsepower (each)	25
Piping to Plant 1	10" diameter

Plant 1 Flowmeter

Panametrics DF868 Strap-on flowmeter

Influent Screen

Date Constructed	2020
Capacity	0.85 MGD Max Flow
Type	Kusters Model ICSS 3/6 In-channel Screw Screen
Motor	230/460 VAC, 3 phase
Horse Power	1
Flowmeter	Ultramag UM06

Plant 1 Partially Aerated Primary Lagoon

Area	37 acres
Operating Volume	68.7 MG
Max Operating Depth	5.7 feet
Max Weir	2854.9 feet
Min Weir	2853.4 feet
Bottom Elevation	2849.2 feet
Detention Time at 1.1 MGD	62 days
Number of Blowers	3
HP of Blowers (each)	50
Oxygen Transfer (lbs/hr)	100

Plant 1 Facultative Secondary Lagoon

Area	10 acres
Depth	5 feet
Bottom Elevation	2844.5 feet
Operating Volume	16 MG
Detention time at 1.1 MGD	15 days

Plant 1 Rock Filters

Filter Area (each)	1.2 acres
Quantity	2
Loading Rate	1.7 gpd/cf
Backwash Rate	1.66 times loading rate
Backwash Pump Capacity	1150 gpm @ 22 feet

Plant 1 Disinfection

Number of Basins	2
Basin L:W ratio	50:1
Basin Volume	26,600 gallons per basin
Chlorine Dosage at Contact Basin	0-100 lb per day

Plant 1 Intermediate Pump Station

Number of Pumps	2
Combined Rated Capacity	1300 gpm @ 48 feet
Horsepower (each)	15

Golf Course Irrigation Storage Lagoon

Area	10.5 acres
Storage Capacity	25 MG
Holding Capacity at 1.1 MGD	23 days

Irrigation Pump Station

Number of Pumps	3
Combined Rated Capacity	3000 gpm @ 324 feet
Horsepower (each)	100

Crooked River Outfall

Diffuser Nozzle Discharge	11.5 ft/sec @ 1.1 mgd
Number of Nozzles	3
Outfall Pipe Diameter	18 inches

Plant 2 Feed Pump Station

Quantity of Submersible Pumps	3
Capacity	1760 gpm @ 35.2 feet
Horsepower (each)	25
Piping to Plant 2	12" diameter

Plant 2 Flowmeter

Panametrics DF868 Strap-on flowmeter

Plant 2 Aerated Lagoon 1

Area	3.49 Acres
Operating Depth	10 feet
Volume	11.4 MG
Detention Time at 1.2 MGD	9.5 days
Number of Blowers	3
HP of Blowers (each)	75
Oxygen Transfer (lbs/hr)	100

Plant 2 Aerated Lagoon 2

Area	2.91 Acres
Operating Depth	6 feet
Volume	5.7 MG
Detention Time at 1.2 MGD	4.7 days
Quantity of Aspirating Aerators	4
Horsepower of Aerators (each)	10
Oxygen Transfer (lbs/Hp*hr)	2

Plant 2 Facultative Lagoon 3

Area	2.91 Acres
Operating Depth	6 feet
Volume	5.7 MG
Detention Time	4.7 days

Plant 2 Disinfection

Type	Chlorine Gas
Capacity	0-100 lbs chlorine per hour
Number of Basins	1
Basin Volume (gal)	21,500
42" Contact Pipe Volume (gal)	10,800
12" PVC Pipe Volume (gal)	20,000
Total Detention Time at 1.2 MGD	60 minutes

Plant 2 Effluent Transfer Pump Station

Number of Pumps	2 Vertical Turbine
Capacity	1200 gpm at 44 ft (TDH)
Horsepower (each)	20

Irrigation Storage Lagoon (Kidney Pond)

Area	29 acres
Volume	118 MG
Minimum Depth	1 foot
Maximum Depth	12.5 feet
Maximum Detention @1.2 MGD	98 days

Effluent Irrigation Pump Station

Number of pumps	3
Capacity	775 gpm @ 215 feet
Horsepower (each)	75

Effluent Reuse Pivot Irrigation Systems

Number of Pivots	3
Acreage Irrigated	120

Crooked River Irrigation Pump Station

Number of pumps	1
Capacity	2400 gpm
Horsepower	20
Variable Speed Drive	

Lined Treatment Wetland 1

Area	7.3 acres
Volume	3.9 MG

Lined Treatment Wetland 2

Area	1.8 acres
Volume	1.9 MG

Lined Treatment Wetland 3

Area	0.9 acres
Volume	0.8 MG

Lined Treatment Wetland 4

Area	7.5 acres
Volume	3.9 MG

Lined Treatment Wetland 5

Area	5.0 acres
Volume	2.5 MG

Lined Treatment Wetland 6

Area	1.3 acres
Volume	1.2 MG

Lined Treatment Wetland 7

Area	0.8 acres
Volume	0.6 MG

Lined Treatment Wetland 8

Area	4.1 acres
Volume	2.1 MG

Disposal Wetland 9

Area	10.2 acres
Volume	6.7 MG

Disposal Wetland 10

Area	13.8 acres
Volume	8.9 MG

Disposal Wetland 11

Area	12.6 acres
Volume	8.0 MG

Disposal Wetland 12

Area	13.4 acres
Volume	8.7 MG

Disposal Wetland 13

Area	14.9 acres
Volume	9.7 MG

Disposal Wetland 14

Area	6.6 acres
Volume	4.3 MG

Disposal Wetland 15

Area	4.7 acres
Volume	2.8 MG

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CITY OF
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WASTEWATER FACILITIES PLAN

WASTEWATER TREATMENT FACILITY COMPONENTS

FIGURE 2-11

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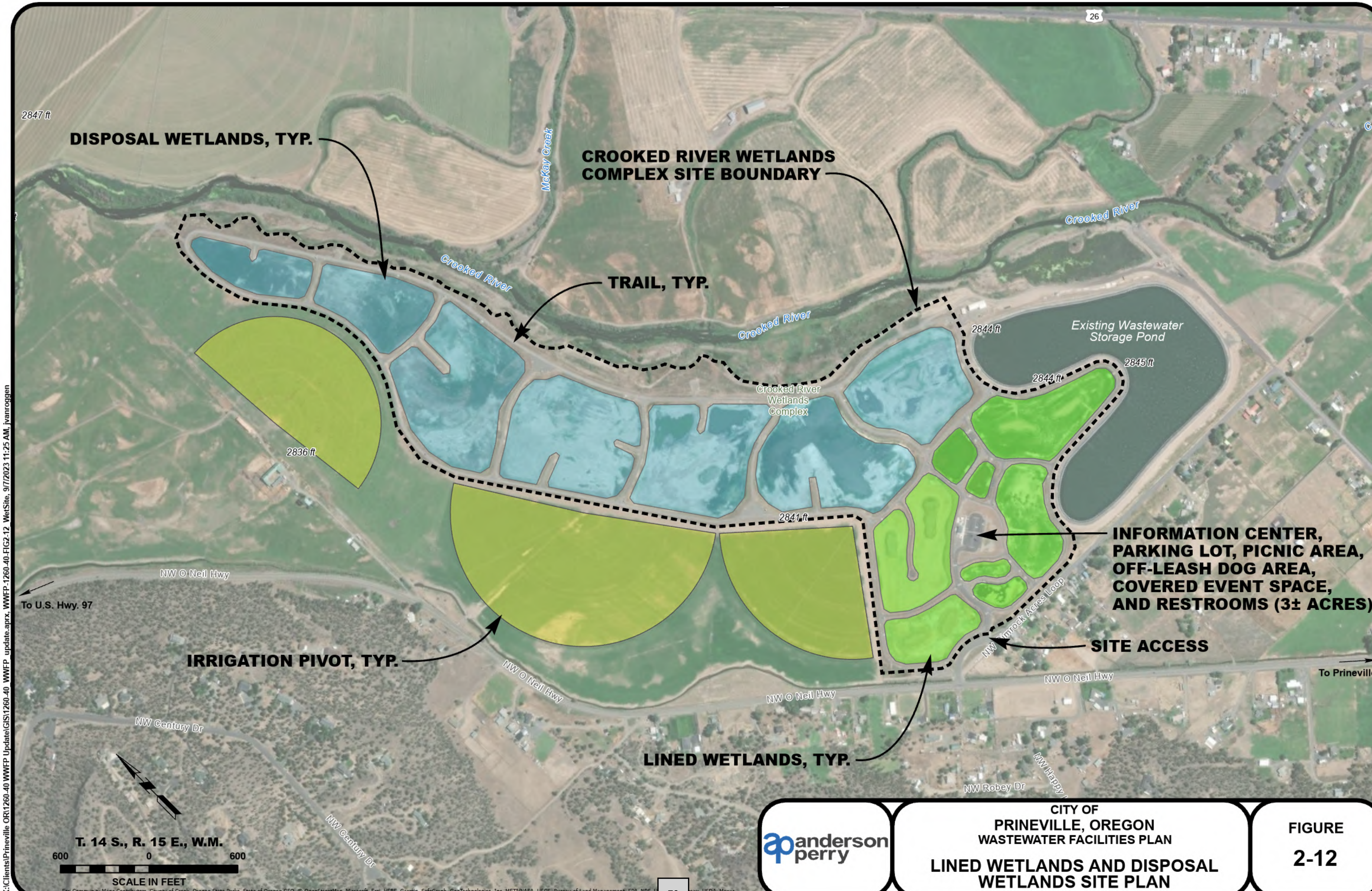

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

LINED WETLANDS AND DISPOSAL WETLANDS SITE PLAN

FIGURE
2-12

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Section 3 - Need for Project

General

This section discusses the Clean Water Act (CWA), state and federal regulations for wastewater treatment facilities (WWTFs) that discharge into Waters of the U.S., and the need for capital improvements projects, including aging infrastructure and reasonable growth.

Health, Sanitation, Environmental Regulations, and Security

Many state and federal regulations have been established that ensure the health, security, and safety of the general public are maintained as a high priority. This section describes how those requirements are impacted by the current condition of the regulated systems.

National Pollutant Discharge Elimination System Permit Requirements

The City of Prineville's wastewater system is regulated by National Pollutant Discharge Elimination System (NPDES) Permit No. 101433 and a Permit Modification (see Appendix A). The permit outfall requirements for the City's WWTF are described in detail in Section 2.

The WWTF improvement projects in 1993, 2005, and 2017 provided the necessary capacity for the planning period as well as the ability to consistently maintain permit compliance. Although the existing WWTF provides the currently needed capacity and treatment capabilities, modifications are needed to improve reliability, operator efficiency, and sanitation and reduce operation and maintenance (O&M) costs. Improvements to the main influent screen will reduce rags and other debris from entering the influent pumps and the lagoon system. Converting the existing gas chlorination system to a bulk sodium hypochlorite system will reduce risks associated with the gas chlorination systems and reduce operator interface with the introduction of supervisory control and data acquisition (SCADA) control and remote monitoring and alarms. Replacement of existing influent and effluent pumping systems with new pumps, electrical, and control systems will reduce energy use via efficient pumps, improved level control, starting and control systems, and reduced down time.

The majority of standard analyses for the WWTF are conducted by an outside laboratory and are subject to the costs and additional time needed for completion. By constructing a new operations building with improved sanitation, showers, locker rooms, a break room, office and operational space, and a laboratory, personnel will have the facilities required to properly operate and maintain the WWTF and collection systems. By adding a laboratory, WWTF personnel will be able to perform the majority of the required analyses, reducing the cost and added time sustained by using an outside laboratory.

Solids Treatment

As required by the CWA Amendments of 1987, the U.S. Environmental Protection Agency developed a regulation to protect public health and the environment from reasonably anticipated adverse effects of certain pollutants that might be present in municipal sewage biosolids. Biosolids are a natural byproduct of the wastewater treatment process.

Title 40 of the Code of Federal Regulations Part 503 separates biosolids into two classifications, Classes A and B, related to pathogen densities contained within the biosolids at the time of land application. Class A biosolids have much more stringent requirements related to pathogen density levels than Class B biosolids. Biosolids meeting Class A requirements can be sold in bags or bulk and applied on public areas such as lawns and home gardens. Class B biosolids are restricted to bulk application to agricultural land, rangeland, forest, or reclamation sites.

The City has not removed solids from the lagoon system since its construction. An accumulation of solids of approximately 70,520 cubic yards (CY) is present in Pond 1 of Plant 1. Anderson Perry & Associates, Inc. (AP) and the City performed a sludge survey on November 11, 2021 (see Figures 3-1A, 3-1B, and 3-1C for sludge depths). Sludge in Pond 1 of Plant 1 has been reduced by an average depth of 0.4 foot since the previous sludge survey completed in March 2017. An additional sludge survey was completed at Ponds 1 and 2 of Plant 2 with measured solids equal to approximately 6,440 CY and 2,130 CY, respectively.

In 2021, AP developed a preliminary Biosolids Removal Plan. The preliminary Biosolids Removal Plan identifies options for biosolids removal, if required, to maintain reasonable biosolids depths within the lagoons. Biosolids removal for Pond 1 at Plant 1 is identified as Capital Improvements Plan (CIP) 10 (further discussed in Section 4) and is considered a long-term improvement. Surveys should be conducted every three years to determine if biosolids depths continue to decline; action plans should be further developed to determine if the sludge needs to be removed, as it could cause operational issues, reduce the treatment capacity, and contribute odors. Characterization of the existing biosolids or an evaluation of requirements for biosolids disposal was not completed as part of this Wastewater Facilities Plan (WWFP).

Aging Infrastructure

Collection System

The City’s collection system facilities vary in age but are generally approximately 60 years old. Repairs have been completed on collection system piping and manholes as identified through field inspections. Most of the collection system remains in adequate condition for rehabilitation using cured-in-place pipe (CIPP) lining trenchless technologies.

Gravity Sewers

Some locations of deteriorating gravity sewer mains, including areas of cracked pipe, root intrusions, and damaged gaskets, exist throughout the system. While this section demonstrates that infiltration and inflow (I/I) is not excessive, the structural integrity of sewer mains is equally important to prevent exfiltration for protection of groundwater and failure of the piping network. It is recommended the City implement an annual collection system inspection and evaluation program. The results of the evaluation will provide information to establish an annual pipe rehabilitation and replacement program that prioritizes the replacement/rehabilitation of damaged sections of pipe depending on the severity of the damage.

Specific locations have been identified for CIPP lining based on location and the ability to perform replacement. The locations identified on Table 3-1 are in areas where typical replacement is not possible, i.e., the pipes run under buildings or other improvements that prevent conventional construction. The locations of these improvements are shown on Figure 3-2.

TABLE 3-1
IDENTIFIED CURED-IN-PLACE PIPE LINING LOCATIONS

Pipe ID	Location Description	Length of Pipe (feet)	Size
1	N.W. Claypool to Deer between 3rd Street and 4th Street	313	8-inch
2	N.E. Dunham Street to N.E. Court Street between 3rd Street and 4th Street	320	8-inch
3	N.E. Fairview Street to N.E. Elm Street between 3rd Street and 4th Street	320	8-inch
4	N.E. Court Street to N.E. Belknap Street between 1st Street and 2nd Street	350	8-inch
5	S.E. Garner Street to S.E. Fairview Street between 5th Street and 4th Street	405	8-inch
6	N.E. Garner to N.E. Holly Street between 6th Street and the park	310	8-inch
7	N.E. Belknap Street and 9th Street line under the grocery store	305	8-inch
8	Between Mason Drive and Mountain View Drive under the creek	105	8-inch
9	Knowledge and 1st Street	355	8-inch
10	Knowledge and 1st Street	177	8-inch
11	Knowledge and 1st Street	300	8-inch
12	Between S. Main Street and Deer Street	269	12-inch
13	Between S. Main Street and Deer Street	328	12-inch
14	Between S. Main Street and Deer Street	328	12-inch

Wastewater Lift Stations

Structural aspects of the City's lift stations are in adequate condition. However, access to the wetwell structures that do not have functioning pump guide rails and quick connect elbows requires a permit-required confined space entry operation. The existing pumps, electrical, and control systems are beyond their life expectancy. The existing lift stations are also in need of new auxiliary alarms with remote monitoring and an alarm notification system. A summary of the City's lift stations is provided on Table 3-2.

TABLE 3-2
CITY LIFT STATION SUMMARY

Name/Location	Year Built	Number of Pumps	Horsepower	Pump Station Features[1]
Airport	1997	2	2	A, B, C
Oregon Youth Authority	1997	2	40	A, B, C
Williamson	1995	2	7.5	A, B, C
McDougal	Unknown	2	5	A, B
Western Sky	1996	2	5	A, B, C
Saddle Ridge	2007	2	2.9	A, B, C

[1] A = Submersible Pumps
B = No Bypass Available
C = Emergency Generator Connection

Wastewater Treatment Facility

The existing collection system could be improved with an ongoing effort to reduce I/I, which would reduce flows to the WWTF and extend the capacity of the treatment and disposal facilities. The WWTF has been designed for a total capacity of 2.5 million gallons per day (MGD). The average annual design flow for the 20-year planning period is 1.435 million gallons. The existing facilities are adequately sized for the planning period; however, continued monitoring of biosolids accumulation is recommended for Pond 1 of Plant 1, and Ponds 1 and 2 of Plant 2, to ensure that negative impacts from sludge buildup do not occur.

No significant deficiencies were found during the evaluation of the existing treatment lagoons. The system has adequate capacity and functions properly without significant issues outside of normal maintenance. However, recommended maintenance of the lagoons should continue and include screening improvements, influent pump station upgrades, and biosolids removal.

The existing main influent screen was installed in 2018. The screen removes small particles, rags, and other contaminants prior to entry into the lagoon system where they could potentially affect performance of aeration systems, outlet piping, and pumps. The recent improvements to the aeration system have minimized the negative effects of contaminants passing through the screen, but it is still important to maintain screening performance at the highest level possible. Recent inspections have shown that the existing screen needs significant maintenance work. A complete rebuild of the existing screen system is currently underway. Once complete, the rebuilt system will be evaluated over time to determine if a different screen system is needed.

In conjunction with maintenance of the influent screen, an upgrade to the headworks influent pump station is needed. While the pumps and systems continue to perform well, the pumps are older and should be upgraded due to their cumulative operational time, which makes them more prone to failure, increased O&M costs, and decreased efficiency. The replacement of the pumps at the influent pump station also includes major upgrades to the electrical and controls system for the pump station. The upgraded control system will allow for integration with the City-wide SCADA upgrade, allowing greater reporting and control options for operators. The headworks upgrade is identified as CIP 2 and the SCADA upgrade is identified as CIP 3, as discussed further in Section 4.

The lagoons also accumulate biosolids over time. A recent survey of the solids in the lagoons was completed. Solids in Pond 1 of Plant 1 are approximately 1-1/2 feet deep in the 5-foot deep lagoon. Ongoing solids surveys should be conducted to monitor the biosolids levels. When the levels reach 2 to 2-1/2 feet in depth, the solids should be removed. The solids could be removed by dredging at an estimated cost of approximately $4,350,000. If Plant 1 can be bypassed so Pond 1 can be dewatered and the solids dried to approximately 30 percent solids, then the solids could be removed for approximately $516,000. The solids could either be transported to a landfill or land-applied for beneficial use on pasture land. Solids removal would also remove the rags from Pond 1. Due to recent improvements in aeration systems, the volume of solids has been reduced and the proposed biosolids removal has been moved to CIP 10, as discussed in Section 4. It is recommended that surveys be conducted to determine biosolids accumulation on approximately three-year intervals and prioritization of this removal be adjusted accordingly based on survey results.

Aeration improvements to Pond 1 of Plant 1 and Pond 1 of Plant 2 have been completed in recent years with the existing surface-mounted aeration systems being replaced with fine bubble diffused aeration systems. It is believed that this improvement is responsible for an overall average reduction of biosolids accumulation of approximately 0.4-foot since 2017, which equates to approximately 74,600 cubic feet (2,763 CY) of biosolids reduction. Biosolids surveys should be conducted to ensure that the biosolids levels are maintained at an appropriate level without detrimental effect to the treatment process.

Redundancy in Unit Process Systems

The City's WWTF is unique in the fact that it has two separate plants that can be operated in combination or individually. This redundancy allows for maintenance and repairs to be completed by isolating the plants and their components individually during average flows. The influent and effluent systems are largely capable of being adjusted to allow for redirection of flows to accommodate maintenance activities.

Currently, the main influent screen does not have redundancy but does have a flow bypass available. This screen and influent pump station are equipped with a backup power supply from a diesel generator to maintain service during power outages.

The effluent disinfection system has some redundant features, but redundancy will be increased through the chlorination conversion project currently in design. The disinfection system is also equipped with a backup power supply from a diesel generator.

Both fine bubble diffused aeration systems have three blowers: two duty blowers and one standby. Both systems also have a backup power supply from a diesel generator.

Removal of Inorganic Solids

Prior to installation of the first screen in 2017, a considerable amount of inorganic materials had been deposited in Pond 1 of Plant 1. Rags and other items will need to be removed during future maintenance activities. Due to the addition of a new influent screen and a conversion of surface-mounted aspirating aerators to fine bubble diffused aerators, the issues caused by rags have been reduced significantly.

Biosolids Processing

Currently, the City does not have a biosolids processing facility. Since construction of the WWTF, the biosolids have not been removed. Recent plant equipment and operations improvements have resulted in a reduction in biosolids depth of approximately 0.4-foot in Pond 1 of Plant 1 between 2017 and 2021.

Wastewater Treatment Facility Plant Influent Pump Station

The pumps, electrical components, and control systems are reaching the end of their useful life. Currently, the City is procuring materials to upgrade these components as part of an asset management program. This improvement is identified as CIP 2, as discussed in Section 4.

Operations Building

The existing operations building is a single-wide modular structure with a simple operations station and a small kitchen area. The operations building has no restrooms, laboratory or testing equipment, conference space, or offices; however, a separate building provides some limited laboratory space. Currently, much of the laboratory analyses are conducted by a third-party laboratory. A proper operations building is needed at the WWTF that includes offices, storage, showers, restrooms, an employee locker room, and a laboratory.

Equipment and Component Deterioration

Most of the equipment and components in all processes of the existing WWTF have been upgraded or are in the process of being upgraded. Upgrades consist of the replacement with new or the rebuilding of existing components. Rebuilding existing equipment is cost-effective but does not realize the potential long-term savings of upgrading to new, more efficient equipment. For this reason, CIP 2, as discussed in Section 4, is included in this WWFP and will upgrade existing pumping systems to newer, more efficient equipment.

Electrical, Controls, and Instrumentation

Many current operational and monitoring practices are performed manually and are labor intensive. Influent and effluent samples are collected manually based on minimum NPDES Permit requirements. Minimal alarms or annunciators are provided to notify the WWTF operators of conditions that could result in damage to vital equipment, hazards to personnel, or a violation of the effluent limitations. Some electrical systems do not meet current electrical codes.

Currently, the chlorine residuals in the effluent discharge can vary significantly depending on the time of year and organic loading rate. Operators proactively perform readings and adjust for current conditions. A significant upgrade to the wastewater system's SCADA system is imperative as growth and staffing challenges continue and is identified in the CIP discussed in Section 4. The ability to maintain awareness of system function without the need for manual observation is an important component of meeting NPDES Permit requirements.

Reasonable Growth

The City of Prineville's population at the 2020 Census was 10,736 as reported by the U.S. Census Bureau. The certified population estimate by the Population Research Center for 2021 was 11,042 with an average annual growth rate (AAGR) of 1.1 percent between the years 2022 and 2042.

The historical population plus the projected AAGR results in a 20-year (year 2042) population estimate of 13,743. This WWFP uses 13,743 as the 20-year design population inside the city limits.

The City has experienced consistent growth between the years 2010 and 2020 averaging 1.6 percent annually. Between 2020 and 2021, the population increased by 306 persons or 2.9 percent.
To accommodate the continued growth of the community, additional improvements to improve the collection system should be considered. For this reason, System Development Charge (SDC) improvements are identified and discussed in Section 4 as are CIP improvements. Needed improvements are identified in the appropriate category to facilitate proactive action to maintain satisfactory services in response to the increasing population.

It is important to note that not all the existing City population is connected to the wastewater system. In reviewing City records, the connected population was determined to be 10,771. A review of historical wastewater data must be completed using the connected population. Collection system improvements are needed to be able to connect the entire population within the city limits. In addition, there are areas of residential development outside the city limits but within the urban growth boundary (UGB). If 20 percent of these areas outside the city limits but within the UGB is annexed into the City, the City's population could increase by 1,002 people, to 11,773, without any additional people moving into the area.

To obtain a realistic population that could require service by the wastewater system in the next 20 years, the estimated 2042 City population of 13,743 was added to the assumed 1,002 population from the annexation of areas within the UGB for a design population of 14,745 in the year 2042.

Wastewater flow projections for the year 2042 were made using the existing base per capita wastewater contributions extrapolated to the end of the 20-year planning period using the year 2042 design population of 14,745 and adding the existing I/I flow contribution. This assumes that I/I will remain constant over the 20-year planning period because I/I does not generally increase proportionally with population, as new pipelines are generally watertight.

Additional Projected Residential Wastewater Flow Contribution

A UGB development east of the Prineville city limits and south of Highway 26 is currently experiencing failing drinking water wells and septic systems. This is known as the Melrose/Willowdale area. Due to the size of the existing lots and setback requirements, replacing the failing septic systems is not feasible. With the wells in this area being very shallow, the concern exists that the groundwater may become contaminated by the failing septic systems. This potential contamination would affect individual residences as well as potentially cause contamination of the aquifer. At this time, some of the lots in the area are faced with condemnation, as the property owners are unable to make needed improvements due to income or lot size restrictions.

The City has been approached by residents of the Melrose/Willowdale area and wishes to assist them with necessary improvements. SDC 10, as discussed in Section 4, is specifically identified to provide wastewater main lines into this area to provide the needed infrastructure to facilitate domestic wastewater connections to the Melrose/Willowdale residents. Additional improvements will be needed to extend smaller diameter main lines to side streets, as well as to make service connections available.

The estimated number of residences in this area is 250. Using the current data of 2.46 persons per household, the estimated number of persons to connect is 615. The estimated additional sewer flow contribution to the wastewater system is summarized on Table 3-3.

TABLE 3-3
MELROSE/WILLOWDALE ADDITIONAL SYSTEM
WASTEWATER FLOW CONTRIBUTION

Parameter	System Flows (gpcd)	gpd
AAF	101	62,115
MMF	162	99,630

AAF = average annual flow
gpcd = gallons per capita per day
gpd = gallons per day
MMF = maximum monthly flow

Based on Table 3-3, the existing wastewater system has the capacity to accommodate the addition of the Melrose/Willowdale area residents.

Industrial/Large Commercial

The existing domestic flows and loadings include the small industrial flows that exist within the City. As the City grows in population, industrial flows in the system will also grow. Currently, the two data centers in use are contracted to produce a peak flow of 0.805 MGD to the treatment plant with an MMF of approximately 0.29 MGD. The historic flows for the completed data centers are included in this WWFP and have been analyzed as the data centers have completed construction and moved into operational status.

Additional Projected Commercial Wastewater Flows

In recognizing the potential need to provide additional wastewater service to future large commercial and industrial service customers located in undeveloped areas of the UGB, an additional allowance for the growth of the wastewater service population should be accounted for separately from the wastewater flow projections in this WWFP. The City has recently received requests from potential commercial tenants looking to site new facilities in the Prineville area. Several of the proposed facilities have large wastewater disposal requirements, and City leaders have indicated a desire to accommodate these proposed facilities.

Many factors must be reviewed during analysis of large commercial wastewater users. Instantaneous high flow contributions are analyzed to confirm that weir and other adjustments can be made at the WWTF to accommodate those flows while maintaining optimum treatment and detention times. Analysis of the proposed discharge returning to the WWTF will need to be completed to determine the concentration and makeup of the discharge chemistry, such as heavy metals, chemicals, or organic loading. Early analysis shows negligible waste loads in the discharge related to the specific commercial users requesting to locate new facilities in Prineville.

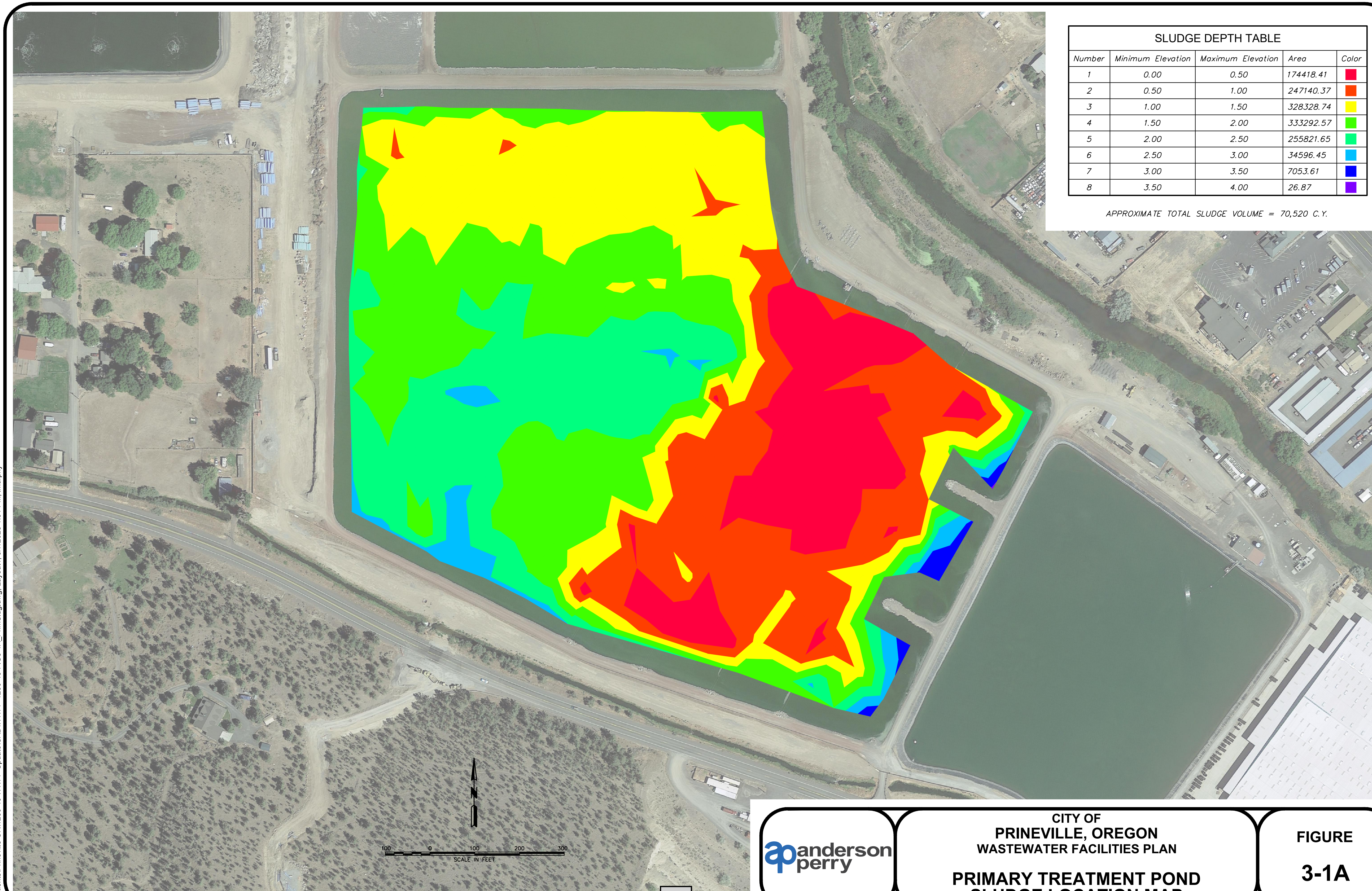
In response to these requests, the City has begun implementation of an Industrial Pretreatment Program. The program consists of a comprehensive framework that establishes minimum standards for industrial wastewater discharges into the WWTF. Wastewater users that qualify as Categorical Industrial Users are required to comply with the program. Additionally, the City has analyzed a series of scenarios utilizing weirs and other flow control devices at the WWTF to confirm that operational capacity, treatment and detention times, and the public collection system can perform properly in response to the proposed discharge flows from data center cooling water systems.

It is recommended that specific industrial discharge requests are reviewed individually. The chemical makeup and volume of discharge, including peak daily flow, should be evaluated. Specific pretreatment processes should be reviewed to address discharge flow chemistry, if needed, as well as peak flows, including attenuation measures for gradual release of instantaneous high flows.

Domestic and Commercial Mass Loadings

The domestic and commercial design mass loadings (five-day biochemical oxygen demand [BOD_5] and total suspended solids [TSS]) to the WWTF were estimated based on the average influent per capita BOD_5 and TSS contributions projected to the end of the 20-year planning period using the year 2042 design population of 14,745 (i.e., mass loading [BOD_5 or TSS] = contribution [BOD_5 or TSS] pounds per capita per day [lbs/capita/day] x 14,745). Using the design mass loading of 0.21 and 0.18 lbs/capita/day for BOD_5 and TSS, respectively, yields a year 2042 domestic mass loading of 3,096 and 2,654 pounds per day, respectively.

This section demonstrates that growth is a considerable driver for improvements. While the systems are adequately sized for the projected flows and loadings, the potential for collection system problems to develop will be determined by the locations where growth occurs. Improvements proposed for the collection system, lift stations, and WWTF are primarily intended to improve reliability, efficiency, safety, and permit compliance. These improvements are also beneficial to future growth. However, these improvements are also needed due to age, deterioration, and lack of reliability of certain system components. These factors remain the primary evaluation criteria for the improvements discussed later in this WWFP.



SLUDGE DEPTH TABLE

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	0.00	0.50	174418.41	
2	0.50	1.00	247140.37	
3	1.00	1.50	328328.74	
4	1.50	2.00	333292.57	
5	2.00	2.50	255821.65	
6	2.50	3.00	34596.45	
7	3.00	3.50	7053.61	
8	3.50	4.00	26.87	

APPROXIMATE TOTAL SLUDGE VOLUME = 70,520 C.Y.

anderson perry

CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

PRIMARY TREATMENT POND
SLUDGE LOCATION MAP

FIGURE
3-1A

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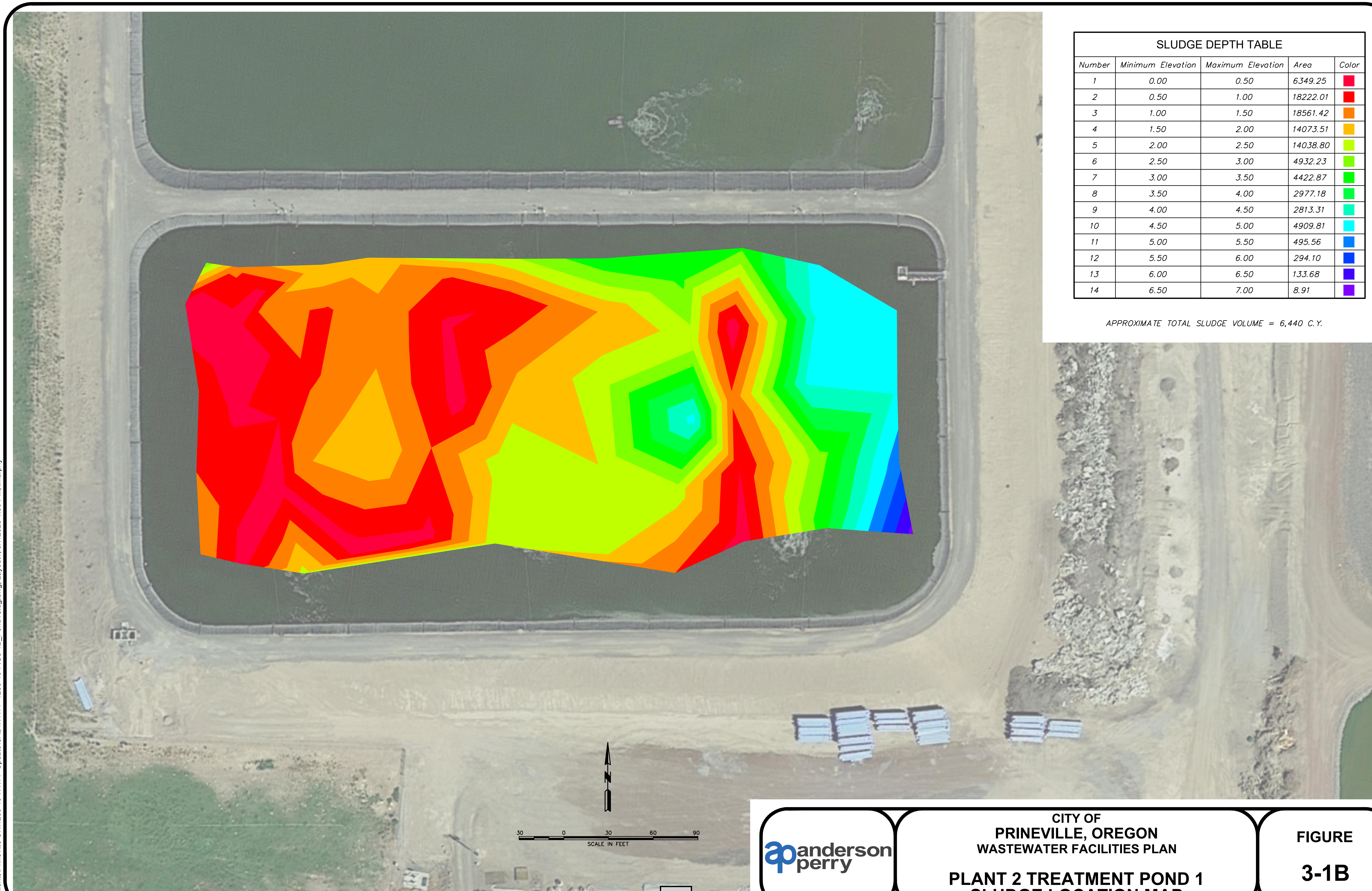

SLUDGE DEPTH TABLE

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	0.00	0.50	6349.25	
2	0.50	1.00	18222.01	
3	1.00	1.50	18561.42	
4	1.50	2.00	14073.51	
5	2.00	2.50	14038.80	
6	2.50	3.00	4932.23	
7	3.00	3.50	4422.87	
8	3.50	4.00	2977.18	
9	4.00	4.50	2813.31	
10	4.50	5.00	4909.81	
11	5.00	5.50	495.56	
12	5.50	6.00	294.10	
13	6.00	6.50	133.68	
14	6.50	7.00	8.91	

APPROXIMATE TOTAL SLUDGE VOLUME = 6,440 C.Y.

anderson perry

CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

PLANT 2 TREATMENT POND 1
SLUDGE LOCATION MAP

FIGURE
3-1B

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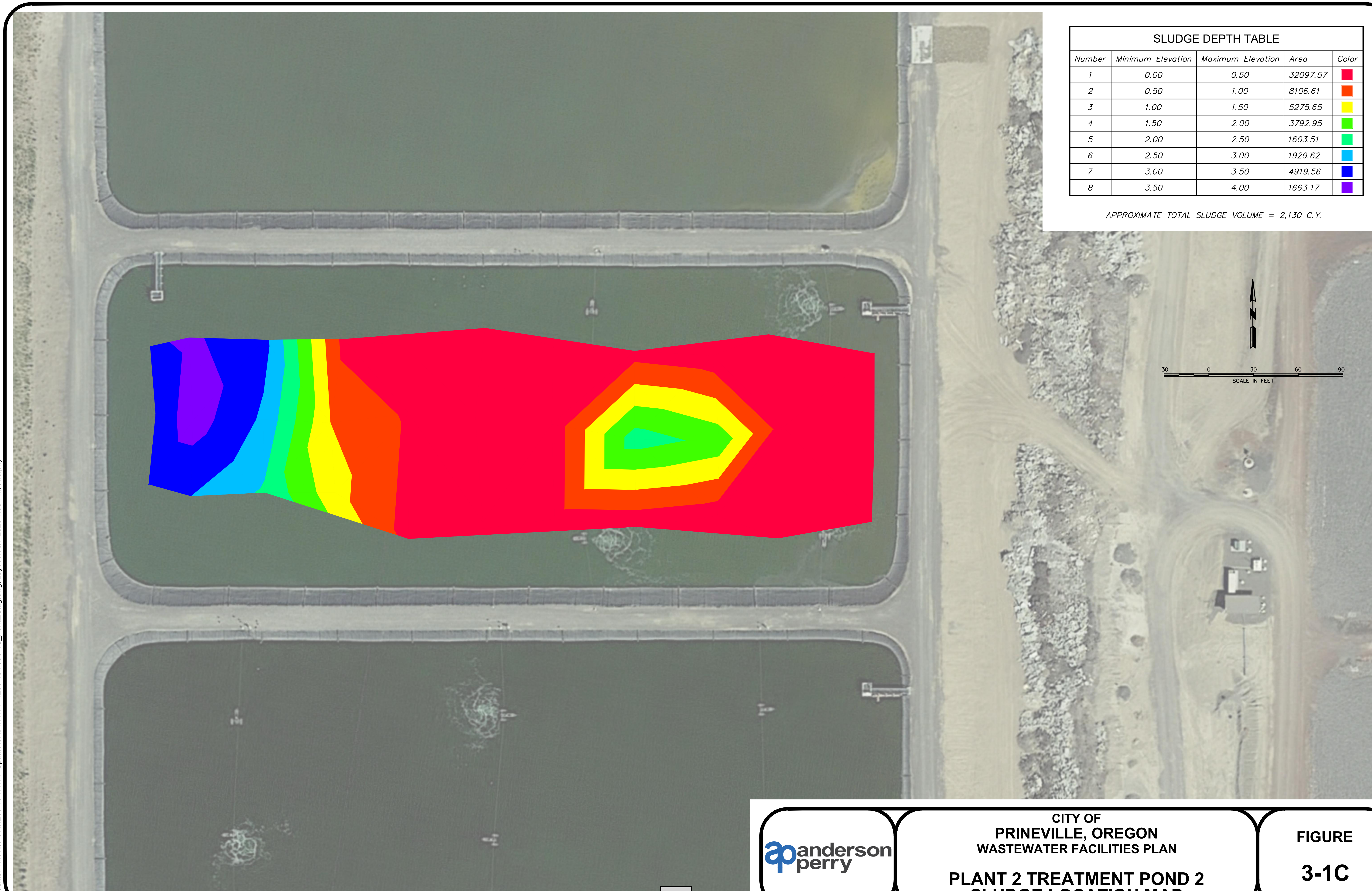
X:\Clients\Prineville OR\1260-40 WWFP Update\CAD\WWFP-1260-40-FIG3-1C_Pond2Sldg.dwg, Layout1, 9/7/2023 1:53 PM, lmurphy



SLUDGE DEPTH TABLE

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	0.00	0.50	32097.57	
2	0.50	1.00	8106.61	
3	1.00	1.50	5275.65	
4	1.50	2.00	3792.95	
5	2.00	2.50	1603.51	
6	2.50	3.00	1929.62	
7	3.00	3.50	4919.56	
8	3.50	4.00	1663.17	

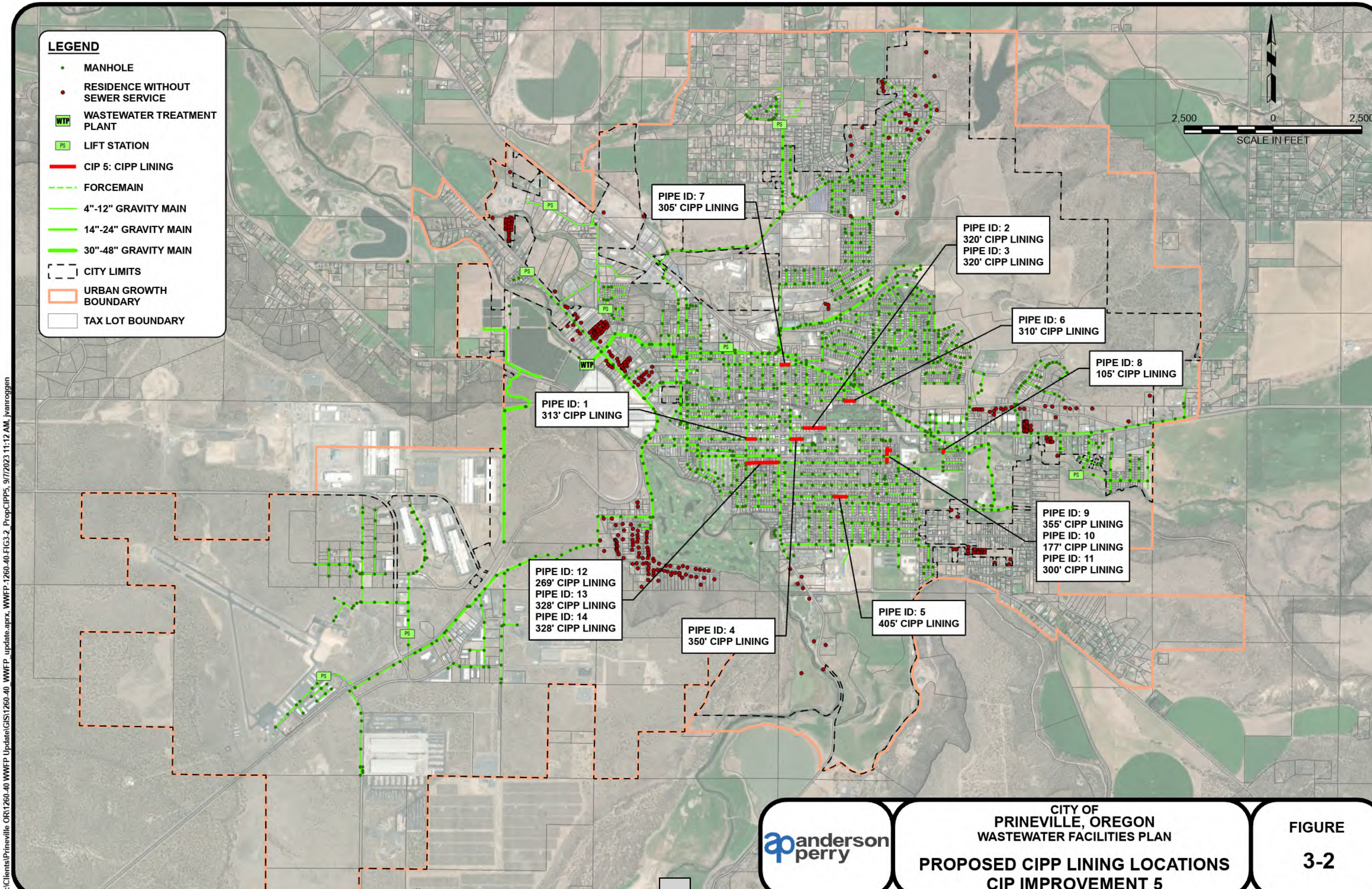
APPROXIMATE TOTAL SLUDGE VOLUME = 2,130 C.Y.

anderson perry

CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

PLANT 2 TREATMENT POND 2
SLUDGE LOCATION MAP

FIGURE
3-1C



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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

PROPOSED CIPP LINING LOCATIONS
CIP IMPROVEMENT 5

FIGURE
3-2

Section 4 - Alternatives Considered

Description

This section presents alternatives to improve the City of Prineville's collection system, lift stations, and wastewater treatment facility (WWTF) to address the deficiencies and issues identified previously. First, design criteria are summarized followed by key objectives of improvement alternative outcomes. Then, a conceptual discussion of improvement alternatives considered is presented with cost estimates for viable alternatives. An environmental impact evaluation is included that identifies the impacts on specific resources. Finally, a discussion on land requirements and potential construction problems, sustainability considerations, and water and energy efficiency is provided.

Design Criteria

To properly evaluate the proposed alternatives, it is necessary to develop design criteria to confirm that the proposed alternatives will provide the necessary capacity to properly treat wastewater throughout the 20-year planning period. The design criteria were discussed in detail in Section 2 and are summarized below.

Wastewater Influent Flow and Mass Loading Projections (2042)

Typical flow rate design parameters used for sizing process systems of WWTFs are average annual flow (AAF), peak hourly flow, and maximum monthly flow. Typical mass loading rate design parameters used for sizing process systems of lagoon WWTFs are maximum monthly five-day biochemical oxygen demand (BOD_5) in pounds per day (lbs/day) and maximum month daily total suspended solids (TSS) in lbs/day.

For the historical data period, the average population used was 10,771 people. This Wastewater Facilities Plan (WWFP) has adopted a design year of 2042 with a projected population of 14,745. Projected flows and loadings for the design year were estimated by multiplying historical per capita values by the projected population. These design criteria are provided on Figure 2-9 in Section 2.

Wastewater Effluent Mass Loading and Regulatory Requirements (2042)

The current National Pollutant Discharge Elimination System (NPDES) Permit was developed for an AAF with no daily maximum limit and restricts to maximum effluent pollutant concentrations for BOD_5 and TSS between November 1 and April 30 when discharging to the Crooked River (Outfall 001) and between May 1 and October 31 for Outfalls 002, 003, and 004. Assuming the WWTF continues to treat and discharge effluent that meets allowable mass loadings concentrations, no change to the NPDES Permit conditions will be required for the WWTF to continue to discharge to any of the outfalls for the design year of 2042.

Key Objectives to be Addressed by Alternatives

A key step in the conceptual evaluation of improvement alternatives is identifying outcomes to be addressed in the final Capital Improvements Plan (CIP) and System Development Charge (SDC) Plan.

Through discussions with the collection and treatment system operators, city manager, and Public Works personnel, the following key objectives should be addressed by alternatives considered:

- Collection System Key Objectives
    - Inspect and evaluate the collection system by closed-circuit television inspection, smoke testing, and visual inspection of manholes. Record results for selection of repair/ replacement locations.
    - Repair damaged and deteriorating collection system mains, as necessary.
    - Repair damaged and deteriorating collection system manholes, as necessary.
    - Upsize 6-inch gravity mains during any new construction or redevelopment.
- Lift Station Key Objectives
    - Address deteriorating equipment, maintenance issues, and absence of instrumentation and controls at the City's lift stations.
    - Improve reliability at the City's lift stations.
    - Provide upgraded supervisory control and data acquisition (SCADA) systems for operator efficiency and notification of deficiencies or failures.
- WWTF Key Objectives
    - Provide equipment to effectively remove inorganic solids at the headworks.
    - Provide equipment to accurately measure and record influent and effluent flows and provide for wastewater constituent sampling.
    - Replace deteriorating mechanical equipment and components required by the chosen alternative.
    - Convert gas chlorine disinfection system to a bulk sodium hypochlorite system. Improvement includes backup diesel generator power for the chlorine system and effluent pumps.
    - Implement controls and instrumentation to allow automation of processes, detect abnormalities, and provide on-site and remote notifications to the WWTF operator or other City personnel of potential problems.
    - Provide proper facilities for WWTF personnel such as showers, crew locker room, laundry, office space, break room space, and storage.
    - Provide laboratory space for WWTF personnel to conduct required analyses.
    - Provide equipment and facilities to effectively remove and dewater biosolids.

Conceptual Discussion of Wastewater Collection System Alternatives

Gravity Sewer Improvement Alternatives

This section outlines the suggested prioritization plan and presents the recommendations and associated cost estimates to complete the wastewater collection system improvements.

When determining the means of repair/replacement of problem areas, the location and overall condition of the main line, service lines, and manholes should be considered. The decision to repair or replace a main line should take into consideration the location, number, and type of deficiencies within the specific reach from manhole to manhole. Cured-in-place pipe (CIPP) lining should generally be used to repair main lines in paved streets that are in poor condition where adequate capacity exists within the existing pipe because of its ease of use and capability to repair existing problems. CIPP lining also reduces asphalt surface restoration and disruption to neighborhoods. CIPP lining is not an appropriate repair method in all cases and should be evaluated on a case-by-case basis to determine its validity and applicability. For example, CIPP lining should not be used when significant bellies exist in the pipe run, as this method of pipe rehabilitation will not address these pipe deficiency situations because the lining follows the existing pipe path and the bellies will still be present after lining has been completed. Replacement should be evaluated when the location is not in a high traffic or unrealistic area to dig (i.e., newly replaced highway) or where CIPP lining rehabilitation is not appropriate to employ.

Collection system and manhole evaluation and rehabilitation should be staged through a ten-year CIP. The majority of the City's sewer lines are in adequate condition and capacity to be rehabilitated with CIPP lining; thus, the useful life of the wastewater collection system could be greatly extended. However, some locations may exist where damage is too severe or other conditions exist that prevent rehabilitation with CIPP lining and must be replaced with new pipe. Recommended improvements have been placed in two priority categories based on the anticipated sequence of phased improvements through a 20-year planning period. The two categories are referred to herein as medium- and long-term improvements. Medium- and long-term improvements projects should be completed within 0 to 10 years and 10 to 20 years, respectively. By dividing improvements and implementing a phased sewer rehabilitation CIP schedule, the City will be able to divide the required work throughout the 20-year planning period, which will allow the City to assign funds more evenly. It is also recommended the City implement an ongoing sewer main inspection and evaluation program addressing any pipe repair or replacement during any new construction, redevelopment, or street reconstruction projects.

Medium-term collection system repairs will typically consist of CIPP lining of sections of pipe where damage exists or where conventional replacement cannot occur due to improvements above or near the pipe location. CIPP lining in longer sections (manhole to manhole) is generally much more economical when considering substantial lengths of sewer lines in need of repair and expensive asphalt surface restoration in roadways. The exact number of sections of severely damaged pipe will need to be verified by the City after adoption of this WWFP, and implementation of an annual television (TV) inspection and an evaluation of the collection system should occur. As CIPP lining installation requires that protruding objects are not present within the pipe to be lined, each section of pipe will need to be inspected (with a closed-circuit camera) and any protruding laterals or other obstructions will need to be addressed prior to installation.

For the purposes of this WWFP and based on Table 3-1 in Section 3, approximately 14 locations are anticipated to need CIPP lining. Figure 4-1 identifies the collection system alternatives by cost and funding category, and Figure 4-2 presents the total estimated project cost and net present worth of the collection system medium-term improvements.

Other collection system improvements projects not identified generally include the rehabilitation of any remaining lengths of pipe not addressed in the medium-term improvements in addition to potential sources of infiltration and inflow (I/I) or increased maintenance, including sagging piping, debris in the laterals, light roots around laterals, or heavy grease in the pipe. These improvements will be identified during the collection system inspection and evaluation project. Additionally, due to age and general characteristics of forcemain deterioration, the existing forcemains servicing the Williamson, Western Sky, McDougal, Oregon Youth Authority, and Airport Lift Stations will need to be evaluated for replacement within the 20-year planning period.

It should be noted that of the improvements shown on Table 3-1 in Section 3 are labeled as medium-term improvements as presented in this section and on Figures 4-1 and 4-2. This is because completing all the priority improvements shown on Table 3-1 in a five-year period is impractical due to budget constraints. Therefore, collection system improvements have been allocated to medium-term projects based on location and anticipated flow. In general, the medium-term improvements shown on Table 3-1 consist of main lines and are expected to be completed within the 0 to 10 year time frame as funding allows. Figures 4-1 and 4-2 present the total estimated project cost and net present worth of the collection system improvements. The collection system improvements are outlined on Table 4-1.

TABLE 4-1
SUMMARY OF COLLECTION SYSTEM IMPROVEMENTS

Improvement	Improvement Purpose/Description	Estimated Cost
CIP 5	Collection System Improvements - Maintenance, Rehabilitation, I/I Reduction (500 LF Annually)	$855,500
CIP 6	Manhole Rehabilitation Program (Manhole Repair/Replacement as Identified Annually)	$382,000
CIP 7	Collection System Inspection/Evaluation (Annual Inspection Program to Evaluate Collection System Condition)	$292,000
CIP 8	Replace Existing Main Line from N.W. 10th Street to the North Side of Lamonta Road	$2,276,800
SDC 2	Increase Size of Main Line from N.W. 10th Street to the North Side of Lamonta Road	$932,500
SDC 4	Extend main line to serve property north of Lamonta and west of Main Street	$325,250
CIP 9	Replace Existing Main Line on Main Street from Lynn Boulevard to 1st Street	$1,293,500
SDC 6	Increase Size of Main Line on Main Street from Lynn Boulevard to 1st Street	$350,000
SDC 5	Extend Pressure Sewer North on Highway 26 from N. Gardner Road to Serve Future Growth	$520,250

Improvement	Improvement Purpose/Description	Estimated Cost
SDC 7	Extend 18-inch Sanitary Sewer South on Main Street to Serve Future Growth	$1,772,500
SDC 8	Extend Existing Interceptor Main Line East from Combs Flat	$2,330,750
SDC 9	Connect Williamson Area to Gravity Sewer - Remove Williamson Lift Station	$611,250
SDC 10	Extend Sanitary Sewer Main Line and Manholes to Melrose/Willowdale Area	$3,169,500

LF = linear feet

Lift Station Alternatives

The following alternatives are discussed conceptually and evaluated to address the wastewater lift station deficiencies.

Lift Station - Alternative 1 - No Action

Under this alternative, the City would continue to use the lift stations in their current conditions. As discussed previously, the existing pumps are beyond their life expectancy and should be replaced. A failure could lead to a sanitary sewer overflow if the pumps were to fail, and the existing, unreliable automatic alarm notification system fails. If use of the existing lift stations was to continue, a major failure could potentially result in the City proceeding with Lift Station - Alternative 2, thus requiring that emergency bypass pumping be implemented until the improvements project were completed. This scenario could potentially add significant costs to mitigating such a scenario in comparison with completing the selected improvements while the existing lift stations are still operational.

Lift Station - Alternative 2 - Replace Existing Pumping Equipment and Install New Remote Monitoring, Electrical, and Instrumentation and Controls

Under this alternative, the City would replace the existing pumps and install new instrumentation and controls with local and remote monitoring and notification capabilities. Alternative 2 would be a long-term solution to extend the operation of the existing lift stations as is. The existing wetwells are in fair to good condition and should be able to perform throughout the 20-year planning period. The design and construction of four of the existing wetwells will require installation of new guide rails for pump installation to allow crews to safely remove the pumps for maintenance without entering the wetwells. Additionally, the ability to standardize pumps, guide rails, level controls, and other components to a single manufacturer will minimize the additional parts required to be kept in stock by the City. Figure 4-3 identifies the lift station alternatives by cost and funding category, and Figure 4-4 presents the total estimated project cost and net present worth of Lift Station - Alternative 2. A summary of the Lift Station - Alternative 2 improvements is provided on Table 4-2.

TABLE 4-2
SUMMARY OF LIFT STATION - ALTERNATIVE 2

Name/Location	Estimated Improvement Cost
Airport	$45,100.00
Oregon Youth Authority	$84,500.00
Williamson	$21,000.00
McDougal	$60,900.00
Western Sky	$42,500.00
Saddle Ridge	$10,500.00
Total Estimated Improvements Cost	**$264,500.00**
Engineering, Contingency, and Mobilization	**$116,000.00**
TOTAL REPLACEMENT COST (2023 DOLLARS)	**$380,500.00**

Wastewater Treatment Facility Alternatives

The following four alternatives are discussed conceptually and evaluated to address WWTF deficiencies.

Wastewater Treatment Facility Alternative 1 - No Action

Under this alternative, the City would continue to use the WWTF in its current condition. As discussed previously, from a capacity and operational standpoint, the existing WWTF is capable of treating the design year flows and loadings. It should be noted that the ability of the WWTF to continue to satisfy current requirements requires necessary maintenance improvements.

Wastewater Treatment Facility - Alternative 2 - Replace Existing Pumping Equipment and Electrical Components

Under Alternative 2, the City would replace the influent and effluent pumps required for operation of the WWTF. The pumps are approaching the end of their useful life and should be replaced, including upgrading associated electrical and control components.

Wastewater Treatment Facility - Alternative 3 - Replace Existing Pumping Equipment, Rebuild the Main Influent Screen, and Convert the Gas Chlorination System to a Bulk Sodium Hypochlorite System

Under Alternative 3, the City would complete the improvements identified in Alternative 2. Additionally, the existing vertical screw screen on the main influent line would be rebuilt and updated with new components.

The existing gas chlorination system and associated scrubber equipment would be replaced with a new bulk sodium hypochlorite chlorination system.

Wastewater Treatment Facility Alternative 4 - Replace Existing Pumping Equipment, Rebuild the Main Influent Screen, Upgrade Supervisory Control and Data Acquisition Systems, Convert the Gas Chlorination System to a Bulk Sodium Hypochlorite System, Complete Biosolids Removal, and Construct a New Operations and Laboratory Building

Under Alternative 4, the City would complete the improvements identified in Alternative 3. Additionally, the WWTF SCADA systems would be upgraded or replaced, including new SCADA software, sensors, and other necessary equipment.

Alternative 4 would also include the construction of a new operations and laboratory building to provide improved facilities for WWTF personnel, as well as the ability to conduct a considerable portion of the necessary permit-required analyses currently contracted to outside laboratories. This alternative would also develop a biosolids removal process with construction of drying beds in preparation for removal, when required.

Cost Comparison of Wastewater Treatment Facility Improvement Alternatives

Alternative 1 is not included in this comparison, as this alternative is not considered viable. The estimated costs for Alternatives 2, 3, and 4 are presented on Table 4-3 for comparison. Figure 4-5 identifies the wastewater treatment facility alternatives by cost and funding category, and Figure 4-6 presents the total estimated project cost and net present worth of WWTF - Alternatives 2, 3, and 4.

TABLE 4-3
SUMMARY OF ESTIMATED COSTS FOR
WASTEWATER TREATMENT FACILITY IMPROVEMENTS ALTERNATIVES (2023 DOLLARS)

Alternative	Estimated Construction Cost including Contingency	Estimated Engineering Fees	Total Estimated Project Cost	Estimated Annual OM&R Costs	Estimated Net Present Worth[1]
2	$480,000	$96,000	$576,000	$40,000	$1,191,000
3	$1,947,500	$437,000	$2,384,500	$50,000	$3,042,000
4	$4,353,000	$747,000	$5,100,000	$60,000	$5,738,000

[1] *Net present value based on Office of Management and Budget Circular A-94, Appendix C, February 2023 update.*

OM&R = operation, maintenance, and replacement

As Table 4-3 indicates, Alternative 4 is estimated to cost approximately $2,715,500 more than Alternative 3 to design and construct. This difference in estimated total project cost is approximately 53 percent higher for Alternative 4 when compared to Alternative 3 with a Net Present Worth difference of $2,696,000. Currently, the City operates an efficient WWTF. Utilizing lagoon and wetlands treatment uses less energy than traditional mechanical treatment facilities. Therefore, efficiency improvements in equipment, processes, and operations are the factors that result in OM&R savings.

The City spent $42,000 in fiscal year 2021-22 for third-party laboratory testing at the WWTF and $45,000 for testing at the wetlands. Alternative 4 includes construction of a new operations and laboratory building, which results in estimated cost savings to the City of $40,000 annually due to the ability to perform in-house analyses. This estimated savings is applied to Alternative 4 on Table 4-4.

TABLE 4-4
ESTIMATED OM&R SAVINGS PER ALTERNATIVE (2023 DOLLARS)

Alternative	Annual Operating Expense	2021 Personnel Costs	2021 Materials and Services	Estimated Annual OM&R Savings	Estimated 20-year OM&R savings at 2.0%
2	$937,368	$151,307	$786,061	$5,000	$103,900
3	$937,368	$151,307	$786,061	$20,000	$415,450
4	$937,368	$151,307	$786,061	$70,000	$1,454,100

Summary of Wastewater Treatment Facility Alternatives

Alternative 1 is not viable, although the City would be able to continue to meet NPDES Permit limits throughout the 20-year planning period. However, a failure within the system could result in a prolonged period of non-compliance before the issue could be resolved.

Alternative 2 would require the City to self-fund the project as it does not meet the Oregon Department of Environmental Quality's (DEQ) requirements for redundancy and reliability. The alternative would improve reliability in the plant influent pumping system but would not improve reliability or redundancy in the Plant 1 influent screen or the WWTF chlorination system. The replacement pumps are more efficient than the original pumps, which would also result in energy savings. Additionally, upgrading the pumps to a single vendor/model would reduce the number of units that must be kept in inventory as backup for failure situations. Therefore, Alternative 2 is not a viable option as the WWTF would continue to operate while continuing to meet permit limits but would be doing so at risk of failure should the systems not included in Alternative 2 fail.

Alternative 3 would result in a system with improved redundancy and reliability. However, improved sanitation facilities for wastewater personnel, laboratory space for required analyses, and biosolids dewatering and handling options are not included. Additionally, a needed SCADA upgrade is not included in Alternative 3, which would result in continued personnel visits to monitor, maintain, and control systems more frequently than would be needed with proper remote monitoring and control systems.

Alternative 4 includes the necessary improvements to increase efficiency and reliability in response to continued population growth, additional sampling and testing requirements, and increased costs to operate. A new operations building would house proper accommodations for personnel and a laboratory to perform required analyses in-house. An upgraded SCADA system would monitor system performance and notify the WWTF operator remotely of alarm conditions, as well as provide remote control capability for operators. The resulting system would be easier to operate, efficient, compliant, reliable, long-lasting, expandable, and appropriately sized for the anticipated flows and loadings, which would provide savings when considering long-term OM&R, energy, and third-party laboratory analysis costs.

Improvements Prioritization and Capital Improvements Plan

A CIP provides a framework to prioritize and implement a city's facility and infrastructure asset improvement process over a specified time period. A CIP is a financing and construction plan for projects that require significant capital investment and are essential to safeguarding the financial health of a city, while providing continued delivery of utility and other services to residents and businesses.

As part of this WWFP, the City has developed a CIP based on identified deficiencies and improvements required to address the City's wastewater system needs for the next 20 years. The CIP will need to be reviewed and updated periodically (at least every five years) to accommodate changing community needs, additional improvements that may be identified through time, and changes in financial resources. The CIP lists the City's capital improvements projects, places the projects in a priority order (subject to periodic review), and schedules the projects for funding and construction. Additionally, improvements may be prioritized as components of another project, such as a street improvements project. The schedule of these other improvements will have an impact on the priorities identified in the CIP if wastewater system upgrades are needed within a broader project area.

The CIP is a tool to be used in the development of responsible and progressive financial planning and generally complies with the City's financial policies. City policies and the CIP form the basis for making annual capital budget decisions and supporting the City's continued commitment to sound, long-term financial planning.

The CIP identifies and prioritizes medium- and long-term projects of all types based on the wastewater system facilities planning process. Wastewater system improvements (WWSI) projects will be coordinated with the annual budget process to maintain full utilization of available resources. For each recommended improvement, the CIP provides a variety of information, including a project description and the service needing to be addressed, a proposed timetable, and proposed funding levels. WWSI projects will be prioritized with the most urgent projects first. Ongoing operating costs are not included in the estimated CIP project costs. It should be noted that while improvements projects are listed in order of priority, the ability to fund the project will determine the length of time to complete the entirety of the identified improvements. For this reason, these improvements will need to be further evaluated based on priority improvements to be funded individually, along with other necessary projects.

Development of a CIP is a collaborative effort between the City manager and engineer, City Council members, department heads, and the City's engineering and financial consultants. City staff participate in the CIP development via specific master plans and other planning tools. Major improvements projects require City Council interaction during project development and a determination of where funding allocations are made.

After review of the City's wastewater collection and treatment facilities deficiencies, an improvements prioritization and CIP were developed to organize necessary improvements over the 20-year planning period. The CIP is divided into two phases: medium- and long-term. Completion of medium- and long-term improvements should be completed in 0 to 10 years and 10 to 20 years, respectively. A summary of the costs associated with each phase of the CIP is shown on Table 4-5. The proposed CIP Improvements are shown on Figure 4-7.

TABLE 4-5
SUMMARY OF CAPITAL IMPROVEMENTS PROJECT PHASES (2023 DOLLARS)

Project Element	Project Purpose/Description	Total Estimated Project Cost
Medium-Term Improvements - 0 to 10 years		
Influent Screen Replacement	Replace the existing main influent screen.	$1,156,500
Update Headworks	Install new headworks influent pumps, electrical, and controls.	$576,000
System-wide SCADA Upgrade	Upgrade the wastewater collection and treatment SCADA systems.	$427,000
Lift Station Improvements	Upgrades to the lift station pumps, equipment, electrical, and controls.	$380,500
Collection System Improvements - Annual I/I Reduction Program	Annually install 500 LF of CIPP lining.	$855,500
Manhole Rehabilitation Program	Repair/replace manholes as identified through inspection/evaluation.	$382,000
Collection System Inspection	Annual TV inspection and evaluation of the existing collection system (footage per year to be determined).	$292,000
Upsize Existing Main Line from 10th Street to the North Side of Lamonta	Upsize existing pipe to remove the bottleneck in the collection system from northeast Prineville.	$2,276,800
Upsize Existing Main Line on Main Street from Lynn Boulevard to 1st Street	Upsize existing pipe that is currently 18 inches upstream, bottlenecks to 12 inches, then becomes 21 inches. Remove the 12-inch bottleneck.	$1,293,500
TOTAL ESTIMATED COST OF MEDIUM-TERM IMPROVEMENTS		**$7,639,800**
Long-Term Improvements - 10 to 20 years		
Long-Term WWTF Improvements	Remove lagoon biosolids.	$541,000
TOTAL ESTIMATED COST OF LONG-TERM IMPROVEMENTS		**$541,000**

The estimated CIP costs listed above are provided in 2023 dollars for comparison. The recommended medium-term improvements projects are anticipated to be advertised for bid and awarded in 2026. The City and any potential funding agencies should recognize that, due to the recent escalation of inflation and construction costs, total relative project costs, including construction, administrative, legal, engineering, and contingencies, together with other project costs, will continue to increase until such time that the project is awarded. Therefore, costs for medium-term improvements have been inflated by 6.5 percent per year to 2026 dollars. The estimated year 2026 dollar amount is the amount of funds the City should apply for to cover actual project costs at the time the project is anticipated to be awarded. Table 4-6 shows the anticipated 2026 total project cost for the recommended medium-term improvements is $9,228,500.

TABLE 4-6
2026 TOTAL PROJECT COST FOR RECOMMENDED MEDIUM-TERM CAPITAL IMPROVEMENTS PLAN IMPROVEMENTS

Medium-Term Improvements (2023 Dollars)	$7,639,800
Assumed Annual Construction Cost Index Inflation Rate	6.5 percent
Total Estimated Project Cost (2026 Dollars)	**$9,228,500**

Improvements Prioritization and System Development Charge Plan

This section summarizes and describes those identified improvements that have been included in the SDC funding category. The estimated costs of the various improvements are also presented.

System Development Charge Fee Categories

Oregon Revised Statutes (ORS) 223.297 through 223.314 require SDCs be divided into two fee categories: Reimbursement Fee and Improvement Fee.

Reimbursement Fee

The Reimbursement Fee establishes the value of the unused capacity of the existing system infrastructure. The value of the unused capacity can be assessed to future connections until the excess capacity is exhausted. The Reimbursement Fee is levied upon new developments to contribute a proportionate share of the cost of constructing existing facilities with the capacity to serve new developments. The Reimbursement Fee is based on original construction costs and the remaining capacity of the system component.

Improvement Fee

The Improvement Fee establishes the cost of planned capital improvements to be constructed within the planning period. The Improvement Fee is levied upon new developments to provide funding for planned capital improvements projects, to increase system capacity, and to provide the needed service.

The Reimbursement Fee and the Improvement Fee are combined and result in the overall total SDC fee.

Establishment of System Development Charges

The State of Oregon SDC statutes require the City to develop a methodology for establishing an SDC fee schedule. These fees can be assessed to new developments requiring City wastewater services. Additional detailed discussions of the SDC methodologies and a comprehensive SDC analysis are presented in an SDC study prepared by GEL Oregon, Inc., as part of the overall wastewater facilities planning effort.

Table 4-7 lists the proposed SDC improvements as identified by a collection system evaluation completed for this WWFP and information provided by the City of Prineville Planning Department regarding potential growth areas. The proposed SDC Improvements are identified on Figure 4-8.

TABLE 4-7
SUMMARY OF SYSTEM DEVELOPMENT CHARGE PROJECT PHASES (2023 DOLLARS)

Project Element	Project Purpose/Description	Total Estimated Project Cost
WWTF Chlorination Conversion	Convert the existing chlorination system from gas chlorine to a bulk sodium hypochlorite system.	$652,000
Upsize Existing Main Line from 10th Street to the North Side of Lamonta	Cost difference to increase pipe size - used in conjunction with CIP 8.	$932,500
WWTF Operations Building and Laboratory	Construct an operations building with restrooms, showers, an employee locker room, offices, storage, conference space, kitchen, and laboratory.	$1,747,500
Main Line Extension North of Existing Main Line along Canal	To serve potential development on Rhoden property.	$325,250
Extend Pressure Sewer Main Line North on Highway 26 from N. Gardner Road	To serve future development north of Prineville along Highway 26.	$520,250
Upsize Existing Main Line on Main Street from Lynn to 1st Street	Cost difference to increase pipe size - used in conjunction with CIP 9.	$350,000
Extend Existing 18-inch Sewer Main Line South on Main Street	To serve future development south of Prineville along Main Street.	$1,772,500
Extend Combs Flat Interceptor to the East	To serve future development east of Prineville.	$2,330,750
Connect Williamson Area to Gravity Sewer. Remove Williamson Lift Station.	To serve future development east of Prineville, remove the Williamson Lift Station, and serve the area by gravity.	$611,250
Melrose/Willowdale Sewer Main Line Installation	Install main lines and manholes to facilitate future connection of Melrose/Willowdale residents.	$3,169,500
	TOTAL ESTIMATED COST OF SDC IMPROVEMENTS	**$12,411,500**

The estimated project costs listed above are provided in 2023 dollars for comparison. The preferred improvements projects would be advertised for bid and awarded as growth dictates. For comparison, costs for the medium-term improvements have been inflated by 6.5 percent per year to 2026 dollars. Since SDC projects are directly related to growth, and location and timing of growth is unknown, the time frame for the improvements on Table 4-7 is unknown. Table 4-8 shows the anticipated 2026 total project cost for the SDC improvements.

TABLE 4-8
2026 TOTAL PROJECT COST FOR RECOMMENDED
SYSTEM DEVELOPMENT CHARGE IMPROVEMENTS

SDC Improvements (2023 Dollars)	$12,411,500
Assumed Annual Construction Cost Index Inflation Rate	6.5 percent
TOTAL ESTIMATED PROJECT COST (2026 DOLLARS)	**$14,992,500**

Environmental Impacts

Land Use

All the proposed WWSI are within the city limits and the urban growth boundary (UGB). Proposed improvements at the Saddle Ridge Lift Station, Williamson Lift Station, and in the Melrose/ Willowdale area are outside the city limits but within the UGB. These improvements are not anticipated to require a Conditional Use Permit.

Important Farmland

The soils in the Prineville area are generally considered good for farming and agriculture. The primary soil types in the vicinity are summarized on Table 4-9. In general, the soils are classified in variations of loam.

TABLE 4-9
FARMLAND CLASSIFICATION, SUMMARY BY MAP UNIT, CROOK COUNTY, OREGON

Map Unit Symbol	Map Unit Name	Rating
014	Powder silt loam, 0 to 2 percent slopes	Prime Farmland if Irrigated
015	Metolius ashy sandy loam, 0 to 2 percent slopes	Prime Farmland if Irrigated
016	Crooked-Stearns complex, 0 to 2 percent slopes	Farmland of Statewide Importance
036	Agentia-Era complex, 40 to 70 percent north slopes	Farmland of Statewide Importance
104Am	Redmond ashy sandy loam, 0 to 3 percent slopes	Prime Farmland if Irrigated
121	Era ashy sandy loam, 0 to 3 percent slopes	Prime Farmland if Irrigated
123	Ochoco-Prineville complex, 0 to 3 percent slopes	Prime Farmland if Irrigated
143	Stukmond-Lickskillet-Redmond complex, 0 to 8 percent slopes	Farmland of Statewide Importance
144	Redmond-Stukmond complex, 0 to 8 percent slopes	Farmland of Statewide Importance

All proposed WWSI are within the UGB and are not located on Exclusive Farm Use land. None of the WWSI are anticipated to affect prime farmland; if farmland could be potentially impacted by a project, consultation under the Farmland Protection Program would be necessary.

Formally Classified Lands

Formally classified lands are lands designated by federal, state, and local governments for special purposes. These include parks, monuments, landmarks, historic trails, wild and scenic areas, wilderness areas, Native American-owned lands, etc.

A number of city parks are in the vicinity of the proposed improvements, including Gary A. Ward Park, Davidson Park, Harwood Park, Library Park, Stryker Park, Yellowpine Park, and Ochoco Creek Park. No impacts to formally classified lands are anticipated.

Floodplains

The Deschutes subbasin is located in central Oregon in the high desert. The Crooked River watershed, within the Deschutes subbasin, is the largest eastside tributary to the Deschutes River.

The South Fork Crooked River and Beaver Creek join the North Fork Crooked River east of Prineville. The Crooked River flows immediately south of Prineville and reaches its confluence with the Deschutes River northwest of Prineville and southwest of Madras. The Deschutes River is a tributary of the Columbia River. In total, the Crooked River extends nearly 125 miles east to west from its source to the Deschutes River.

According to the Federal Emergency Management Agency (FEMA) Map Service Center, FEMA Flood Insurance Rate Map Panel Numbers 41013C0400C, 41013C0403C, 41013C0405C, 41013C0412C, 41013C0411C, 41013C0384C, 41013C0415C, and 41013C0416C (dated February 2, 2012) have been assigned to the project area. See Appendix D for the referenced FEMA floodplain maps.

Portions of the recommended WWSI appear to be located within FEMA Zone AE, an area located within the 100-year flood zone, and other flood areas. Construction activities will consist of upgrading/replacing and burying main lines and restoring the sites to preconstruction conditions. No permanent impacts to the 100-year flood zone are anticipated. Any activity within floodplains will be required to comply with applicable local floodplain development standards.

Wetlands

The National Wetlands Inventory Map identifies several freshwater emergent wetlands and a freshwater forested/shrub wetland within the surrounding vicinity. A wetland determination/ delineation should be completed prior to construction, and wetlands should be avoided if possible during design. If avoidance is impracticable or unfeasible, permits will be obtained, and appropriate environmental documents will be prepared prior to construction.

Cultural/Historic Resources

A search of the National Register of Historic Places was conducted. Five historic buildings are listed in the City of Prineville. The majority of the recommended WWSI would be located in existing rights-of-way (ROW) that have been previously disturbed; however, portions of the WWSI may be located in areas of ground that do not appear to have been previously disturbed. These SDC main line extensions may require additional review.

Additional requirements may be necessary depending on federal involvement (funding or permits), which may necessitate compliance with Section 106 of the National Historic Preservation Act. If no federal nexus is identified, the projects must still comply with ORS 97.740, ORS 358.905-358.961, and ORS 390.235 and Oregon Administrative Rules 736-051-0090, which protect Native American cairns, graves, and associated items, items of cultural patrimony, and archaeological sites on non-federal and private lands. Additional archaeological survey, testing, and/or permitting may be required to comply with state laws.

Biological Resources

Important fish and wildlife habitat in the surrounding vicinity includes the Crooked River, Ochoco Creek, and associated riparian areas. Riparian areas are critical to the health of streams, as riparian vegetation provides shade and temperature regulation for the streams, provides cover for aquatic organisms, and stabilizes streambanks to prevent erosion.

According to a U.S. Fish and Wildlife Service Information for Planning and Consultation website search, bull trout (*Salvelinus confluentus*) and gray wolf (*Canis lupus*) have the potential to be present in the surrounding vicinity. Due to lack of suitable habitat, the gray wolf is unlikely to be present and, thus, is unlikely to be impacted. According to StreamNet, spring Chinook salmon (*Oncorhynchus tshawytscha*), summer steelhead (*Oncorhynchus mykiss*), pacific lamprey (*Entosphenus tridentatus*), and redband trout (*Oncorhynchus mykiss*) utilize the Crooked River and have the potential to be present in the surrounding vicinity. Any potential impacts to these species would be mitigated using best management practices (BMPs) during construction activities of the recommended improvements. No Essential Fish Habitat or Critical Habitat is mapped within the surrounding vicinity.

One of the recommended improvements (SDC 9) is anticipated to cross Ochoco Creek. SDC 7 is adjacent to the Crooked River. These projects have the potential to impact waterbodies. If trenching through waterbodies occurs, it is anticipated that an Oregon Department of State Lands removal/fill permit, U.S. Army Corps of Engineers Section 404 Permit, and DEQ 401 Water Quality Certification will be required; however, potential crossings are anticipated to be accomplished in the least environmentally damaging way possible (e.g., boring, crossing on established roadways, etc.). If impacts to waterbodies are unavoidable, appropriate permits and mitigation will be completed.

Water Quality

The Crooked River, Ochoco Creek, Ryegrass Ditch, and several distribution canals are the primary surface waters located in the vicinity of Prineville. Some of the recommended improvements would occur in the vicinity of waterbodies, although no impacts are anticipated. BMPs will be employed to control potential erosion and sedimentation that could temporarily impact water quality. Due to the anticipated size of the recommended improvements being greater than 1 acre and the potential for stormwater discharge to Waters of the State, it is anticipated that a 1200-C Construction Stormwater General Permit will be required.

Impacts to Groundwater

The City of Prineville and the surrounding area do not lie in a Sole Source Aquifer or Critical Groundwater Area, but the City is located within the Upper Deschutes Groundwater Mitigation Area, which regulates groundwater withdrawal and mitigation. The recommended improvements do not involve any groundwater removal, so the Upper Deschutes Groundwater Mitigation Area regulations do not apply. No impacts to groundwater are anticipated.

Socioeconomic/Environmental Justice

No elderly or minority populations residing in the vicinity of the recommended improvement areas will be impacted by the project. No business or residential relocations will be required as part of the recommended improvements.

Completion of the recommended WWSI projects is necessary to provide adequate wastewater treatment and disposal for the anticipated population growth over the 20-year planning period.

Air

A majority of the recommended improvements would be constructed within the city limits and UGB and, as such, are subject to the City's ordinances. According to Josh Smith, Planning Director, the dust ordinance simply states that activity cannot create a "nuisance." He noted that this is complaint-based and can usually be addressed by spraying water on the affected areas to reduce dust.

The recommended improvements have the potential to temporarily affect air quality. Short-term impacts could include emissions from equipment operation and dust generated from construction activities.

No substantial particulate matter or detrimental emissions will be released as a result of the recommended improvements. It is unlikely that the DEQ will require air quality permits.

Noise

The recommended improvements will not emit additional noise. However, construction activities will create significant intermittent and temporary noise. To minimize impacts, work will generally be confined to the project area during daylight hours. Construction activities will be subject to any City and/or County noise ordinances.

Traffic

During construction of the recommended improvements there may be temporary increases in traffic due to construction vehicles. No permanent or long-term impacts to transportation are anticipated as a result of the recommended improvements.

Hazardous Material

According to the DEQ, there is potential for buried asbestos cement (AC) pipe in the potential work areas. The City installed AC pipe for its water and sewer systems from 1960 through the latter part of the 1970s. The recommended WWSI could potentially cross existing AC lines.

Environmental records were reviewed for identified hazardous waste sites, environmental cleanup sites, leaking underground storage tanks (LUSTs) and underground storage tanks (USTs) using information on the DEQ Environmental Cleanup Site Information (ECSI) website. According to the ECSI database, 119 environmental cleanup sites, hazardous waste sites, LUSTs, and USTs are located in the vicinity of the City of Prineville. The following environmental records were found for sites adjacent to the proposed WWSI:

- Adjacent to the location of CIP 8:
  - Miller Oil, Inc. (Facility ID 88782)
    - ECSI - listed for tracking
    - Four active USTs

- Adjacent to the location of 313 feet of CIPP lining:
  - Prineville Exxon (Facility ID 40827)
    - LUST - No further action (NFA) issued
    - ECSI - Soil and groundwater contamination were documented in 1999. The 2008 site monitoring indicated the site does not present a significant risk.
  - Prineville Chevron (Facility ID 23743)
    - LUST - NFA issued
    - Four active USTs
- Adjacent to the location of 305 feet of CIPP lining:
  - Main Station (Facility ID 24219)
    - Four active USTs
- Adjacent to the location of 320 feet of CIPP lining:
  - Prineville Area Groundwater Contamination (Facility ID 40601)
    - ECSI - Air, soil, and groundwater contamination were documented. LUSTs and potential LUSTs were removed, and contaminants were reduced to acceptable levels.
  - Pacific Power and Light (Facility ID 41268)
    - ECSI - Soil and groundwater contamination were documented in 2005; conditional NFA issued.
    - LUST - Soil and groundwater contamination were documented in 1996; cleanup completed/administrative closure status.
  - Bryan Gold's Texaco (Facility ID 20077)
    - ECSI - Soil and groundwater contamination were documented in 1998; conditional NFA issued.
    - LUST - Soil and groundwater contamination were documented in 1997; cleanup completed status.
- Adjacent to the location of 350 feet of CIPP lining:
  - Belknapp, Wilford (Facility ID 16297)
    - LUST - Soil contamination documented in 1992; NFA issued.
- Adjacent to the location of 355 feet, 177 feet, and 300 feet of CIPP lining:
  - Heating Oil Tank (Facility ID 143522)
    - LUST - Groundwater contamination was documented in 2016; NFA issued.
  - Heating Oil Tank (Facility ID 123809)
    - LUST - Soil contamination was documented in 2012; cleanup completed status.
- Adjacent to the location of 405 feet of CIPP lining:
  - Heating Oil Tank (Facility ID 145921)
    - LUST - Oil contamination was documented in 2017; cleanup completed status.

All adjacent sites appear to be closed or remediated and are not anticipated to present a significant risk to the projects with the exception of sites adjacent to the location of 320 feet of CIPP lining. If soil or groundwater is disturbed in this area, contaminants may be encountered. Due to the large number of sites within the general Prineville area, the potential to encounter contaminated soil or groundwater exists. Additional hazardous materials analysis may be required during the project design phase, depending on funding requirements.

Land Requirements

Improvements located within the city limits but outside existing City ROW will need easements, although none are currently identified in the proposed CIP and SDC improvements. Improvements located outside the city limits but within the UGB will require annexation and ROW for the improvements to be constructed and maintained. These improvements include SDC 7, 8, 9, and 10. Any needed ROW or easements are anticipated to be a condition of approval during the planning phase and, as such, should not require acquisition of land.

Potential Construction Problems

The valley floor of Prineville has a shallow groundwater aquifer in many areas. This high water table may impact construction of some improvements depending on the depth and location of the improvement. Timing of construction activities in locations where shallow groundwater exists should be carefully considered to minimize groundwater impacts, such as avoiding areas near open irrigation canals during irrigation season.

The airport area of Prineville sits on a basalt plateau approximately 350 feet above the valley floor. Subsurface rock is present in much of this region, although shallow groundwater does not exist here. Potential improvements in this area consist of upgrades to existing wastewater lift stations and should not require excavation outside previously disturbed areas.

Costs for the recommended improvements have taken into consideration these potential construction problems and represent actual estimated costs for construction with the above factors included.

Sustainability Considerations

The existing WWTF has had considerable improvements to increase sustainability. The construction and operation of a treatment wetland system, which uses gravity flow and native vegetation for treatment, is a significant step toward sustainability. The treatment and disposal wetlands have created an important environmental and social improvement to the community. The Crooked River Wetlands Complex has become a destination for bird watching, hiking, bicycling, and other outdoor recreational activities. With 5.4 miles of trails, a covered pavilion, picnic area, and restrooms, the Complex has also become an important destination for local schools to tour and view first-hand effective wastewater treatment while providing an important community improvement. Thirteen educational kiosks that local school children designed are located along the trails for future educational opportunities.

The recommended improvements only seek to enhance the overall efficiency of the wastewater collection and treatment systems. These will reduce energy consumption, improve effluent quality and operations efficiency, and control long-term costs to users.

The construction of a 1.2 megawatt (MW) solar field on the WWTF property and backup power generation at critical operation locations have already been completed. Improvements to pumping, electrical, and control systems will improve operational simplicity and efficiency and reduce energy costs, leading to a more resilient system overall.

Water and Energy Efficiency

As discussed previously, the current WWTF utilizes lagoon and wetland treatment, which is energy efficient. Pumping of wastewater influent and effluent consumes energy, and improvements identified for the wastewater lift stations, headworks influent pumping, and collection system (I/I reduction) are intended to reduce energy use and provide a more efficient system. New, more efficient pumps, controls, and electrical systems will reduce energy usage. Collection systems that result in I/I reduction will reduce the overall wastewater influent/effluent being pumped and, thus, reduce energy costs.

The City completed construction of a 1.2 MW solar field at the WWTF in 2021. The solar field was constructed under partnership with the solar provider, which allows the WWTF and other City facilities to purchase power at a discounted rate from a renewable energy source. The use of solar energy in conjunction with an efficient WWTF and the recommended improvements is an important goal for the City to reduce energy consumption and improve efficiency in the energy used.

Green Infrastructure

The existing wastewater treatment systems have been designed and constructed in an effort to mimic natural processes for wastewater treatment and discharge (Outfall 004). Construction of the wetland treatment and disposal system has created additional storage and treatment capacity while introducing natural effluent finishing processes to the wastewater system. Additionally, the constructed wetlands have created a popular open space for walking, bird watching, and educational opportunities for schools. The use of treated effluent on the City-owned Meadow Lakes Golf Course and pasture irrigation areas (Outfalls 002 and 003) represents another beneficial reuse of treated wastewater effluent.

The existing wastewater collection system is identified in the CIP for improvements that will reduce the potential for I/I and exfiltration through phased evaluation of the collection system followed by commensurate rehabilitation and repair. These proposed improvements will reduce non-wastewater contributions to the influent flow as well as improve the overall functionality and efficiency of the collection system.

The proposed improvements to the wastewater lift stations have been selected to upgrade aging infrastructure with more efficient systems that will reduce energy consumption with more efficient electrical and pumping systems, reduced site visits by operations personnel, and provide remote monitoring as part of a system-wide SCADA system upgrade.

Proposed improvements at the WWTF have also been selected to upgrade aging facilities with more energy efficient systems. Upgraded control systems will reduce the number of site visits by operations personnel to the amount needed to properly observe the treatment process, take samples, and perform regular maintenance. The proposed conversion of the gas chlorination system to a bulk sodium hypochlorite system will reduce the risk of hazardous chlorine gas release, increase operator safety, and reduce the overall cost of treatment.

The improvements proposed in both the Capital Improvements and SDC Plans were selected not only out of the necessity to upgrade aging systems but to reduce energy consumption, operations personnel visits, and overall system monitoring and control. These improvements, in addition to the existing system, represent an opportunity to position the City of Prineville as an example of green infrastructure for the rest of the industry.

Cost Estimates

Cost estimates for the proposed alternatives are provided as Figures 4-1 through 4-6. Locations for proposed improvements are identified on Figures 4-7 and 4-8.

The prepared cost information represents the anticipated complete cost of the improvement inclusive of all costs to the system. Additional personnel, administrative costs, water purchase, insurance, energy cost, process chemicals, monitoring and testing, or other miscellaneous costs should not be incurred. In fact, the analysis predicts that these costs will be reduced by the proposed alternatives due to reduced energy use, operator efficiency, and ease of operation.

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
COLLECTION SYSTEM ALTERNATIVES BY COST AND FUNDING CATEGORY

Improvement	Funding Category	Improvement Purpose/Description	Medium-/Long-Term	Primary Purpose	Total Estimated Cost (2023)	SDC Growth Apportionment		City's Estimated Portion
						Percent	Cost (2023)	
Proposed Collection System Improvements								
5	CIP	Collection System Improvements - Maintenance, rehabilitation, I/I reduction (500 LF completed annually).	Medium	Operations Reliability Compliance	$855,500	0%	$0	$855,500
6	CIP	Manhole Rehabilitation Program - Manhole repair/replacement as identified annually.	Medium	Operations Reliability Compliance	$382,000	0%	$0	$382,000
7	CIP	Collection System Inspection/Evaluation - Annual inspection program to evaluate collection system condition.	Medium	Operations Reliability Compliance	$292,000	0%	$0	$292,000
8	CIP	Replace existing main line from N.W. 10th Street to the north side of Lamonta Road.	Medium	Operations Reliability	$2,276,800	0%	$0	$2,276,800
2	SDC	Increase size of main line from N.W. 10th Street to the north side of Lamonta Road (constructed in conjunction with CIP 8).	Medium	Capacity	$932,500	100%	$932,500	$0
4	SDC	Extend main line to serve property north of Lamonta and west of Main Street.	Medium	Capacity	$325,250	0%	$0	$325,250
9	CIP	Replace existing main line on Main Street from Lynn Boulevard to 1st Street.	Medium	Operations Reliability	$1,293,500	0%	$0	$1,293,500
6	SDC	Increase size of main line on Main Street from Lynn Boulevard to 1st Street (constructed in conjunction with CIP 9).	Medium	Capacity	$350,000	100%	$350,000	$0
5	SDC	Extend pressure sewer north on Highway 26 from N. Gardner Road to serve future growth.	Medium	Capacity	$520,250	100%	$520,250	$0
7	SDC	Extend 18-inch sanitary sewer south on Main Street to serve future growth.	Medium	Capacity	$1,772,500	100%	$1,772,500	$0
8	SDC	Extend existing interceptor main line east from Combs Flat.	Medium	Operations Reliability	$2,330,750	100%	$2,330,750	$0
9	SDC	Connect Williamson area to gravity sewer. Remove Williamson Lift Station.	Medium	Capacity	$611,250	100%	$611,250	$0
10	SDC	Extend sanitary sewer main line and manholes to Melrose/Willowdale area.	Medium	Operations Reliability	$3,169,500	100%	$3,169,500	$0
				TOTAL COST	**$15,112,000**		**$9,687,000**	**$5,426,000**

CIP = Capital Improvements Plan
I/I = infiltration and inflow
LF = linear feet
SDC = System Development Charge

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
COLLECTION SYSTEM ALTERNATIVES BY COST AND FUNDING CATEGORY

FIGURE 4-1

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
COLLECTION SYSTEM ALTERNATIVES PRELIMINARY COST AND NET PRESENT WORTH

Improvement	Funding Category	Improvement Description	Medium/Long-Term	Total Estimated Cost (2023)	Annual OM&R	Present Worth O&M Present Worth of an Annuity, 2 Percent, 20 years (Present Worth Factor = 16.3514)	Salvage Value	Present Worth Salvage Present Worth of a Future Value, 2 Percent, 20 Years (Present Worth Factor = 0.6730)	Net Present Worth[1]
Proposed Collection System Improvements									
5	CIP	Collection System Improvements - Maintenance, rehabilitation, I/I reduction (500 LF completed annually).	Medium	$855,500	$7,500	$122,636	$85,500	$57,542	$920,594
6	CIP	Manhole Rehabilitation Program - Manhole repair/replacement as identified annually.	Medium	$382,000	$5,000	$81,757	$38,200	$25,709	$438,048
7	CIP	Collection System Inspection/Evaluation - Annual inspection program to evaluate collection system condition.	Medium	$292,000	$7,500	$122,636	$29,200	$19,652	$394,984
8	CIP	Replace existing main line from 10th Street to north side of Lamonta.	Medium	$2,276,800	$5,000	$81,757	$227,680	$153,229	$2,205,328
2	SDC	Increase size of main line from 10th Street to north side of Lamonta Road (constructed in conjunction with CIP 8).	Medium	$932,500	$5,000	$81,757	$93,250	$62,757	$951,500
4	SDC	Extend main line to serve property north of Lamonta and west of Main Street.	Medium	$325,250	$5,000	$81,757	$93,250	$62,757	$344,250
9	CIP	Replace existing main line on Main Street from Lynn Boulevard to 1st Street.	Medium	$1,293,500	$5,000	$81,757	$129,350	$87,053	$1,288,204
6	SDC	Increase size of main line on Main Street from Lynn Boulevard to 1st Street (constructed in conjunction with CIP 9).	Medium	$350,000	$5,000	$81,757	$35,000	$23,555	$408,202
5	SDC	Extend pressure sewer north on Highway 26 from N. Gardner Road to serve future growth.	Medium	$520,250	$5,000	$81,757	$35,000	$23,555	$578,452
7	SDC	Extend 18-inch sanitary sewer south on Main Street to serve future growth.	Medium	$1,772,500	$5,000	$81,757	$35,000	$23,555	$1,830,702
8	SDC	Extend existing interceptor main line east from Combs Flat.	Medium	$2,330,750	$5,000	$81,757	$35,000	$23,555	$2,388,952
9	SDC	Connect Williamson area to gravity sewer. Remove Williamson Lift Station.	Medium	$611,250	$5,000	$81,757	$35,000	$23,555	$669,452
10	SDC	Extend sanitary sewer main line and manholes to Melrose/Willowdale area.	Medium	$3,169,500	$5,000	$81,757	$35,000	$23,555	$3,227,702
			TOTAL COST	**$15,112,000**		**$1,145,000**		**TOTAL NET PRESENT WORTH**	**$15,646,000**

[1] Net present worth based on Office of Management and Budget Circular A-94, Appendix C, February 2023 update

CIP = Capital Improvements Plan
I/I = infiltration and inflow
LF = linear feet
O&M = operation and maintenance
OM&R = operation, maintenance, and replacement
SDC = System Development Charge

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
COLLECTION SYSTEM ALTERNATIVES
PRELIMINARY COST AND NET PRESENT WORTH

FIGURE
4-2

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
LIFT STATION ALTERNATIVE BY COST AND FUNDING CATEGORY

Improvement[1]	Funding Category	Improvement Description	Medium-/Long-Term	Primary Purpose	Total Estimated Cost (2023)	City's Estimated Portion
2	CIP	Replace existing pumping equipment, install new remote monitoring, electrical, instrumentation, and controls.	Medium	Operations Reliability Compliance Safety	$380,500	$380,500
				TOTAL COST	**$380,500**	**$380,500**

[1] Lift Station - Alternative 1 - No Action was not evaluated.

CIP = Capital Improvements Plan

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITES PLAN
LIFT STATION ALTERNATIVE BY COST AND FUNDING CATEGORY

FIGURE
4-3

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
LIFT STATION ALTERNATIVE PRELIMINARY COST AND NET PRESENT WORTH

Improvement[1]	Funding Category	Improvement Description	Medium-/Long-Term	Total Estimated Cost (2023)	Annual OM&R	Present Worth O&M Present Worth of an Annuity, 2 Percent, 20 years (Present Worth Factor = 16.3514)	Salvage Value	Present Worth Salvage Present Worth of a Future Value, 2 Percent, 20 Years (Present Worth Factor = 0.6730)	Net Present Worth
2	CIP	Replace existing pumping equipment, install new remote monitoring, electrical, instrumentation, and controls.	Medium	$380,500	$45,000	$735,813	$38,050	$25,700	$1,090,613
			TOTAL COST	**$380,500**				**TOTAL NET PRESENT WORTH**	**$1,091,000**

[1] Lift Station - Alternative 1 - No Action was not evaluated.

CIP = Capital Improvements Plan
O&M = operation and maintenance
OM&R = operation, maintenance, and replacement

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
LIFT STATION ALTERNATIVE PRELIMINARY COST AND NET PRESENT WORTH

FIGURE 4-4

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
WASTEWATER TREATMENT FACILITY ALTERNATIVE BY COST AND FUNDING CATEGORY

Improvement[1]	Funding Category	Improvement Description	Medium-/Long-Term	Primary Purpose	Total Estimated Cost (2023)	SDC Growth Apportionment Percent	SDC Growth Apportionment Cost (2023)	City's Estimated Portion (2023 Cost)[2]
Alternative 2								
2	CIP	Replace existing pumping equipment, electrical, and control components.	Medium	Operations Reliability	$576,000	0%	$0	$576,000
				TOTAL COST	**$576,000**	**SDC TOTAL**	**$0**	**$576,000**
Alternative 3								
1	CIP	Improve/replace existing main influent screen.	Medium	Operations Reliability	$1,156,500	0%	$0	$1,156,500
2	CIP	Replace existing pumping equipment, electrical, and control components.	Medium	Operations Reliability	$576,000	0%	$0	$576,000
1	SDC	Convert existing gas chlorination disinfection system to a bulk sodium hypochlorite disinfection system.	Medium	Operations Reliability	$652,000	100%	$652,000	$0
				TOTAL COST	**$2,384,500**	**SDC TOTAL**	**$652,000**	**$1,732,500**
Alternative 4								
1	CIP	Improve/replace existing main influent screen.	Medium	Operations Reliability	$1,156,500	0%	$0	$1,156,500
2	CIP	Replace existing pumping equipment, electrical, and control components.	Medium	Operations Reliability	$576,000	0%	$0	$576,000
3	CIP	System-wide Supervisory Control and Data Acquisition Upgrade	Medium	Operations Reliability	$427,000	0%	$0	$427,000
10	CIP	Lagoon biosolids removal.	Long	Operations Compliance Capacity	$541,000	0%	$0	$541,000
1	SDC	Convert existing gas chlorination disinfection system to a bulk sodium hypochlorite disinfection system.	Medium	Operations Reliability	$652,000	100%	$652,000	$0
3	SDC	Construct WWTF operations building and laboratory.	Medium	Operations Compliance Capacity	$1,747,500	100%	$1,747,500	$0
				TOTAL COST	**$5,100,000**	**SDC TOTAL**	**$2,399,500**	**$2,700,500**

[1] Wastewater Treatment Facility - Alternative 1 - No Action was not evaluated.
[2] May change to list of benefits.

CIP = Capital Improvements Plan
SCADA = supervisory control and data acquisition
SDC = System Development Charge
WWTF = wastewater treatment facility

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
WASTEWATER TREATMENT FACILITY
ALTERNATIVE BY COST AND FUNDING CATEGORY

FIGURE
4-5

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
WASTEWATER TREATMENT FACILITY ALTERNATIVE PRELIMINARY COST AND NET PRESENT WORTH

Improvement[1]	Funding Category	Improvement Description	Medium-/Long-Term	Total Estimated Cost (2023)	Annual OM&R	Present Worth O&M Present Worth of an Annuity, 2 Percent, 20 years (Present Worth Factor = 16.3514)	Salvage Value	Present Worth Salvage Present Worth of a Future Value, 2 Percent, 20 Years (Present Worth Factor = 0.6730)	Net Present Worth
Alternative 2									
2	CIP	Replace existing pumping equipment, electrical, and control components.	Medium	$576,000	$40,000	$654,056	$57,600	$38,800	$1,191,256
			TOTAL COST	**$576,000**				**TOTAL NET PRESENT WORTH**	**$1,191,000**
Alternative 3									
1	CIP	Improve/replace existing main influent screen.	Medium	$1,156,500	$10,000	$163,514	$115,650	$77,900	$1,242,114
2	CIP	Replace existing pumping equipment, electrical, and control components.	Medium	$576,000	$30,000	$490,542	$57,600	$38,800	$1,027,742
1	SDC	Convert existing gas chlorination disinfection system to a bulk sodium hypochlorite disinfection system.	Medium	$652,000	$10,000	$163,514	$65,200	$43,900	$771,614
			TOTAL COST	**$2,384,500**				**TOTAL NET PRESENT WORTH**	**$3,042,000**
Alternative 4									
1	CIP	Improve/replace existing main influent screen.	Medium	$1,156,500	$10,000	$163,514	$115,650	$77,900	$1,242,114
2	CIP	Replace existing pumping equipment, electrical, and control components.	Medium	$576,000	$10,000	$163,514	$57,600	$38,800	$700,714
3	CIP	System-wide Supervisory Control and Data Acquisition Upgrade	Medium	$427,000	$10,000	$163,514	$42,700	$28,800	$561,714
10	CIP	Lagoon biosolids removal	Long	$541,000	$10,000	$163,514	$54,100	$36,500	$668,014
1	SDC	Convert existing gas chlorination disinfection system to a bulk sodium hypochlorite disinfection system.	Medium	$652,000	$10,000	$163,514	$65,200	$43,900	$771,614
3	SDC	Construct WWTF operations building and laboratory.	Medium	$1,747,500	$10,000	$163,514	$174,750	$117,700	$1,793,314
			TOTAL COST	**$5,100,000**				**TOTAL NET PRESENT WORTH**	**$5,738,000**

[1] Wastewater Treatment Facility - Alternative 1 - No Action was not evaluated.

CIP = Capital Improvements Plan
SCADA = supervisory control and data acquisition
SDC = System Development Charge
O&M = operation and maintenance
OM&R = operation, maintenance, and replacement
WWTF = wastewater treatment facility

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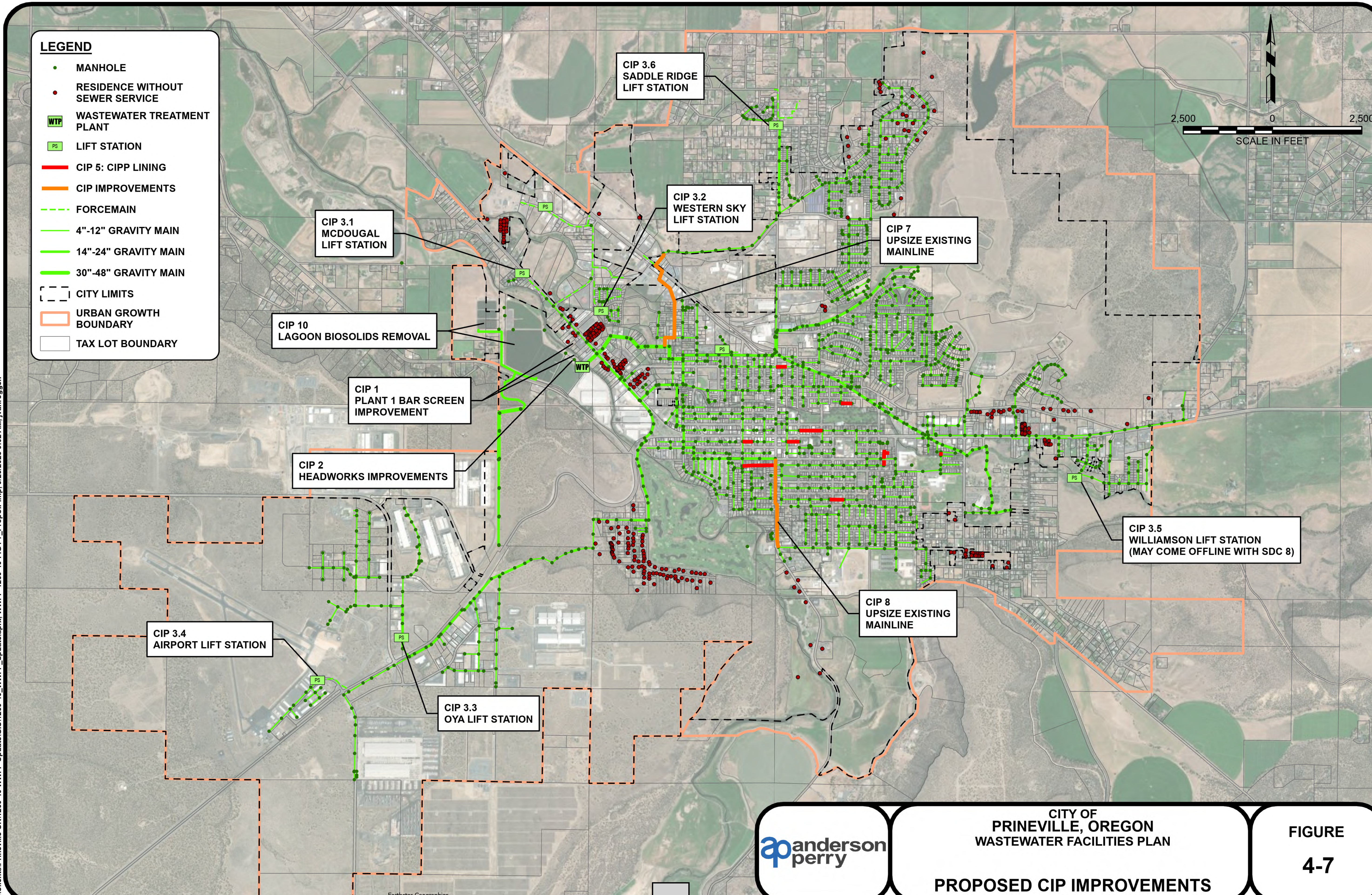
CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
WASTEWATER TREATMENT FACILITY ALTERNATIVE PRELIMINARY COST AND NET PRESENT WORTH

FIGURE
4-6



LEGEND
MANHOLE
RESIDENCE WITHOUT SEWER SERVICE
WASTEWATER TREATMENT PLANT
LIFT STATION
CIP 5: CIPP LINING
CIP IMPROVEMENTS
FORCEMAIN
4"-12" GRAVITY MAIN
14"-24" GRAVITY MAIN
30"-48" GRAVITY MAIN
CITY LIMITS
URBAN GROWTH BOUNDARY
TAX LOT BOUNDARY
2,500 0 2,500
SCALE IN FEET
CIP 3.6 SADDLE RIDGE LIFT STATION
CIP 3.2 WESTERN SKY LIFT STATION
CIP 3.1 MCDOUGAL LIFT STATION
CIP 7 UPSIZE EXISTING MAINLINE
CIP 10 LAGOON BIOSOLIDS REMOVAL
CIP 1 PLANT 1 BAR SCREEN IMPROVEMENT
CIP 2 HEADWORKS IMPROVEMENTS
CIP 3.5 WILLIAMSON LIFT STATION (MAY COME OFFLINE WITH SDC 8)
CIP 3.4 AIRPORT LIFT STATION
CIP 3.3 OYA LIFT STATION
CIP 8 UPSIZE EXISTING MAINLINE
WTP
PS
Earthstar Geographics
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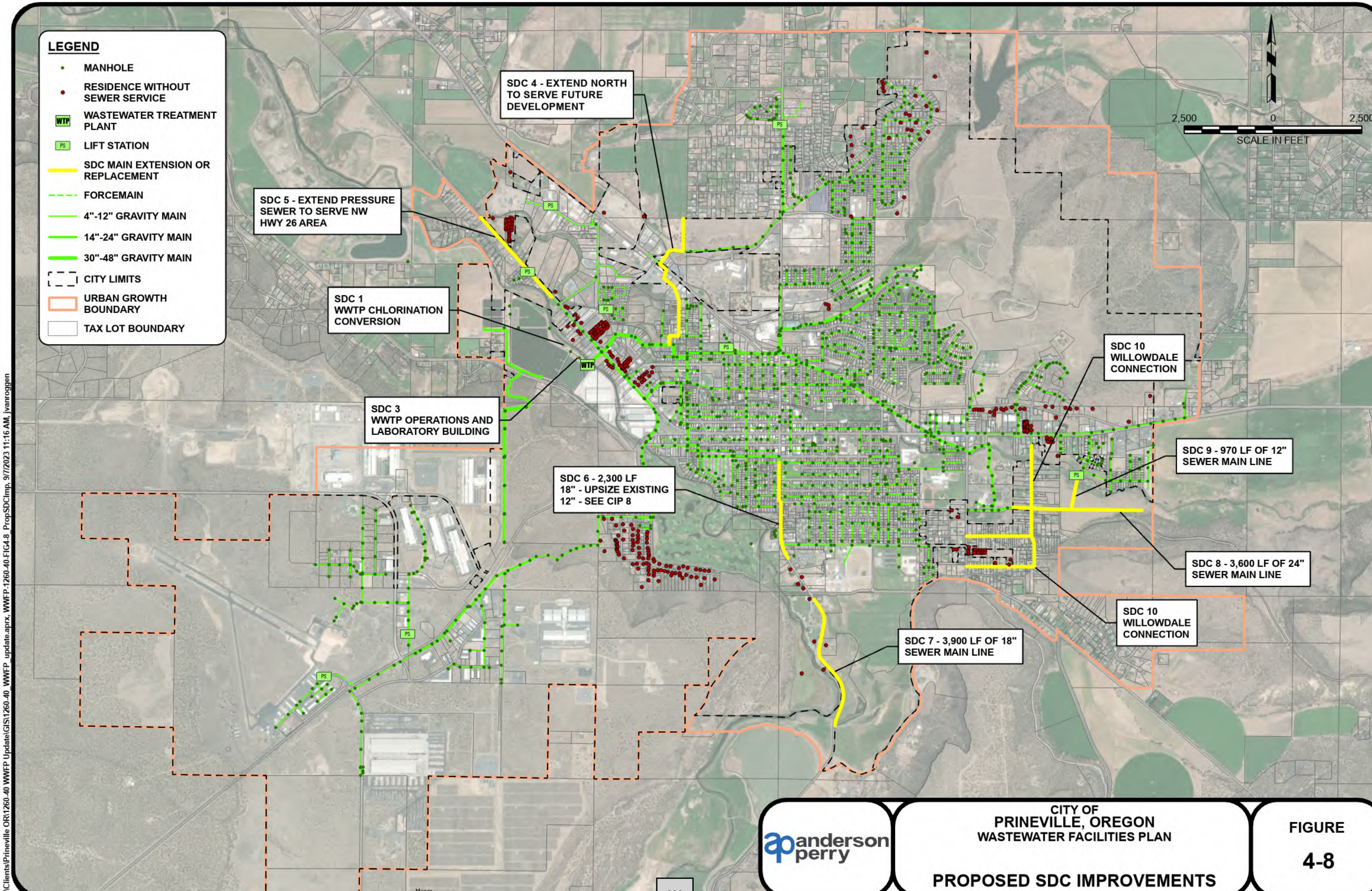
CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
PROPOSED CIP IMPROVEMENTS
FIGURE 4-7
X:\Clients\Prineville OR\1260-40 WWFP Update\GIS\1260-40_WWFP_update.aprx, WWFP-1260-40-FIG4-7_PropCIPImp, 9/25/2023 9:02 AM, jvanroggen



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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

PROPOSED SDC IMPROVEMENTS

FIGURE 4-8

Section 5 - Selection of an Alternative

General

This section describes the process used to identify recommended alternatives. This analysis considers monetary factors followed by non-monetary factors, such as efficiency, energy efficiency, and long-term operation of the improved facilities.

Operation, maintenance, and replacement (OM&R) costs are also evaluated with each alternative. It is anticipated that operation and maintenance (O&M) costs will be reduced but replacement costs will increase as replacement monies are set aside for the new improvements. These costs are identified on Tables 5-1, 5-2, and 5-3 presented later in this section and represent the OM&R costs for the specific alternative identified only. Table 5-4 represents the actual, overall annual OM&R costs for the fiscal year ending June 30, 2021.

Evaluation Process

Only the lift stations and wastewater treatment facility (WWTF) have alternatives that warrant evaluation. The collection system evaluation criteria are provided below; however, the improvements to the collection system are general in nature and should be completed as needed to maintain the system.

Lift Stations

The six City-owned and operated lift stations were evaluated based on comments from Public Works personnel. Based on the information obtained, it was determined the lift stations are in good condition structurally; however, improvements to pumps, pumping mechanical equipment, and electrical and controls systems are needed. Two alternatives were developed for the lift stations:

- Alternative 1 - No action
- Alternative 2 - Replace existing pumping equipment and install new remote monitoring, electrical, and instrumentation and controls

Wastewater Treatment Facility

The WWTF has adequate capacity and redundancy to meet the needs of the planning period while meeting National Pollutant Discharge Elimination System Permit requirements. Recommended improvements are intended to improve operational efficiency, safety, reliability, expandability, and consistency.

Four conceptual wastewater treatment improvement alternatives were evaluated during preparation of this Wastewater Facilities Plan (WWFP):

- Alternative 1 - No action
- Alternative 2 - Replace existing pumping equipment and electrical components
- Alternative 3 - Replace existing pumping equipment, rebuild the main influent screen, and convert the gas chlorination system to a bulk sodium hypochlorite system

- Alternative 4 - Replace existing pumping equipment, rebuild the main influent screen, upgrade supervisory control and data acquisition systems, convert the gas chlorination system to a bulk sodium hypochlorite system, complete biosolids removal, and construct a new operations and laboratory building

Life Cycle Cost Analysis

Collection System

The collection system should be cleaned and television (TV) inspected to define problem areas, a meaningful rating system to prioritize areas needing repairs or replacement should be applied, and the highest priority areas should be corrected on an annual basis as funds permit. This approach should be augmented by adding smoke testing to the TV inspection stage of the process. Smoke testing will help identify sources of inflow into the collection system. Once sources of inflow are identified, these areas can be rated and prioritized along with other identified problem areas. Improvements can then be made as part of the annual plan. By implementing a repair and replacement program systematically, the entire collection system can be repaired or replaced over a period of time, and infiltration and inflow (I/I) can be effectively reduced. The TV inspection program is identified in the Capital Improvements Plan (CIP) as CIP 7, and the repair and replacement plan is identified as CIP 5. These two recommended improvements are intended to be completed concurrently with the collection system inspection program, providing locations for priority collection system repairs or pipe replacement.

The recommended collection system improvements are related to maintenance and growth. Energy reduction and social and environmental impacts are expected to be minimal. However, improvements to the existing collection system should reduce the risk of leakage, I/I, and possible wastewater overflows.

A life cycle cost analysis is presented on Table 5-1 below.

TABLE 5-1
LIFE CYCLE COST ANALYSIS - COLLECTION SYSTEM IMPROVEMENTS

A	B	C	D	E	
Capital Cost	Annual OM&R	Present Worth OM&R, Present Worth of an Annuity, 2 percent, 20 years (Present Worth Factor = 16.3514)[1]	Salvage Value[2]	Present Worth Salvage, Present Worth of a Future Value, 2 percent, 20 years (Present Worth Factor = 0.6730)	A + C - E Net Present Worth
$15,113,000	$70,000	$1,145,000	$1,511,300	$610,000	$15,647,000

[1] Present worth percentage for 20 years (2 percent) was obtained from Office of Management and Budget Circular A-94, Appendix C, for the year 2023.

[2] For comparison purposes, salvage value is assumed to be 10 percent of the initial capital cost.

Lift Stations

An evaluation of the conceptual lift station improvements alternatives determined that Alternative 1 is not viable. Therefore, the cost information presented on Table 5-2 for Alternative 2 is provided for informational purposes only.

TABLE 5-2
LIFE CYCLE COST ANALYSIS - LIFT STATION IMPROVEMENTS

	A	B	C	D	E	
Alternative	**Capital Cost**	**Annual OM&R**	**Present Worth OM&R, Present Worth of an Annuity, 2 percent, 20 years (Present Worth Factor = 16.3514)[1]**	**Salvage Value[2]**	**Present Worth Salvage, Present Worth of a Future Value, 2 percent, 20 years (Present Worth Factor = 0.6730)**	**A + C - E Net Present Worth**
2	$380,500	$45,000	$735,813	$38,050	$25,700	$1,090,613

[1] Present worth percentage for 20 years (2 percent) was obtained from Office of Management and Budget Circular A-94, Appendix C, for the year 2023.

[2] For comparison purposes, salvage value is assumed to be 10 percent of the initial capital cost.

Wastewater Treatment Facility

An evaluation of the WWTF produced four alternatives for analysis. While each of the alternatives is viable, the long-term goals of the City and the need to meet future system demands requires further evaluation of the alternatives. A thorough evaluation of the proposed alternatives and detailed information is provided in Section 4 of this WWFP.

Table 5-3 presents a life cycle cost analysis that compares the monetary value of the four alternatives. Additionally, a comparison of the estimated OM&R savings is provided.

OM&R costs are increased based on the cost of replacement set aside for each alternative. O&M costs are expected to decrease through the use of more efficient pumping systems and operational efficiency gained through the improvements.

TABLE 5-3
LIFE CYCLE COST ANALYSIS - WASTEWATER TREATMENT FACILITY IMPROVEMENTS

	A	B	C	D	E	
Alternative	**Capital Cost**	**Annual OM&R**	**Present Worth OM&R, Present Worth of an Annuity, 2 percent, 20 years (Present Worth Factor = 16.3514)[1]**	**Salvage Value[2]**	**Present Worth Salvage, Present Worth of a Future Value, 2 percent, 20 years (Present Worth Factor = 0.6730)**	**A + C - E Net Present Worth**
2	$576,000	$40,000	$654,000	$57,600	$38,800	$1,191,000
3	$2,384,500	$50,000	$817,600	$238,450	$160,600	$3,042,000
4	$5,100,000	$60,000	$981,100	$510,000	$343,600	$5,738,000

[1] Present worth percentage for 20 years (2 percent) was obtained from Office of Management and Budget Circular A-94, Appendix C, for the year 2023.

[2] For comparison purposes, salvage value is assumed to be 10 percent of the initial capital cost.

A reduction in OM&R costs is anticipated, dependent on the alternative selected. These reductions are related to improved efficiency, reduced energy consumption, and reduced reliance on third-party testing laboratories. These estimated OM&R savings are summarized on Table 5-4 below.

TABLE 5-4
ESTIMATED OPERATION, MAINTENANCE, AND REPLACEMENT SAVINGS PER ALTERNATIVE
(2023 DOLLARS)

Alternative	Personnel Costs[1]	Materials and Services[1]	Annual Operating Expense[2]	Estimated Annual OM&R Savings[3]	Estimated 20-year OM&R savings at 2 Percent
2	$151,307	$786,061	$937,368	$5,000	$103,900
3	$151,307	$786,061	$937,368	$20,000	$415,450
4	$151,307	$786,061	$937,368	$70,000	$1,454,100

[1]Costs from City of Prineville Annual Comprehensive Financial Report - Fiscal Year Ending June 30, 2021.

[2] Sum of Personnel and Material and Services costs. All OM&R expenses for the Wastewater Department are included for the year ending June 30, 2021.

[3]Estimated Annual OM&R Savings accounts for additional OM&R identified on Table 5-3. Replacement costs unchanged.

Currently, the City operates an efficient WWTF. Utilizing lagoon and wetlands treatment uses less energy than traditional mechanical treatment facilities. Therefore, efficiency improvements in equipment, processes, and operations are the factors that result in the estimated OM&R savings.

The City spent $42,000 in fiscal year 2021-22 for third-party laboratory testing at the WWTF and $45,000 for testing at the wetlands. Alternative 4 includes construction of a new operations and laboratory building, which results in estimated cost savings to the City of $40,000 annually due to the ability to perform in-house analyses. This estimated savings is applied to Alternative 4 on Table 5-4 above in addition to other estimated OM&R savings.

Non-Monetary Factors

Efficiency

Currently, the City operates a reasonably efficient system. However, improvements in remote monitoring and notifications are needed to reduce the possibility of unrecognized system failures and the number of personnel required to properly operate the system.

Environmental

System components nearing the end of their useful life are at risk for system failure, potentially resulting in negative environmental impacts. Outdated pumps, controls, and electrical systems are at greater risk of failure as they reach the end of their normal life cycle. These failures may result in environmental emergencies requiring major cleanup and mitigation activities. It should also be noted that the proposed improvements will be completely within the existing facility and no ground disturbance or other impacts outside the facility are anticipated.

Energy Efficiency

As technology continues to evolve, the improved efficiency of pumps, motors, controls, and electrical systems reduces energy consumption and energy costs to the system. Variable frequency drives and other electrical and controls components can further improve the energy efficiency of new pumps and motors as part of a larger system upgrade.

Section 6 - Recommended Alternatives

General

This section identifies the recommended alternatives, provides an evaluation of the financial status of the City of Prineville's Wastewater Department, and outlines options for financing and implementing the recommended medium- and long-term priority improvements as outlined earlier, referred to herein as the recommended wastewater system improvements (WWSI) projects. A summary of state and federal funding programs is presented, including a review of funding options potentially available to the City for high priority WWSI projects. To design and construct the recommended improvements, a financing plan acceptable to the residents of the City must be developed to complete the improvements. Financing resources will need to include low-interest loans coupled with grant funding, if available, to make it feasible for the City to implement the improvements.

Although a detailed analysis of the City's current sewer rate structure is beyond the scope of this Wastewater Facilities Plan (WWFP), a discussion of the existing rate structure and current and future wastewater system budgets is included. A summary of potential sewer rate structures to provide project funding is also presented. Generally, most utility rate structures include funding for periodic minor system improvements and maintenance items, payroll costs for staff, and a set-aside for future improvements.

Recommended Alternatives

Collection System

The needed improvements to the collection system are general in nature and should be completed as needed to maintain the system. Recommended improvements have been divided into two phases based on the most economical approach for organizing projects, resulting in the lowest cost to the City. The two phases are referred to as medium- (0 to 10 years) and long-term (10 to 20 years) improvements. Medium-term improvements include rehabilitating main line sewers with trenchless technologies, collection system inspection and evaluation, pipe replacements, and manhole rehabilitation. Medium-term improvements also include an annual inspection and evaluation of the collection system. More detailed information regarding the collection system improvements can be found in Section 4 and on Figure 3-2 in Section 3 and Figures 4-7 and 4-8 in Section 4.

Lift Stations

An evaluation of the conceptual lift station improvements alternatives determined that Alternative 1 is not viable, as the existing mechanical equipment is reaching the end of its useful life and equipment failures would result in sanitary sewer overflows.

Alternative 2 would extend the useful life of the existing stations without requiring extensive structural improvements. The evaluation of the lift stations determined that the existing wetwells are in relatively good condition, while the pumping, electrical, and controls components are reaching the end of their useful life. The ability to upgrade the existing components without a full replacement of the lift stations is a considerable benefit and cost savings to the City while improving the lift stations' reliability and efficiency. Therefore, the recommended alternative is Lift Station - Alternative 2. The locations of the lift station improvements are shown on Figure 4-7 in Section 4.

Wastewater Treatment Facility

An evaluation of the conceptual wastewater treatment facility (WWTF) alternatives determined that Alternatives 1 and 2 are viable, as the City would be able to continue meeting treatment requirements and currently possesses adequate redundancy. Alternative 3 was determined to be a needed improvement but falls short of the long-term needs of the facility as the City continues to see increased residential and commercial growth.

The factors that determined the evaluation process were based on components such as construction costs; operation, maintenance, and replacement (OM&R); and ease of operations. As described in Sections 4 and 5 of this WWFP, after a review and a cost comparison of the two most viable alternatives and following discussions and meetings with the Public Works Director, the WWTF operator, and Public Works personnel, Alternative 4 was selected as the recommended alternative.

Criteria for the WWTF alternatives included:

- Design to provide treatment for projected flows and loadings through year 2042, as previously discussed.
- Maintain resiliency at all critical operations including backup power supply, backup manual control operation, and alarm notification to operators.
- Operator-friendly and energy-efficient system to minimize the amount of operator time required and minimize long-term operational costs.
- Production of effluent that meets Oregon Department of Environmental Quality (DEQ) requirements for treatment per the existing and future National Pollutant Discharge Elimination System Permit program.
- Provide improved facilities for wastewater personnel.
- Reduce third-party analysis costs.

Alternative 4 includes the necessary improvements to increase efficiency and reliability in response to continued population growth, additional sampling and testing requirements, and increased costs to operate. A new operations building would house proper accommodations for personnel and a laboratory to perform required analyses in-house. Upgraded supervisory control and data acquisition systems would monitor system performance and notify the WWTF operator remotely of alarm conditions, as well as provide remote control capability for operators. The resulting system would be easier to operate, efficient, compliant, reliable, long-lasting, expandable, and appropriately sized for the anticipated flows and loadings, which would provide savings when considering long-term OM&R, energy, and third-party laboratory analysis costs.

Currently, the City uses a third-party testing laboratory for the majority of its required analyses, and the ability to self-perform these analyses would result in cost savings to the City. Locations of the WWTF Improvements are shown on Figures 4-7 and 4-8 in Section 4.

Current Sewer Rates, Revenue, and Operation and Maintenance Costs

Operation and maintenance (O&M) of the existing wastewater system is financed through the City's annual budget. Revenue is obtained primarily from sewer user fees but also comes from other sources, such as sewer connection fees, system development charges (SDCs), and investment income. The City is authorized to collect sewer connection and service fees under Ordinances No. 714, 980, and 1111. A copy of these ordinances is included in Appendix K.

The data presented on Table 6-1 were provided by the City. The data provide the number of sewer service accounts as of December 2022 and the associated sewer service rate effective July 1, 2022. The rates were set by Resolution No. 1530 and were approved on June 26, 2022. A copy of Resolution No. 1530 is included in Appendix L.

TABLE 6-1
SEWER SERVICE ACCOUNTS

Account Type	Total Number of Connections	Monthly Service Charge per Account	Total Monthly Revenue
Residential	4,335	$55.61	$241,100
Commercial	724	$55.61	$40,200
Large General Service - Metered Water Usage in Excess of 5 Units per Month (per 100 cubic feet)[1]	14	$6.62	Based on usage
Industrial Use	5	Determined on a case-by-case basis	Determined on a case-by-case basis
TOTAL	**5,078**		**$342,530**[2]

[1]*Varies per month based on usage. Not included in the total number of connections.*

[2]*Average monthly revenue for 2022.*

Revenue generated from the City's sewer service fees and investment income is presented on Table 6-2. Rates are reviewed and revised periodically to ensure adequate revenue is generated to pay the total OM&R costs of the wastewater system.

TABLE 6-2
SEWER SERVICE REVENUE

Fiscal Year	Total Revenue	Total Costs*	Net Difference
2016-17	$3,477,701	($1,511,658)	$1,966,043
2017-18	$3,722,627	($1,586,633)	$2,135,994
2018-19	$3,691,237	($1,838,247)	$1,852,990
2019-20	$3,663,030	($2,177,440)	$1,485,590
2020-21	$4,120,995	($2,194,325)	$1,926,670

**Total costs do not include debt service collections.*

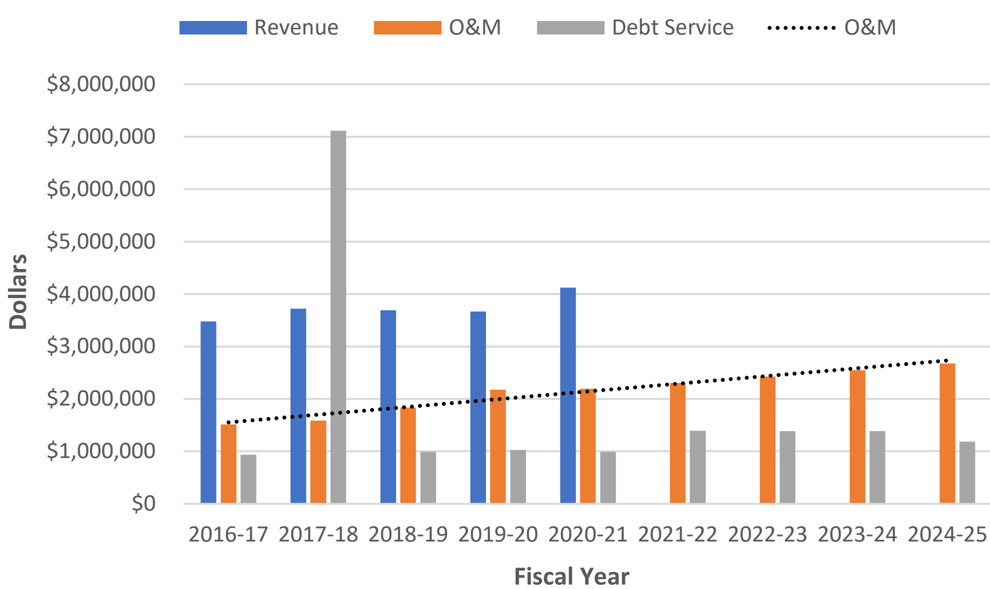
Current Financial Status

The annual revenue received and the cost of operating and maintaining the City's wastewater system are summarized on Figures 6-1 and 6-2. The costs presented were obtained from the City's audited financial statements and include all costs for the wastewater system, such as O&M, personnel services, materials and services, and capital outlay. These data are presented to provide insight into the general costs required to operate the City's existing wastewater system. For funding and other financial analysis, it is recommended that the audited financial statements be reviewed in detail to refine the costs prior to considering any available revenue for future debt purposes.

Historical and Projected Budget Trends

A graphical plot of the City's wastewater system budget, with revenue and expenditures, is shown on Chart 6-1. O&M costs are projected to the fiscal year (FY) 2024-25 by applying a 5.1 percent inflation rate.

CHART 6-1
HISTORICAL AND PROJECTED BUDGET



The revenue and expenditures shown on Chart 6-1 are variable. O&M costs have seen a consistent increase due to normal cost increases expected in the industry. Revenues have also remained relatively constant with deviations well within expected ranges. While general trends can be developed over time, annual revenue and/or costs may vary during a particular year.

The average annual cost of operating and maintaining the City's WWTF over the planning period was $2,073,233. The average annual revenue over the planning period was $3,735,118. Annual wastewater system O&M costs, not including inter-fund transfers or debt service, have varied from a low of approximately $1,511,658 in FY 2016-17 to a high of $2,194,325 in FY 2020-21.

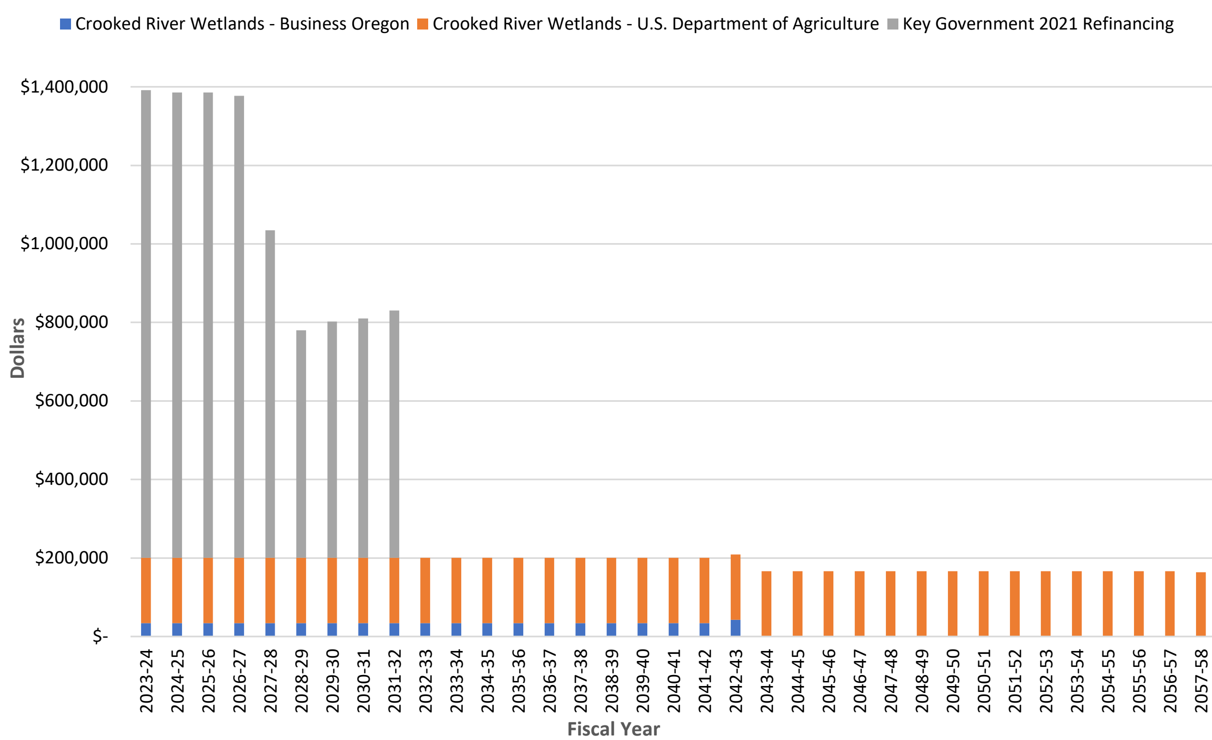
In general, an upward trend of O&M activities is observed. It is typically expected that expenditures should be increasing with time as the costs to own and operate a wastewater system continually increase. Any proposed upgrades to the system are anticipated to be constructed by FY 2025-26, which will add debt service to the annual expenditures.

Currently, the City budgets reserve account funds for wastewater system OM&R costs. Because the City already has a reserve account, it is better prepared to deal with future wastewater system expenses and emergencies. Pump replacement, lagoon liner repairs, pipe repair/replacement, trash screen mechanical breakdowns, etc., are items that require funds from time to time.

Existing Wastewater System Debt

The City will complete repayment of the Key Government Refinancing debt in FY 2031-32, which accounts for $7,995,009 of the City's debt; the Business Oregon loan for the Crooked River Wetlands in FY 2042-43, which accounts for $689,714 of the City's debt; and the U.S. Department of Agriculture loan for the Crooked River Wetlands in 2058, which accounts for $5,813,181 of the City's debt. The annual debt service from 2022 to 2031 averages $1,066,303. From 2031 to 2042, the annual debt service averages $219,199. The annual debt service from 2042 to 2058 averages $166,160. A graphical plot of the City's debt service by FY is provided on Chart 6-2.

CHART 6-2
ANNUAL DEBT SERVICE



State and Federal Grant and Loan Programs

Financing public improvements projects is a complex issue that must be resolved before a project can move beyond the planning stage. The cost of providing local financing for WWSI often exceeds the financial capability of local businesses and residents. Federal and state financing programs are in place that may allow the City to access low-interest loans and, possibly, grants. Federal and state programs are designed to keep monthly user rates affordable, simultaneously making the improvements project possible.

A number of federal and state grant and loan programs can provide assistance to Oregon cities for municipal improvements projects. These programs offer various levels of funding aimed at different types of projects. These include programs administered by the U.S. Department of Agriculture Rural Development (RD), the U.S. Economic Development Administration (EDA), Business Oregon, the DEQ, and others. These agencies can provide low-interest loan funding, and possibly grant funding, to assist rural communities with public works projects. Most of these agencies will require sewer rates that equal or exceed the City's Affordability Index of approximately $44 per month to support a loan for WWSI, both as a condition of receiving monies and prior to being considered for grant funds.

The following section briefly summarizes the primary funding programs available to assist the City with a WWSI project. It should be noted that the monthly user rates discussed in this section can represent a combination of monthly usage fees and taxes.

Summary of State Funding Programs

Business Oregon Finance Programs

Community Development Block Grant Program

The primary objective of the Community Development Block Grant (CDBG) program is development of viable (livable) urban communities by expanding economic opportunities and providing decent housing and a suitable living environment principally for persons of low and moderate incomes (LMIs).

This is a federally funded grant program. The state receives an annual allocation from Housing and Urban Development for the CDBG program. Grant funding is subject to applicant need, availability of funds, and any other restrictions in the state's Method of Distribution (i.e., program guidelines). It is not possible to determine how much, if any, grant funds may be awarded prior to an analysis of the application and financial information.

Eligibility for the CDBG program requires that greater than 51 percent of persons within the community fall into the LMI category. According to the 2021 5-Year American Community Survey utilized by Business Oregon, in 2021 the City of Prineville had approximately 55.3 percent of the population within the LMI category. This puts the City within the criteria to qualify for CDBG funds.

Water/Wastewater Financing Program

This is a loan and grant program that provides for the design and construction of public infrastructure when needed to ensure compliance with the Safe Drinking Water Act (SDWA) or the Clean Water Act (CWA). To be eligible, a system must have received, or is likely to soon receive, a Notice of Non-Compliance by the appropriate regulatory agency associated with the SDWA or the CWA.

While this is primarily a loan program, grants are available for municipalities that meet eligibility criteria. The loan/grant amounts are determined by a financial analysis of the applicant's ability to afford a loan (debt capacity, repayment sources, current and projected utility rates, and other factors). The maximum loan term is 25 years, or the useful life of the infrastructure financed, whichever is less. The maximum loan amount is $10 million per project, determined by financial review, and may be offered through a combination of direct and/or bond-funded loans. Loans are generally repaid with utility revenues or voter-approved bond issues. A limited tax general obligation pledge may also be required. Creditworthy applicants may be funded through the sale of state revenue bonds.

The maximum grant is $750,000 per project based on a financial analysis. An applicant is not eligible for grant funds if the applicant's annual median household income (MHI) is equal to or greater than 100 percent of the state average MHI for the same year. The State of Oregon's annual MHI from 2017 to 2021 was $70,084. The City of Prineville's annual MHI from 2017 to 2021 was $44,167, which is 63 percent of the statewide MHI. Based on this information, the City should be eligible for grant funds through the Water/Wastewater financing program.

Special Public Works Fund

The Special Public Works Fund (SPWF) program was established by the Oregon legislature in 1985 to provide primarily loan funding for municipally owned infrastructure and other facilities that support economic and community development. Loans and grants are available to municipalities for planning, designing, purchasing, improving, and constructing municipally owned facilities, replacing owned essential community facilities, and emergency projects as a result of a disaster.

For design and construction projects, loans are primarily available; however, grants are available for projects that will create and/or retain traded-sector jobs. A traded-sector industry sells its goods or services into nationally or internationally competitive markets. Loans range in size from less than $100,000 to $10 million. The SPWF is able to offer very attractive interest rates that reflect tax-exempt market rates for very good quality creditors. Loan terms can be up to 25 years or the useful life of the project, whichever is less. Grants are limited to projects associated with job creation/retention. The maximum grant award is $500,000 or 85 percent of the project cost, whichever is less. The grant amount per project is based on up to $5,000 per eligible job created or retained. Unless the City can tie the needed improvements to job creation, the SPWF is not a likely funding source for WWSI.

For Business Oregon Programs - Contact Regional Development Officer

Since program eligibility and funds availability may change from year to year, potential applicants are encouraged to contact their respective regional development officer to obtain the most accurate and up-to-date information for each program.

Oregon Department of Environmental Quality

Clean Water State Revolving Fund Program

This program, administered by the DEQ, provides low-interest rate loans to public agencies for the planning, design, and construction of various projects that prevent or mitigate water pollution (e.g., wastewater treatment facilities), as well as for some publicly owned estuary management and non-point source control projects. Priority in the agency's ranking process is always given to projects addressing documented water quality problems and health hazards.

The Clean Water State Revolving Fund (CWSRF) program charges interest rates that are calculated based on criteria defined in Oregon Administrative Rules 340-054-0065. Different interest rates and other financial terms apply to different types of loans and to loans of differing repayment periods. Rates are adjusted quarterly, based on the average Bond Buyer rates of the previous quarter, as published by the Federal Reserve. Under CWSRF program rules, interest rates on all standard design and/or construction loans are set at 65 percent of the municipal bond rate as of the quarter preceding the signing of the loan agreement. These percentages vary from 25 to 55 percent of the bond rate depending on the length of the repayment period. In 2021, loans for design and construction had an interest rate that varied from 1.91 to 2.60 percent, with repayment of 15 years up to 30 years, depending on the MHI and other factors. For small communities below the statewide MHI, design/construction interest rates for loans executed from January 1 through March 30, 2023, were less than 2 percent. Current interest rates can be found on the DEQ's website: https://www.oregon.gov/deq/wq/cwsrf/Pages/CWSRF-Rates.aspx. Once a loan is signed, the interest rate is fixed for the life of the loan. In addition, fees are assessed to cover program administration costs by the DEQ. A servicing fee of 0.5 percent of the outstanding balance is collected annually, and a loan reserve equal to 50 percent of the annual debt service is also to be set aside in a separate fund. This program has also implemented measures for principal forgiveness or hardship grants to be allocated to cities in combination with loans. The DEQ CWSRF program is an attractive low-interest loan and potential grant source for the City, although priority in the agency's ranking process would need to be sought by the City.

The CWSRF program can also sometimes provide principal forgiveness in combination with a loan for eligible communities. To be eligible, the project must either support a community with an MHI below the statewide MHI or meet Green Project guidelines. The CWSRF program has a limited amount of money available for principal forgiveness each year. If the community is eligible and money is available at the time of loan signing, the DEQ can offer principal forgiveness for 50 percent of the loan amount, for a maximum amount of $500,000. The Infrastructure Investment and Jobs Act, also known as the "Bipartisan Infrastructure Law," was signed into law in November 2021. With the passage of this Act, the DEQ has the ability to offer principal forgiveness of 50 percent up to $2 million through the CWSRF program.

The CWSRF program may be a low-interest loan and potential principal forgiveness source for the City of Prineville.

Summary of Federal Grant and Loan Programs

U.S. Department of Agriculture Rural Development

RD can provide financial assistance to communities with a population under 50,000 through the Water and Waste Disposal Loan Guarantees Program. Under this program, the City can seek private lender funding for projects with the agency providing loan guarantee to the lender on behalf of the City.

U.S. Economic Development Administration

EDA grant and loan monies are available to public agencies to fund projects that stimulate the economy of an area, and the overall goal of the program is to create or retain jobs. The EDA has invested a great deal of money in Oregon to fund public works improvements projects in areas where new industries are locating or planning to locate in the future. In addition, the agency has a program known as the Public Works Impact Program to fund projects in areas with extremely high rates of unemployment. This program is targeted toward creating additional jobs and reducing the unemployment rate in the area. Unless the City's WWSI can be linked directly to industrial expansion or job retention, the City is not likely to be in a competitive position to receive funding from the EDA.

Hardship grants may be available through this program for rural communities that have:

1. Fewer than 3,000 residents with no access to a centralized wastewater treatment/collection system or need improvements to on-site systems.
2. A community per capita income of less than 80 percent of the national average.
3. An unemployment rate exceeding the national average by one percentage point or more.

The City of Prineville may meet some of these criteria, so a hardship grant through the EDA may be available.

Local Financing Options

Regardless of the ultimate project scope and agency from which loan and grant funds are obtained, the City may need to develop authorization to incur debt, i.e., bonding, for the recommended improvements. The need to develop authorization to incur debt depends on funding agency requirements and provisions in the City Charter.

Two options are generally available for a city to use for its bonding authority (authorization to incur debt): general obligation bonds and revenue bonds. General obligation bonds require a vote of the people to give the City the authority to repay the debt service through tax assessments, sewer rate revenues, or a combination of both. The taxing authority of the City provides the guarantee for the debt. Revenue bonds are financed through revenues of the wastewater system. Authority to issue revenue bonds can come in two forms. One would be through a local bond election similar to that needed to sell a general obligation bond, and the second would be through City Council action authorizing the sale of revenue bonds, if the City Charter allows. If more than 5 percent of the registered voters do not object to the bonding authority resolution during a 60-day remonstrance period, the City would have authority to sell these revenue bonds.

Bonding is not typically required for the Business Oregon and CWSRF programs. Due to current tax measure limitations in Oregon, careful consultation with experienced, licensed bonding attorneys needs to occur if the City begins the process of obtaining bonding authority for the recommended WWSI. It would be wise for the City to consult its City Charter and City attorney to see if debt for the wastewater system can be assumed.

Funding Summary

It appears that more than one funding source is available to the City, including Business Oregon's Water/Wastewater program and the DEQ's CWSRF program. These programs appear to be sources that can provide the funds needed to potentially make the recommended improvements financially feasible for the City, if immediate implementation is needed or desired.

It is important for the City to consult with funding agencies early in project development to ascertain which funding programs the City would be eligible to receive funding from for its recommended improvements and understand which funding programs would provide the best funding package. This consultation with funding agencies may be done at a One Stop meeting, discussed later in this section.

Preliminary Equivalent Dwelling Unit Analysis

When projecting future revenue for a wastewater system, an equivalent dwelling unit (EDU) analysis is usually completed. One EDU is intended to represent the average residential wastewater contribution for a "typical" user for a given city. As an example, each residential connection in Prineville would represent one EDU. A commercial or industrial connection user with wastewater flows similar to the average residential flow would also be considered one EDU, while a commercial connection such as a café, with three times the typical wastewater flows as an average residential sewer connection, would be considered three EDUs.

The City's sewer service accounts, as of September 2022, are shown on Table 6-3. The number of EDUs allocated to schools and commercial businesses have been estimated based on current rates being charged to residential users. An exception is the data centers, which account for 3,208 EDUs.

TABLE 6-3
PRELIMINARY EQUIVALENT DWELLING UNITS ANALYSIS

Connection Type	Total Number of Accounts	Estimated EDUs
Residential	4,335	4,335
Commercial	724	3,680
Large General Service	14	Included in Commercial
Industrial Use	5	Included in Commercial
TOTAL	**5,078**	**8,015**

Based on the above EDU analysis, the City has 4,335 residential wastewater system accounts that represent 4,335 EDUs with a connected population of 10,771 and a persons per household of 2.46. The estimated commercial EDUs is 3,680 with a large portion of the EDUs associated with the data centers. Most funding agencies will use this type of EDU analysis as a basis for estimating future yearly revenues and debt capabilities for a city. The EDU determination is intended to equitably distribute wastewater system costs among all users. The EDU determination helps funding agencies determine the maximum loan (debt) amount a city can afford to service.

Debt Repayment Options and Loan Capacity

Debt Repayment Using Sewer User Fees

One method for repayment of loans is through increased sewer user fees. Sewer user fee increases are determined by the annual debt service cost of the recommended improvements selected by the City of Prineville and annual O&M costs for the WWTF and collection system. Figure 6-2 was prepared to determine the City's capacity for repayment of loans with sewer user fees given different funding options (discussed below). Several assumptions were made to develop the analysis presented on Figure 6-2.

- Wastewater user fee revenue is based on 8,015 EDUs.
- Wastewater system expenditures for the budget year 2021-22 were set at $4,482,681 per year. The year 2021-22 was used because this is the most recent budget data available including debt service.
- The estimated OM&R expenditures do not take into consideration the anticipated savings that may result from the improved treatment process and collection system operating more efficiently with less labor demands.
- Future debt service was calculated based on a typical Business Oregon loan at 2.53 percent interest for a 25-year repayment period and a CWSRF loan at 1.33 and 1.52 percent interest for a 15- and 30-year repayment period, respectively, depending on which financing program is able to assist the City.

The data shown on Figure 6-2 provide a general idea of the amount of debt the City could service at various average monthly sewer service costs. As shown on Figure 6-2, the current wastewater rate of $55.61 allows for a total estimated project cost of $10,000,000 (maximum loan amount) if the entire project were funded with a loan only through the Water/Wastewater Financing program, or $19,608,000 if the project were funded with a loan only through the CWSRF fund with a 30-year loan term (not including a 0.5 percent annual fee). If the City were to fund the selected medium-term WWSI projects identified previously without any grants and with DEQ CWSRF loans only, monthly sewer rates would need to be raised to approximately $62 per month assuming a 15-year loan term with a 1.33 percent interest rate or $57 per month assuming a 30-year loan term with a 1.92 percent interest rate. These potential rates confirm that it is important for the City to pursue potential grant funds or loan forgiveness to assist with project financing.

It is important to note that the estimated loan capacities shown on Figure 6-2 are based on the current EDU estimate and interest rates. Interest rates were lowered due to the COVID-19 pandemic and are increasing to reduce inflation. Interest rates need to be verified as project funding proceeds. It should be recognized that this is only a preliminary analysis and the financial assumptions and figures presented in this WWFP should be refined as project implementation proceeds in the future and as agreements are drafted with funding agencies.

Debt Repayment Using Property Tax Revenue

Under the Oregon Property Tax Limitation-Measure 5, property tax rates can be used to repay WWSI costs through property tax revenues. Figure 6-3 lists the increases in property tax rates required to finance loan amounts solely with property taxes.

Debt repayment may also be achieved by some combination of sewer user fees, SDCs, and property taxes.

Project Funding Options

To complete all recommended improvements, low-interest loan funds coupled with grant funds, if available, may need to be acquired. Actual funding amounts and breakdowns will be based on a financial review completed by each agency and could vary from the estimated amounts shown herein. Other potential funding measures may be available to the City to reduce the potential rate increase impact on the City's customers. It will be important for the City to work directly with a Business Oregon regional development officer, RD area specialist, and DEQ finance administrators to evaluate these options.

The four funding agencies require some level of environmental review, although specific requirements and processes may vary. A cursory environmental review is provided in Section 4.

Project One Stop Meeting

To evaluate all potential project funding options, a One Stop meeting is generally requested by a city. One Stop meetings are often scheduled in Salem or the city, upon request, where representatives of DEQ, Business Oregon, and other funding agencies meet with the city to discuss the project and funding needs. This joint meeting provides a forum to evaluate and identify the most suitable funding package for the project and the city. After the meeting, the city is usually invited to submit a funding application to the preferred funding program(s) identified in the One Stop meeting.

Implementation Steps

The key to implementing part or all of the City's WWSI is the City's ability to finance them. The City will have to work closely with its residents to inform them of the system needs and the necessity for increased sewer user costs. It is also possible for the City to complete the identified improvements by seeking funding assistance from both state and federal funding sources.

The WWSI outlined herein are anticipated to provide the City with a higher quality wastewater system with significantly improved efficiency and reliability. The funding sources outlined in this section are potential sources of loans and grants for the City to consider if improvements projects are pursued.

Project Implementation

The following action items and implementation steps need to occur to implement the proposed WWSI projects. The steps outlined are general in nature and include the major steps that need to be undertaken.

Action Items

- The City will need to formally adopt this WWFP, which addresses review comments from Business Oregon and the DEQ. A formally adopted WWFP is required by state and federal funding and regulatory agencies if the City pursues funding from these agencies to complete the improvements.
- The City will need to consult and initiate funding discussions with funding agencies (Business Oregon and the DEQ) to ensure the best possible funding package is developed and obtained for the projects. The City will need to contact the Business Oregon regional

coordinator to start the intake process and, as necessary, complete the intake form and submit it to Business Oregon to initiate funding discussions.

- The City will need to prepare and submit funding applications to appropriate funding agencies.
- The City will need to investigate if authorization to incur debt for the WWSI projects is required by City Charter. If authorization is required by City Charter, the City will need to decide how to obtain the authorization to incur debt. Once decided (revenue bond or general obligation bond), a bond attorney should be consulted, and the appropriate resolution paperwork should be prepared and considered for implementation.
- The City will need to hold public information meetings to inform its residents of the needs and scope of the project, answer questions, and generate support for the required sewer rate increase.

Implementation Schedule

Should the City wish to proceed with the recommended WWSI, the following Implementation Schedule outlines the key steps the City would need to undertake. The implementation steps and stated completion dates are presented as general guidance only and provide the estimated time needed to complete projects of this complexity and magnitude. The dates are subject to change and will depend on economic conditions within the community; implementation of the improvements could be delayed due to economic conditions.

Item No.	Implementation Item	Time Frame
1.	Submit draft WWFP to the City and agencies for review.	September 2023
2.	Finalize and adopt the WWFP.	December 2023
3.	Review and update the City's Comprehensive Plan with the WWFP as required.	Winter 2023-24
4.	Attend One Stop meeting.	Winter 2023-24
5.	Prepare and submit funding application(s) to appropriate agency(ies).	Spring 2024
6.	Finalize project funding.	Summer 2024
7.	Design system improvements.	Summer 2024 through Summer 2025
8.	Submit design documents for agency(ies) review.	Summer 2025
9.	Advertise, bid, and award construction project.	Winter 2025-26
10.	Project construction.	Spring 2026 through Winter 2026-27
11.	Project startup and construction completion.	Spring 2027
12.	Project closeout.	Summer 2027
13.	Monitor system performance to determine the impact of improvements and report impacts to the DEQ.	Two years after project closeout

It should be noted that these implementation steps assume the City pursues and obtains project funding in summer 2024. Should delays occur in securing project funding, completion of the improvements will likely be delayed. Similar timelines will occur with funding for the medium-term and long-term WWSI projects.

The key to implementing the WWSI, as outlined in this WWFP, is the City's ability to acquire Business Oregon and/or DEQ low-interest loans coupled with grant funding. In addition, it is vital that the City supports the improvements and contributes their appropriate share of the cost. All improvements will likely not be economically feasible for the City unless grant funds can be obtained. The City will have to work closely with its citizens to inform them of the system needs and the necessity for increased sewer rates.

WWSI as outlined in this WWFP will provide the City with reliable, quality wastewater collection and treatment systems that will meet the City's needs for many years to come. The improved collection system and WWTF will help provide safer, more reliable, and more efficient operation and increased protection of the environment and public health.

Project Schedule

Figures 6-4 and 6-5 provide project schedules, including Gantt charts, for the implementation of the planning process as well as the phased construction of the collection system improvements. The schedules provide estimated timelines for processes to be completed and to illustrate the execution of the collection system improvements over the estimated duration of those improvements.

Permit Requirements

As shown on Figures 4-7 and 4-8 in Section 4, the majority of the proposed improvements are located within the city limits. Permits required through the Crook County Building Department will be acquired as appropriate. Proposed improvements in the Melrose/Willowdale area will be located outside the city limits but within the urban growth boundary. Annexation of this area will be required to construct the needed WWSI in this area.

Where needed, access permits, a Joint Permit Application, and county building permits will be acquired. Any projects resulting in total ground disturbance of 1 acre or more will acquire a general stormwater discharge permit.

Sustainability Considerations

The improvements selected by the City will provide aspects of sustainability including water and energy efficiency and system resiliency.

Water and Energy Efficiency

The proposed improvements include reduction of infiltration and inflow (I/I), upgrades to pumping systems, and collection system extensions that will result in wastewater lift station removal. I/I reduction will decrease the amount of non-wastewater being transported and treated in the City's collection and treatment systems. Pumping system improvements will reduce energy consumption through the replacement of outdated or inefficient pumping equipment.

Other benefits of the proposed improvements include improved telemetry and supervisory control and data acquisition (SCADA) capabilities, which will reduce the number of vehicle trips required by Public Works personnel.

Green Infrastructure

All proposed improvements are intended to utilize efficient equipment wherever possible. Selecting highly efficient pumping and control systems during design and installing them during construction will reduce energy use considerably throughout the wastewater collection and treatment systems. Improvements in control systems, such as smart controllers, aid in the reduction of energy use by operating at the most efficient operating point when sized and selected correctly. Self-cleaning systems reduce the use of additional water to clean wetwells and other improvements requiring regular washdown. Additionally, new impermeable surfaces will not be added with the proposed improvements with the exception of the WWTF operations and laboratory building.

Other (System Resiliency)

The proposed system improvements will provide the City with the ability to more easily maintain its current wastewater collection, treatment, and disposal/irrigation systems. The WWTF will continue to operate in a manner similar to the current operations but with the upgrade of selected components to improve efficiency and reliability.

Total Project Cost Estimate

Capital Improvements Plan

Improvements identified under the Capital Improvements Plan (CIP) category include projects that need to be completed to address existing system deficiencies irrespective of growth.

After a review of the City's wastewater collection and treatment facilities' deficiencies, improvements were prioritized and the CIP was developed to help organize necessary improvements over the 20-year planning period. The CIP is divided into two phases: medium- and long-term. The medium- and long-term improvements should be completed in 0 to 10 years and 10 to 20 years, respectively, with portions of the medium-term improvements completed annually, such as the collection system inspection and evaluation, cured-in-place pipe (CIPP) lining, and manhole rehabilitation. A summary of the costs associated with the CIP is provided on Table 6-4. Detailed project cost estimates are included in Appendix H.

TABLE 6-4
SUMMARY OF CAPITAL IMPROVEMENTS PROJECT PHASES (2023 DOLLARS)

Project Element	Project Purpose/Description	Total Estimated Project Cost
Medium-Term Improvements - 0 to 10 years		
Influent Screen Replacement	Replace the existing main influent screen.	$1,156,500
Update Headworks	Install new headworks influent pumps, electrical, and controls.	$576,000
System-wide SCADA Upgrade	Upgrade the wastewater collection and treatment SCADA systems.	$427,000
Lift Station Improvements	Upgrades to the lift station pumps, equipment, electrical, and controls.	$380,500

Project Element	Project Purpose/Description	Total Estimated Project Cost
Collection System Improvements - Annual I/I Reduction Program	Annually install 500 linear feet of CIPP lining. The total project cost of $855,000 is based on an annual budget of $150,000 to complete in six years.	$855,500
Manhole Rehabilitation Program	Repair/replace manholes as identified through inspection/evaluation.	$382,000
Collection System Inspection	Annual television inspection and evaluation of the existing collection system (footage per year to be determined).	$292,000
Upsize Existing Main Line from 10th Street to the North Side of Lamonta	Upsize existing pipe to remove the bottleneck in the collection system from northeast Prineville.	$2,276,800
Upsize Existing Main Line on Main Street from Lynn Boulevard to 1st Street	Upsize existing pipe that is currently 18 inches upstream, bottlenecks to 12 inches, then becomes 21 inches. Remove 12-inch bottleneck.	$1,293,500
TOTAL ESTIMATED COST OF MEDIUM-TERM IMPROVEMENTS		**$7,639,800**
Long-Term Improvements - 10 to 20 years		
Long-Term WWTF Improvements	Remove lagoon biosolids.	$541,000
TOTAL ESTIMATED COST OF LONG-TERM IMPROVEMENTS		**$541,000**

The estimated CIP costs listed above are provided in 2023 dollars for comparison. The recommended medium-term improvements projects are anticipated to be advertised for bid and awarded in 2026. The City and any potential funding agencies should recognize that, due to the recent escalation of inflation and construction costs, total relative project costs, including construction, administrative, legal, engineering, and contingencies, together with other project costs, will continue to increase until such time that the project is awarded. Therefore, costs for medium-term improvements have been inflated by 6.5 percent per year to 2026 dollars. The estimated year 2026 dollar amount is the amount of funds the City should apply for to cover anticipated project costs at the time the project is anticipated to be awarded. Table 6-5 shows the anticipated 2026 total project cost for the recommended medium-term improvements is $9,228,500.

TABLE 6-5
2026 TOTAL PROJECT COST FOR RECOMMENDED MEDIUM-TERM CAPITAL IMPROVEMENTS PLAN IMPROVEMENTS

Medium-Term Improvements (2023 Dollars)	$7,639,800
Assumed Annual Construction Cost Index Inflation Rate	6.5 percent
TOTAL ESTIMATED PROJECT COST (2026 DOLLARS)	**$9,228,500**

System Development Charge Plan

Improvements identified under the SDC category were developed to address those needs in the system to specifically support growth and associated increased system demands.

After a review of the City's wastewater collection and treatment facilities' deficiencies, improvements were prioritized and the SDC Plan was developed to help organize necessary improvements over the 20-year planning period. The SDC improvements are not listed in any order of priority. Improvements will be completed based on where growth and development occur.

TABLE 6-6
SUMMARY OF SYSTEM DEVELOPMENT CHARGE PROJECT PHASES (2023 DOLLARS)

Project Element	Project Purpose/Description	Total Estimated
WWTF Chlorination Conversion	Convert the existing chlorination system from gas chlorine to a bulk sodium hypochlorite system.	$652,000
Upsize Existing Main Line from 10th Street to the North Side of Lamonta	Cost difference to increase pipe size; used in conjunction with CIP 8 (discussed in Section 4).	$932,500
WWTF Operations Building and Laboratory	Construct an operations building with restrooms, showers, an employee locker room, offices, storage, conference space, kitchen, and laboratory.	$1,747,500
Main Line Extension North of Existing Main Line along Canal	To serve potential development on Rhoden property.	$325,250
Extend Pressure Sewer Main Line North on Highway 26 from N. Gardner Road	To serve future development north of Prineville along Highway 26.	$520,250
Upsize Existing Main Line on Main Street from Lynn to 1st Street	Cost difference to increase pipe size; used in conjunction with CIP 9 (discussed in Section 4).	$350,000
Extend Existing 18-inch Sewer Main Line South on Main Street	To serve future development south of Prineville along Main Street.	$1,772,500
Extend Combs Flat Interceptor to the East	To serve future development east of Prineville.	$2,330,750
Connect Williamson Area to Gravity Sewer. Remove Williamson Lift Station	To serve future development east of Prineville, remove the Williamson Lift Station, and serve the area by gravity.	$611,250
Melrose/Willowdale Sewer Main Line Installation	Install main lines and manholes to facilitate future connection of Melrose/Willowdale residents.	$3,169,500
	TOTAL ESTIMATED COST OF SDC IMPROVEMENTS	**$12,411,500**

The estimated project costs listed above are provided in 2023 dollars for comparison. The preferred improvements projects would be advertised for bid and awarded as growth dictates. For comparison, costs for the SDC improvements have been inflated by 6.5 percent per year to 2026 dollars. Since SDC projects are directly related to growth, and location and timing of growth is unknown, the time frame for the improvements outlined on Table 6-6 is unknown. Table 6-7 shows the anticipated 2026 total project cost for the SDC improvements.

TABLE 6-7
2026 TOTAL PROJECT COST FOR RECOMMENDED SYSTEM DEVELOPMENT CHARGE IMPROVEMENTS

SDC Improvements (2023 Dollars)	$12,411,500
Assumed Annual Construction Cost Index Inflation Rate	6.5 percent
TOTAL ESTIMATED PROJECT COST (2026 DOLLARS)	**$14,992,500**

Summary of Estimated Total Costs

The estimated total project costs are summarized on Tables 6-4 and 6-6. The year 2023 costs shown on Tables 6-4 and 6-6 were estimated utilizing associated rates of 2019 to 2022 with a 5 percent inflation rate per year to the year 2023, as this provides the City with a more consistent anticipated cost for the capital improvements. The total estimated project cost in 2023 dollars is $20,051,300. Detailed cost estimates are included in Appendix H.

Annual Operating Budget

The average annual cost to operate and maintain the City's WWTF over the planning period is anticipated to be $2,140,360. The average annual revenue over the planning period is anticipated to be $3,735,118. Annual wastewater system O&M costs, not including inter-fund transfers, have varied from a low of approximately $1,511,658 in FY 2016-17 to a high of $2,194,325 in FY 2020-21.

In general, an upward trend of O&M activities is observed. It is typically expected that expenditures should increase with time as the costs to own and operate a wastewater system continually increase. Any proposed upgrades to the system are anticipated to be constructed by FY 2025-26, which will add a debt service to the annual expenditures.

Reserves

Currently, the City budgets reserve account funds for wastewater system OM&R costs. Because the City already has a reserve account, it is better prepared to deal with future wastewater system expenses and emergencies. Pump replacement, lagoon liner repairs, pipe repair/replacement, trash screen mechanical breakdowns, etc., are items that require funds from time to time. According to the FY 2025 biennial budget adopted in July 2023, the City currently maintains a Short-Lived Asset Replacement Account of $302,600, an emergency reserve of $239,003, and a budgeted contingency of $602,224.

Income

O&M of the existing wastewater system is financed through the City's annual budget. Revenue is obtained primarily from sewer user fees. The current monthly wastewater rates at the time this WWFP was prepared are summarized on Table 2-1 and Chart 2-1 in Section 2.

The annual revenue received and the costs of operating and maintaining the City's wastewater system are summarized on Table 6-8. The costs presented were obtained from the City's audited financial statements and include all costs for the wastewater system, such as O&M, personnel services, materials and services, capital outlay, and debt service. These data are presented to provide insight into the general costs required to operate the City's existing wastewater system. For funding and other financial analysis, it is recommended that the audited financial statements be reviewed in detail to refine the costs prior to considering any available revenue for future debt purposes.

TABLE 6-8
SEWER SERVICE REVENUE

Fiscal Year	Total Revenue	Total Costs*	Net Difference
2016-17	$3,477,701	($1,511,658)	$1,966,043
2017-18	$3,722,627	($1,586,633)	$2,135,994
2018-19	$3,691,237	($1,838,247)	$1,852,990
2019-20	$3,663,030	($2,177,440)	$1,485,590
2020-21	$4,120,995	($2,194,325)	$1,926,670

Total costs do not include debt service collections.

A portion of the project cost will be eligible to be paid off with SDCs. This is discussed in further detail in Section 2.

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
HISTORICAL SEWER SYSTEM FUNDS

Fiscal Year	Sewer Fees Revenue	Additional Revenue[1]	Personnel Services[2]	Materials and Services[3]	Capital Outlay	Total O&M[4] Expenditures	Debt Service	Total Expenditures	Net Fund Balance[5]
2016-17	$3,419,401	$58,300	$117,047	$831,520	$374,029	$1,322,596	$934,344	$2,256,940	$1,220,761
2017-18	$3,627,913	$94,714	$117,330	$723,610	$633,434	$1,474,374	$7,114,455	$8,588,829	($4,866,202)
2018-19	$3,482,719	$208,518	$127,070	$889,227	$340,152	$1,356,449	$991,971	$2,348,420	$1,342,817
2019-20	$3,628,250	$4,780	$123,575	$651,652	$141,315	$916,542	$1,029,305	$1,945,847	$1,687,183
2020-21	$3,995,331	$125,664	$151,307	$786,061	$343,922	$1,281,290	$991,971	$2,273,261	$1,847,734

Notes:

1 Additional revenue includes cash flows provided by investing activities.

2 Includes sewer and administration personnel services.

3 Includes sewer and administration materials and services.

4 O&M = operation and maintenance.

5 Net fund balance does not include annual cash carryover or capital reserve transfers into fund.

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

HISTORICAL SEWER SYSTEM FUNDS

FIGURE
6-1

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
PRELIMINARY SEWER RATE ANALYSIS FOR LOAN CAPACITY
2023-24 BUDGET YEAR

Average Monthly Rate[1]	Revenue Potential[2]	Estimated OM&R Costs[3]	Revenue Available for Future Debt Service	Water/ Wastewater Loan Funding Capacity (2.53 Percent, 25-Year Term)[4,5]	CWSRF Loan Capacity (1.33 Percent, 15-Year Term)[4]	CWSRF Loan Capacity (1.92 Percent, 30-Year Term)[4]
$ 55.61	$ 5,348,570	$ 4,482,681	$ 865,889	$ 10,000,000	$ 11,705,000	$ 19,608,000
$ 56	$ 5,386,080	$ 4,482,681	$ 903,399		$ 12,212,000	$ 20,457,000
$ 57	$ 5,482,260	$ 4,482,681	$ 999,579		$ 13,512,000	$ 22,635,000
$ 58	$ 5,578,440	$ 4,482,681	$ 1,095,759		$ 14,812,000	$ 24,813,000
$ 59	$ 5,674,620	$ 4,482,681	$ 1,191,939		$ 16,112,000	$ 26,991,000
$ 60	$ 5,770,800	$ 4,482,681	$ 1,288,119		$ 17,412,000	$ 29,169,000
$ 61	$ 5,866,980	$ 4,482,681	$ 1,384,299		$ 18,712,000	$ 31,347,000
$ 62	$ 5,963,160	$ 4,482,681	$ 1,480,479		$ 20,012,000	$ 33,525,000
$ 63	$ 6,059,340	$ 4,482,681	$ 1,576,659		$ 21,312,000	$ 35,703,000
$ 64	$ 6,155,520	$ 4,482,681	$ 1,672,839		$ 22,612,000	$ 37,881,000
$ 65	$ 6,251,700	$ 4,482,681	$ 1,769,019		$ 23,913,000	$ 40,059,000
$ 66	$ 6,347,880	$ 4,482,681	$ 1,865,199		$ 25,213,000	$ 42,237,000
$ 67	$ 6,444,060	$ 4,482,681	$ 1,961,379		$ 26,513,000	$ 44,415,000
$ 68	$ 6,540,240	$ 4,482,681	$ 2,057,559		$ 27,813,000	$ 46,593,000
$ 69	$ 6,636,420	$ 4,482,681	$ 2,153,739		$ 29,113,000	$ 48,771,000
$ 70	$ 6,732,600	$ 4,482,681	$ 2,249,919		$ 30,413,000	$ 50,949,000
$ 71	$ 6,828,780	$ 4,482,681	$ 2,346,099		$ 31,713,000	$ 53,127,000
$ 72	$ 6,924,960	$ 4,482,681	$ 2,442,279		$ 33,013,000	$ 55,305,000
$ 73	$ 7,021,140	$ 4,482,681	$ 2,538,459		$ 34,313,000	$ 57,483,000
$ 74	$ 7,117,320	$ 4,482,681	$ 2,634,639		$ 35,614,000	$ 59,661,000
$ 75	$ 7,213,500	$ 4,482,681	$ 2,730,819		$ 36,914,000	$ 61,839,000
$ 76	$ 7,309,680	$ 4,482,681	$ 2,826,999		$ 38,214,000	$ 64,017,000
$ 77	$ 7,405,860	$ 4,482,681	$ 2,923,179		$ 39,514,000	$ 66,195,000
$ 78	$ 7,502,040	$ 4,482,681	$ 3,019,359		$ 40,814,000	$ 68,373,000
$ 79	$ 7,598,220	$ 4,482,681	$ 3,115,539		$ 42,114,000	$ 70,551,000
$ 80	$ 7,694,400	$ 4,482,681	$ 3,211,719		$ 43,414,000	$ 72,729,000
$ 81	$ 7,790,580	$ 4,482,681	$ 3,307,899		$ 44,714,000	$ 74,907,000
$ 82	$ 7,886,760	$ 4,482,681	$ 3,404,079		$ 46,014,000	$ 77,085,000
$ 83	$ 7,982,940	$ 4,482,681	$ 3,500,259		$ 47,315,000	$ 79,263,000
$ 84	$ 8,079,120	$ 4,482,681	$ 3,596,439		$ 48,615,000	$ 81,441,000
$ 85	$ 8,175,300	$ 4,482,681	$ 3,692,619		$ 49,915,000	$ 83,619,000
$ 86	$ 8,271,480	$ 4,482,681	$ 3,788,799		$ 51,215,000	$ 85,797,000
$ 87	$ 8,367,660	$ 4,482,681	$ 3,884,979		$ 52,515,000	$ 87,975,000
$ 88	$ 8,463,840	$ 4,482,681	$ 3,981,159		$ 53,815,000	$ 90,153,000
$ 89	$ 8,560,020	$ 4,482,681	$ 4,077,339		$ 55,115,000	$ 92,330,000
$ 90	$ 8,656,200	$ 4,482,681	$ 4,173,519		$ 56,415,000	$ 94,508,000
$ 91	$ 8,752,380	$ 4,482,681	$ 4,269,699		$ 57,715,000	$ 96,686,000
$ 92	$ 8,848,560	$ 4,482,681	$ 4,365,879		$ 59,015,000	$ 98,864,000
$ 93	$ 8,944,740	$ 4,482,681	$ 4,462,059		$ 60,316,000	$ 101,042,000
$ 94	$ 9,040,920	$ 4,482,681	$ 4,558,239		$ 61,616,000	$ 103,220,000
$ 95	$ 9,137,100	$ 4,482,681	$ 4,654,419		$ 62,916,000	$ 105,398,000
$ 96	$ 9,233,280	$ 4,482,681	$ 4,750,599		$ 64,216,000	$ 107,576,000
$ 97	$ 9,329,460	$ 4,482,681	$ 4,846,779		$ 65,516,000	$ 109,754,000
$ 98	$ 9,425,640	$ 4,482,681	$ 4,942,959		$ 66,816,000	$ 111,932,000
$ 99	$ 9,521,820	$ 4,482,681	$ 5,039,139		$ 68,116,000	$ 114,110,000
$ 100	$ 9,618,000	$ 4,482,681	$ 5,135,319		$ 69,416,000	$ 116,288,000
$ 101	$ 9,714,180	$ 4,482,681	$ 5,231,499		$ 70,716,000	$ 118,466,000
$ 102	$ 9,810,360	$ 4,482,681	$ 5,327,679		$ 72,017,000	$ 120,644,000
$ 103	$ 9,906,540	$ 4,482,681	$ 5,423,859		$ 73,317,000	$ 122,822,000
$ 104	$ 10,002,720	$ 4,482,681	$ 5,520,039		$ 74,617,000	$ 125,000,000
$ 105	$ 10,098,900	$ 4,482,681	$ 5,616,219		$ 75,917,000	$ 127,178,000
$ 106	$ 10,195,080	$ 4,482,681	$ 5,712,399		$ 77,217,000	$ 129,356,000
$ 107	$ 10,291,260	$ 4,482,681	$ 5,808,579		$ 78,517,000	$ 131,534,000
$ 108	$ 10,387,440	$ 4,482,681	$ 5,904,759		$ 79,817,000	$ 133,712,000
$ 109	$ 10,483,620	$ 4,482,681	$ 6,000,939		$ 81,117,000	$ 135,890,000
$ 110	$ 10,579,800	$ 4,482,681	$ 6,097,119		$ 82,417,000	$ 138,068,000
$ 111	$ 10,675,980	$ 4,482,681	$ 6,193,299		$ 83,718,000	$ 140,246,000
$ 112	$ 10,772,160	$ 4,482,681	$ 6,289,479		$ 85,018,000	$ 142,424,000
$ 113	$ 10,868,340	$ 4,482,681	$ 6,385,659		$ 86,318,000	$ 144,602,000
$ 114	$ 10,964,520	$ 4,482,681	$ 6,481,839		$ 87,618,000	$ 146,780,000
$ 115	$ 11,060,700	$ 4,482,681	$ 6,578,019		$ 88,918,000	$ 148,958,000
$ 116	$ 11,156,880	$ 4,482,681	$ 6,674,199		$ 90,218,000	$ 151,136,000
$ 117	$ 11,253,060	$ 4,482,681	$ 6,770,379		$ 91,518,000	$ 153,314,000
$ 118	$ 11,349,240	$ 4,482,681	$ 6,866,559		$ 92,818,000	$ 155,492,000

Notes:

[1] Current monthly rate = $55.61.

[2] Revenue potential determined by assuming 8,015 Residential EDU accounts and using the following formula:
Revenue = (Total Number of EDUs = 8,015 x Monthly Rate) x 12

[3] Estimated operation, maintenance, and replacement costs are projected for the 2021-22 budget year.

[4] Loan terms are further described in Chapter 6 of the Wastewater Facilities Plan. Loan capacities are rounded to the nearest $1,000.

[5] Maximum loan amount is $10 million. Does not include an annual fee of 0.5 percent of the remaining loan amount.

CWSRF = Clean Water State Revolving Fund

EDU = Equivalent Dwelling Unit

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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN

PRELIMINARY SEWER RATE
ANALYSIS F LOAN CAPACITY

FIGURE
6-2

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
PRELIMINARY PROPERTY TAX BONDING CAPACITY ANALYSIS

Typical CWSRF Loan - 30-Year Term

Loan Amount	Interest Rate[1]	Loan Period (years)	Estimated Annual Payment	Estimated Annual Tax Rate Increase per $1,000[2,3]	Estimated Annual Tax Increase for a $100,000 Home	
					Monthly	Annual
$1,000,000	1.52%	30	$44,160	$1.45	$12.08	$145.00
$2,000,000	1.52%	30	$88,321	$2.90	$24.17	$290.00
$3,000,000	1.52%	30	$132,481	$4.35	$36.25	$435.00
$4,000,000	1.52%	30	$176,641	$5.80	$48.33	$580.00
$5,000,000	1.52%	30	$220,801	$7.25	$60.42	$725.00
$6,000,000	1.52%	30	$264,962	$8.70	$72.50	$870.00
$7,000,000	1.52%	30	$309,122	$10.15	$84.58	$1,015.00
$8,000,000	1.52%	30	$353,282	$11.60	$96.67	$1,160.00
$9,000,000	1.52%	30	$397,442	$13.05	$108.75	$1,305.00
$10,000,000	1.52%	30	$441,603	$14.49	$120.75	$1,449.00
$11,000,000	1.52%	30	$485,763	$15.94	$132.83	$1,594.00
$12,000,000	1.52%	30	$529,923	$17.39	$144.92	$1,739.00
$13,000,000	1.52%	30	$574,083	$18.84	$157.00	$1,884.00
$14,000,000	1.52%	30	$618,244	$20.29	$169.08	$2,029.00
$15,000,000	1.52%	30	$662,404	$21.74	$181.17	$2,174.00
$16,000,000	1.52%	30	$706,564	$23.19	$193.25	$2,319.00
$17,000,000	1.52%	30	$750,725	$24.64	$205.33	$2,464.00
$18,000,000	1.52%	30	$794,885	$26.09	$217.42	$2,609.00
$19,000,000	1.52%	30	$839,045	$27.54	$229.50	$2,754.00
$20,000,000	1.52%	30	$883,205	$28.99	$241.58	$2,899.00

[1] Actual loan interest rates could vary. Rates adopted are based on recent information available.

[2] Actual loan interest rates could vary. Rate adopted for an intermediate borrow for the first quarter fiscal year 2023.

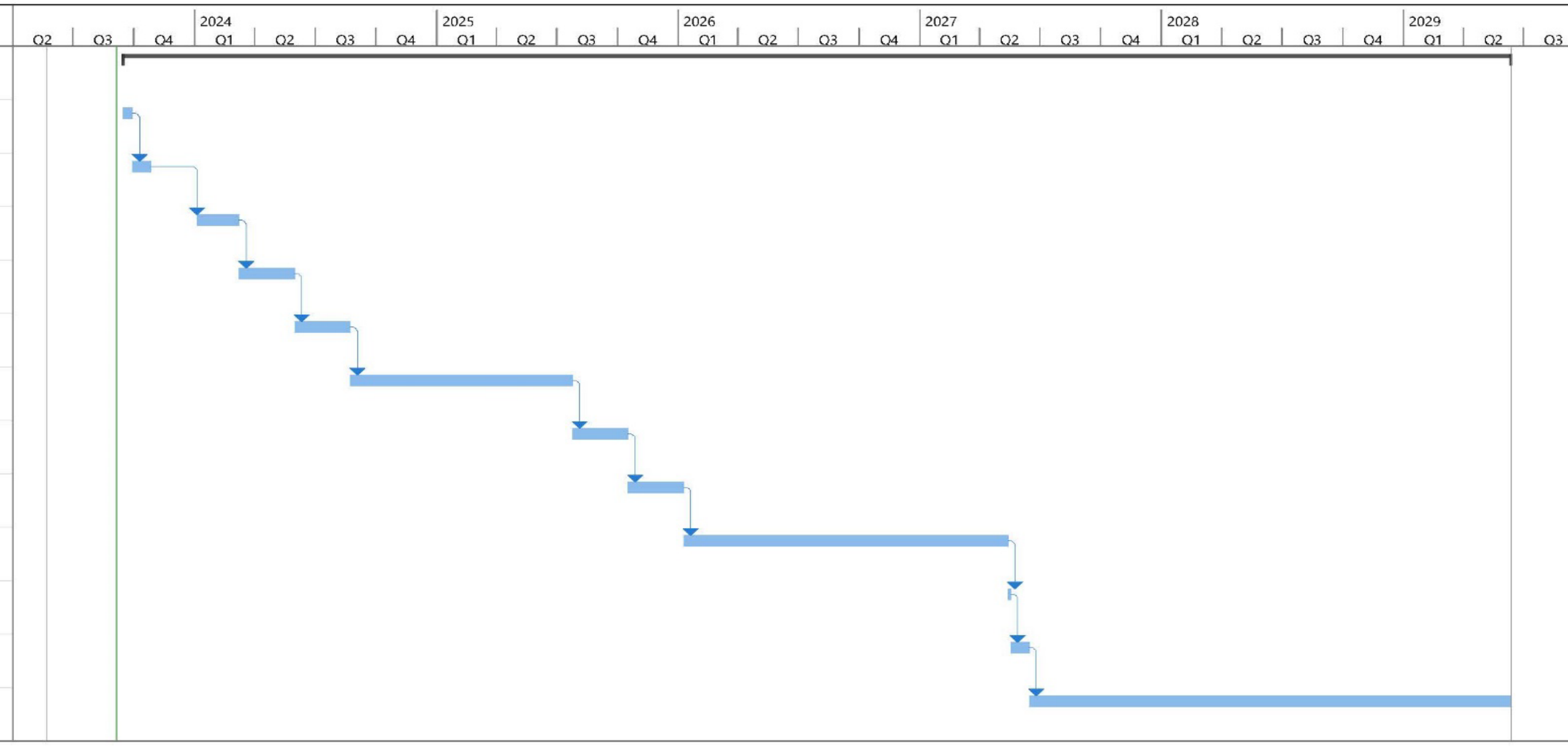
[3] The annual tax rate increase is based on the City of Prineville's 2020-21 assessed valuation of $1,152,433,106. It was also assumed that 100 percent of taxes would be collected. Typically, a small percentage of taxes is not paid, which would require the estimated tax rate to be increased slightly higher than what is shown herein. Per ORS 287.004(2) "no city shall issue or have outstanding at any one time bonds in excess of 3 percent of the real market value of all taxable property within its boundaries, computed in accordance with ORS 308.297." This allows a legal debt margin of $30,466,879.

CWSRF = Clean Water State Revolving Fund

ORS = Oregon Revised Statutes

CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
PLANNING PROCESS IMPLEMENTATION SCHEDULE

ID	Task Name
1	**City of Prineville Wastewater Facilities (WWFP) Plan**
2	Submit Draft WWFP to the City for Review
3	Finalize and Adopt the WWFP
4	Attend One Stop Meeting
5	Prepare and Submit Funding Packages
6	Finalize Project Funding
7	Design System Improvements
8	Submit Design Documents for Agency Review
9	Advertise, Bid, and Award Construction Project
10	Project Construction
11	Project Startup and Construction Complete
12	Project Closeout
13	Monitor System Performance



Project: Prineville WWFP Sched
Date: Tue 9/5/23

Task | Split | Milestone ◆

Page 1

CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
PLANNING PROCESS
IMPLEMENTATION SCHEDULE

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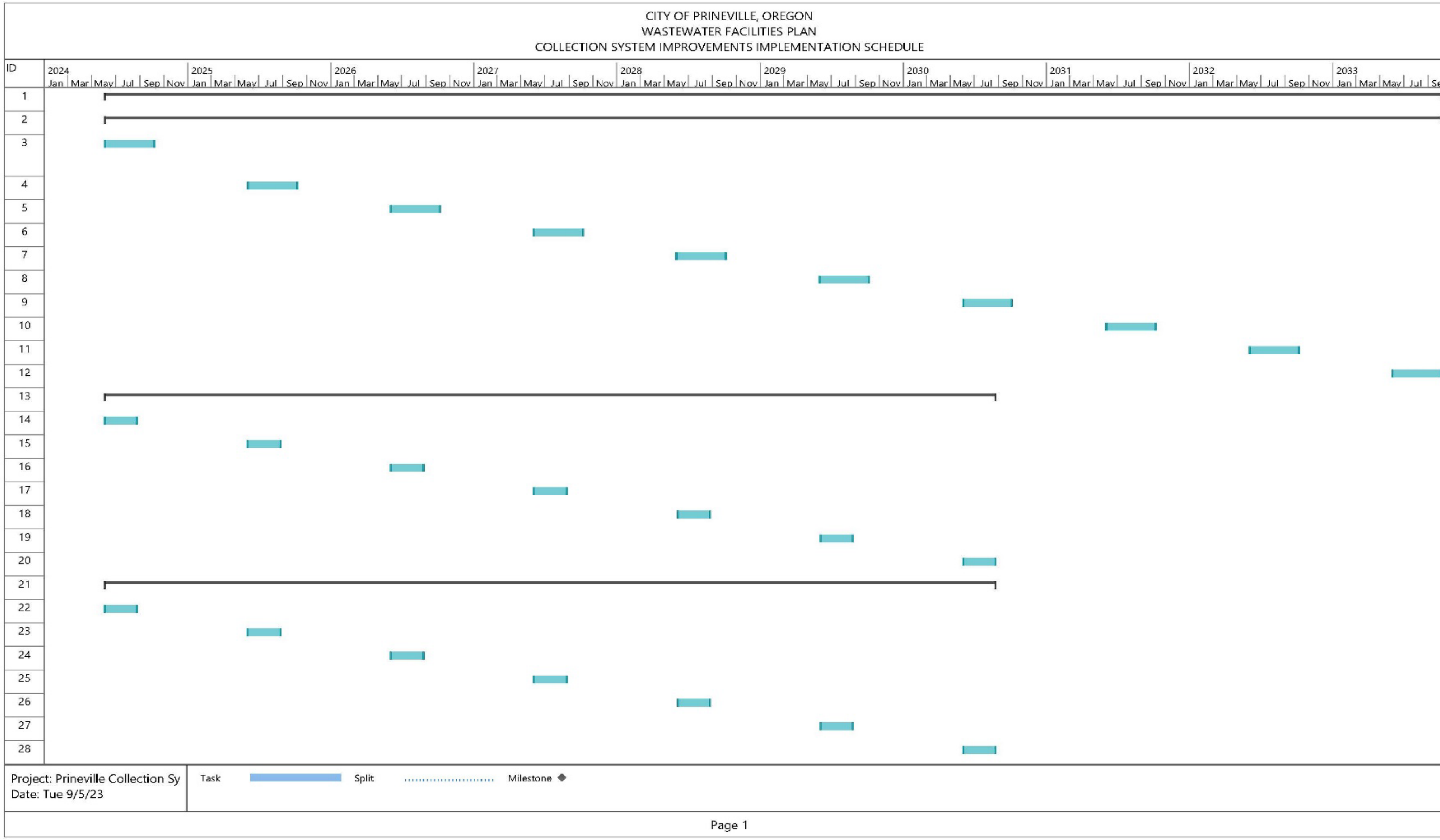
FIGURE
6-4



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CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN
COLLECTION SYSTEM IMPROVEMENTS IMPLEMENTATION SCHEDULE

FIGURE 6-5

Section 7 - Conclusions and Recommendations

General

The primary goal of this Wastewater Facilities Plan (WWFP) is to develop flexible, dynamic facilities that address potential regulatory, social, environmental, population, and economic changes. Each component is recommended on the basis of a distinct need, condition, capacity, performance, regulatory criteria, or some combination thereof.

Coordination with all stakeholders is important to optimize the benefits of the planned improvements. It is recommended that the City continue to gather data and work with regulatory agencies and stakeholders to define the impacts of newly developed treatment standards and explore options for how those requirements may be met. This coordination is imperative to maintaining an open dialogue to address challenges and successes and to maintain a cooperative environment of participation.

Permit Renewal

The City of Prineville's National Pollutant Discharge Elimination System (NPDES) Permit renewal is scheduled for 2024. Activities that the Oregon Department of Environmental Quality (DEQ) is requiring as part of the NPDES Permit renewal process for the City that are outside the scope of this WWFP include:

- Develop and implement an Industrial Pretreatment Program (IPP)
- Conduct additional sampling per the DEQ request on March 28, 2022, and as modified by the City's request on May 4, 2022

Industrial Pretreatment Program

The DEQ required the City to submit an Industrial User (IU) Survey as described in 40 Code of Federal Regulations 403.8(f)(2)(i-iii) "suitable to make a determination as to the need for development of a pretreatment program." The IU Survey was provided to the DEQ in July 2018. A public hearing regarding the IPP was held at the City Council meeting on September 27, 2022. No questions or written testimony were received. The IPP Manual is in the final stages of completion for submittal to the DEQ in 2023.

Additional Sampling Requirements

On March 28, 2022, the DEQ sent a letter to the City requiring additional information to fully evaluate the site-specific conditions of the wastewater treatment facility (WWTF) in order to proceed with the NPDES Permit renewal. A summary of the required supplemental information follows:

- Receiving Water Ammonia as N. Sampling analyzed with a quantitation limit no greater than 0.2 milligrams per liter and to be reported with monthly Discharge Monitoring Report data.

- Copper Biotic Ligand Model and Aluminum Parameter Data
- Toxic Pollutants
- Mixing Zone Information

The City and Anderson Perry & Associates, Inc., requested a modification to the additional sampling requirements in a meeting with the DEQ on April 11, 2022. On May 4, 2022, the DEQ responded with a modification to the original request for additional information. The constituent sampling remains the same; however, the number of sampling locations and, therefore, the number of samples, have been reduced. The City continues to complete the required additional sampling and reporting to the DEQ.

Additional Recommendations

In addition to the recommended improvements in this WWFP, other recommendations for improving the maintenance and management of the wastewater system include:

- Asset Management
  - Continue to update data, such as pipe material, year installed, and invert elevations in the City's geographic information systems database.
  - Continue to update information on mechanical equipment, such as brand, model number, horsepower, and year installed, and performance information, if applicable, such as pump curves.
  - Establish a maintenance schedule for system components based on manufacturers' recommended intervals.
  - Standardize condition assessments and television inspection reports, and update the database whenever those inspections are conducted.
- Additional Reuse Opportunities
  - Continue to pursue additional wastewater effluent reuse opportunities, such as industrial cooling water.

Conclusions

Currently, the City of Prineville operates a very resilient and redundant WWTF. The use of two separate plants operating in parallel allows for simplified maintenance and an enhanced ability to respond to changing conditions. With backup power generation at all critical facilities, solar power, and a wetlands disposal system, the WWTF represents a strong foundation for future growth. With the recommended improvements identified in this WWFP, the City can improve critical systems that, although function properly, need updating. These recommended improvements will improve operational efficiency, reduce energy consumption and cost, and improve the quality of treatment. Upgrades to the existing supervisory control and data acquisition (SCADA) systems will improve data acquisition and system awareness for operators. Additionally, the construction of a needed operations building and laboratory will reduce annual testing costs and provide improved facilities for wastewater personnel.

While the majority of the collection system was constructed in the 1960s, it continues to perform adequately. Root removal and other maintenance is completed regularly, as needed. Additional inspection and evaluation of the collection system will provide guidance for maintenance activities and funding to be prioritized by need for pipe lining, pipe replacement, and manhole repair. System bottlenecks, although few, can be addressed through pipe replacement, including larger diameter pipe and manholes as appropriate and sized for future growth.

The six wastewater lift stations owned and operated by the City continue to perform as required; however, significant upgrades are needed. The lift stations are in good condition structurally, with minor periodic maintenance required, but the pumps and appurtenances, controls, and electrical systems are out of date and at risk of failure. Two of the lift stations do not have proper guide rail and disconnect systems for the pumps, and two lift stations have guide rail and disconnect systems that are badly corroded, which requires WWTF personnel to enter the wetwell to remove pumps for maintenance or replacement. The risk to personnel is considerable, and the proposed upgrades will greatly reduce the need for operators to enter wetwells. SCADA upgrades to the lift stations will allow for remote data acquisition, control, and alarms to warn operators of system conditions that need attention. Additionally, standardizing pumps and appurtenances, controls, and electrical systems will reduce the need to keep multiple replacement parts in inventory, reducing inventory cost and storage space requirements.

Overall, the City of Prineville has a good wastewater system. The system is well-operated and maintained, and the City continues to pursue opportunities to improve the system by increasing operator efficiency, reducing energy consumption, and finding opportunities to improve the environment in and around Prineville, such as using treatment wetlands for effluent treatment. While population growth in excess of forecasted numbers continues, the City's wastewater system can handle this growth and, with the proposed improvements, the City can continue to expand its wastewater capabilities to serve users through the 20-year planning period and beyond.

City of
Prineville, Oregon
Water System Master Plan

2023

anderson perry & associates, inc.
engineering · surveying · natural resources

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WATER SYSTEM MASTER PLAN

FOR

CITY OF PRINEVILLE, OREGON

2023

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DAVID W. WILDMAN
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ANDERSON PERRY & ASSOCIATES, INC.

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Executive Summary

Introduction

This Executive Summary briefly summarizes the results of the Water System Master Plan (WSMP) prepared by Anderson Perry & Associates, Inc., for the City of Prineville, Oregon. The recommendations outlined hereafter have been developed in cooperation with the Prineville City Council and City staff. The focus of this WSMP is on the City's water system components, including the water supply, storage, and distribution systems. This WSMP includes an analysis of the existing systems and their performance, an evaluation of system needs and improvement alternatives, and development of a financial plan and project implementation plan. Included in this Executive Summary is a brief discussion of the population, design criteria, summary of the evaluation and needs of water system components, categories of improvements and summary of costs, and project financing and implementation. For a more detailed discussion of the information presented in this Executive Summary, refer to the individual chapters of this WSMP.

Population

To estimate future water system demands, population projections must be made. Projections are usually made based on an annual percentage increase estimated from past growth rates combined with future expectations. The City of Prineville's population at the 2020 Census was 10,736. The certified population estimate by the Population Research Center (PRC) at Portland State University for 2021 was 11,042, with a predicted average annual growth rate of 1.1 percent between the years 2022 and 2042.

The historical population plus the projected annual growth rate results in a 20-year (year 2042) population estimate of 13,743. This WSMP uses 13,743 as the 20-year design population inside the city limits.

It is important to note that an estimated 812 people within the city limits do not receive City-supplied water, and an estimated 295 people outside the city limits but within the urban growth boundary (UGB) do receive City-supplied water. Therefore, the net 2022 population served by City-supplied water is estimated to be 10,525. A review of historical water data must be completed using the connected population. Improvements to the distribution system are needed to be able to connect the entire population within the city limits. In addition, there are areas of residential development outside the city limits but within the UGB. If 20 percent of these areas are annexed into the City in addition to the 812 people not currently connected, the connected population could increase by 1,297 people to 11,822 without any additional people moving into the area.

To obtain a realistic population that could require service from the water system in the next 20 years, a design population of 14,722 in the year 2042 was estimated by utilizing the average annual growth rate values declared by the PRC with the addition of the anticipated future connected population.

Design Criteria

When establishing design standards for a water system, primary consideration must be given to state and federal rules and regulations governing water quality and construction standards for water systems. These regulations are set by both the U.S. Environmental Protection Agency (EPA) and the Oregon

Health Authority - Drinking Water Services (DWS). In addition to these public health and safety requirements, many other factors control the design parameters for municipal water systems. The City must evaluate factors such as financial feasibility, philosophy, and policies of the City Council; past system performance and service; and expectations of the water users. All of these factors are important and can influence the standards by which water system improvements are created.

Chapter 2 presents design criteria for evaluating the existing water system and developing improvements to satisfy present and future needs. Application of these criteria is discussed further in the specific chapters that address the water supply, storage, and distribution system facilities.

Existing Water System

The City of Prineville utilizes water drawn from groundwater wells tapped into the aquifer beneath the valley floor and the Airport Area Aquifer System. Twenty-eight groundwater wells are used, 17 of which pump into a Water Treatment Plant for treatment prior to entering the distribution system. The City uses four aboveground reservoirs in the Valley Floor area and two aboveground reservoirs in the Airport Area for storage. The six combined reservoirs have a capacity of 4.5 million gallons (MG) of storage.

In 2019, the City acquired a Limited License to begin pilot testing for an aquifer storage and recovery (ASR) injection and recovery operation. The ASR program is intended to increase storage during periods of reduced demand and for use during periods of high demand. More detailed information regarding the ASR program is included in this WSMP.

The distribution system began operation in the 1920s and, therefore, is composed of an assortment of pipe sizes and materials. Throughout its history, the City has grown beyond the original system and has upgraded much of the original distribution system to improve flow, pressure, and circulation.

Water Quality Requirements

The City of Prineville's water system comes under the jurisdiction of the DWS. The DWS assumed primary responsibility from the EPA in February 1986 for enforcement of the federal Safe Drinking Water Act. Therefore, the City works primarily with DWS as the regulating agency with regard to their water system. The City has not had any water quality violations but has had 14 cases of late/ nonreporting violations, all of which have been returned to compliance.

In summary, many regulations affect the operation of the City of Prineville's water system. The City has good water quality with a well-run system meeting federal and state water quality criteria.

Summary of Supply, Storage, and Distribution Systems' Evaluation and Needs

Supply

At this time the City has enough source capacity to meet current and future demands. It is desirable to design a system with enough source capacity to provide for peak daily demands without requiring the well pumps to operate 24 hours per day. The 2042 peak daily flow requirement is estimated to be 5,220 gallons per minute (gpm). The current capacity from the City's 11 wells and Crooked River Wellfield is approximately 6,436 gpm based on current water rights withdrawal rate limits. As a preliminary step the City should explore water right improvements for existing sources to allow higher withdrawal rates to further maximize existing source production. With additional water rights, the City could begin developing additional wells in the Deschutes Regional Aquifer within the Airport Area or by constructing additional wells in the Valley Floor area. Both options are currently being explored, and additional source capacity has recently been constructed in the Valley Floor area. The City and its partners continue to evaluate water sources and the necessary water rights in order to acquire additional capacity for future growth. Once the study is completed, the information needed to compare alternatives will be available, and the City will have the required data and documentation to make the best long-term decision to meet supply capacity needs.

Storage

The City currently has six operating storage reservoirs with a total volume of 4.5 MG. With the exception of the Ochoco Heights reservoirs, the existing condition of the reservoirs is generally good to very good. The recommended storage needed for the 20-year planning period is 5.9 MG, so the City should add another 1.4 MG of storage within the planning period. Additionally, maintenance and rehabilitation improvements are recommended for the Ochoco Heights reservoirs as discussed below.

Anticipated future growth in east Prineville will require expansion of two existing water system pressure zones, Williamson and Barnes Butte. The expansion of these two pressure zones will allow additional water to move into the Valley Floor Pressure Zone through the use of pressure reducing valves (PRVs). A new 1.0 MG reservoir is recommended to be constructed in connection with the growth in this area to provide adequate system pressures and fire protection. The lower of the two pressure zones would be served by gravity flows from the new reservoir. A booster pump station would be necessary to provide adequate pressures to fill the new reservoir. While this improvement will not directly impact the Barnes Butte Pressure Zone, it is anticipated that the additional pressure downstream of the Williamson, Wilco, and Combs Flat PRVs will help to maintain pressure and stored water volume in the Barnes Butte Pressure Zone.

As discussed in Chapter 4, a new larger reservoir (1.5 MG) is recommended to be constructed at the existing Ochoco Heights reservoirs site. This would enable the existing reservoirs to continue to serve the system as the new reservoir is constructed. Once the new reservoir is constructed and in operation, one of the existing 0.5 MG reservoirs can be taken out of service to complete renovations and repairs. Once the rehabilitation work is complete, the renovated and repaired reservoir would work in conjunction with the new reservoir, providing a total of 2.0 MG storage at the site. The second existing 0.5 MG reservoir would be demolished.

Distribution

As detailed in Chapter 5, the City's distribution system is generally well looped and provides adequate system-wide pressures under normal operating conditions. Fire flow availability is limited in some areas of the system due to several undersized main lines and areas of higher elevation. The undersized main lines in the system result in both fire flow capacity limitations and water circulation issues. Some of these lines, where improved fire flow capacities are needed, are recommended for upgrading. It is recommended the City complete improvements to the distribution system to eliminate as many deteriorating and undersized main lines as possible and provide improved system fire flow capacities in areas lacking adequate fire flows. Key water distribution system improvements have been identified to meet the following objectives:

- Improve water quality and circulation by replacing old, undersized, deteriorating pipe. Increase flow capacity to the existing system to provide adequate fire flows to residential, commercial, and industrial areas.
- Replace existing small diameter or wood stave water pipes. Upsize water pipes in key locations to increase fire flow.
- Connect existing homes in the Fairview, Crestview, and Seehale areas to City water.
- Improve the system to serve future growth.
- Construct a new transmission main, booster pump station, and reservoir to serve growth in the east portion of the City. This improvement will also eliminate some of the low-pressure problems currently experienced in the system at higher elevation areas by reducing the amount of water released through PRVs.
- Construct a new reservoir and booster pump station at Ochoco Heights. Refurbish one existing 0.5 MG reservoir and demolish the other 0.5 MG reservoir.
- Construct future mains and booster pump stations to serve growth within the UGB.

To meet these objectives, address identified deficiencies and support growth and development, the recommended water system improvements have been identified and are shown on Figure ES-1.

Categories of Improvements and Summary of Costs

The City of Prineville's intent is to complete water system improvements utilizing the following funding categories:

System Development Charge (SDC)

Improvements identified under the SDC category were developed to address those needs in the system to specifically support growth and associated increased system demands.

Capital Improvements Plan (CIP)

Improvements identified under the CIP category include capital improvements projects that need to be completed to address existing system deficiencies irrespective of growth.

Proposed water system improvements under the SDC funding category are shown on Figure ES-1. A summary of the identified improvements and estimated costs categorized under the SDC funding category are shown on Figure ES-2. It should be noted the reference numbers shown on the figure have been arbitrarily assigned and are not in order of priority. It is not possible to assign priorities to the improvements identified under the SDC funding category as they are development driven and it is unknown which areas of the City will develop first or how quickly development within the City will occur.

The CIP identifies and prioritizes short-, medium-, and long-term capital projects of all types based on the water system master planning process. Capital water system improvements projects will be coordinated with the annual budget process to maintain full utilization of available resources. For each capital improvements project, the CIP provides a variety of information, including a project description and the service need to be addressed, a proposed timetable, and proposed funding levels. Capital water system improvements projects will be prioritized with the most urgent projects first, or projects that should be completed as part of another improvement, such as street reconstruction. Ongoing operating costs are not included in the CIP estimated project costs.

Development of a CIP is a collaborative effort between the City manager, engineer, City Council members, department heads, and the City's engineering and financial consultants. City staff participates in CIP development via specific master plans and other planning tools. Major capital improvements projects require City Council interaction during project development and where funding allocations are made.

A summary of the identified improvements and associated costs categorized under the CIP funding category are shown on Figure ES-3. It should be noted the reference numbers shown on the figure have been assigned based on City-established priorities (1 being the highest and 11 being the lowest). The priorities are based on the relative urgency of addressing the identified existing deficiencies that are recommended regardless of population growth and associated development.

The estimated costs represent 2023 dollars. As project funding is established, costs should be projected to the year of the anticipated expenditure to account for inflation. It should be noted that due to the COVID-19 Pandemic and other global geopolitical issues, the current construction market pricing is abnormally high. This should be considered when projecting cost estimates for future water system improvements projects.

Action Items and Implementation Schedule

To move forward with completing the water system improvements summarized in this WSMP, the following actions are recommended.

Action Items

The City will need to:

- Submit and obtain approval of this WSMP from the DWS.
- Finalize and adopt this WSMP and the recommended improvements once agencies review and approve the draft WSMP.
- Review and update the City's Comprehensive Plan to incorporate the findings of the WSMP.
- Hold public information meetings to inform citizens of the need for and scope of the improvements projects, answer questions, and explain the need for potential increases in user fees.
- Develop a funding plan for the desired improvements during the time frames indicated in the CIP.
- Begin discussions with property owners to identify available lands for potential land acquisition associated with recommended improvements.
- Develop the required permitting (e.g., new water rights, boring under highways, river crossings, etc.)
- Obtain additional water rights to secure additional, future City water supply sources.

- Prepare funding applications, as applicable, for the associated water system improvements projects and submit them to the appropriate funding agencies.

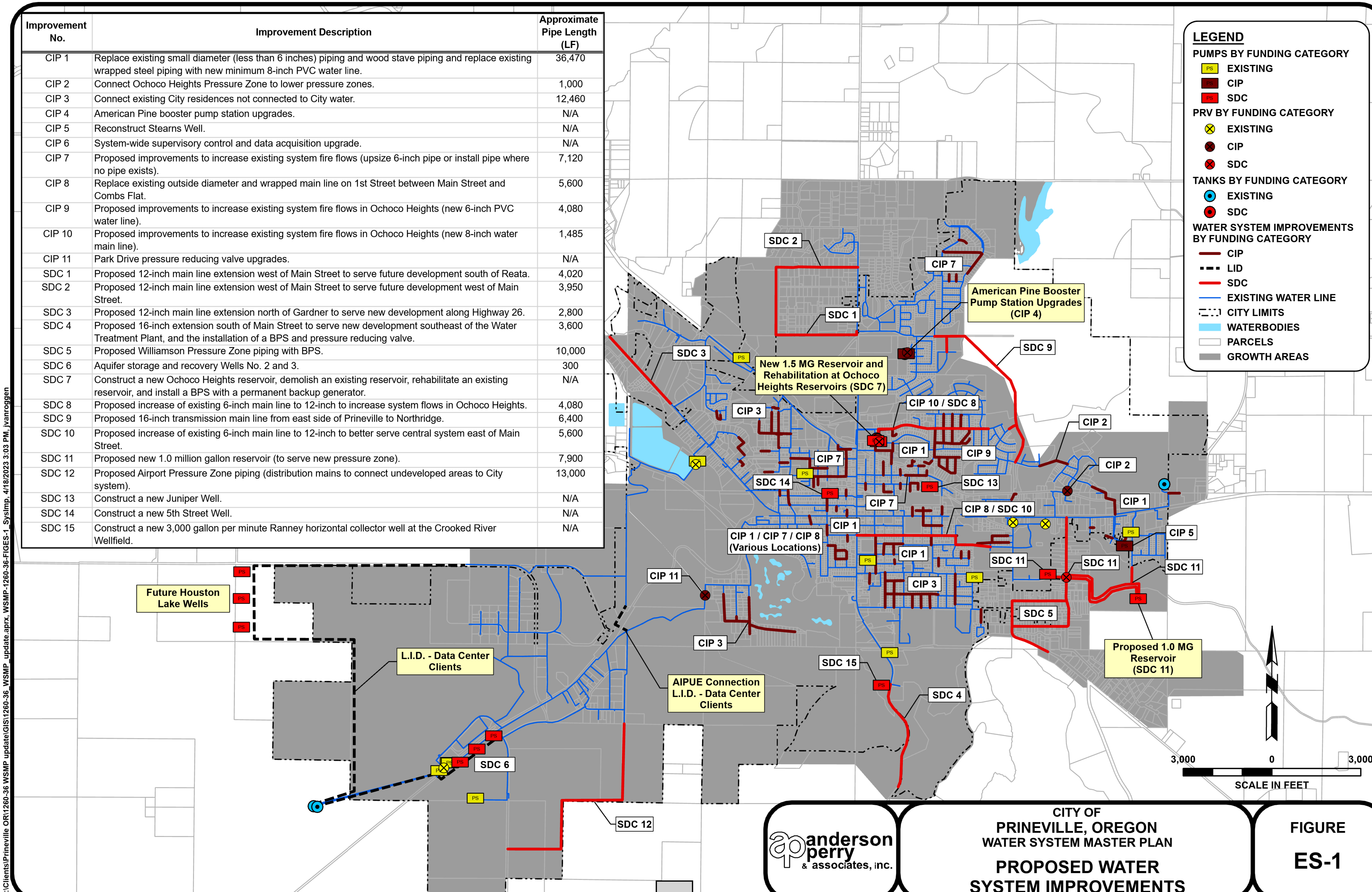
Recommended Improvements Summary Implementation Plan

To implement the recommended improvements, the City will need to secure monies to fund these improvements, while working closely with its citizens to inform them of the water system needs and the necessity for a possible increase in water user rates.

Water system improvements as outlined in this WSMP are intended to provide the City with a reliable, quality water system that will meet the needs of the City for the 20-year planning period and beyond. As development occurs, water system improvements will help the City meet these needs. With the CIP approach, the City may reduce or eliminate the need to borrow additional funds to complete some of the improvement projects. However, this approach can limit the speed at which more expensive improvements are implemented. If the City wishes to implement the water system improvements immediately due to rapid growth or aging infrastructure, funding from outside agencies would be needed. However, growth related improvements can also be funded from the SDC funding category, which is discussed further in Chapter 6. All of the options may require water user rates to be raised to adequately fund the recommended improvements over the 20-year planning period.

For a more detailed discussion of the City's financial status and project financing options, see Chapter 7.

Improvement No.	Improvement Description	Approximate Pipe Length (LF)
CIP 1	Replace existing small diameter (less than 6 inches) piping and wood stave piping and replace existing wrapped steel piping with new minimum 8-inch PVC water line.	36,470
CIP 2	Connect Ochoco Heights Pressure Zone to lower pressure zones.	1,000
CIP 3	Connect existing City residences not connected to City water.	12,460
CIP 4	American Pine booster pump station upgrades.	N/A
CIP 5	Reconstruct Stearns Well.	N/A
CIP 6	System-wide supervisory control and data acquisition upgrade.	N/A
CIP 7	Proposed improvements to increase existing system fire flows (upsize 6-inch pipe or install pipe where no pipe exists).	7,120
CIP 8	Replace existing outside diameter and wrapped main line on 1st Street between Main Street and Combs Flat.	5,600
CIP 9	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 6-inch PVC water line).	4,080
CIP 10	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 8-inch water main line).	1,485
CIP 11	Park Drive pressure reducing valve upgrades.	N/A
SDC 1	Proposed 12-inch main line extension west of Main Street to serve future development south of Reata.	4,020
SDC 2	Proposed 12-inch main line extension west of Main Street to serve future development west of Main Street.	3,950
SDC 3	Proposed 12-inch main line extension north of Gardner to serve new development along Highway 26.	2,800
SDC 4	Proposed 16-inch extension south of Main Street to serve new development southeast of the Water Treatment Plant, and the installation of a BPS and pressure reducing valve.	3,600
SDC 5	Proposed Williamson Pressure Zone piping with BPS.	10,000
SDC 6	Aquifer storage and recovery Wells No. 2 and 3.	300
SDC 7	Construct a new Ochoco Heights reservoir, demolish an existing reservoir, rehabilitate an existing reservoir, and install a BPS with a permanent backup generator.	N/A
SDC 8	Proposed increase of existing 6-inch main line to 12-inch to increase system flows in Ochoco Heights.	4,080
SDC 9	Proposed 16-inch transmission main line from east side of Prineville to Northridge.	6,400
SDC 10	Proposed increase of existing 6-inch main line to 12-inch to better serve central system east of Main Street.	5,600
SDC 11	Proposed new 1.0 million gallon reservoir (to serve new pressure zone).	7,900
SDC 12	Proposed Airport Pressure Zone piping (distribution mains to connect undeveloped areas to City system).	13,000
SDC 13	Construct a new Juniper Well.	N/A
SDC 14	Construct a new 5th Street Well.	N/A
SDC 15	Construct a new 3,000 gallon per minute Ranney horizontal collector well at the Crooked River Wellfield.	N/A



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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

PROPOSED WATER SYSTEM IMPROVEMENTS

FIGURE
ES-1

CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED SDC-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS
(YEAR 2023 COSTS)

Improvement No.[1]	Improvement Description	Approximate Pipe Length (LF)	Total Estimated Costs
SDC 1	Proposed 12-inch main line extension west of Main Street to serve future development south of Reata.	4,020	$ 1,700,000
SDC 2	Proposed 12-inch main line extension west of Main Street to serve future development west of Main Street.	3,950	1,914,000
SDC 3	Proposed 12-inch main line extension north of Gardner to serve new development along Highway 26.	2,800	1,010,000
SDC 4	Proposed 16-inch extension south of Main Street to serve new development southeast of the Water Treatment Plant, and the installation of a BPS and pressure reducing valve.	3,600	2,579,000
SDC 5	Proposed Williamson Pressure Zone piping with BPS.	10,000	5,066,000
SDC 6	Aquifer storage and recovery Wells No. 2 and 3.	300	5,052,000
SDC 7	Construct a new Ochoco Heights reservoir, demolish an existing reservoir, rehabilitate an existing reservoir, and install a BPS with a permanent backup generator.	N/A	7,231,000
SDC 8[2]	Proposed increase of existing 6-inch main line to 12-inch to increase system flows in Ochoco Heights.	4,080	1,118,000
SDC 9[3]	Proposed 16-inch transmission main line from east side of Prineville to Northridge.	6,400	3,021,000
SDC 10	Proposed increase of existing 6-inch main line to 12-inch to better serve central system east of Main Street.	5,600	1,313,000
SDC 11	Proposed new 1.0 million gallon reservoir (to serve new pressure zone).	7,900	8,775,000
SDC 12	Proposed Airport Pressure Zone piping (distribution mains to connect undeveloped areas to City system).	13,000	5,466,000
SDC 13	Construct a new Juniper Well.	N/A	850,000
SDC 14	Construct a new 5th Street Well.	N/A	850,000
SDC 15	Construct a new 3,000 gallon per minute Ranney horizontal collector well at the Crooked River Wellfield.	N/A	3,327,000
	TOTAL ESTIMATED SDC-FUNDED IMPROVEMENTS COST (2023 DOLLARS)		**$ 49,272,000**

[1] The SDC-funded improvements are not listed in order of priority. The improvement to be completed first will depend on where growth and development occur within the City.

[2] Cost to increase in size for future growth. Replacement cost shared with CIP 9.

[3] Cost to increase in size for future growth. Replacement cost shared with CIP 8.

BPS = booster pump station

CIP = Capital Improvements Plan

LF = linear feet

N/A = not applicable

SDC = system development charge

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED SDC-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS

FIGURE ES-2

CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED CIP-FUNDED IMPROVEMENTS
AND ESTIMATED PROJECT COSTS
(YEAR 2023 COSTS)

Improvement No.[1]	Improvement Description	Approximate Pipe Length (LF)	Total Estimated Costs	Time Frame When Improvements Completed
CIP 1	Replace existing small diameter (less than 6 inches) piping and wood stave piping and replace existing wrapped steel piping with new minimum 8-inch PVC water line.	36,470	$ 14,708,000	0 to 40 years
CIP 2	Connect Ochoco Heights Pressure Zone to lower pressure zones.	1,000	2,379,000	0 to 10 years
CIP 3	Connect existing City residences not connected to City water.[2]	12,460	6,272,000	0 to 10 years
CIP 4	American Pine booster pump station upgrades.	N/A	325,000	0 to 10 years
CIP 5	Reconstruct Stearns Well.	N/A	693,000	0 to 10 years
CIP 6	System-wide supervisory control and data acquisition upgrade.	N/A	1,207,000	0 to 10 years
CIP 7	Proposed improvements to increase existing system fire flows (upsize 6-inch pipe or install pipe where no pipe exists).	7,120	2,463,000	0 to 20 years
CIP 8	Replace existing outside diameter and wrapped main line on 1st Street between Main Street and Combs Flat.[3]	5,600	1,483,000	0 to 20 years
CIP 9	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 6-inch PVC water line).[4]	4,080	1,166,000	0 to 20 years
CIP 10	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 8-inch water main line).	1,485	764,000	0 to 20 years
CIP 11	Park Drive pressure reducing valve upgrades.	N/A	42,000	10 to 20 years
TOTAL ESTIMATED CIP-FUNDED IMPROVEMENTS COST (2023 DOLLARS)			**$ 31,502,000**	

[1] Improvements listed in order of City-identified priority, with CIP 1 being the highest priority and CIP 11 being the lowest. CIPs 1, 3, and 10 will be pursued as funding allows. Individual improvements will be selected due to extreme deficiency, increased maintenance costs, system growth, or the ability to coordinate work with other City projects.

[2] Funding source to be determined.

[3] Replacement cost only. Increase in size for future growth capacity captured in SDC 10.

[4] Replacement cost only. Increase in size for future growth capacity captured in SDC 8.

LF = linear feet
N/A = not applicable
PVC = polyvinyl chloride
SDC = system development charge

Chapter 1 - Introduction

Purpose of Study

In 2018, Anderson Perry & Associates, Inc. (AP) completed a Water System Master Plan (WSMP) for the City of Prineville. Due to population and commercial growth beyond expectations, as well as the development of new water supply sources, the City has requested a comprehensive update to the 2018 WSMP. This WSMP is intended to replace the 2018 WSMP and provide updated information on which future operation of Prineville's municipal water system can be based. This WSMP is also intended to satisfy the criteria of the Oregon Health Authority - Drinking Water Services (DWS) and Oregon Administrative Rules 333-061-0060. This WSMP is intended to fulfill the DWS requirements for a current master plan for the next 20 years.

Preparation of this WSMP was authorized by an agreement between the City and AP, dated March 18, 2022. The primary purposes for developing this WSMP are to establish water system design criteria for a 20-year planning period; evaluate the adequacy of the existing water supply, treatment, storage, and distribution systems; evaluate alternatives and priorities for improving the City's water system; and identify a financial plan for implementing the recommended improvements. This WSMP will also serve as the basis for updating the existing Capital Improvements Plan (CIP) based on the identified improvements and priorities.

Organization of Study

This WSMP is divided into seven main chapters with an Executive Summary and Appendices. Specifically, the WSMP includes the following:

- The Executive Summary of the overall WSMP describes water quality and service goals (design criteria), present and future water system deficiencies, the City's selected and prioritized improvements for achieving the goals and correcting the deficiencies, and the recommended implementation schedule and financing program for constructing improvements.
- Chapter 1 - Introduction discusses the objectives of the WSMP, describes the community and environment, and provides a brief history of past development and operation of the City of Prineville's water system.
- Chapter 2 - Water System Requirements develops the data on which recommended improvements to the water system are based. Data relating to elements such as service area, population, land use, water use, fire flows, state and federal regulations, and the design criteria developed for this WSMP are presented. A description is also provided of the water quality and level of service goals (design criteria) for the water system considering existing and anticipated future regulatory requirements, non-regulatory water quality needs of water users, flow and pressure requirements, capacity needs related to water use, and fire flow needs.
- Chapter 3 - Water Supply and Treatment discusses the operation, capacity, and quality of the existing water supply and treatment systems with respect to existing and future system demands and regulations. Information is presented concerning water rights and permits for the appropriation of water from various sources. An evaluation of the existing water treatment

system is also included, as well as alternatives to address current treatment system deficiencies. A comparison of alternatives to obtain additional water supply sources is also provided.

- Chapter 4 - Water Storage discusses the existing storage reservoirs, presents the four primary components of water storage relative to the City's design criteria, evaluates alternative storage facilities, and provides recommendations for storage improvements.
- Chapter 5 - Distribution System presents information related to the existing distribution system facilities and fire protection. Existing deficiencies and deficiencies likely to develop during the planning period are identified.
- Chapter 6 - Summary of Proposed Improvements and Capital Improvements Plan presents information related to water supply, treatment, storage, and distribution system improvements developed through analysis of the system. Cost estimates are provided for each of the recommended water system improvements.
- Chapter 7 - Project Financing and Implementation provides a description of alternatives to finance water system improvements including local financing such as user rates, taxes, and financing assistance programs. A recommended water system improvement implementation process, including an evaluation of financing alternatives and identification of key implementation steps, is also provided.
- The Appendices contain key materials referenced in this WSMP, which are provided for future reference by City staff. This information includes well log and water rights information, testing results, and other applicable water system information.

Sources of Information

The conclusions and recommendations outlined in this WSMP are based on data, information, and records provided by the City. This information includes, in part, past flow records (supply and usage); financial data (operational cost, revenues, and cost distribution); descriptions of system operation, condition of system components, and identification of problem areas; water quality data; and system layout and sizing. The recommendations and conclusions are, therefore, dependent on the completeness and accuracy of the base information provided.

Review and Updating of Study

This WSMP should be periodically reviewed and updated to stay current with population growth, water system demands, and changing state and federal regulations. This WSMP is recommended to be reviewed at five-year intervals and be updated at ten-year intervals, or as growth dictates.

Objectives of Study

The primary objectives of this WSMP are to:

1. Establish planning criteria including service area boundaries; population growth projections; past, present, and future water usage patterns; fire flow requirements; federal and state standards; system pressures; and service goals.
2. Analyze the individual components of the existing water supply system considering capacity, compliance with current water quality standards, water rights, condition of components,

operational dependability, and cost of operation. Develop the water supply needs for the planning period and identify alternatives for meeting long-term water supply and treatment needs. Outline general operation and maintenance requirements for the water supply system.

3. Analyze the existing water storage facilities considering capacity, condition of the reservoirs, and distribution system pressures. Assess the City's storage capacity considering emergency storage, operational storage, equalization storage, and fire flow storage. Identify the storage requirements of the water system for the planning period.
4. Develop a Geographic Information System-based map of the distribution system including line sizes, line types, valve and hydrant locations, etc., when known.
5. Utilizing existing distribution system maps, a computer model, and City records, review the condition and adequacy of the distribution system piping. Identify system deficiencies and alternatives for meeting current and future system needs. Provide estimated costs for implementation of recommended improvements.
6. Analyze the hydraulic capacity and system pressures in the existing water distribution system under average daily and peak daily demand conditions using an existing computer model. Identify distribution system deficiencies such as low system pressures, low fire flow capacities, dead-end or undersized lines, etc. Identify opportunities for distribution system improvements to address any noted deficiencies.
7. Provide a summary of the existing water department financial condition.
8. Provide information on potential state and federal grant and loan programs that may be available to assist the City in implementing any needed system improvements.
9. Prepare a summary identifying current and future water system needs with their associated estimated cost. Make recommendations for meeting the water system needs for the planning period.
10. Provide an implementation schedule for recommended water system improvements outlining the key steps the City would need to undertake to implement the improvements.

Regional Setting

The City of Prineville is located in central Oregon along the Crooked River, a major tributary of the Deschutes River, which flows north into the Columbia River. The valley through which the river flows is bordered on the north by the slopes of the Ochoco Mountains and on the south by steep escarpments that rise to an extensive lava plateau south of the Prineville area. Location and vicinity maps and aerial maps for the City are shown on Figures 1-1, 1-2A, and 1-2B. The City of Prineville is the county seat and the only incorporated city in Crook County, with a population of 10,736 at the 2020 Census. The 2021 certified estimated population for Prineville was 11,042, as provided by the Population Research Center at Portland State University.

The climate in the summer is typically dry with clear days. Winter brings rain, snow, and frozen soils. Temperatures vary from extremes of -30° Fahrenheit (F) in the winter to 120°F in the summer. These extreme temperatures are usually not prolonged. According to the Western Regional Climate Center, the average annual temperature of the City of Prineville is approximately 48°F, and the annual average precipitation is approximately 9.9 inches.

Transportation is provided to the City of Prineville by Highways 26 and 126. The City of Prineville is positioned at the intersection of these two highways. It is located approximately 16 miles east of Highway 97, which is a major north-south highway in Oregon.

Soils

The soils throughout the City of Prineville are generally designated silt loams or sandy loams. The major types are Ochoco-Prineville complex, Powder silt loam, Crooked-Stearns complex, and Metolius ashy sandy loam. These soils are generally nearly level well-drained to moderately well-drained soils with parent materials of volcanic ash over mixed alluvium from volcanic rock.

Location

The City of Prineville is located in central Oregon at the intersection of Highways 26 and 126, adjacent to the Crooked River in Crook County. The general location of the community is shown on Figure 1-1, Location and Vicinity Maps.

The area of analysis provided in this WSMP encompasses the entire area within the city limits and urban growth boundary (UGB), as shown on Figure 1-1.

Water System History

General

The majority of the historical information for the water system was obtained from City records; conversations with Eric Klann, Prineville Interim City Engineer; the City's Water Management and Conservation Plan prepared in 2016 by GSI Water Solutions, Inc.; and the 2018 WSMP completed by AP.

The City of Prineville owns and operates a municipal water system that obtains water from several wells. The water is stored in ground-level storage reservoirs and distributed to residential, commercial, large commercial, and public customers within the city limits and approximately 120 residences outside the city limits but within the UGB. An estimated 330 residences exist within the city limits that are currently served by private wells and are not connected to the City's water system.

The City's water system was privately owned and operated by the Deschutes Power and Light Company until 1928, when it was acquired by Inland Power and Light Company, and then sold to Pacific Power and Light in 1930. The City acquired the water system from Pacific Power and Light in January 1985.

Approximately 10 percent of the water mains are 4-inch diameter and smaller, and some are galvanized steel pipe. Over the years, the City has replaced some undersized mains and installed new mains, additional wells, and storage reservoirs.

Previous Study

The primary recommendations in the 2018 WSMP were to increase supply, storage, and distribution system capacity. These improvements included replacing existing undersized water mains, outside diameter and wrapped (O.D. and wrapped) steel pipes, and wood stave pipes, as well as developing several wells and constructing additional storage capacity and a booster pump station. In response to the 2018 WSMP, the City constructed the Airport Industrial Park Utility Extension project to better connect the airport area and valley floor sources, installed a 16-inch water line from the south side of the airport to the industrial area north of Highway 126 and west of Tom McCall Road, constructed the Crooked River Wellfield and Water Treatment Plant (WTP), retrofitted the Airport No. 4/Heliport Well for aquifer storage and recovery (ASR) injection and recovery, constructed two new wells to replace the existing Yancey Well, constructed the Lamonta No. 2 Well, completed the 4th Street Deep No. 2 Well, and removed a significant amount of wood stave and undersized pipes.

Water Supply Sources

The City's water sources are wells tapped into the alluvial aquifer beneath the Prineville valley floor and the Airport Area Aquifer System. The water is pumped from 28 groundwater wells, seven of which pump directly into the distribution system to fill four aboveground reservoirs. The four wells located near the airport pump into a fill line that supplies water to the two airport reservoirs. The remaining 17 wells pump into a raw water system to the WTP for treatment prior to entering the distribution system.

The City holds surface water rights to the Crooked River, Prineville Reservoir, and Ochoco Creek. While much of this water is used for irrigation and livestock purposes, a portion of the surface water from Prineville Reservoir, through mitigation credits, has been used for a shallow groundwater wellfield in Crooked River Park near the Crooked River. Municipal water for the City of Prineville is sourced from 11 wells that supply individually into the system as well as 17 wells in the Crooked River Wellfield that supply water to the City's WTP for treatment prior to entry into the distribution system. Seven of the individual wells and the 17 wells in the Crooked River Wellfield are located on the Prineville valley floor and appropriate water from an alluvial aquifer with a total reported production capacity of 4,750 gallons per minute (gpm). The other four wells are located west of the City and source water from the Airport Area Aquifer System, which has a reported production limit of 1,770 gpm. This aquifer is currently being monitored to determine its long-term reliability. All the wells in the system are controlled by telemetry with the exception of the Stearns Well and the Stadium Well, which are controlled manually. The well locations are shown on Figures 1-2A and 1-2B and a summary of production well data is presented on Table 3-1 in Chapter 3. A brief description of each of the City's water supply sources follows.

Stearns Well

The Stearns Well is located on S.E. Stearns Road south of Highway 26. In January 1973, the well was drilled to a depth of 246 feet below ground surface (BGS) and was artesian. A project to replace or reconstruct the Stearns Well is identified in the existing CIP to update this aging well to new well construction standards.

4th Street Deep Well/4th Street Deep No. 2 Well

The 4th Street Deep Well is centrally located in the City approximately 525 feet from the intersection of S.E. Belknap Street and S.E. 4th Street. The well was drilled to a depth of 252 feet with a diameter of 12 inches. The static water level was 22 feet BGS when the well was drilled on October 12, 1960.

In 2021, a second well was drilled at this location, which is called the 4th Street Deep No. 2 Well. It is located approximately 30 feet southeast of the existing 4th Street Deep Well. The well was drilled to a depth of 257 feet at a diameter of 24 inches, which was completed on January 24, 2022.

4th Street Shallow Well

The 4th Street Shallow Well is located adjacent to the 4th Street Deep Well. The well was drilled to a depth of 75 feet and cased to a depth of 61 feet. Construction was completed in August 1950.

Lamonta Well/Lamonta No. 2 Well

The Lamonta Well is located on Lamonta Road north of the City. Completed on September 4, 1957, the well was drilled to a depth of 256 feet with a diameter of 24 inches.

In 2020, a new well was drilled to a depth of 226 feet located approximately 37 feet northwest of the existing well.

Yancey Well/Yancey No. 2 Well/Yancey No. 3 Well

The original Yancey Well is located north of Highway 26 on N.W. Fairmont Street. The well was reportedly drilled in 1917 to a depth of 228 feet and was reconstructed in 1975.

In 2019, a new well located approximately 40 feet west of the existing well was drilled to a depth of 242 feet. The well has an 8-inch casing to a depth of 227 feet and stainless steel screen from 227 to 242 feet.

In 2022, an additional well was drilled to a depth of 243 feet. Yancey No. 3 Well is located approximately 78 feet northwest of Yancey No. 2 Well.

Stadium Well

The Stadium Well is located on 5th Street adjacent to the high school track and stadium. Construction was completed in February 1987, and the well was drilled to a depth of 259 feet. This well is utilized manually as a backup for emergencies and used only for short periods of time.

Barney Well

The Barney Well is located close to the Barnes Butte Reservoir and Stearns Well on the east side of the City. Construction was completed in December 1994, and the well was drilled to a depth of 280 feet.

Ochoco Heights Well

The Ochoco Heights Well is located adjacent to the Ochoco Heights reservoirs north of the City off Main Street. The well is currently inoperable. The well was drilled to a depth of 1,002 feet and was cased to approximately 300 feet. Construction was completed in 1943 and, at that time, the water level was 52 feet BGS.

Crooked River Wellfield

In 2017, the City began construction of a wellfield along the Crooked River south of Prineville in Crooked River Park. The wellfield was completed in 2021 and consists of 17 completed wells ranging from 84 to 140 feet deep. The wells feed collectively into a 16-inch high density polyethylene raw water pipe that delivers the raw water to the WTP, where it is treated and disinfected prior to entry into the distribution system.

Airport Area Aquifer System

There are four airport wells, each of which is located southwest of the City, neighboring the Prineville Airport. These wells appropriate water from a separate aquifer than the wells located in the Prineville valley. The aquifer is still being monitored to determine whether the aquifer is a reliable source of water. The wells were drilled between 1980 and 2014. Per information available from the well logs, the static water level appears to be deeper than other City wells, at approximately 440 feet BGS.

An elevation schematic of the water system is provided on Figure 1-3. Detailed information regarding the City's wells can be found in Chapter 3.

Water Storage Reservoirs

The City of Prineville has six aboveground covered water storage reservoirs. The total capacity of the reservoirs is 4.5 million gallons (MG).

Ochoco Heights Reservoirs

The Ochoco Heights reservoirs are identical and are located north of the City. Ochoco Heights Reservoir No. 1 was constructed in 1955. The reservoir is an aboveground welded steel tank with a diameter of 41.5 feet and a height of 50 feet. Ochoco Heights Reservoir No. 2 was built in 1964 directly adjacent to Ochoco Heights Reservoir No. 1 with the same material and dimensions. The Ochoco Heights reservoirs are filled by the wells located on the valley floor. The reservoirs feed the Ochoco Heights Booster Pump Station, which feeds the Ochoco Heights Pressure Zone, the Valley Floor Pressure Zone, and the American Pine Reservoir.

American Pine Reservoir

The American Pine Reservoir is located north of the Ochoco Heights reservoirs, south of Peters Road. Constructed in 2002, this reservoir is an aboveground welded steel reservoir. The reservoir has a diameter of 73 feet and a height of 33 feet. Because the City was unable to obtain the property for a proposed Yellowpine reservoir at the north end of the Northridge area, the City elected to construct this reservoir with a booster pump station to provide water to the Northridge area. The reservoir is fed by an altitude valve and provides water to the Northridge Pressure Zone, discussed further in Chapter 5.

Barnes Butte Reservoir

The Barnes Butte Reservoir is located near the Barney and Stearns Wells north of Highway 26. The welded steel aboveground reservoir was constructed in 1978. The reservoir is 40 feet tall with a diameter of 47 feet.

Airport No. 1 Reservoir/Airport No. 2 Reservoir

The Airport No. 1 Reservoir is an aboveground bolted steel tank built in 1996 with a diameter of 85 feet, a wall height of 24 feet, and an operating range of 22.5 to 23.8 feet. The Airport No. 2 Reservoir, built in 2014, is an 80-foot diameter welded steel tank adjacent to the Airport No. 1 Reservoir. The operating range is set to match the Airport No. 1 Reservoir.

Additional information for the City's water storage reservoirs can be found in Chapter 4. Table 1-1 provides a summary of these reservoirs.

TABLE 1-1
SUMMARY OF SYSTEM RESERVOIRS

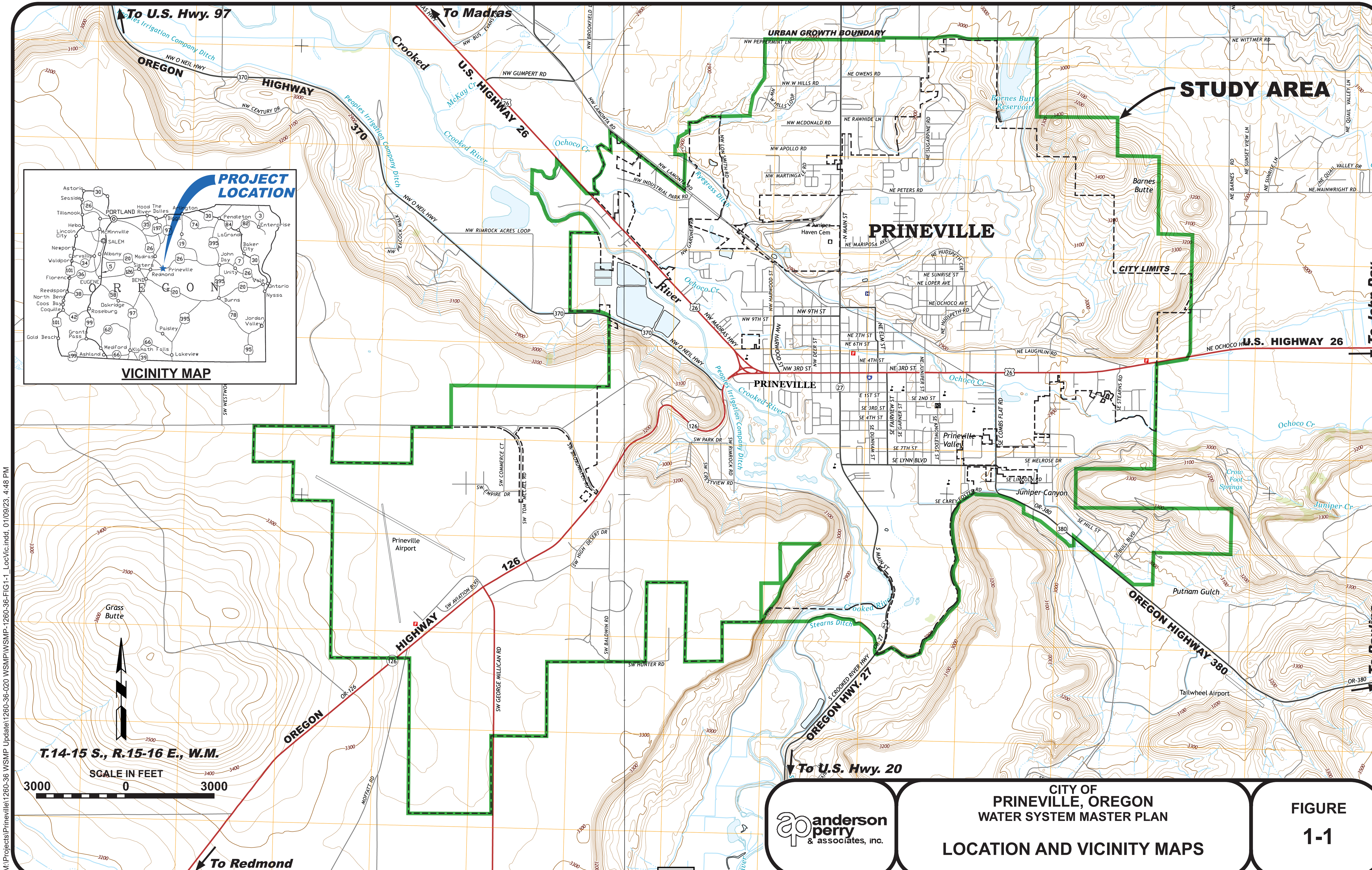
Reservoir	Volume (MG)	Completion Date
Ochoco Heights Reservoir No. 1	0.5	1955
Ochoco Heights Reservoir No. 2	0.5	1964
American Pine Reservoir	1.0	2002
Barnes Butte Reservoir	0.5	1978
Airport No. 1 Reservoir	1.0	1996
Airport No. 2 Reservoir	1.0	2014
Total	**4.5**	

Aquifer Storage and Recovery

In 2019, the City acquired a Limited License (LL-26) to begin pilot testing for an ASR injection and recovery operation. In 2019, the City began a series of three cycles of pilot testing by utilizing the Airport No. 4/Heliport Well after the well was retrofitted to accommodate the ASR injection and recovery operation. The Limited License allows for storage of up to 870 MG in up to five wells with a maximum injection rate of 1,100 gpm per well and a maximum recovery rate of 1,400 gpm per well. Further details regarding the ASR project are provided in Chapter 3.

Distribution System

The City's water distribution system consists of an assortment of pipe materials including asbestos cement, cast iron, ductile iron, steel, wood stave, and polyvinyl chloride pipe. Pipelines range in size from 1 to 18 inches in diameter. The City's distribution system main lines are primarily 6 to 12 inches in diameter, although there are also areas with smaller lines. However, distribution system improvements have been made in recent years to improve flow and pressure in the system. The distribution system is generally laid out with looped piping to assist with water circulation through the system. The City has indicated the water main lines in the distribution system are generally in fair condition. The distribution system is discussed in more detail in Chapter 5.



anderson perry & associates, inc.

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

LOCATION AND VICINITY MAPS

FIGURE
1-1

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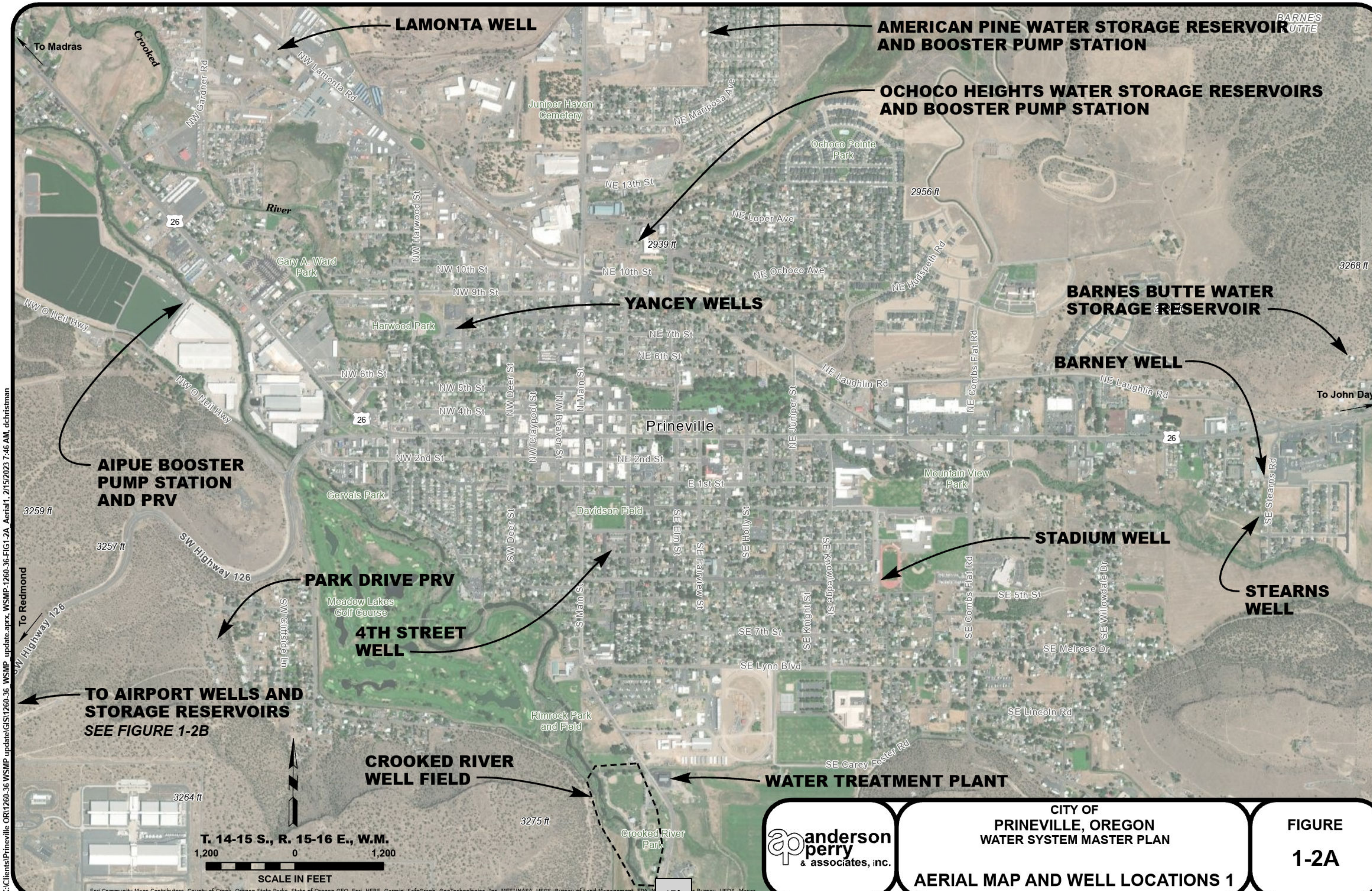

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

AERIAL MAP AND WELL LOCATIONS 1

FIGURE
1-2A

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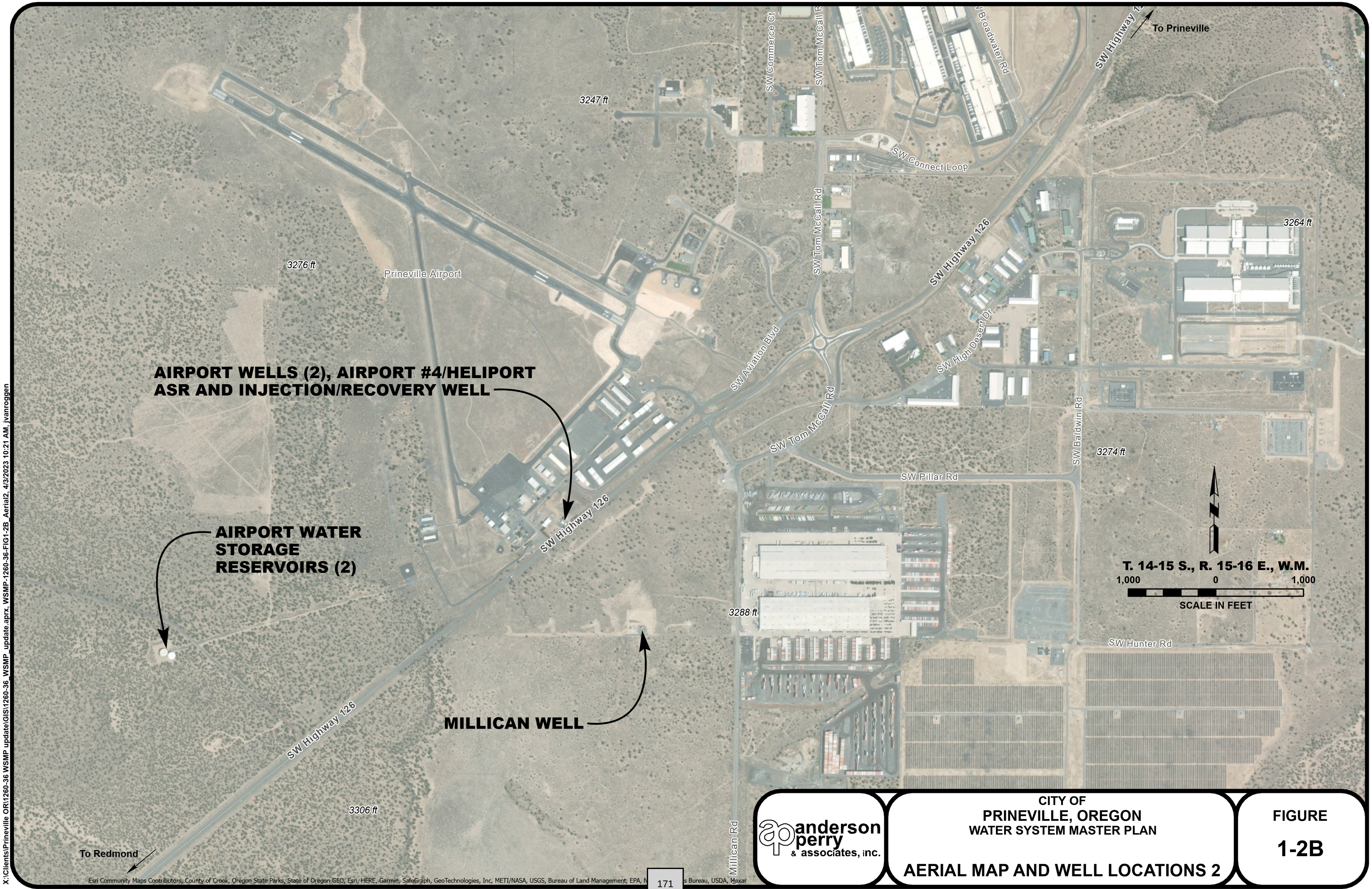

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

AERIAL MAP AND WELL LOCATIONS 2

FIGURE
1-2B

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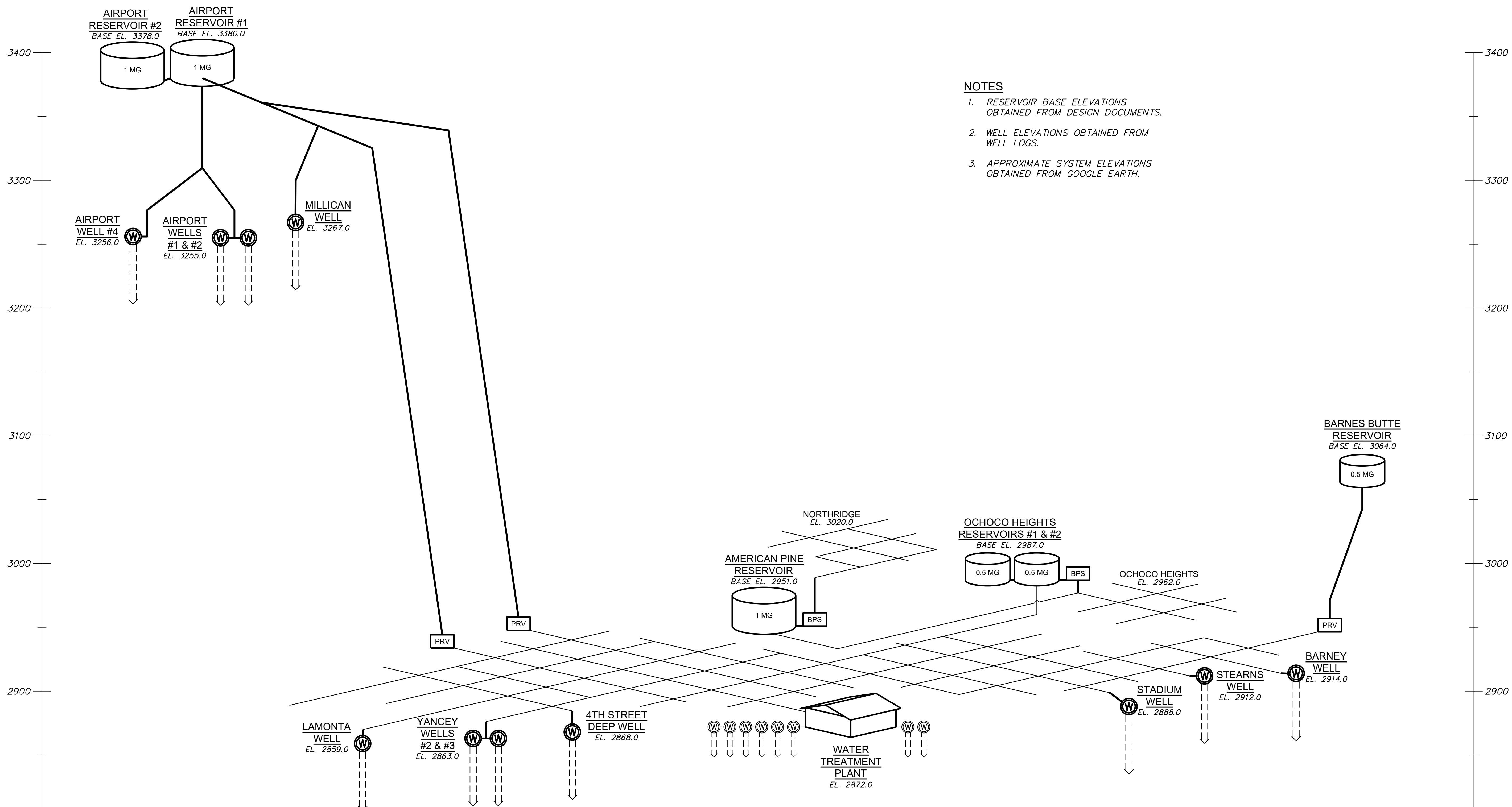

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

WATER SYSTEM SCHEMATIC

FIGURE 1-3

Chapter 2 - Water System Requirements

Introduction

This chapter presents basic information from which criteria have been developed for evaluating the City of Prineville's existing water system and for defining and sizing the required components of the system for the 20-year planning period. Information concerning the service area, population projections, water use, and state and federal requirements is presented.

Service Area

The term "service area" refers to the area being served with water from the City's water system. Both the present and future service areas are considered in this Water System Master Plan (WSMP). The present service area primarily consists of the developed lands within the boundaries of the city limits; however, there is one small area serviced outside the city limits. The area is on S.W. Saddle Ridge Loop, which is outside the city limits yet inside the urban growth boundary (UGB). For the purposes of this WSMP, the future service area will consist of the present service area plus all areas within the current UGB. The City's zoning map is shown on Figure 2-1.

The service area is located in a valley known as the Crooked River-Ochoco Creek Valley. Dominant geographic features include rimrock formations in the southern part of the service area and Barnes Butte located in the northeastern portion of the area. Surface elevations range from 2,800 to 3,600 feet above mean sea level. Many areas with large tracts of undeveloped land currently exist within the UGB (see Figure 1-1 in Chapter 1). With a significant area of open, undeveloped land available, the City has the potential for residential, commercial, and large commercial growth.

Service Population and Planning Period

To estimate the demands that may be placed on a municipal water system, a determination of the population to be served must be made. Population estimates must be made with reference to time. Projections are usually made on the basis of an annual percentage increase estimated from past growth rates tempered by future expectations. It is difficult to accurately predict the population of a community over an extended period of time.

The period of time over which the population is to be projected usually depends on the type of improvements to be considered. Improvements that will require long-term financing should be designed for no less than the term of the financing. Facilities readily expanded or modified are normally designed for a period of 10 to 20 years. Facilities not easily modified or expanded, such as buried pipelines and storage reservoirs, may be designed for their expected life, which is usually 40 to 50 years or more.

The City's water system serves residential, commercial, large commercial, and public customers within the city limits, with the exception of an estimated 330 residences currently served by private wells not connected to the City's water system. In addition to the customers within the city limits, the City currently serves an estimated 120 residences outside the city limits but within the UGB.

The certified 2021 population of the City of Prineville was 11,042, according to Portland State University's (PSU) Population Research Center (PRC). This agency is the official source of population data available in Oregon between the official Census data generated at the beginning of each decade.

For planning purposes, the certified population of 11,042 was utilized for the 2022 population. Assuming an average number of persons per household of 2.46 per PRC data, an estimated 812 people within the city limits do not receive City-supplied water and an estimated 295 people outside the city limits but within the UGB do receive City-supplied water. Therefore, the net 2022 population served by City-supplied water is estimated to be 10,525.

Projections are usually made on the basis of an annual percentage increase estimated from past growth rates combined with future expectations. The historical population data shown hereafter on Table 2-1 was provided by the PSU Oregon Population Forecast Program. In 2013, the Oregon legislature approved legislation assigning coordinated population forecasting to the PRC. Utilizing average annual growth rates (AAGR) provided by the PRC, historical population trends for the City are shown on Table 2-1 and Chart 2-1. The historical population data shown on Chart 2-1 for 2010 and 2020 were provided by the U.S. Census Bureau.

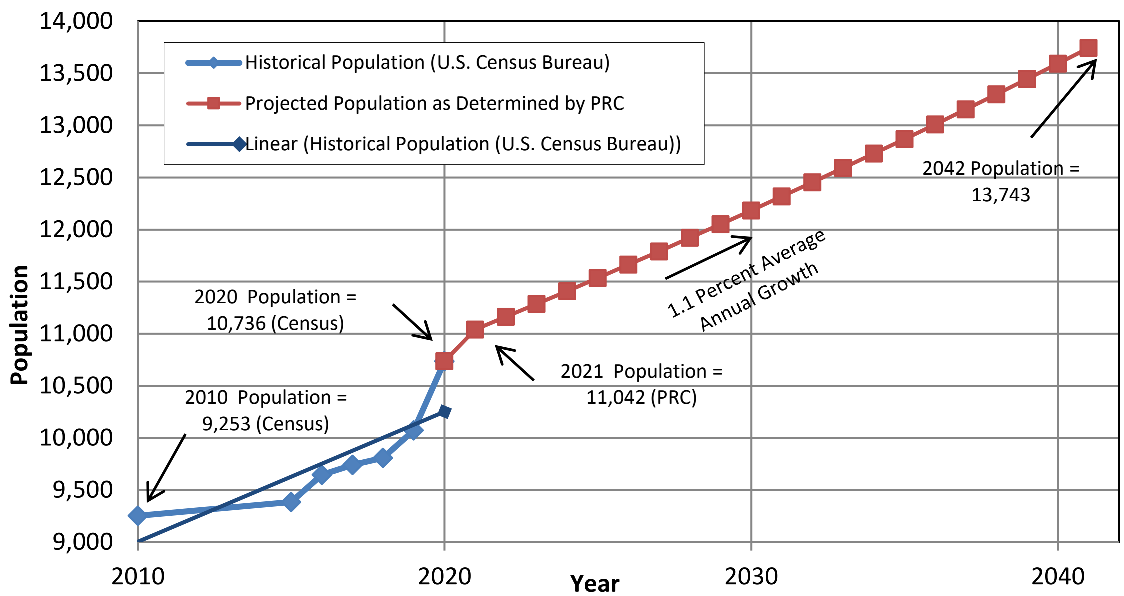
TABLE 2-1
HISTORICAL[1] AND FORECASTED[2] POPULATIONS

Historical			Forecast			
2010	2020	AAGR (2010 to 2020)	2021	2042	AAGR (2022 to 2047)	AAGR (2047 to 2072)
9,253	10,736	*1.6 percent*	11,042	13,743	*1.1 percent*	*1.3 percent*

[1]As provided by the U.S. Census Bureau.

[2]As provided by the PRC.
For planning purposes, the PRC's 2021 certified population was used for 2022.

CHART 2-1
HISTORICAL AND PROJECTED POPULATION



The assumed 1.1 percent AAGR between the years 2022 and 2047 results in a 2042 population of 13,743. This value takes into consideration connecting all residences within the city limits but does not include the projected growth in the UGB. When the assumed 20 percent of UGB residences are connected, the total 2042 population estimated to be served by the City's water system is 14,722. However, over the planning period of this WSMP, actual growth could exceed or fall well below the figures presented on Chart 2-1. A more detailed discussion of the design population is presented later in this chapter.

In addition to substantial residential growth within the city limits, Prineville has experienced large demands on the water system related to large commercial growth, most notably demand from data centers. The increased usage by large commercial users is not incorporated into the additional demand attributed to population growth. The projected future demands of large commercial users are estimated separately from the standard residential population growth. For Prineville, this is a significant portion of the projected future demand on the water system and is discussed in greater detail later in this chapter.

Land Use

The current zoning in the City of Prineville is shown on Figure 2-1. Four Comprehensive Plan land use designations have been identified within the city limits: residential, commercial, large commercial, and public. The majority of the City is designated for residential use. Areas along Highway 126 are primarily designated as multipurpose and airport.

Regulatory Requirements

The City of Prineville's water system is under the jurisdiction of the Oregon Health Authority - Drinking Water Services (DWS). The DWS assumed primacy (responsibility) from the U.S. Environmental Protection Agency (EPA) in February 1986 for enforcement of the federal Safe Drinking Water Act (SDWA). Therefore, the City of Prineville is currently, and will principally be, working with the DWS as the regulating agency with regard to their water system. The City is required to publish annual Consumer Confidence Reports; a copy of the 2021 Report is located in Appendix A.

Regulatory Background

The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources (rivers, lakes, reservoirs, springs, and groundwater wells). The primary regulations associated with the SDWA address requirements concerning trace minerals, compounds, and microorganisms that may affect the health of water consumers. The SDWA provides for monitoring, testing requirements, reporting, recordkeeping, and public notification procedures in the event of non-compliance.

The 1986 amendments to the SDWA included provisions for wellhead protection, new monitoring for certain substances, filtration for certain surface water systems, disinfection for certain groundwater systems, and restrictions on lead content in pipe solder and plumbing.

The 1996 amendments to the SDWA included provisions for consumer confidence reporting, stronger protection for microbial contaminants and disinfection byproducts, operator certification, lowering maximum contaminant levels (MCL), and source water assessments.

Enacted in 1981, the Oregon Drinking Water Quality Act established periodically amended statutes and subsequent administrative rules to enforce, at a minimum, the federal SDWA requirements. The DWS focuses resources in the areas of highest public health benefit and promotes voluntary compliance with state and federal drinking water standards. The DWS also emphasizes prevention of contamination through source water protection, provides technical assistance to water system owners, and provides water system operator training. They also work closely with public water systems to ensure public notification is made in accordance with regulatory guidelines, when required. If the City is unaware of their compliance status or in need of regulatory guidance, it is recommended that the regional DWS office be contacted.

The Arsenic Rule, which became effective in February 2002, lowered the MCL for arsenic allowed in a community water system from 50 parts per billion (ppb) to 10 ppb. The City has not received any violations of this rule within the last five years.

Recent Regulatory History (Past 15 Years)

Following is a list of regulations that have been enacted in the past 15 years:

1. **Reduction of Lead in Drinking Water Act**. This requires any new installation or purchase of materials used in potable locations to be “lead-free.” Lead-free has been redefined as “(A) not containing more than 0.2 percent lead when used with respect to solder and flux; and (B) not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.” This law was enacted on January 4, 2014. Oregon requires drinking water components to be National Sanitation Foundation/American National Standards Institute Standard 61 compliant to meet the intent of this law.
2. **Stage 2 Disinfectants and Disinfection Byproduct Rule (D/DBPR)**. This rule focuses on public health protection by limiting exposure to disinfection byproducts. The D/DBPR specifically targets total trihalomethanes and five haloacetic acids, which can form in water through disinfectants used to control microbial pathogens. This rule applies to all community water systems (CWSs) and non-transient non-community (NTNC) water systems that add a primary or residual disinfectant other than ultraviolet light. Stage 2 of the D/DBPR was enacted in 2012 for large CWSs and NTNCs and in October 2013 for all CWSs and NTNC water systems.
3. **Unregulated Contaminant Monitoring Rule 5 (UCMR5)**. The EPA uses the UCMR program to collect data for contaminants suspected to be present in drinking water but that do not have health-based standards set under the SDWA. Every five years, the EPA develops a new list of UCMR contaminants, largely based on the Contaminant Candidate List. Oregon Administrative Rule 333-061-0043 requires CWSs to report detection of unregulated contaminants in their annual Consumer Confidence Report. UCMR5 was published on December 27, 2021, and requires sample collection of 30 contaminants between 2023 and 2025 using EPA-developed analytical methods. The UCMR5 will provide new data to improve the EPA’s understanding of the frequency of 29 polyfluoroalkyl substances (PFAS) and lithium in the nation’s drinking water and the associated levels.

4. **Revised Coliform Monitoring Requirements**. This rule requires that total coliform samples be collected by public water systems at sites representative of water quality throughout the distribution system according to a written sample site identification plan. Total coliform occurrence will continue to be investigated; however, it is no longer associated with an MCL. Emphasis is placed on the MCL for *E. coli* because it is a reliable indicator of fecal contamination. The MCL for *E. coli* is exceeded if the presence of *E. coli* is confirmed (often via a repeat sample), repeat samples are not collected, or if a total coliform-positive sample is not analyzed for *E. coli*. Monitoring changes were made that include reducing the number of repeat samples to collect after a routine coliform positive from four to three.

5. **Lead and Copper Rule Revisions (LCRR)**. On January 15, 2021, the EPA issued LCRR. The LCRR require public water systems take further actions to minimize lead and copper in drinking water. The goals for the revisions are to identify areas that are most impacted, strengthen treatment requirements, replace lead service lines, increase sampling reliability, improve risk communication, and protect children in schools. The EPA intends to promulgate the Lead and Copper Rule Improvements prior to October 2024.

   The agency has determined that some aspects of the rule will go into effect quickly to support near-term development of actions to reduce lead in drinking water. Specifically, lead service line inventories that will be developed under the LCRR are necessary to achieve 100 percent removal of lead service lines. The EPA is requiring that initial lead service line inventories be completed by the current October 16, 2024, compliance date.

Potential Regulatory Changes

Following is a list of regulations that may be enacted in the future:

1. **Radon in Drinking Water Rule**. This rule would attempt to reduce airborne and waterborne radon concentrations to limit exposure levels. This rule would apply to CWSs that use groundwater or mixed groundwater and surface water. The proposal is currently on hold, and the EPA has no timeline for publishing this rule.

2. **Fourth Contaminant Candidate List (CCL4) Regulatory Determinations**. On February 22, 2021, the EPA reissued final regulatory determinations for contaminants on the CCL4. The EPA is making final determinations to regulate two contaminants in drinking water, perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), and to not regulate six contaminants (1,1-dichloroethane, acetochlor, methyl bromide [bromomethane], metolachlor, nitrobenzene, and hexogen [RDX]). With the final regulatory determinations for PFOA and PFOS, the EPA will move forward to implement the national primary drinking water regulation development process for these two PFAS. In addition to the CCL4 regulatory determinations, the EPA is evaluating additional PFAS, which may include regulatory actions addressing those PFAS. This follows the CCL4 final determination to regulate PFOA and PFOS in drinking water.

3. **Carcinogenic Volatile Organic Chemicals (cVOC) Rule**. The EPA is developing a proposed national primary drinking water regulation for a group of 16 known cancer-causing compounds, including eight currently regulated cVOCs and up to eight from the Third Contaminant Candidate List.

4. **Hexavalent Chromium**. The EPA currently regulates hexavalent chromium as part of the total chromium drinking water standard. New information on health effects has become available since the original standard was set, and the EPA is reviewing this information to determine whether new health risks need to be addressed. The State of California has already implemented a hexavalent chromium-specific MCL.
5. **Fluoridation**. Fluoride MCLs may be lowered in the future as the health impacts of fluoride are fully realized. The current MCL of 4 parts per million could be reduced to 1 or less. This lower MCL could require systems with naturally occurring fluoride above the MCL to treat to reduce levels.
6. **Cybersecurity**. Executive Order 13636: Improving Critical Infrastructure Cybersecurity was established in February 2013. The Order calls for the development of a voluntary, risk-based cybersecurity framework. The EPA will evaluate whether any additional authority and/or regulations to address cybersecurity in the water sector are needed.

Regulatory Requirements Summary

In summary, many regulations affect operation of the City of Prineville's water system. The City has good water quality and a well-run water system meeting federal and state water quality criteria.

The information presented herein is intended to provide the City with a brief summary of the regulations and possible future regulations that will likely affect operation of the City's water system. These regulations continue to expand and will require careful attention to maintain compliance. It is recommended that the City of Prineville consult periodically with the DWS to ensure compliance with current regulatory requirements and to address any regulatory questions or issues.

Regulatory Violations

The City has not had any water quality violations but has had 14 cases of late/nonreporting violations, all of which have been returned to compliance.

Seismic Risk Assessment and Mitigation Plan

To better prepare the state for earthquake preparedness, the Oregon Resilience Plan (ORP) was developed in 2013 by the Oregon Seismic Safety Policy Advisory Commission. The goals of the ORP are to address critical infrastructure needed to supply water in the event of an emergency and identify projects that need to be completed in the next 50 years to ensure that water can be supplied to a community in the event of a strong earthquake. Scientists have recognized the Cascadia subduction zone as an active fault that poses a major geological hazard to Oregon. The ORP addresses vulnerabilities of pipelines, treatment plants, water storage reservoirs, supply wells, and pump stations that compose Oregon's water and wastewater systems and discusses the intervention required to increase the resilience of infrastructure in the event of a Cascadia earthquake.

To assist in the goal of preparing communities, water systems that submit a WSMP to the DWS after January 10, 2018, are required to follow seismic assessment guidelines put forth by the DWS. Community water systems with more than 300 connections must conduct a Seismic Risk Assessment and Mitigation Plan if any of their existing or proposed facilities are located in areas with moderate to very heavy damage potential as determined by the Oregon Department of Geology and Mineral Industries.

According to the ORP, central Oregon is located outside the Cascadia Scenario Light, Moderate, Heavy, and Very Heavy Impact Zones. Therefore, a Seismic Risk Assessment and Mitigation Plan was not conducted as part of this WSMP.

Water System Sanitary Survey

The DWS conducts sanitary surveys of water systems for communities to assist in identifying potential contamination sources that may impact water quality. These surveys are generally scheduled to occur every five years.

The City of Prineville's latest water system sanitary survey was conducted on September 2, 2020. The water system sanitary survey found the following significant deficiencies:

- The sanitary seals and casings on three of the City's wells were not watertight. The seal was deficient in the 4th Street Shallow Well, the Yancey Well, and the Airport 2 Well.
- Water quality monitoring was not current. Adding the new Yancey and Lamonta Wells triggered two 6-month rounds of lead and copper samples in 2020.

These deficiencies were corrected by April 5, 2021, or are on an approved corrective action schedule. A copy of the full 2020 Water System Sanitary Survey is included in Appendix B. Included in the survey is a checklist of sanitary survey items to be checked during inspection of the water system. City staff should periodically review the checklist; this will help the City take a proactive approach to these surveys and also help to avoid potential future violations.

Water Demand

Future water demands, for the purpose of identifying needed future water system improvements, can be estimated from past water use data and population projections. Water use data are usually expressed in terms of various rates of water used for various periods of time. This allows components of the water system to be sized for the maximum demands that will be placed on them. The rates of water use that are important in the evaluation of a water supply system are the average daily demand (ADD), which is the total amount of water used during a one-year period divided by 365 days; the peak daily demand (PDD), which is the maximum total amount of water used during any 24-hour period; and the peak hour or peak instantaneous demand, which is a measure of the maximum flow of water at any given time.

Water supply facilities are normally designed for PDD. As a rule, a well would be sized for supplying the needed water during the PDD without continuous 24-hour operation. For example, if the water usage during high demand summer months required a well pump to operate 18 hours or more per day to keep up with the PDD, the situation may warrant the addition of another well or other water supply source to provide some backup capability and to not over-stress the well pumping equipment. Booster pumps and distribution pipelines are generally sized to deliver peak instantaneous demands, because they must be capable of meeting the highest demand. Storage reservoirs are sized to make up the difference between water supply capacity and peak water use rates, at a minimum. Additional capacity (reserve) is usually provided in water storage reservoirs for both emergencies and fire suppression.

Per Capita Water Use

To be utilized for projecting future water demands, past water use data must be converted to a per capita (per person) rate of use. This is done by dividing the average day, peak day, and peak instantaneous water use rates by the number of people served by the water system. These water demand rates are expressed as gallons per capita day (gpcd). These values multiplied by a population projected for some future year give estimated total demand rates for that year.

Historical Average Water Use

To determine current water demands, production records for the City's water supply system were reviewed from water years 2017 through 2021. Monthly well production for the City of Prineville for 2017 through 2021 is shown on Charts 2-2 through 2-12. A production comparison for all 11 wells and the Crooked River Wellfield is shown on Figure 2-2.

CHART 2-2
AIRPORT WELL NO. 1 MONTHLY PRODUCTION

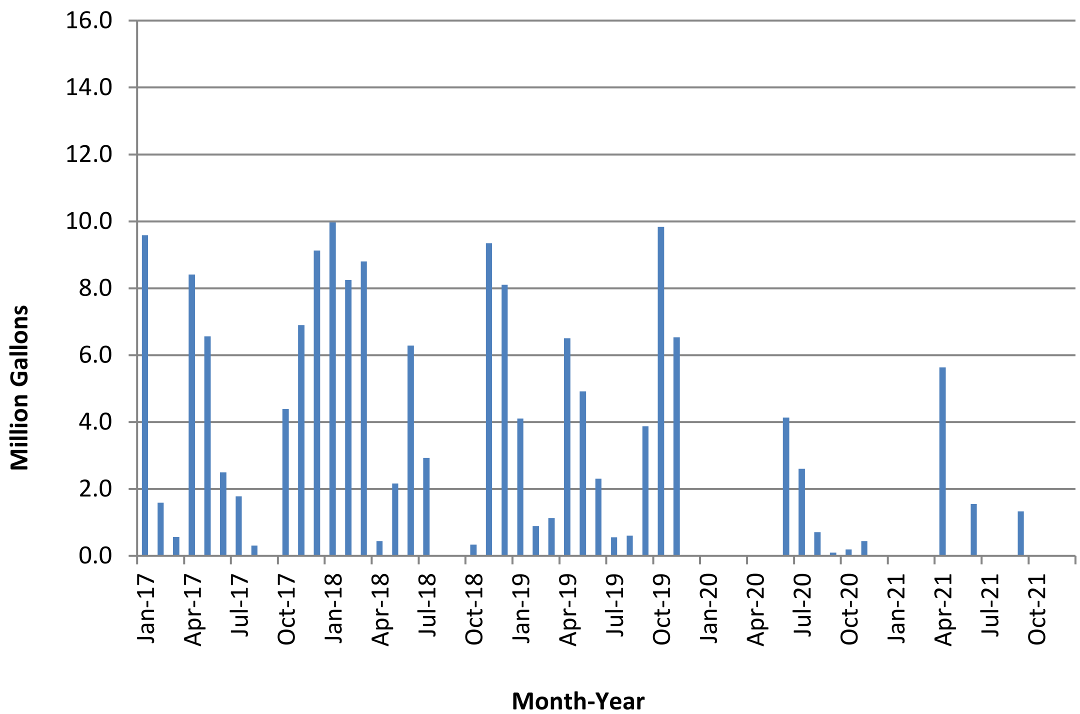


CHART 2-3
AIRPORT WELL NO. 2 MONTHLY PRODUCTION

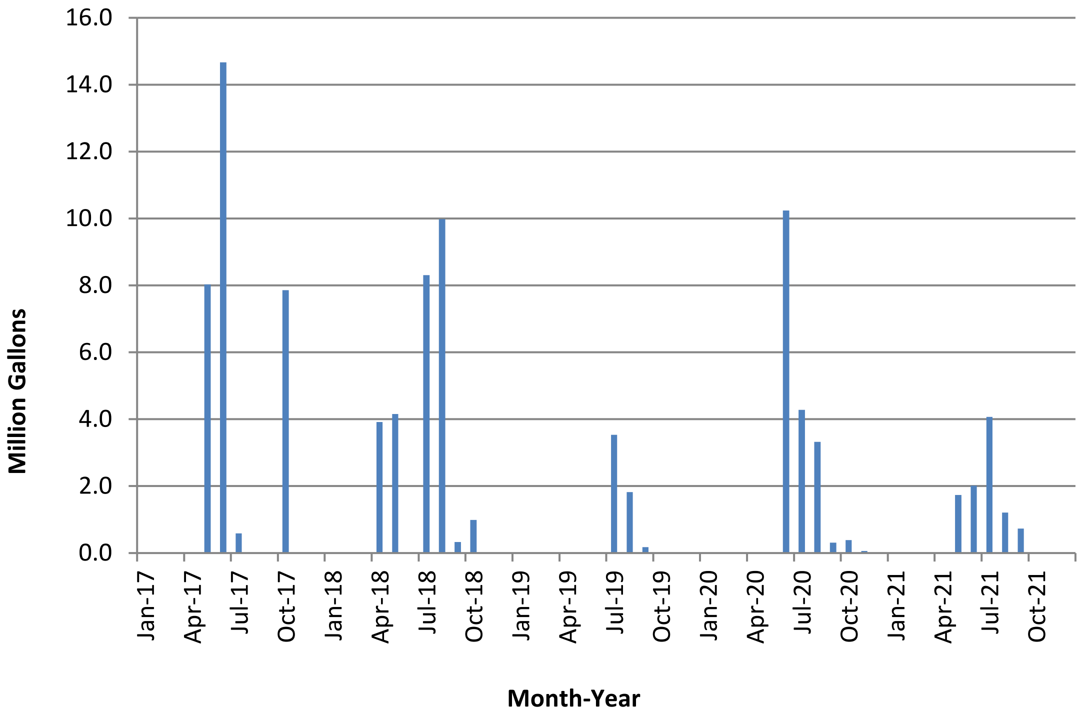


CHART 2-4
AIRPORT WELL NO. 3 MONTHLY PRODUCTION

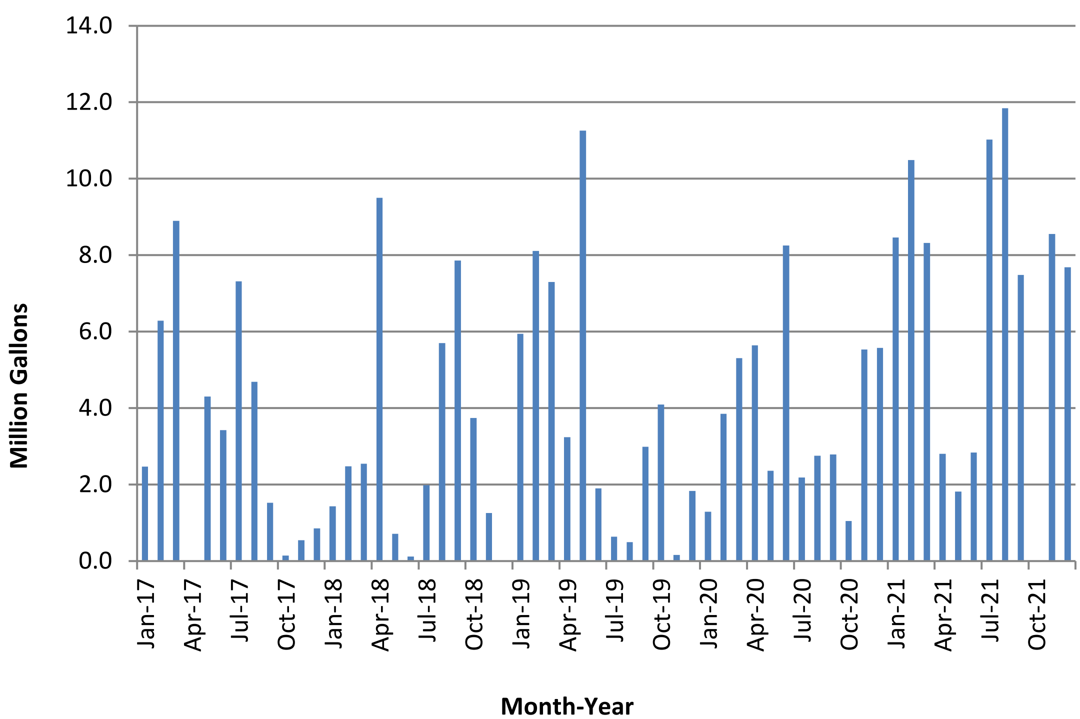


CHART 2-5
AIRPORT WELL NO. 4 MONTHLY PRODUCTION

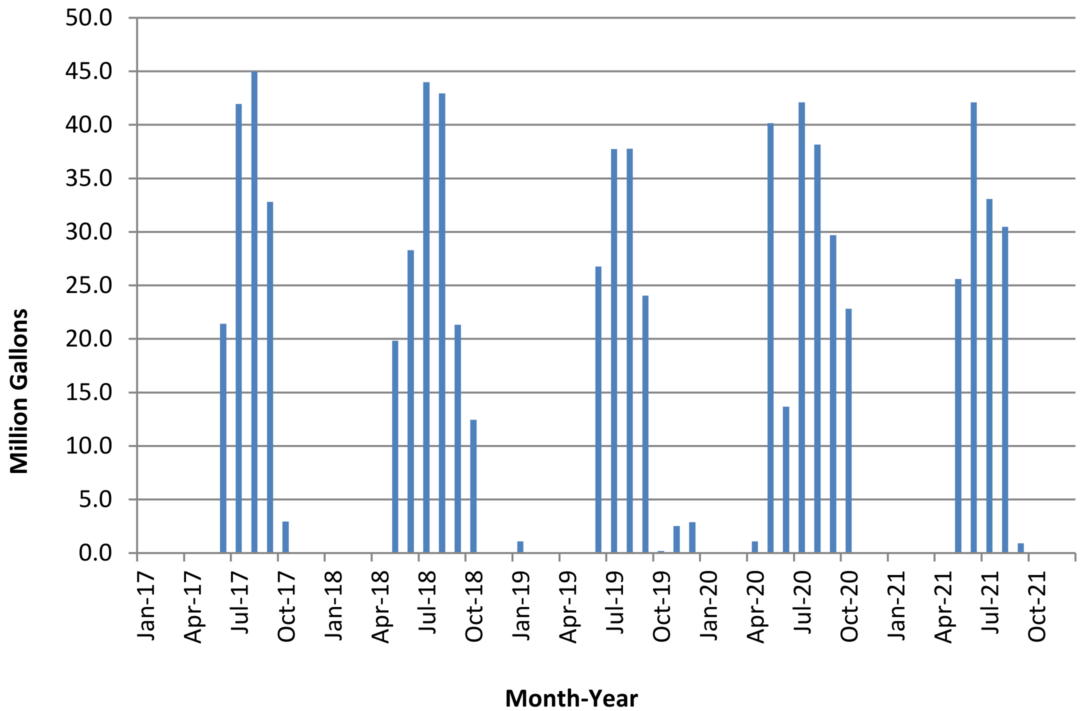


CHART 2-6
ORIGINAL 4TH STREET DEEP WELL MONTHLY PRODUCTION

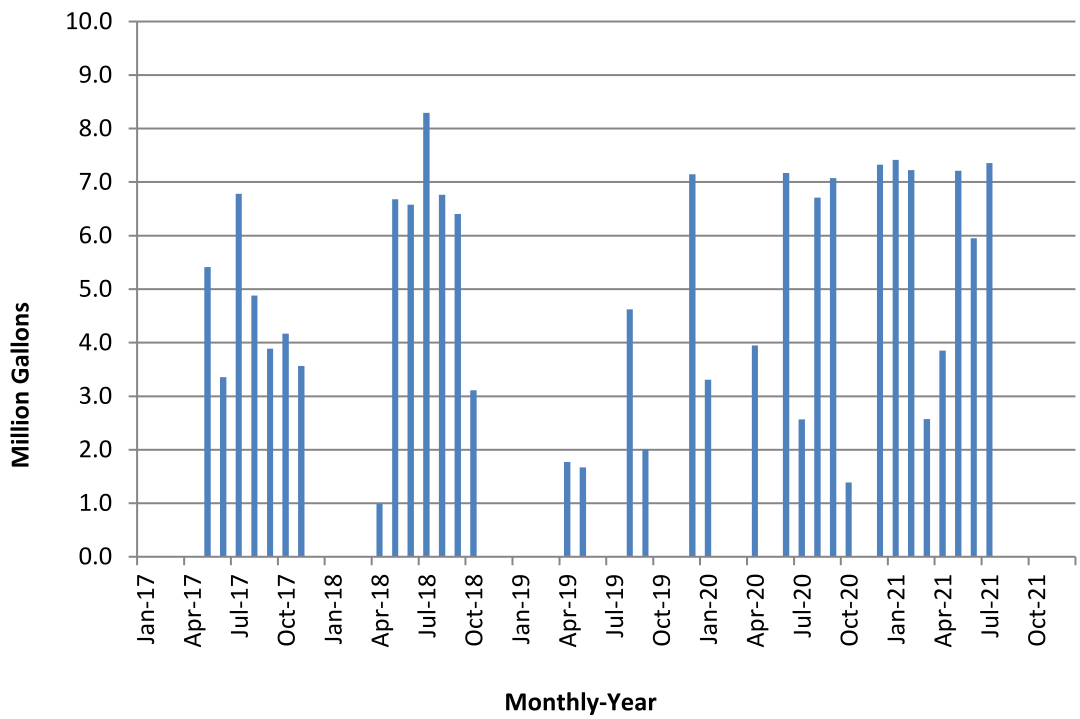


CHART 2-7
LAMONTA WELL (TO APRIL 2020) AND LAMONTA NO. 2 WELL (POST-2020) MONTHLY PRODUCTION

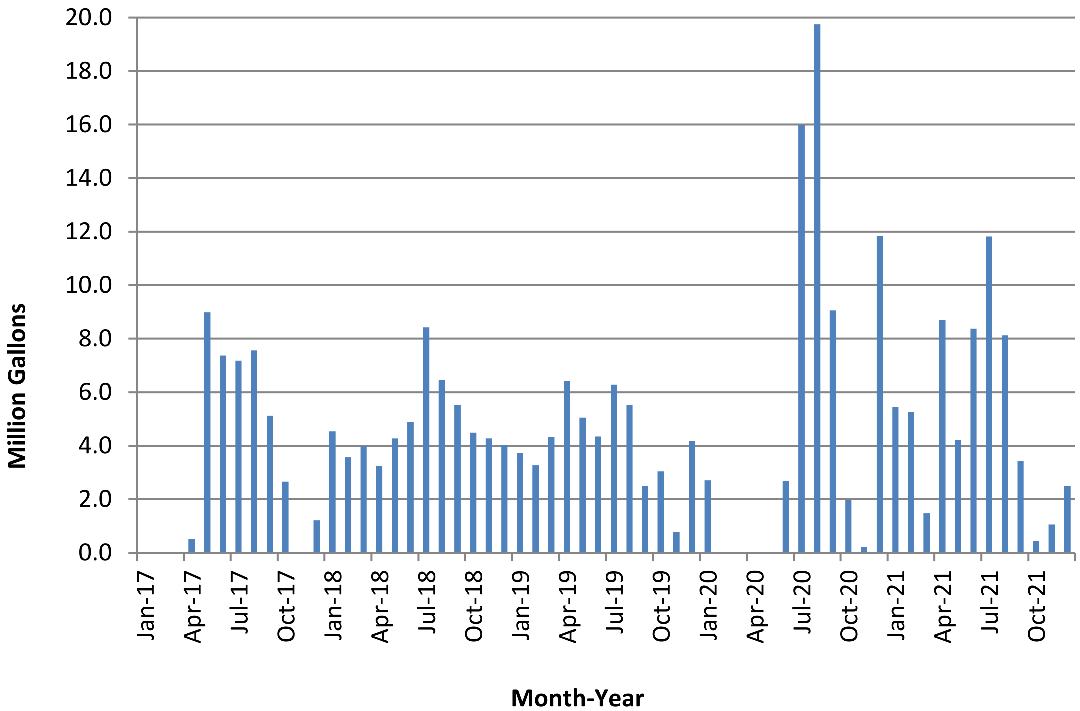


CHART 2-8
STADIUM WELL MONTHLY PRODUCTION

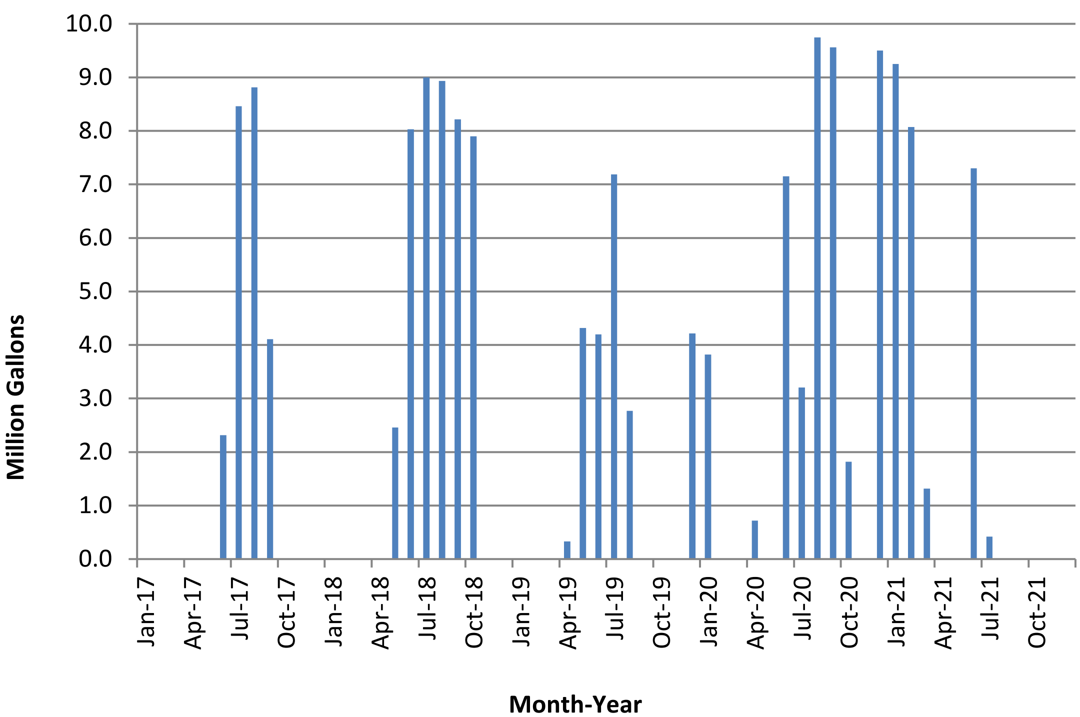


CHART 2-9
STEARNS WELL MONTHLY PRODUCTION

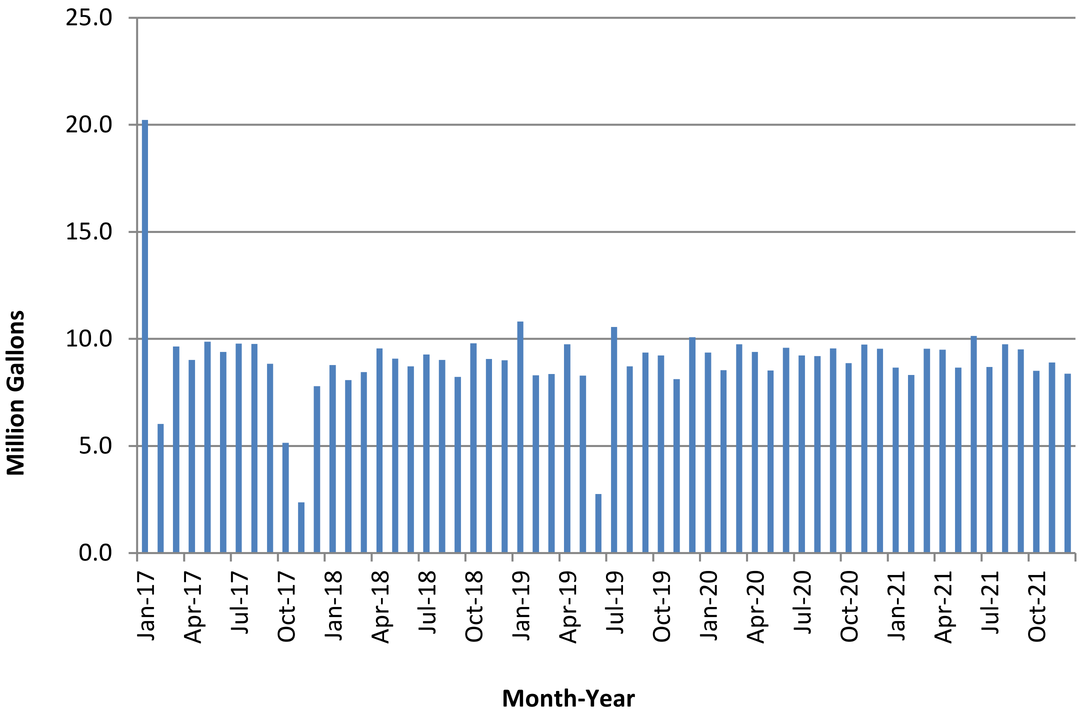


CHART 2-10
BARNEY WELL MONTHLY PRODUCTION

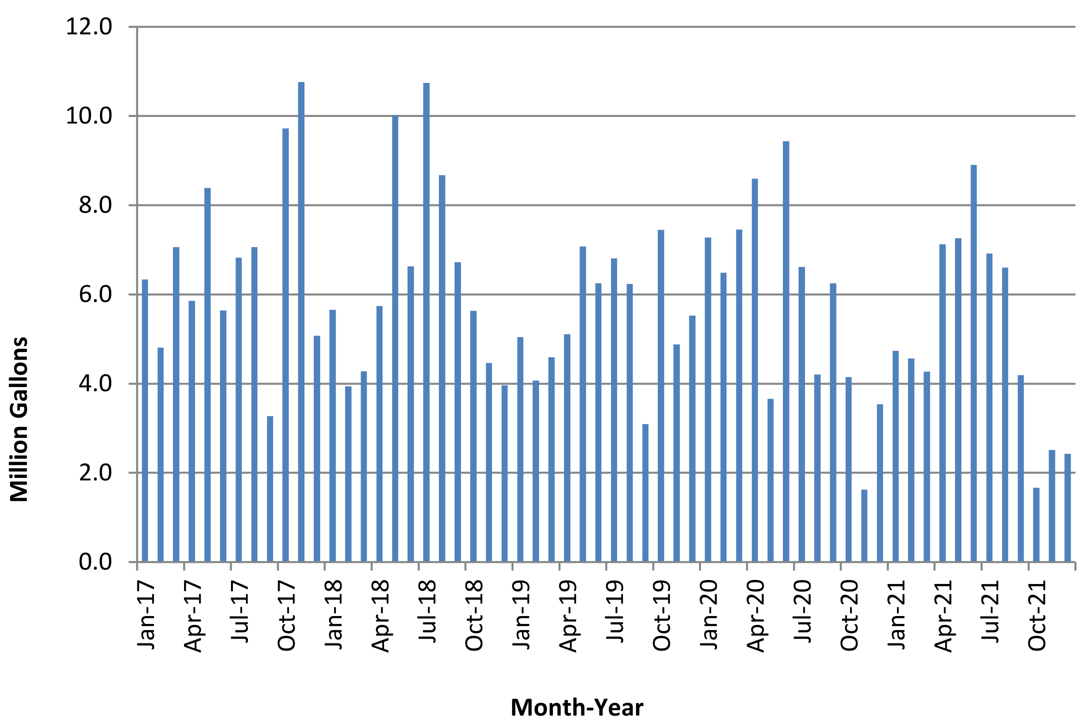


CHART 2-11
YANCEY WELL (2017-18) AND YANCEY NO. 2 WELL (POST-2018) MONTHLY PRODUCTION

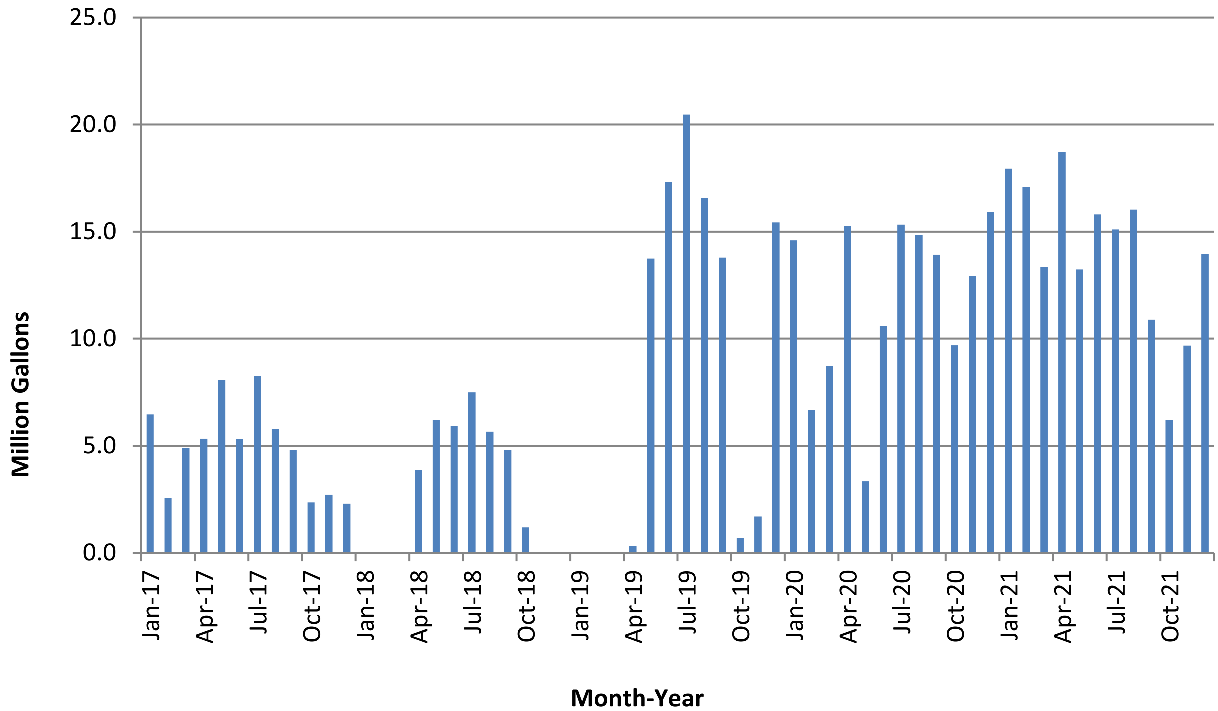
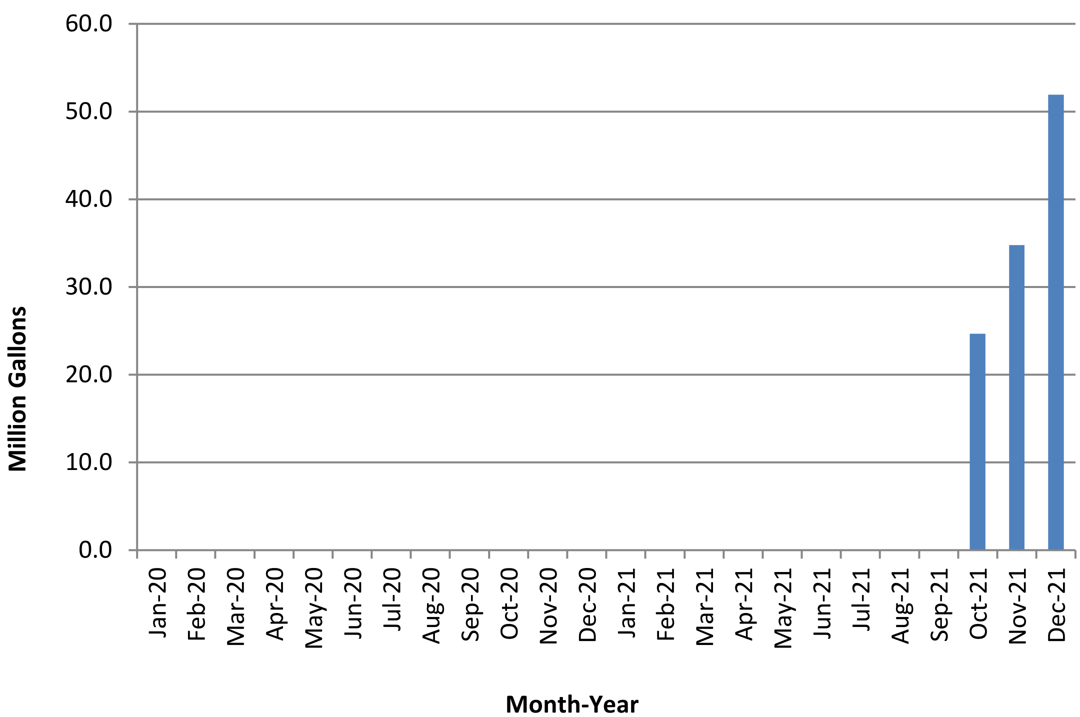


CHART 2-12
CROOKED RIVER WELLFIELD MONTHLY PRODUCTION



Average Daily Demand

The Oregon Water Resources Department maintains a database of water use amounts as reported by the individual water user or entity. Per this database, the total water use reported by the City for the 2017-21 water years is listed below on Table 2-2. For planning purposes, the per capita water use was calculated by dividing the annual water production by the estimated population served during that year.

TABLE 2-2
AVERAGE DAILY DEMAND

Year	Population[1]	Annual Water Production (MG)	Average Daily Demand		
			MGD	gpm	gpcd
2017	9,224	606.8	1.66	1,154	180
2018	9,292	640.5	1.75	1,219	189
2019	9,557	580.6	1.59	1,105	166
2020	10,219	665.1	1.82	1,265	178
2021	10,525	708.3	1.94	1,348	184

[1]The population estimates are from the PRC Certified Populations and U.S. Census (2020).

MG = million gallons

MGD = million gallons per day

gpm = gallons per minute

For this WSMP, the per capita water use of 184 gpcd was selected as the ADD to project future demand needs. This is approximately the average of the five years of data presented, as well as the most recent demand experienced by the City.

Peak Daily Demand

PDD usually occurs during a particular day between June through September, which is when water use is normally at its greatest due to irrigation and other summer uses. PDD can occur in other months but normally occurs during the hottest period of the year. During PDD, the City’s wells operate as needed, up to 18 hours per day each, and equalization storage is required to meet demands. During the summer of 2021, the City experienced an extremely hot and dry period, causing the highest water demand the City has on record. On June 29, 2021, the City recorded a water demand of 4,755,700 gallons. With the estimated connected population of 10,525 at that time, the approximate PDD would be 452 gpcd. While this demand will likely not occur on an annual basis, the City has elected to utilize this high demand for planning purposes.

The City’s 184 gpcd ADD is in the low range of typical ADD when compared to other cities with water meters in eastern and central Oregon, as shown on Table 2-3. The PDD and associated peak factor of 2.5 is within the expected range and is comparable to other communities.

TABLE 2-3
COMPARATIVE WATER USAGE
TYPICAL FOR SMALL CITIES IN CENTRAL AND EASTERN OREGON, METERED SYSTEMS

City	Average Daily Demand (gpcd)	Peak Daily Demand (gpcd)	Peak Factor (peak daily)	Population
Echo	175	525	3.0	700
Prineville	**184**	**452**	**2.5**	**10,525**
Adams	195	625	3.2	265
Umatilla	210	483	2.3	4,686
Cove	215	628	2.9	594
Baker City	227	834	3.7	10,035
La Grande	230	667	2.9	13,238
Prairie City	234	549	2.3	1,195
Mt. Vernon	240	585	2.4	617
Stanfield	240	600	2.5	1,770
Hermiston	250	600	2.4	17,730
Athena	250	710	2.8	1,142
Vale	250	625	2.5	1,890
Island City	270	810	3	989
John Day	270	865	3.2	2,010
Boardman	275	960	3	3,445
La Pine	280	700	2.5	982
Irrigon	290	800	2.8	1,790
Hines	350	1,600	2.5	1,700
Joseph	375	1,100	2.9	1,060
Ione	461	1,865	4	250

The ADD and PDD assumed for planning purposes are summarized on Table 2-4. These demands have also been summarized as a flow rate to provide the basis for comparison to water supply capacity. The assumed service population for determining the actual daily demand rates is 10,525, as discussed earlier in this chapter.

TABLE 2-4
YEAR 2022 TOTAL AVERAGE AND PEAK DAILY DEMAND DATA

Parameter	System Demand (gpcd)	Total Demand (gpm)	Percentage of System Capacity (Assumed Total Capacity of 6,436 gpm)	Percentage of System Capacity (18-hours-per-day operation)
ADD	184	1,348	21	28
PDD	452	3,303	51	68

Water supply facilities (well pumps) are normally designed to meet PDD without providing 24-hour service. It is preferable that well pumps operate a maximum of 18 hours per day, if possible. The current total production capability of the valley floor and airport area is approximately 4,666 gpm and 1,770 gpm, respectively. The combined capacity is 6,436 gpm. When assuming an 18-hour operation, the total pumping capacity is reduced by 25 percent, and the current 18-hour pumping capacity can meet both the current ADD and PDD assuming an 18-hour maximum operation.

Description of Customers Served

The City of Prineville's water service accounts, as of 2022, are summarized on Table 2-5.

TABLE 2-5
WATER ACCOUNT INFORMATION

Account Type	Number of Accounts	Percent of Total Accounts	Percent of Water Use in 2021
Residential	3,254	89	51.4
Commercial	381	10	20.3
Large Commercial	29	<1	28.3
TOTAL	**3,663**	**100**	**100**

The commercial users noted on Table 2-5 consist of schools, churches, City property, and businesses. Large commercial users include lumber mills, the hospital, manufacturing, and data centers. As shown on Table 2-5, residential water users account for approximately 89 percent of the total water users in the City, while commercial and large commercial users account for approximately 11 percent. However, residential water use accounts for only approximately 51 percent of water use, while commercial and large commercial users account for the remaining approximately 49 percent.

Design Criteria

In establishing design standards for a water system, primary consideration must be given to state and federal rules and regulations governing water quality and construction standards. These regulations, as previously stated, are set by both the EPA and DWS. In addition to these public health and safety requirements, many other factors control the design parameters for municipal water systems. The City must evaluate factors such as financial feasibility, philosophy and policies of the City Council, past system performance and service, and expectations of the water users. All of these factors are important and can influence the standards by which water system improvements are made.

Figure 2-3 presents a summary of the water system design criteria for evaluating the existing water system and developing improvements to satisfy present and future needs. Application of these criteria is discussed further in the specific chapters that address the water supply and treatment, storage, and distribution system facilities. Figure 2-3 presents design criteria based on the estimated present service population of 10,525 and present estimated ADD and PDD. Design criteria are shown for the year 2042 based on a 1.1 (2022 through 2042) AAGR in the City. Storage volumes are derived from calculations summarized in Chapter 4. The design criteria presented on Figure 2-3 are used as base information in later chapters for evaluating existing and future system needs and capability.

Additional Projected Large Commercial Water Demands

In recognizing the potential need to provide additional water service to future large commercial and industrial service customers located in undeveloped areas of the UGB, an additional allowance for the growth of the water service population should be accounted for separately from this WSMP's water demand projections. The PRC population projections were discussed with the City's Public Works staff, and it was determined that an additional allowance for large commercial business growth is needed to identify projected demands on the water system. The City has recently received requests from potential commercial tenants looking to site new facilities in the Prineville area. Several of the proposed facilities require a large quantity of water, and City leaders have indicated a desire to accommodate these proposed facilities. Based on this, Figures 2-4, 2-5, and 2-6 show both an additional 1.0 MGD and 2.0 MGD of large commercial demands in 2022 and 2042 in addition to the projected population growth. Further discussion of the potential large commercial water demands can be found in Chapters 3 and 4.

It should be recognized that, over the planning period of this WSMP, actual growth could exceed or fall below the projections presented on Figures 2-3 through 2-6 and discussed herein.

Additional Projected Residential Water Demand

To the east of the Prineville city limits and south of Highway 26, a development within the UGB is currently experiencing failing drinking water wells and septic systems. This area is known as the Melrose/Willowdale area. Due to the size of the existing lots and setback rules, replacing the failing septic systems is not an option. With the wells in this area being very shallow, there is concern that the groundwater may become contaminated by the failing septic systems. This contamination would affect individual residences as well as potentially cause contamination of the aquifer. At this time, some of the lots in this area are faced with condemnation as they are unable to make needed improvements due to income or lot size restrictions.

The City has been approached by members of the Melrose/Willowdale area and has expressed a desire to assist these residents. Project SDC 10 included in this WSMP would extend water distribution main lines into this area to provide the needed infrastructure to facilitate domestic water connections and fire protection. Additional improvements would be needed to extend smaller diameter main lines into side streets as well as to make service connections available.

The estimated number of residences in this area is 250. Using the current data of 2.46 persons per household, the estimated number of persons to connect is 615. The estimated additional demand to the water system is summarized on Table 2-6.

TABLE 2-6
MELROSE/WILLOWDALE ADDITIONAL SYSTEM DEMAND

Parameter	System Demand (gpcd)	Total Demand (gpm)	Gallons Per Day
ADD	184	78	113,160
PDD	452	190	278,000

Based on Table 2-6, the existing water system has the capacity to accommodate the addition of the Melrose/Willowdale area residents.

Fire Demand

Fire Protection Ratings

Flow rates for fire suppression in residential, commercial, and large commercial areas within developed communities are usually determined from the size, density, and occupancy of buildings, type of construction materials, and desired fire insurance rating. Incorporated cities and some rural areas are given a fire suppression rating by Insurance Services Office, Inc. (ISO). The rating is used by insurance companies to determine the cost for providing fire insurance to home and business owners. ISO's fire suppression rating schedule is used to review those features of available public fire protection that have a significant influence on minimizing damage once a fire has begun. These features include receiving and handling fire alarms; the fire district's manpower, equipment, and training; and the capability of the water system to provide the needed fire flows.

ISO periodically evaluates fire suppression capabilities of incorporated cities and rural fire districts. Prior to 2014, the numerical ratings ranged from Class 1 to Class 10, with Class 1 indicating the highest fire suppression capability and Class 10 the lowest. The rating for Class 1 through Class 8 represented a fire suppression system that included a Fire Suppression Rating Schedule, creditable dispatch center, fire department, and water supply. The number assigned to the community depended on the community's score on a 100-point scale. The score was based on ISO's evaluation of the community according to a uniform set of criteria, incorporating nationally recognized standards developed by the National Fire Protection Association and the American Water Works Association. A Class 10 rating was reserved for unprotected areas that have no fire department and no water supply system. Most protected areas outside of cities had a Class 9 rating, and most small rural cities with municipal water systems were rated Class 8, 7, or 6, depending on the strength of their water system and fire department. The ISO rating for the City of Prineville, reflecting the revised classification system adopted in 2014, and based on the 2018 evaluation, is Class 04/10. Class 10 is an additional classification that recognizes the distance between a property and a creditable water supply. Because Crook County Fire and Rescue is both a rural and urban fire protection agency, Class 10 classifies those properties more than 5 miles from a recognized fire station and more than 1,000 feet from a creditable water supply. The ISO rating information is presented in Appendix C.

ISO's fire suppression rating schedule evaluates the City's fire department capabilities and the domestic water supply capacity on an approximately equal basis (50 percent and 40 percent of the rating schedule, respectively). To reduce the cost of fire insurance in a community, improvements usually must be made to the fire department, the water system, or both, depending on their present condition. It is difficult to determine possible fire insurance savings on commercial buildings, because the insurance costs are determined by many other factors related to the type of occupancy and the type of building construction.

Recommended Fire Flows

ISO also recommends fire flows for various conditions in both residential and commercial settings. Recommended fire flows for residential areas are set forth in the 2014 ISO Schedule as shown below.

Distance Between Buildings	Required Fire Flows
Over 30 feet	500 gpm
21 to 30 feet	750 gpm
11 to 20 feet	1,000 gpm
10 feet or less	1,500 gpm

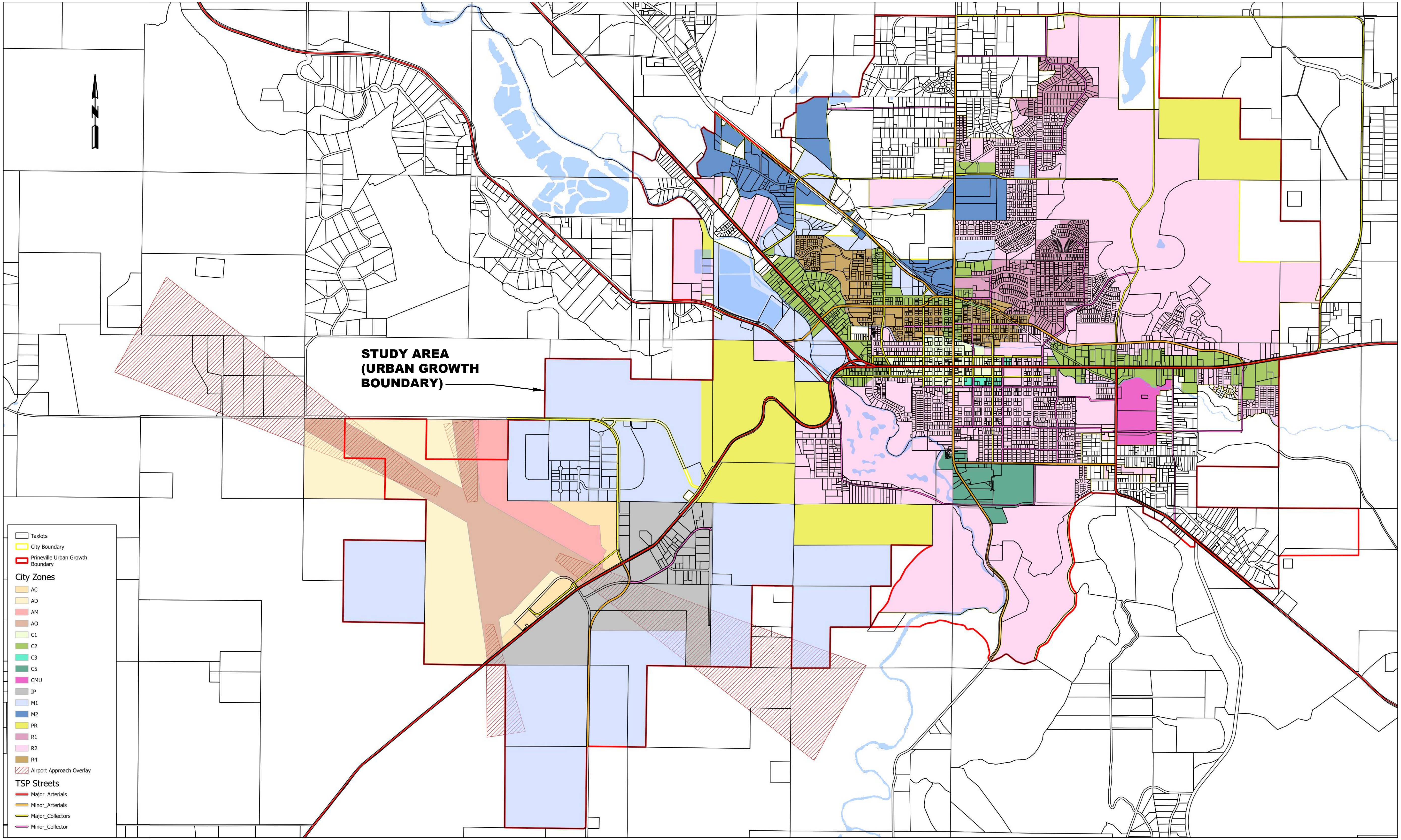
Recommended fire flows for commercial buildings are based on many factors including building size, construction materials used, and what is housed in the building.

The Oregon Fire Code (OFC) requires a minimum flow of 1,000 gpm in residential areas and a minimum of 1,500 gpm for a minimum of two hours in all other occupancies. These requirements increase with square footage of the building and can be quite large for commercial and institutional buildings (schools). These fire flows must be maintained with a system-wide minimum of 20 pounds per square inch (psi) residual pressure. Attaining the required fire flows for commercial areas may not be realistically achievable. The OFC has an allowance for decreases in fire flows for small communities (if approved by the local fire chief), where development of full fire flows is impractical.

The 2012 ISO Hydrant Flow Data Summary recommends needed fire flow protection rates for both residential and commercial districts to receive full credit ratings. ISO does not consider needed fire flows over 3,500 gpm in determining the Public Protection classification for cities. The fire flow design criterion for this WSMP is based on the typical maximum fire flow recommended by ISO, which is 3,500 gpm for a two-hour duration. This maximum fire flow is typically recommended for school areas and other high-density development.

Available Fire Flow

The City routinely tests fire hydrants to help ensure the hydrants remain operable and to estimate available fire flows. Fire hydrant flushing and flow testing data were provided by the City for this WSMP. Based on the test results, the City of Prineville's water system is generally able to deliver water flows ranging from approximately 95 to 3,500 gpm at individual fire hydrants while maintaining working distribution system pressures from 50 to 65 psi. A copy of the fire hydrant flow test results is included in Appendix D. Refer to Chapter 5 for a more detailed discussion of fire flow capacity.



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ZONING MAP OBTAINED FROM CITY OF PRINEVILLE'S WEBSITE

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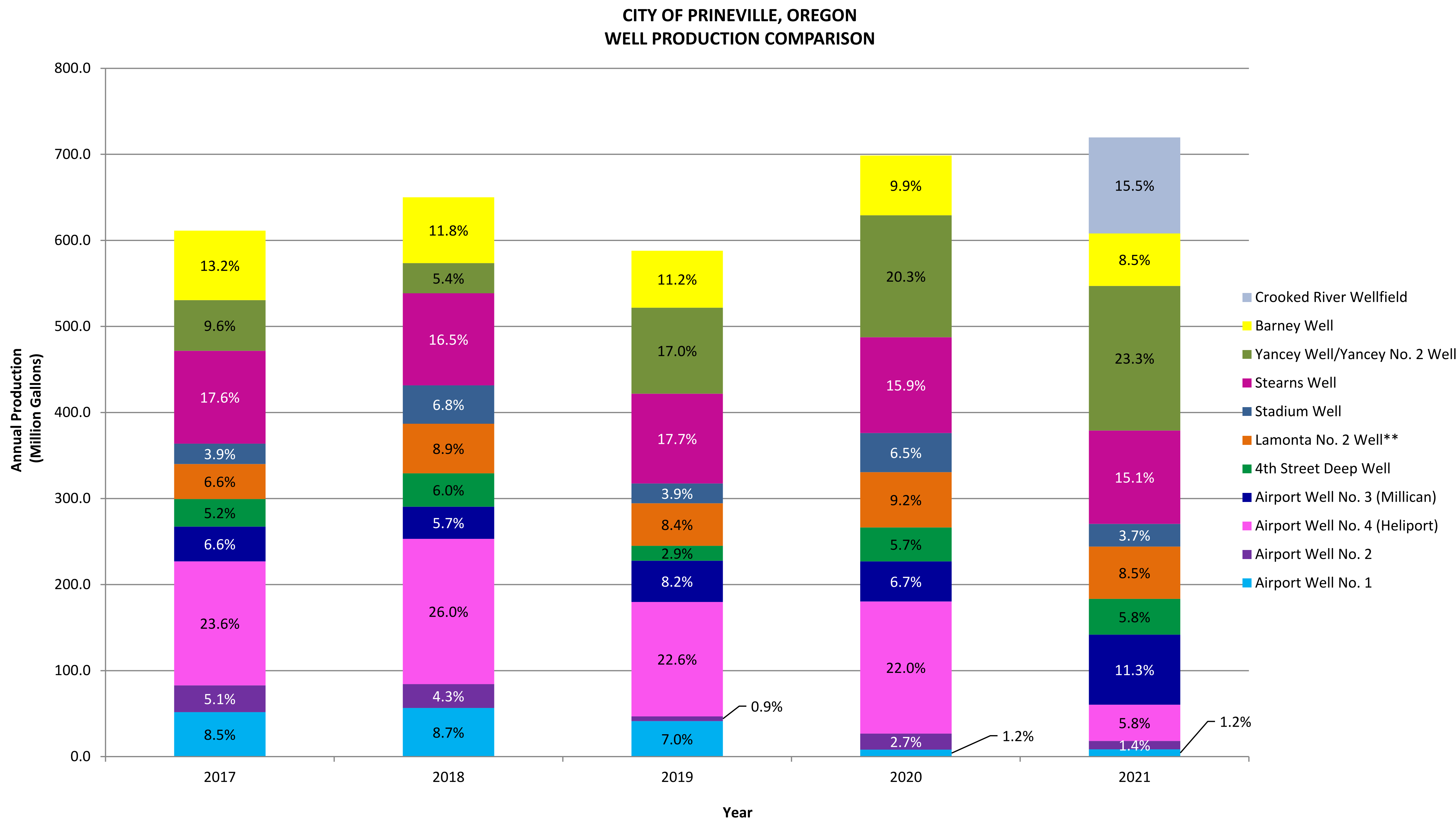
CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

ZONING MAP

FIGURE 2-1

X:\Clients\Prineville OR\1260-36 WSMP update\CAD\WSMP-1260-36-FIG2-1_Zoning.dwg, Layout1, 1/10/2023 7:27 AM, dchristman



* Yancey No. 2 Well was brought online in 2019. Data shown for 2017 and 2018 are from the original Yancey Well.
** Due to no data being available for Lamonta No. 3 Well at the time this Water System Master Plan was written, data shown are for Lamonta No. 2 Well only.

anderson perry & associates, inc.

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

WELL PRODUCTION COMPARISON

FIGURE
2-2

WATER SYSTEM DESIGN CRITERIA

	Existing Connected Population 2022[1]	Existing Connected Population with Improvements 2022[2]	Existing Connected Population with Improvements and Anticipated Connections within Urban Growth Boundary 2022[3]	Future Connected Population* with Improvements and Anticipated Connections within Urban Growth Boundary 2042[4]
Design Population	10,525	11,337	11,822	14,722
Total System				
Average Daily Demand (gpcd)	184	184	184	255
Average Daily Flow (gpd)	1,936,600	2,086,000	2,175,200	3,758,400
Average Daily Flow (gpm)	1,340	1,450	1,510	2,610
Peak Daily Demand[5] (gpcd)	452	452	452	511
Peak Daily Flow[6] (gpd)	4,757,300	5,124,300	5,343,500	7,523,600
Peak Daily Flow (gpm)	3,300	3,560	3,710	5,220
Peak Hourly Flow[7] (gpm)	8,250	8,900	9,275	13,050
Estimated Supply Flow Available[8] (gpm)	6,436	6,436	6,436	6,436
Estimated Supply Flow Required[9] (gpm)	4,400	4,750	4,950	6,960
Residential				
Average Daily Flow (gpd)	993,500	1,077,000	1,123,100	1,394,000
Average Daily Flow (gpm)	690	750	780	970
Commercial				
Average Daily Flow (gpd)	393,900	393,900	393,900	644,244
Average Daily Flow (gpm)	270	270	270	450
Large Commercial				
Average Daily Flow (gpd)	549,200	549,200	549,200	1,708,864
Average Daily Flow (gpm)	380	380	380	1,190
Residential				
Peak Daily Demand (gpcd)	232	232	232	232
Peak Daily Flow (gpd)	2,441,800	2,630,000	2,743,000	3,416,000
Peak Daily Flow (gpm)	1,700	1,830	1,900	2,370
Commercial				
Peak Daily Flow (gpd)	966,000	966,000	966,000	1,579,000
Peak Daily Flow (gpm)	670	670	670	1,100
Large Commercial				
Peak Daily Flow (gpd)	1,346,000	1,346,000	1,346,000	2,528,600
Peak Daily Flow (gpm)	930	930	930	1,760
Fire Demand				
Residential (gpm)	1,500	1,500	1,500	1,500
Commercial/Public (gpm)	3,500	3,500	3,500	3,500
Duration (hour)	2	2	2	2
Minimum Residual Line Pressure Under Peak Demands Plus Fire Flow (psi)	20	20	20	20
Storage				
Operating Storage[10] (gal)	500,000	500,000	500,000	500,000
Equalization Storage[11] (gal)	272,100	369,600	425,850	992,100
Fire Reserve[12] (gal)	420,000	420,000	420,000	420,000
Dead Storage[13] (gal)	225,000	225,000	225,000	225,000
Emergency Reserve[14] (gal)	1,936,600	2,020,200	2,066,200	3,758,400
Total Recommended Storage[15] (gal)	3,353,700	3,534,800	3,637,050	5,895,500
Total Existing Storage (gal)	4,500,000	4,500,000	4,500,000	4,500,000
Potential Storage Need (gal)	0	0	0	1,395,500

gal = gallons
gpcd = gallons per capita day
gpd = gallons per day
gpm = gallons per minute
PRC = Population Research Center
psi = pounds per square inch

*Population forecasting provided by Portland State University.

[1] City billing reports were utilized to find the number of residences within the city limits not connected to water (330) and the number of residences located outside the city limits connected to water (120). According to the PRC, the average person per household within the City is 2.46. The certified population for 2021 was 11,042. For planning purposes, this population is utilized as the 2022 population.
[2] Includes all residences within the city limits that could be served plus the number of residences located outside the city limits currently connected to water (120).
[3] Includes all residences within the city limits that could be served (11,337), plus the number of residences located outside the city limits currently connected to water (120), plus residences directly outside the city limits that could be served in the future (assumed to be 20 percent of total residences in the urban growth boundary, which equates to 197 residences).
[4] Utilized the average annual growth rate values declared by the PRC. This calculation represents a significant, large commercial projection in addition to the residential population growth.
[5] Peak day use obtained from City water use reports from 2017 through 2021. The peak day flow used for planning purposes occurred in June 2021.
[6] Per City Records, usage of 4,755,700 gallons occurred June 29, 2021.
[7] 2.5 times peak daily flow.
[8] Total pumping capacity at 24 hours per day.
[9] Total capacity required to operate well pumps a maximum of 18 hours per day and meet peak demands.
[10] Based on a 2.3 psi range of operating pressure from supply on to supply off.
[11] Difference between peak hourly flow and available supply for a 2-1/2-hour period.
[12] 3,500 gpm flow for two-hour duration, assuming only storage is used.
[13] Assumes 5 percent of overall system storage volume. This volume is not considered usable for consumption.
[14] One-day supply at average daily demand, assuming only storage is used.
[15] Sum of equalization, operating, fire reserve, dead storage, and emergency reserve.

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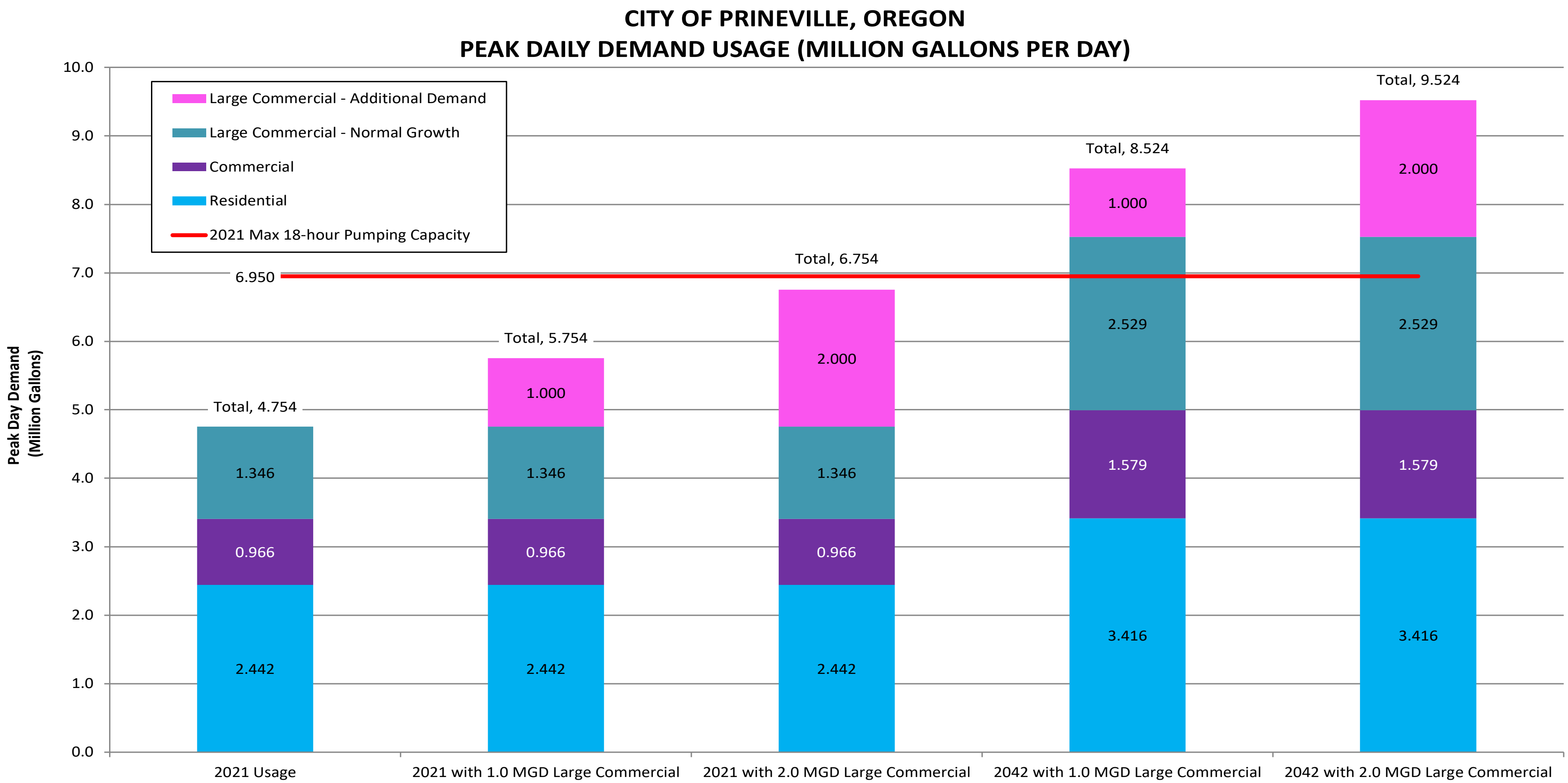
CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

WATER SYSTEM DESIGN CRITERIA

FIGURE
2-3



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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

PEAK DAILY DEMAND USAGE

FIGURE
2-4

SUMMARY OF WATER SYSTEM DESIGN CRITERIA
PEAK DAILY DEMAND - 2021

	Year 2021	Year 2021 with 1.0 MGD Additional Large Commercial Demand[1]	Year 2021 with 2.0 MGD Additional Large Commercial Demand[1]
Population[2]	10,525		
Peak Daily Large Commercial Demand, gpd	1,346,000	2,346,000	3,346,000
Peak Daily Commercial Demand, gpd	966,000	966,000	966,000
Peak Residential Demand[3], gpd	2,441,800	2,441,800	2,441,800
Total Peak Demand			
Peak Daily Flow (gpd)	4,753,800	5,753,800	6,753,800
Peak Daily Flow (gpm)	3,300	4,000	4,690
Pumping Capacity			
Maximum Flow Available, gpm	6,436	6,436	6,436
Supply Flow Required[4], gpm	4,400	5,330	6,250
Supply Deficit[5], gpm	0	0	0

gpd = gallons per day
gpm = gallons per minute

[1]Based on current requested capacity increase.
[2]Current connected population.
[3]Based on historical usage data.
[4]Total capacity required to operate well pumps 18 hours per day and meet peak demands.
[5]Based on current total well pumping capacity of 6,436 gpm.

SUMMARY OF WATER SYSTEM DESIGN CRITERIA
PEAK DAILY DEMAND - 2042

	Year 2042	Year 2042 with 1.0 MGD Additional Large Commercial Demand[1]	Year 2042 with 2.0 MGD Additional Large Commercial Demand[1]
Population[2]	14,722		
Peak Daily Large Commercial Demand, gpd	2,528,600	3,528,600	4,528,600
Peak Daily Commercial Demand, gpd	1,579,000	1,579,000	1,579,000
Peak Residential Demand[3], gpd	3,416,000	3,416,000	3,416,000
Total Peak Demand			
Peak Daily Flow (gpd)	7,523,600	8,523,600	9,523,600
Peak Daily Flow (gpm)	5,220	5,920	6,610
Pumping Capacity			
Maximum Flow Available, gpm	6,436	6,436	6,436
Supply Flow Required[4], gpm	6,960	7,890	8,810
Supply Deficit[5], gpm	(524)	(1,454)	(2,374)

gpcd = gallons per capita day
gpd = gallons per day
gpm = gallons per minute

[1]Based on current requested capacity increase.
[2]Future connected population.
[3]Based on current residential peak gpcd demand times population.
[4]Total capacity required to operate well pumps 18 hours per day and meet peak demands.
[5]Based on current total well pumping capacity of 6,436 gpm.

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF WATER SYSTEM DESIGN CRITERIA
PEAK DAILY DEMAND - 2042

FIGURE
2-6

Chapter 3 - Water Supply and Treatment

Introduction

This chapter includes a description of the City of Prineville's present water supply sources, water rights, and treatment systems and a discussion of the water system's capacity to meet present and future needs. The City's current water supply system consists of production from water wells located in the City. The only treatment currently required for the well water is chlorination for distribution system residual maintenance and disinfection purposes. The exception is the Crooked River Wellfield, which pumps to the Water Treatment Plant (WTP) for treatment prior to distribution, as discusser later in this chapter.

Existing Water Supply System

General

Prineville's water currently comes from two groundwater sources supplied by 28 production wells. Seven wells pump water from the deep alluvial aquifer underlying the valley floor, and 17 wells pump water from the shallow alluvial aquifer near the Crooked River. Four additional wells pump water from the Airport Area Aquifer System, located on the plateau west of the City adjacent to the Prineville Airport. The locations of the City's production wells are shown on Figures 1-2A and 1-2B in Chapter 1. The City does not have interconnections with other municipal water supply systems.

Although the City also holds surface water rights for the use of water from the Crooked River, Prineville Reservoir, and Ochoco Creek, surface water is not currently used as a source for the municipal water supply system (surface water rights are primarily used for agricultural purposes).

A summary of the wells and capacity data is provided on Table 3-1 below.

TABLE 3-1
SUMMARY OF PRODUCTION WELL DATA

Well	OWRD Well Log Number	Year Constructed	Depth (feet)	Static Water Level at Construction (feet)	Current (2018 to 2022) Static Water Level (feet)	Pump Motor Horsepower	Estimated Capacity (gpm)
Prineville Valley Floor Aquifer Wells							
Barney	CROO 3132	1994	280	35	130.5	60	340
Stearns	CROO 2083	1973	246	0 (Artesian)	164.9	75	210
Stadium	CROO 184	1987	259	31	32.6	40	205
4th Street Deep*	CROO 2133	1960	252	22	9.8	30	175
4th Street Deep No. 2	CROO 55194	2022	257	49		--	400
4th Street Shallow*	CROO 52542 CROO 2130	1950	75	4.5	2.1	--	90
Yancey*	CROO 50181	1917	228	16.2	11	--	210
Yancey No. 2	CROO 54711	2019	242	10.5		60	600

Yancey No. 3	CROO 55225	2022	243	13		60	400
Lamonta*	CROO 1540	1957	256	0 (Artesian)	50	--	210
Lamonta No. 2	CROO 54871	2020	298	8		75	600
						Subtotal	**2,755**
*No longer in service (abandoned) and not included in subtotal.							
Crooked River Wellfield							
DTW-1	CROO 54593	2017	140	4.5			80
DTW-2	CROO 54592	2017	140	4			94
DTW-3	CROO 54588	2018	140	4			130
DTW-4	CROO 54785	2019	95	6			220
DTW-5	CROO 54792	2019	107	9			112
DTW-6	CROO 54834	2019	98	9			93
DTW-7	CROO 54832	2019	84	9			46
DTW-8	CROO 54833	2019	85	9			78
DTW-9	CROO 54830	2019	93	10			158
DTW-10	CROO 54831	2019	95	10			113
DTW-11	CROO 54829	2019	94	5			161
DTW-12	CROO 54810	2019	93	10			192
DTW-13	CROO 54789	2019	95	6			192
DTW-14	CROO 54869	2019	95	4			118
DTW-15	CROO 54750	2019	85	3			124
DTW-17							
DTW-18	CROO 53215	2020	255	20.8			68
						Subtotal**	**1,911**
**Capacity rate with all wells flowing into raw water system (entire plant).							
Airport Area Wells							
Airport Well No. 1	CROO 1894 CROO 54206	1980/1996	575	435.7	446.9	60	300
Airport Well No. 2	CROO 53453	2007	546	408	449.8	150	640
Airport Well No. 3	CROO 53956 CROO 54149	2012	703	480	373.5	100 (derated to 90)	285
Airport Well No. 4	CROO 54191	2014	607	432	436.2	250	1,100
						Subtotal	**2,325**
						Total Production Capacity	**6,991**
Water Source Not Connected to Municipal Water Supply System							
Freight Depot	CROO 35759	2010	280				
10th Street	CROO 1549	1943	223				
Ochoco Heights	CROO 1577	1943	1,002				
Northridge A	CROO 426	1992	940				
Stearns No. 1	--	--	--				
Clear Pine	CROO 1551	1948	400				
Simmons Well	CROO 50124	1996	148				

-- = Data not available

gpm = gallons per minute

OWRD = Oregon Water Resources Department

Prineville Valley Floor Aquifer

The Prineville Valley Floor aquifer is located within the alluvial deposits that have filled the Crooked River Valley. The alluvial system contains a shallow unconfined aquifer and a deeper confined aquifer. The majority of water production in the valley is from the deeper confined aquifer, including all of the City's valley floor municipal production wells. The confined aquifer system has a seasonal water level fluctuation pattern. Water levels are near ground surface during late winter and spring and then decline during the summer. The valley water levels typically recover fully each year. Although this valley aquifer appears to be able to support the current level of production, the City continues to monitor its long-term resiliency of the alluvial aquifer system.

The Crooked River Wellfield produces water from an aquifer that is hydraulically connected to the Crooked River upstream of the wellfield location. The wells are constructed to withdraw water from an aquifer that is mostly confined by a layer of natural clay with a water-bearing zone consisting of alluvial materials, although the entire limits of this particular aquifer are not entirely known.

Airport Area Aquifer System

The Airport Area Aquifer System has been developed into a sequence of permeable materials deposited at the base of a narrow ancestral paleochannel that existed beneath the plateau in the vicinity of the Prineville Airport. The deposits within the ancestral canyon are part of the eastern edge of the older Deschutes Formation. The groundwater flow within the ancestral canyon is present in the more permeable deposits found at the base of the paleochannel. The City's Airport Area production wells are located in two distinct water-bearing units: the fractured basalt flow located at the bottom of the ancestral canyon (lower aquifer) and the coarse sand and gravel deposit that represents the ancestral river's alluvial channel deposits (upper aquifer).

Valley Floor Wells

The City's seven main valley floor wells currently provide approximately two-thirds of the City's water supply, with each well capable of providing between 205 and 600 gpm. Four wells have been drilled in the Valley Floor aquifer since 2019 to replace aging wells at three locations: 4th Street, Lamonta, and Yancey. Two new wells have been constructed at the Yancey site, with the latest being completed in April 2022. The existing 4th Street Deep, Lamonta, and Yancey Wells, along with the 4th Street Shallow Well, have been abandoned or are awaiting final abandonment. The Valley Floor wells range in depth from 242 to 298 feet. Well logs for all the City's municipal water supply wells are included in Appendix E.

Figure 3-1 shows estimated current production capacity for the wells connected to the municipal water system. The City considers its most reliable Valley Floor wells to be the Stearns, 4th Street, Lamonta, Yancey, Stadium, and Barney Wells. The current combined capacity of the City's Valley Floor wells is approximately 6.14 cubic feet per second (cfs) (2,755 gpm).

Stearns Well

The Stearns Well is located on S.E. Stearns Road south of Highway 26. In January 1973, the well was drilled to a depth of 246 feet below ground surface (BGS) and was artesian. A casing with diameters of 24 and 12 inches was installed to a depth of 225 and 226 feet, respectively, with cement grout from 32 to 75 feet. A stainless steel screen was installed from 226 to 246 feet. The materials observed during drilling included silty sand, clays, and gravel. An initial well test at the time of construction showed the well yield was 820 gpm with a 136-foot drawdown for 10 hours. The 75 horsepower (Hp) line-shaft turbine pump has a current capacity of 210 gpm. A project to replace or reconstruct the Stearns Well is identified in the existing Capital Improvements Plan to update this aging well to new well construction standards.

4th Street Deep Well/4th Street Deep No. 2 Well

The 4th Street Deep Well is centrally located in the City approximately 525 feet from the intersection of S.E. Belknap Street and S.E. 4th Street. The well was drilled to a depth of 252 feet with a diameter of 12 inches. The static water level was 22 feet BGS when the well was drilled on October 12, 1960. A stainless steel screen was installed from 222 to 242.5 feet. Casing was installed from the surface to 222 feet with diameters of 24 and 12 inches. Casing was also installed with a diameter of 12 inches from 242.5 feet to 252 feet. The materials observed during drilling included silty clay, silts, water-bearing sand, and gravel. An initial well test at the time of construction showed the well yield was 650 gpm with a 74-foot drawdown after 12 hours. The well was rehabilitated in 2005, and the 30 Hp submersible pump had a capacity of 175 gpm.

In 2021, a second well was drilled at this location, which is called the 4th Street Deep No. 2 Well. It is located approximately 30 feet southeast of the existing 4th Street Deep Well. The well was drilled to a depth of 257 feet at a diameter of 24 inches, which was completed on January 24, 2022. The well has a 12-inch steel casing to 225 feet, stainless steel screen from 225 to 245 feet, and 12-inch steel casing from 245 to 257 feet. The static water level measured on January 24, 2022, was 49 feet BGS. The 60 Hp submersible pump has a capacity of 400 gpm. With construction of the 4th Street Deep No. 2 Well, the original 4th Street Deep is sitting idle and awaiting final abandonment.

4th Street Shallow Well

The 4th Street Shallow Well is located adjacent to the 4th Street Deep Well. The well was drilled to a depth of 75 feet and cased to a depth of 61 feet. Construction was completed in August 1950. The aquifer was recorded to be gravel from 13 to 28 feet, and the well casing is perforated from 13 to 22 feet. Materials observed included clay, silt, gravel, and sand. The submersible pump has a rated capacity of 90 gpm. The well was the City's backup source, has not been utilized in recent history, and has now been abandoned.

Lamonta Well/Lamonta No. 2 Well

The Lamonta Well is located on Lamonta Road north of the City. Completed on September 4, 1957, the well was drilled to a depth of 256 feet with a diameter of 24 inches. Wire-wound screen was installed from 228 to 253 feet. The static water level is 17 feet BGS. An initial well test at the time of construction showed the well yield was 800 gpm with a 200-foot drawdown after one hour. Materials observed in the well included sand, sandstone, surface water, clay, sandy silt, sticky shale, and gravel. The 60 Hp turbine pump produced an average of 210 gpm with a rated capacity of 450 gpm. In 2020 a new well was drilled to a depth of 226 feet located approximately 37 feet northwest of the existing well. The well has a 12-inch casing to a depth of 291 feet, a stainless steel screen from 226 to 291 feet, and steel casing from 291 to 298 feet. The static water level was recorded to be 8 feet BGS on February 14, 2020. During a well pump test, the drawdown was reported to be 165 feet after 73 hours of pumping at 600 gpm. The 60 Hp submersible pump has a capacity of 600 gpm. With the construction of the new Lamonta No. 2 Well, the original well has been abandoned.

Yancey Well/Yancey No. 2 Well/Yancey No. 3 Well

The original Yancey Well is located north of Highway 26 on N.W. Fairmont Street. The well was reportedly drilled in 1917 to a depth of 228 feet and was reconstructed in 1975. The well has an 8-inch casing to a depth of 239 feet. The static water level was recorded to be 16.2 feet BGS on October 26, 1944. The 30 Hp turbine pump has a capacity of 210 gpm. During a well pump test, the drawdown was reported to be 96 feet after 20 hours of pumping at 360 gpm.

In 2019 a new well located approximately 40 feet west of the existing well was drilled to a depth of 242 feet. The well has an 8-inch casing to a depth of 227 feet and stainless steel screen from 227 to 242 feet. The static water level was reported to be 10.5 feet BGS on February 5, 2019. During a well pump test, the drawdown was reported to be 121 feet after 120 hours of pumping at 600 gpm. The 60 Hp submersible pump has a capacity of 600 gpm. With the construction of Yancey No. 2 Well, the original Yancey Well is sitting idle and awaiting final abandonment.

In 2022, an additional well was drilled to a depth of 243 feet at the Yancey site. Yancey No. 3 Well is located approximately 78 feet northwest of Yancey No. 2 Well. The well has a 12-inch casing to a depth of 218 feet and stainless steel screen from 218 to 243 feet. The static water level was reported to be 13 feet BGS on April 13, 2022. The 60 Hp submersible pump has a capacity of 400 gpm.

Stadium Well

The Stadium Well is located on 5th Street adjacent to the high school track and stadium. Construction was completed in February 1987, and the well was drilled to a depth of 259 feet. At the time of drilling, the static water level was 31 feet BGS. The well is cased with a 12- and 10-inch diameter welded steel liner from 3.5 feet to 228 feet and 218 to 259 feet, respectively. Materials observed during drilling include clay, gravel, and sand. The 40 Hp submersible pump has a limited capacity of 205 gpm with significant drawdown. A filter has been installed in the well due to sand and iron problems. This well is utilized manually as a backup for emergencies and used only for short periods of time.

Barney Well

The Barney Well is located close to the Barnes Butte Reservoir and Stearns Well on the east side of the City. Construction was completed in December 1994, and the well was drilled to a depth of 280 feet. The static water level was 35 feet BGS at the time of drilling. During initial well tests, the yield was 700 gpm for one hour with a drawdown of 110 feet. Materials observed during drilling include gravel, clay, and coarse sand. The well was rehabilitated in 2002 and currently produces approximately 340 gpm with a 60 Hp submersible pump.

Ochoco Heights Well

The Ochoco Heights Well is located adjacent to the Ochoco Heights reservoirs north of the City off Main Street. The well is currently inoperable. Presently, no well pump is installed, but there is a possibility of utilizing this well for monitoring if another well is constructed in the vicinity. The well was drilled to a depth of 1,002 feet and was cased to approximately 300 feet. Construction was completed in 1943 and, at that time, the water level was 52 feet BGS.

Crooked River Wellfield

In 2017, the City began construction of a wellfield along the Crooked River south of Prineville in Crooked River Park. The 2017 work consisted of test well construction to confirm water availability, chemistry, and treatment procedures, which were confirmed through a pilot test study. The wellfield was completed in 2021 and consists of 17 completed wells ranging from 84 to 140 feet deep. Materials observed during drilling include gravels, clay, silt, and sand. All wells are constructed with steel casing and stainless steel screen with sand pack in the water-bearing zone. Submersible pumps and motors supplied by variable frequency drives control the pumping system, with automated meter and well depth readings supplied constantly to the supervisory control and data acquisition system. The entire wellfield has a pumping capacity of approximately 4.26 cfs (1,911 gpm) when all wells are pumping into the raw water system. The wells feed collectively into a 16-inch high density polyethylene raw water pipe that delivers the raw water to the WTP, where it is treated and disinfected prior to entry into the distribution system.

Airport Wells

The City's four Airport Area Aquifer System wells (Airport Wells No. 1 through 4) currently provide the other one-third of the City's water supply, although the volume supplied by the Airport wells has been increasing over the past 10 years as the City has developed its groundwater rights for the Airport Area Aquifer System. The Airport wells range in depth from 546 to 703 feet and draw water from the upper and lower water-bearing units within the ancestral Crooked River channel, as described previously in this chapter. The well in the fractured basalt flow (Airport Well No. 3) produces 285 gpm, and the wells in the coarse sand and gravel deposits produce up to 1,100 gpm.

Airport Wells No. 1 through 4 have a combined instantaneous capacity of 5.18 cfs (2,325 gpm). However, all four wells are not operated simultaneously due to water rights constraints. The City's current water rights for its Airport wells limit the total supply capacity to a maximum withdrawal rate of 3.94 cfs (1,768 gpm).

With all the supply sources noted previously, the City's current municipal water supply wells have a combined production capacity of 15.58 cfs (6,991 gpm); however, the water rights limitations for the Airport wells currently cap production capacity at 14.33 cfs (6,436 gpm).

Critical Groundwater Areas

The City's wells are not located in an area designated by the OWRD as a critical groundwater area or groundwater limited area. However, the wells are located within the Upper Deschutes Basin, which is regulated under the OWRD's Deschutes Basin Groundwater Mitigation Program.

Deschutes Basin Groundwater Mitigation Program

A joint OWRD and U.S. Geological Survey study of the Upper Deschutes Basin (Deschutes Groundwater Study Area) determined that the high permeability of the Deschutes Formation also results in a hydraulic connection between groundwater and surface water. Specifically, the OWRD concluded that groundwater uses within the Groundwater Study Area have the potential for substantial interference with surface water rights and will reduce scenic waterway flows unless mitigation is provided, as defined in Oregon Administrative Rules (OAR) Chapter 690, Division 505. As a consequence, new groundwater permits are conditioned to require mitigation that meets the OWRD's requirements.

The City of Prineville and surrounding lands are located within the Upper Deschutes Basin Groundwater Study Area. The City provides mitigation in the Crooked River zone of impact for water pumped from its Airport Area Aquifer System wells and will need to provide mitigation for groundwater withdrawals under any new groundwater permit.

The City has obtained a water right for the release of up to 5,100 acre-feet (AF) of stored water from Prineville Reservoir for groundwater pumping (downstream fish and wildlife use) mitigation credits. These mitigation credits are part of the federal Crooked River Collaborative Water Security and Jobs Act of 2014 and required a change in use of the storage right for Prineville Reservoir through a transfer and a new secondary water right to establish mitigation credits.

Existing Treatment Systems

Treatment of the well supply sources that pump directly into the distribution system has been designated as residual maintenance chlorination by the Oregon Health Authority - Drinking Water Services (DWS). This means the source water does not require treatment and, therefore, chlorine contact time is not required. Chlorination is completed at each well source through injection of a sodium hypochlorite solution for most wells, with Airport Wells No. 1 and 2 using a shared gas chlorination system for the purpose of preventing the potential development of algae and pathogens in the distribution system. Chlorine residuals are measured and recorded regularly to help ensure chlorine levels are maintained appropriately.

In 2021, the City constructed a WTP to treat the raw water from the Crooked River Wellfield. The WTP uses biological filtration on granular activated carbon media to remove ammonia from the source water while utilizing pyrolusite media for removal of iron and manganese. The water is disinfected at the WTP prior to entry into the distribution system through the use of on-site sodium hypochlorite generation. The WTP is currently rated for a production capacity of 2,000 gpm with an additional expansion capacity of 1,000 gpm. The City began producing finished water from the WTP for public consumption in 2021.

Static Water Level Trends

Prineville Valley Floor Aquifer

The Prineville Valley Floor aquifer has a seasonal water level fluctuation pattern. Water levels are near ground surface during late winter and spring and then decline during the summer. The Valley Floor aquifer water levels typically recover fully each year. Although this aquifer appears to be able to support the current level of production, the City needs to continue to monitor the long-term resiliency of the alluvial aquifer system.

Airport Area Aquifer System

Water levels in the Airport Area Aquifer System fluctuate seasonally, with the water tables dropping during the summer, then recovering during the winter. In addition to the seasonal fluctuations, the water levels in both of the Airport Area aquifers have shown a long-term decline over the past three years of monitoring. Water levels have declined at average rates of more than 3.5 feet per year in the upper aquifer and slightly less than 1 foot per year in the lower aquifer during the three-year groundwater mitigation plan data collection effort. Factors that are likely contributing to the measured declines include climate fluctuations (short- and long-term) and an increase in annual withdrawals from these aquifers. The precipitation record from the Prineville Valley indicates the Prineville area was in a drying trend between 2017 and 2021, which may be one reason for the observed long-term water level decline. However, the recent increases in annual withdrawal from these aquifers may also be a contributing factor to the observed declining water level trend. A longer-term water level dataset that includes a wet climate cycle will assist in further assessment of these relationships. The City needs to continue to monitor water levels in the Airport Area Aquifer System to further understand and evaluate both current and long-term trends.

Well Maintenance

Wells require periodic maintenance to keep them functioning properly and working efficiently. Many wells, particularly wells that source their water from an alluvial aquifer, have a tendency to lose efficiency over time. The result of lost efficiency is either decreased yield (gpm) or greater pumping drawdown. This results in higher pumping costs and loss of production.

Specific capacity (production in gpm per foot of drawdown) is a measure of the well's ability to yield water. Wells can lose efficiency and capacity for a variety of reasons, including mechanical clogging, bacterial clogging, and loss of pump efficiency. Observing changes in a well's specific capacity over time will alert a well owner of developing well efficiency problems.

It is recommended the City perform specific capacity pumping tests either annually or biannually on each well. The results should be recorded and plotted on a graph over time. A specific capacity test is performed by pumping the well using the existing well pump and documenting the static water levels, drawdown, and pumping rate of the well. This is best done during a period when the well has been sitting idle for a reasonable period of time (e.g., one week). The idle time is needed to normalize the well's static water level. Noting a reduction in specific capacity will indicate problems with the well or pumping system and the need to take corrective action before the problem becomes irreversible and also to minimize operating costs.

Rehabilitation work may include a variety of approaches, depending on the nature of lost efficiency. Rehabilitation work may be accomplished using mechanical cleaning or non-mechanical methods such as shocking with percussion apparatuses, chemical addition, or chlorination. In some cases, it may be necessary to use a combination of mechanical and non-mechanical methods. Generally, the longer rehabilitation work is delayed, the greater the risk that the lost capacity cannot be recovered. Tracking well production over time by performing this specific capacity test will provide good information to project forward and budget for a maintenance activity that may be required on the well. If specific capacity has not decreased but pumping rates have, this may indicate a problem with the pump rather than the well.

Water Rights

The City of Prineville holds 33 water rights for the use of both groundwater and surface water for municipal, irrigation, group domestic, and industrial supply. Of these 33 water rights, a majority are for either municipal or irrigation purposes. The City's water rights are summarized on Figures 3-1 and 3-2 as provided by GSI Water Solutions, Inc., and are described in more detail in the following sections. Copies of the water rights certificates are included in Appendix F.

Municipal Water Rights

The City currently holds a total of 13 groundwater rights for municipal use, which include eight certificates, one transfer, and four groundwater permits. The City's municipal water supply currently comes from groundwater supplied by 28 wells, appropriating water under nine of the City's municipal use water rights with a total authorized rate of appropriation of 19.66 cfs (8,825 gpm). Although the City has municipal use water rights authorizing 19.66 cfs, current production capacity of the associated wells is approximately 15.58 cfs (6,991 gpm). However, the water rights limitations for the Airport wells currently cap production capacity at 14.33 cfs (6,436 gpm).

Prineville Valley Floor Aquifer Groundwater Rights

The City holds seven water rights certificates, one transfer, and one permit (Permit G-11993) for the use of water for the municipal supply from the Prineville Valley Floor alluvial aquifer. These Valley Floor aquifer water rights total 10.02 cfs (4,498 gpm). The current combined production capacity of the City's Valley Floor wells is 6.14 cfs (2,756 gpm); therefore, there is 3.88 cfs (1,742 gpm) in excess water rights capacity available for use in the Valley Floor alluvial aquifer. Except for Permit G-11993, all of the City's alluvial aquifer water rights are certificated. Permit G-11993 was partially perfected, with Certificate 87714 issued in 2012. An application for extension of time is currently pending for the remaining unperfected portion of Permit G-11993.

Permit G-18482 authorizes the use of water from the new Yancey Wells, new Lamonta Well, new 4th Street Well, and six other wells that are either not in use or have not yet been constructed. Because Permit G-18482 is for industrial use, the City must apply water appropriated under the permit to industrial water use to certify the water right and obtain a water right certificate. As needed, the City can then seek to transfer the water right to municipal use. The City submitted a permit amendment application, T-13836, in October 2021 to add multiple wells to Permit G-18482. The deadline for applying water to beneficial use under Permit G-18482 is October 1, 2026. Transfer T-13176 authorizes the use of water from the new Yancey Wells for municipal use. This authorization is a backup for, not additive to, the authorization for industrial use under Permit G-18482. The deadline to make full beneficial use of the water under T-13176 is October 1, 2025. Considering the time constraints on these water rights transfers, it is recommended that the City start budgeting for and completing the needed beneficial use documentation in the fall of 2024.

Airport Area Aquifer System Groundwater Rights

Native Groundwater

The City holds two groundwater permits in the Airport Area Aquifer System: Permit G-17577 (commonly referred to as Permit A) and Permit G-18155 (commonly referred to as Permit B). These groundwater permits are for the use of "native groundwater," water stored in the aquifer due to natural recharge, as distinguished from water injected into the aquifer and recovered as part of the City's aquifer storage and recovery (ASR) project, described below. Combined, the City can currently appropriate up to 3.94 cfs (1,769) under the two permits.

Both Permit G-17577 and Permit G-18155 require mitigation under the Deschutes Basin Groundwater Mitigation Program (OAR Chapter 690, Division 505) and are, therefore, subject to maximum annual volume limits.

Permit G-17577 is for the use of up to 1.71 cfs (770 gpm), further limited to a maximum annual volume of 1,242 AF from four wells (Airport Wells No. 1 through 4) in the Airport Area Aquifer System.

Permit G-18155 is for the use of up to 8.02 cfs (3,560 gpm) from up to nine wells, further limited to a maximum annual volume of 2360.7 AF. The authorized rate is also subject to the following limitations: use of no more than 5.57 cfs (2,500 gpm) from Airport Wells No. 1 through 4 and future Wells No. 5 through 7, being no more than 2.23 cfs (1,000 gpm) in total from Airport Wells No. 1 through 4, no more than 1.11 cfs (500 gpm) in total from future Wells No. 5 and 6, and no more than 2.23 cfs (1,000 gpm) from future Well No. 7. There are no well-specific rate limitations on future Wells No. 8 and 9.

Currently, only Airport Wells No. 1 through 4 (the same wells authorized under Permit G-17577) are constructed and utilize; as a result, the combined authorized rate allowed under the two permits is 3.94 cfs (1,769 gpm) (1.71 cfs [770 gpm] under Permit A and 2.23 cfs [1,000 gpm] under Permit B). For operational flexibility, the combined capacity of Airport Wells No. 1 through 4 is approximately 5.21 cfs (2,340 gpm). The proposed Wells No. 5 and 6 would appropriate water from near Powell Butte, Well No. 7 from an area northwest of the Prineville Airport, and Wells No. 8 and 9 from the basalt Deschutes Regional Aquifer near Redmond. The current authorized locations of Wells No. 1 through 9 are provided on Figure 3-3.

Under the Deschutes Basin Groundwater Mitigation Program, the City must provide mitigation pursuant to the rules in OAR Chapter 690, Division 505. To date, the City has provided 263.6 mitigation credits under Permit G-17577 and 340.3 credits under Permit G-18155. The City must provide mitigation for OWRD's estimate of consumptive use. OWRD has generally determined that the use of water for year-round municipal supply is 40 percent consumptive, so with the mitigation currently provided the City can appropriate a maximum of 1,509.8 AF from the Airport Area Aquifer wells.

Aquifer Storage and Recovery

In addition to the City's native groundwater rights, the City holds a Limited License for ASR pilot testing. The City pumps treated and disinfected water from the Crooked River Wellfield for injection into Airport Well No. 4. During the summer, the City can legally recover 95 percent of the volume of water injected into Well No. 4. The City is currently limited to a maximum injection rate of 2.45 cfs (1,100 gpm) and a maximum recovery rate of 3.12 cfs (1,400 gpm) per well, as discussed below. The maximum rate authorized for ASR recovery is in addition to the maximum rate of appropriation under the City's native groundwater permits. As a condition of the City's ASR Limited License, the City must first recover 95 percent of stored water in Well No. 4 prior to using Well No. 4 to pump native groundwater. In 2019, the City began a series of three cycles of pilot testing by utilizing the Airport No. 4/Heliport Well after the well was retrofitted to accommodate the ASR injection and recovery operation. The Limited License allows for storage of up to 870 million gallons (MG) through up to five wells with a maximum injection rate of 1,100 gpm per well and a maximum recovery rate of 1,400 gpm per well. The ASR pilot testing has stored and recovered approximately 34 MG and 98 MG of water during the first two years of pilot testing, respectively, and has stored and recovered approximately 130 MG during the third year of testing.

The three pilot test cycles are summarized on Table 3-2 below.

TABLE 3-2
SUMMARY OF ASR PILOT TESTING PROGRAM*

	Cycle 1 December 2019 through January 2020		Cycle 2 December 2020 through March 2021		Cycle 3 November 2021 through March 2022	
	Gallons	**Days**	**Gallons**	**Days**	**Gallons**	**Days**
November					30,207,000	28
December	20,077,129	19	31,882,400	31	22,040,000	21
January	13,581,871	12	33,228,000	31	35,164,000	31
February			30,677,000	28	30,464,000	28
March			2,367,000	1.2	11,877,000	11
Total Injected =	33,659,000	31	98,154,400	91.2	129,752,000	119
Total Recovered =	31,976,050		93,246,680		123,264,400	

** Data provided by GSI Water Solutions, Inc.*

Based on early results of the City’s ASR testing, the City may be able to obtain approval to recover water from additional wells or at higher rates. With sufficient well capacity, this would allow the City to recover the volume of stored water more quickly to meet periods of high maximum demands. It may also be possible for the City to request an increase in the maximum rate limitation under the City’s native groundwater rights. Because ASR testing has shown that groundwater levels are stable or increasing, OWRD may consider relaxing the rate limitation of 1,000 gpm under Permit G-18155 for Wells No. 1 through 4. The City could also increase the maximum authorized rate of use from the Airport Area aquifer by requesting to recover water stored through the City’s ASR program at higher rates.

Municipal Water Rights for Wells Not Connected to the City Municipal Water Supply System

The City also holds three additional municipal use groundwater certificates, which are not currently being used, to supply water to the City’s municipal water system. These rights are used to supply water for industrial use or are not used by the City due to water quality, production, or other issues. One of these rights is a surface water withdrawal from Ochoco Creek. Figure 3-2 provides further details regarding these water rights. Because these water rights are not used to supply water to the City’s municipal system, they are not discussed further in this Water System Master Plan (WSMP). Although the wells associated with these groundwater rights are not connected to the City’s municipal system, the water rights associated with the wells may be utilized at other points of appropriation in the Prineville Valley Floor Area aquifer through a water rights transfer, should the City develop additional wells from that source of supply over the long term.

Other City Water Rights

The City holds one certificate and two groundwater permits for uses that include group domestic, industrial, fire protection, and sewerage (see Figure 3-2). Because these water rights are not used to supply water to the City's municipal system, they are not discussed further in this WSMP. The City also holds surface water Certificate 531 in reserve for potential future needs.

Irrigation Water Rights

The City holds 18 water right certificates for primary irrigation of 1,169.3 acres and supplemental irrigation of 562.5 acres. These rights are all surface water rights, with the exception of one supplemental irrigation right associated with a groundwater well. These irrigation water rights are shown on Figure 3-2. The City uses a portion of these rights, in combination with reclaimed water, to irrigate City-owned lands. Both the City golf course and pasture lands near the wastewater treatment plant are irrigated with surface water in this manner. Some of the City's surface water irrigation rights are also to provide in-stream water rights each year. Because these water rights are not used to supply water to the City's municipal system, they are not discussed further in this WSMP.

Water Supply Analytical Testing

General Supply Well Testing Data

Summaries of analytical data related to the City's water quality testing were obtained from the DWS website. The City's well sources have been sampled for the constituents required by the DWS, including total and fecal coliforms, volatile organic compounds, synthetic organic compounds, inorganic compounds, radiological agents, pesticides, fluoride, nitrates, nitrites, arsenic, asbestos, and several metals.

As shown in the City's testing data, most of the constituents were not detected in samples obtained from the wells. Of those detected, the concentrations were significantly less than their corresponding U.S. Environmental Protection Agency (EPA) primary drinking water maximum contaminant levels (MCL). Based on the latest chemical results, groundwater from the City's supply wells does not contain bacteriological or chemical constituents at concentrations greater than the corresponding EPA primary drinking water MCL. The DWS water quality testing summaries are presented in Appendix G.

Distribution System Water Quality Testing

Although the distribution system is discussed in greater detail in Chapter 5, a brief discussion of water distribution system sample analytical testing is presented herein for completeness. The City routinely obtains samples from the water distribution system for analysis of total coliform and fecal coliforms. In general, coliforms are not present in routine water distribution system samples, although the water has tested positive for total coliforms in the past, but not recently. These past positive test results were reported to the DWS, and the DWS recorded the positive test as an alert, although it was not considered a violation. Total coliform bacteria are commonly found in the environment (e.g., soil or vegetation) and are generally harmless. When only total coliform bacteria are detected in drinking water, the likely source is environmental, and fecal contamination is not likely. However, if environmental contamination can enter the system, that may indicate there is a way for pathogens to enter the system and, therefore, it is important to find the source and resolve the issue.

The City also obtains samples from the distribution system for chemical analysis of disinfection byproducts (DBP), asbestos, lead, and copper. From 1993 through 2015, all detected concentrations of DBP, asbestos, lead, and copper were less than their corresponding EPA action levels. Results from the City's coliform, lead, and copper tests are summarized in the DWS water quality testing summaries in Appendix G.

Source Water Assessment Update

The 1996 amendments to the Safe Drinking Water Act required states to provide the information needed by public water systems to develop source water assessments if they chose to do so. The information provided in the source water assessment includes identification of the area most critical to maintaining safe drinking water (i.e., the Drinking Water Protection Area [DWPA]), an inventory of potential sources of contamination within the DWPA, and an assessment of the relative threat that these potential sources pose to the water system. The DWS is the principal agency involved with source water assessments in Oregon. As part of the source water assessment, the DWS developed time of travel delineations for the City of Prineville's water supply wells. In 2020, the DWS certified the City's updated DWPA designated time of travel delineations. The City also completed an Inventory of Potential Contaminant Sources associated with the updated DWPA time of travel delineations in 2020. A copy of the Source Water Assessment (Report) is included in Appendix H.

The Report includes information related to the City's water sources, including delineation of the source water protection area, a sensitivity analysis, an inventory of potential contamination sources, and the susceptibility of the drinking water sources. Refer to Appendix H for information relative to the City's water supply well source aquifers present beneath the Prineville area. The DWPA delineations are intended to identify the area that supplies the system's drinking water. The DWPA is designated for projected 1-, 2-, 5-, and 10-year time of travel periods for water from the aquifer to enter Prineville's water supply sources. Figures showing the DWPA, the times of travel for groundwater to the wells, and potential contamination sources are included in the Report in Appendix H.

The City utilizes the local groundwater aquifer to supply water to the system. Because groundwater sources can be susceptible and sensitive to contamination, it is important to understand and protect the groundwater systems the local population relies on for their drinking water. Potential contaminant sources for each City well were identified and labeled on figures in the Inventory of Potential Contaminant Sources included in the Report located in Appendix H. Potential contaminant sources identified by the Report include leaking underground storage tank sites, commercial and industrial properties, and agricultural facilities. The full list of potential contaminant sources can be found on tables associated with the Report.

The documents conclude the City of Prineville's water system obtains water from several local aquifers that could be impacted by the release of contaminants on the ground or into the subsurface. Several high to moderate risk potential contaminant sources were identified within the protection area of several of the City's water wells.

Water Conservation

Although it does not impact system capacity, water conservation can create water savings and reduction in water demand that can eliminate or delay the need for the development of new sources. The City has implemented a number of conservation measures and is considering future conservation program enhancements as outlined in the City's 2011 Water Management and Conservation Plan prepared by GSI Water Solutions, Inc.

The City has employed several basic conservation programs including annual water audits, water meter upgrades to radio read metering (including testing and maintenance of meters), a tiered water rate structure, encouragement of conservation measures, leak detection and repair, public education, and providing free water conserving devices.

Water Supply Reliability

The reliability of the water supply is one of the most important components of any water system. Because the health and safety of the community depends on a reliable water source, high priority should be given to help ensure a municipal water system always has the ability to meet the water needs of its customers. A number of factors, such as mechanical failures, water quality concerns, power outages, primary water transmission line failures, etc., can affect the reliability of a water supply. It is nearly impossible to ensure 100 percent reliability of any system. However, having proper system components can reduce the risk of a water supply failure.

The City of Prineville uses a combination of both deep and shallow wells for their water supply. In general, a groundwater well source is less susceptible to seasonal fluctuations in weather patterns, drought, or contamination than a surface water source. The water levels in the City's wells do have some seasonal fluctuations; however, over time, the static water levels have remained fairly constant. Although the City's water sources have been reliable, certain events could affect the City's water supply. When evaluating the system's performance, potential weaknesses were identified as follows:

1. Transmission line failure
2. Source contamination
3. Equipment failure at the Airport Area Aquifer System wells and/or Valley Floor Area wells
4. WTP failure
5. Booster pump station equipment failure
6. Contamination in reservoirs and the distribution system

To date, the City has been able to meet system demands, currently possessing approximately 1,826 gpm of additional pumping capacity above peak daily demands (PDD). Recent improvements to the water system include a 16-inch pipe connecting the Airport and the Valley Floor areas of the water system, which provides redundancy to both systems, as water can be pumped to the airport as well as received from the Airport area to supply the Valley Floor area. Additional redundancy improvements include a backup power generation system capable of maintaining system electrical and controls to the Crooked River Wellfield and WTP. Additional backup power is available at the Airport No. 4/Heliport Well, which currently serves as the City's ASR injection and recovery well, as well as from a portable generator that can be used to provide power to individual sites in the event of a long-term power outage.

Reservoir storage is further discussed in Chapter 4, and the distribution system and delivery of water supply from the Airport Area Aquifer System wells to other zones within the City are discussed in detail in Chapter 5.

Water Supply Enhancement Alternatives

The City has constructed four new wells since 2019 that have replaced aging Valley Floor Area wells: Yancey No. 2 and 3, Lamonta No. 2, and 4th Street Deep No. 2. Additionally, the City has constructed the Crooked River Wellfield and WTP. The combined increase in available flow from the wells in the Valley Floor area is approximately 3,226 gpm more than the previous well pumping capacity. This increased flow provides the City enough source capacity to meet current PDDs. As shown on Figure 2-3 in Chapter 2, the peak daily flow requirements, assuming the wells operate 18 hours per day, are estimated to be approximately 4,405 gpm and 6,960 gpm for current and projected future (2042), respectively. It should be noted that increased population growth and large commercial use could significantly increase the PDDs in the near future, and the continued development of additional water sources should be pursued. Assuming the recommended daily operating time limit of 18 hours for the well pumps is implemented, the City will need to develop an additional pumping capacity of 524 gpm to meet the 20-year projected demands.

Develop Additional Well Sources Alternative

Drilling and developing additional wells to appropriate water from the Deschutes Regional Aquifer is an option the City could consider. As discussed above, Wells No. 1 through 4 have a physical pumping capacity of 2,325 gpm but are limited by the water rights permit to an instantaneous water right withdrawal rate of 1,770 gpm. Water rights from proposed Wells No. 5 through 7 (see Figure 3-3) allow no more than 500 gpm in total from Wells No. 5 and 6 and no more than 1,000 gpm from Well No. 7, or 1,500 gpm total. There are no well-specific rate limitations on proposed Wells No. 8 and 9. Well No. 7 would be the most feasible well to drill and develop as it has the closest proximity to the City and would require the shortest pipeline to allow it to be connected to the City's water system; it also has double the available water right when compared to Wells No. 5 and 6. As shown on Figure 3-3, all the proposed wells would require miles of pipeline to be constructed to connect them to the City's system. These pipelines would have a high capital cost to construct and, unless Well No. 8 or 9 was connected, would not provide the City with the long-term capacity needed to meet the projected demands. For these reasons, the development of these proposed wells does not appear to be the most cost-effective option potentially available to the City.

Additional ASR capabilities should also be explored as additional wells are constructed in the Deschutes Regional Aquifer. Currently the City has one ASR injection and recovery well, which is allowed up to 1,100 gpm of injection and 1,400 gpm of recovery. Additional wells, up to five total, are anticipated to have the same limitations up to a total ASR storage of 870 MG per the Limited License (LL-26) currently held by the City. Further expansion of the ASR program would allow for storage of water during cooler months for use in warmer periods, which would reduce the use of native groundwater and any urgent need for additional groundwater rights.

A list of advantages and disadvantages associated with this option follows:

Advantages

- Storage and reuse of excess water during low-demand periods
- Stored water can be recovered as needed during high-demand periods without using native groundwater
- Airport Area sources and storage can gravity feed the lower pressure zones
- Water sources in this area currently do not require treatment beyond chlorination for residual only

Disadvantages

- Higher capital cost for initial well construction
- Higher capital cost for piping improvements to connect to existing system

Expansion of Shallow Groundwater Source(s) Adjacent to the Crooked River

The City completed construction of the Crooked River Wellfield and WTP in 2021. The current pumping capacity of the wells in the wellfield, full plant, is approximately 1,900 gpm, and the WTP capacity is 2,000 gpm. The WTP was constructed in a manner to accommodate a future expansion of 1,000 gpm. Further expansion of the wellfield and WTP should be explored as a source for an additional 1,000 gpm potential capacity.

A list of advantages and disadvantages associated with this option follows:

Advantages

- Existing treatment facility was constructed to accept additional capacity
- Lower capital cost for shallow well construction
- Much of the needed infrastructure is already installed
- Produces source water for ASR storage

Disadvantages

- Location requires extensive pumping to serve the distribution system
- Raw water requires treatment prior to distribution
- Higher operation and maintenance costs to operate WTP

Recommendations

To obtain the projected additional water supply capacity, the City should consider increasing its water supply capacity. This could be done by developing the proposed wells in the Deschutes Regional Aquifer or through additional development of the shallow groundwater sources located near the Crooked River. Both proposed options can work with the other to improve the source capacity, redundancy, and reliability of the system. The most feasible option available to the City appears to be from the shallow groundwater sources since the existing infrastructure has the potential to increase flows by approximately 1,000 gpm. Additional well drilling and exploration in the Deschutes Regional Aquifer is ongoing and has had reasonable success, so this option could also be explored further along with expansion of the City's ASR program.

Water Rights for Water Sources Currently or Recently Connected to the Municipal Water System

	Well	Application	Permit	Certificate	Claim or Transfer	Entity Name on Water Right	Type of Beneficial Use	Priority Date	Source of Water	Water Right Authorized Rate				Current Capacity		Status
										gpm	cfs	mgd	Max AF/year	gpm	cfs	
	Water Rights for Sources Currently or Recently Connected to Municipal Water System															
	Barney	G-6313	G-9154	94816		City of Prineville	MU	10/5/1973	Prineville Valley Aquifer	605	1.35	0.87		340	0.76	
	Stearns 2													210	0.47	
	Stadium	G-12344	G-11993	87714 (PP)		City of Prineville	MU	12/14/1990	Prineville Valley Aquifer	271	0.60	0.39		205	0.46	
										154	0.34	0.22				Permit completion date 10/1/1998. Extension application pending. Addendum submitted 1/17/2018.
	4th Deep 2	U-402	U-372	94817		City of Prineville	MU	12/8/1950	Prineville Valley Aquifer	192.5	0.43	0.28		450	1.00	New 4th Street Deep well drilled 2021 (CROO 55194). 4th Deep well also added to permit G-18482 through permit amendment T-13836 (pending).
	4th Shallow (Abandoned)	U-396	U-370	88146		City of Prineville	MU	10/11/1950	Prineville Valley Aquifer	135	0.30	0.19		0	0	Well decommissioned 3/2021. Considering options for transfer of water right.
	Yancey 3	U-241	U-215	94815		Pacific Power & Light Co.	MU	6/17/1947	Prineville Valley Aquifer	220	0.49	0.32		400	0.89	New Yancey well drilled 2021. Yancey 3 well also added to permit G-18482 through permit amendment T-13836 (pending).
	Lamonta 2	G-605	G-506	94818		City of Prineville	MU	4/5/1957	Prineville Valley Aquifer	231	0.51	0.33		600	1.34	New Lamonta well drilled 2020. Lamonta also added to permit G-18482 through permit amendment T-13446.
	Ochoco Heights	U-147	U-140	94819		City of Prineville	MU	5/20/1942	Prineville Valley Aquifer	297.5	0.66	0.43		0	0	Well not currently in use
	Yancey 2 (Municipal Backup Transfer)	G-6313	G-9154	~~83993~~	T-13176	City of Prineville	MU	10/5/1973	Prineville Valley Aquifer	95	0.21	0.14		600	1.34	T-13176 C-date - 10/1/2025
		U-402	U-372	~~86889~~				12/8/1950		144.5	0.32	0.21				
		U-241	U-215	~~22839~~				6/17/1947		139	0.31	0.20				
		G-605	G-506	~~86337~~				4/5/1957		115	0.26	0.17				
		U-147	U-140	~~86558~~				5/20/1942		61.5	0.14	0.09				
		U-140	U-133	~~15539~~				5/16/1941		45	0.10	0.06				
Clear Pine Permit	Yancey 2	G-13238	~~G-12541~~ ~~G-18304~~ G-18482		T-13026 T-13446 T-13836	City of Prineville	Industrial Use Including Fire Protection and Dust Control	1/6/1993	Prineville Valley Aquifer	1,791	3.99	2.58		600	1.34	Yancey 2 added via Permit Amendment T-13026.
	Lamonta 2													600	1.34	Lamonta 2 added via Permit Amendment T-13446.
	New Ochoco Heights Well													0	0	Well not developed yet. Added via permit amendment T-13026.
	Stryker Park Well													0	0	Well not developed yet. Added via permit amendment T-13026.
	Juniper Well													0	0	Well not developed yet. Added via permit amendment T-13026.
	4th Deep 2													450	1.00	4th Deep 2 added via permit amendment T-13836 (pending).
	Yancey 3													400	0.89	Yancey 3 added via permit amendment T-13836 (pending).
	Stearns 3													0	0	Well not developed yet. Added via permit amendment T-13836 (pending).
	5th and Deer													0	0	Well not developed yet. Added via permit amendment T-13836 (pending).
	Airport Well 1	G-15974	G-17577		T-10378 T-11647 T-12192 T-13826	City of Prineville	MU	3/31/2003	Airport Area Aquifer System	770	1.72	1.11	1242	2325	5.18	Completion date 12/29/2026
	Airport Well 2															
	Airport Well 3 (Millican Well)															
	Airport Well 4 (Heliport Well 4)															
	Airport Well 1	G-16900	G-18155		T-11685 T-13826	City of Prineville	MU	6/27/2007	Airport Area Aquifer System	1,000	2.23	1.44	3682.7			Completion Date 10/1/2031. Well A, B, and C proposed for inclusion in permit amendment application T-13826. These are the same as ASR wells 2, 3, and 4. Addition to permit G-18155 would allow the wells to be used both for ASR recovery or native groundwater pumping.
	Airport Well 2															
	Airport Well 3 (Millican Well)															
	Airport Well 4 (Heliport Well 4)															
	Well A													0	0	
	Well B													0	0	
	Well C													0	0	
	Wells 5-9								Deschutes Regional Aquifer	2,599	5.79	3.74		0	0	
	Les Schwab Wellfield (Wells 1 - 25), H1, H2, H3	G-18662	G-18154		T-13621	City of Prineville	MU	4/25/2018	Prineville Valley Aquifer	2000	4.46	2.88	3,230	2000	4.46	Permit Amendment T-13621 redescribes location of 17 valley floor wells and proposed to add nine new wells (2, 22, 24, 25, 26, & 27, H1, H2, H3)
		G-19263				City of Prineville	MU	3/18/2022	Prineville Valley Aquifer	Proposed: 2,000	Proposed: 4.46	Proposed: 2.88	Proposed: 3,230	N/A - WATER RIGHT PERMIT NOT YET ISSUED		OWRD has not issued a permit for this application.
	Valley Floor Deep Aquifer Subtotal (not including proposed):									4,497	10.02	6.48	N/A	2,805	6.25	Production rates authorized for 4th Deep 2, Yancey 3, Lamonta 2, and Yancey 2 are authorized by multiple water rights, but well capacity is not double-counted in this total.
	Airport Area Aquifer System Subtotal (not including ASR Recovery):									1,770	3.94	2.55	4,924.70	2,325	5.18	
	Powell Butte/Redmond Area Water Right Capacity Remaining (gpm):									2,599	5.79	3.74		0	0	All water right capacity for Airport and Redmond Area wells requires mitigation. Airport Area Wells limited to 1,770 gpm. All remaining capacity is for proposed wells to be located west of the airport area near Powell Butte and Redmond.
	Les Schwab Wellfield Aquifer Subtotal (not including proposed):									2,000	4.46	2.88	3,230.00	2,000	4.46	Includes only permit G-18154.

Municipal Water Rights for Sources Not Connected to the Municipal Water System

Well	Application	Permit	Certificate	Claim or Transfer	Entity Name on Water Right	Type of Beneficial Use	Priority Date	Source of Water	Water Right Authorized Rate		
									gpm	cfs	mgd
Municipal Water Rights for Sources Not Connected to Municipal Water Supply System											
Freight Depot	G-605	G-506	~~T-11026~~ 89853		City of Prineville	MU	4/5/1957	Prineville Valley Aquifer	148	0.33	0.21
10th Street	U-140	U-133	15539	City of Prineville	MU	5/16/1941		Prineville Valley Aquifer	45	0.1	0.06
Ochoco Creek	Crooked River Decree	--	531		City of Prineville	MU, FP, Sewerage	12/31/1879	Ochoco Creek	Reasonable Amount	Reasonable Amount	Reasonable Amount

GSI Water Solutions, Inc.

anderson perry & associates, inc.

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
CITY-HELD MUNICIPAL
WATER RIGHTS

FIGURE
3-1

Other Water Rights Held by the City (Sources Not Connected to the City's Municipal Water System)

Well	Application /Decree	Permit	Certificate, Claim or Transfer	Entity Name on Water Right	Type of Beneficial Use	Priority Date	Source of Water	Authorized Rate			Primary Acres	Supplemental Acres	Status/Comments
								gpm	cfs	mgd			
Other Water Rights Held by the City													
Northridge A	G-13280	G-13280		City of Prineville	GD	2/5/1993	Prineville Valley Floor Aquifer	67.0	0.15	0.10			Completion date 10/1/2017. Not connected to City's Municipal Water Supply System
Stearns #1	G-3139	G-2919	57438	Pacific Power & Light Co.	GD	6/17/1965	Prineville Valley Floor Aquifer	112	0.25	0.16			Currently not in use due to water quality and/or production issues

Irrigation Water Rights Held by the City (Sources Not Connected to the City's Municipal Water System)

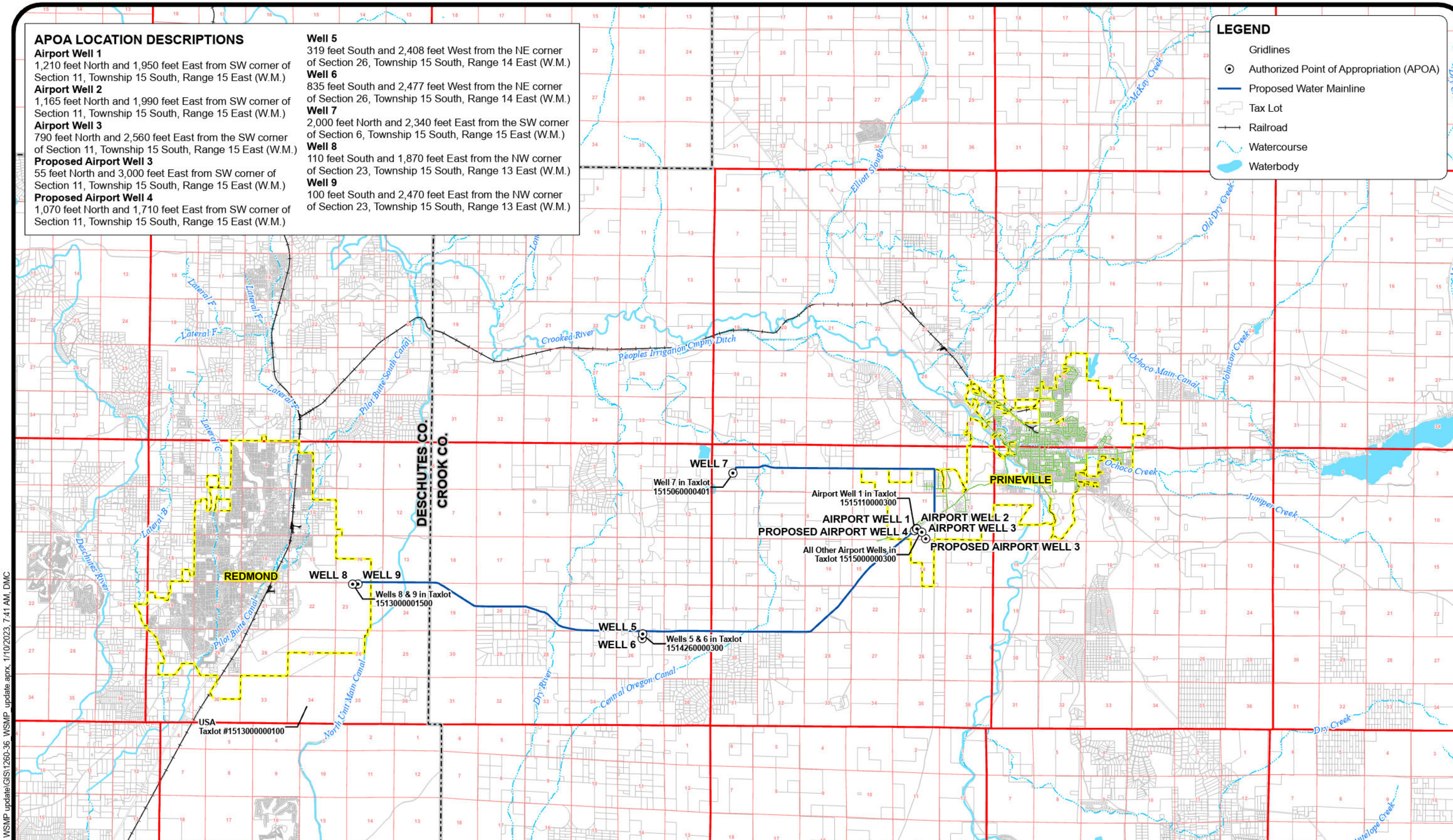
Source	Application /Decree	Permit	Certificate, Claim or Transfer	Entity Name on Water Right	Type of Beneficial Use	Priority Date	Source of Water	Authorized Rate			Primary Acres	Supplemental Acres	Status/Comments
								gpm	cfs	mgd			
Surface Water Irrigation Rights													
Surface Water	S-25184	S-19956	33012	Claude Williams	SUP IR	8/25/1950	Crooked River	480	1.07	0.69	85.4		
	S-15522	S-11411	75485	Peoples Irrigation Co.	Primary IR	9/11/1934	Crooked River	449	1	0.65	78.4		
	S-15629	S-11494	75487	Peoples Irrigation Co.	IR	11/21/1934	Crooked River	72	0.16	0.10	12.4		
	S-4788	S-5426	82246	Ochoco Irrigation District	IR	3/13/1916 (from McKay) 8/10/1917 (from other sources)	Ochoco Creek, McKay Creek, Dry Creek, Lytle Creek, Johnson Creek, Ochoco Reservoir, Waste and Return Water Flowing in All Unnamed Waterways				304.7		
	S-32641	S-25991	~~68395~~ ~~T-8648~~ 82247	US Bureau of Reclamation	SUP IR	4/8/1914	Crooked River and Prineville Reservoir	13	0.03	0.02	2.5	304.7	
			82247	US Bureau of Reclamation	IR	4/8/1914	Crooked River and Prineville Reservoir	31	0.07	0.05	2.8		
	S-15766	S-11619	87546	Peoples Irrigation Co.	IR	3/28/1935	Crooked River	85	0.19	0.12	15		
	Crooked River Decree		87547	Peoples Irrigation Co.	IR, LV	1893	Crooked River	304	0.6775	0.44	54.2		
	S-32641	S-25991	87548	US Bureau of Reclamation and Peoples Irrigation Company	IR, SUP IR	4/8/1914	Crooked River and Prineville Reservoir	395 gpm primary; 1522 gpm supplemental	0.88 cfs primary; 3.39 cfs supplemental		32.5	129.3	
	S-32641	S-25991	~~T-11103~~ 83850	Bureau of Reclamation	SUP IR	4/8/1914	Crooked River and Prineville Reservoir	415	0.925	0.60	37		
			~~T-11134~~ 83850	Bureau of Reclamation	IR, SUP IR	4/8/1914	Crooked River, Prineville Reservoir	471	1.05	0.68	21.8	20	
	S-15766	S-11619	~~T-11134~~ 90380	Peoples Irrigation Co.	IR	3/28/1935	Crooked River	139	0.31	0.20	25		
	Crooked River Decree		~~T-11134~~ 90381	Peoples Irrigation Co.	IR, LV	12/31/1893 12/31/1895	Crooked River	166	0.37	0.24	29.3		
	S-32641	S-25991	~~T-11134~~ 90382	US Bureau of Reclamation and Peoples Irrigation Company	IR, SUP IR	4/8/1914	Crooked River, Prineville Reservoir	705	1.57	1.01	8.3	54.3	
	Crooked River Decree		~~T-11134~~ 90383	Peoples Irrigation Co.	IR, DOM, LV	1895	Crooked River	112	0.25	0.16	20		
	Crooked River Decree		90397	Peoples Irrigation Co.	IR, DOM, LV	1895	Crooked River	224	0.5	0.32	40		
	Crooked River Decree	--	531	City of Prineville	IR	12/31/1879		2,244	5.00	3.23	400		
Groundwater Irrigation Rights													
Simmons Well	G-13068	G-12511	87724	City of Prineville	SUP IR	8/7/1992	Prineville Valley Floor Aquifer	301	0.67	0.43		54.2	Not connected to City's Municipal Water Supply System
										Total:	1,169.3	562.5	

GSI Water Solutions, Inc.

anderson perry & associates, inc.

CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
CITY-HELD IRRIGATION AND OTHER WATER RIGHTS

FIGURE 3-2



DISCLAIMER

This map was prepared for the purpose of identifying the location of a water right only and it is not intended to provide legal dimensions or location of property ownership lines.

0 2 4
SCALE IN MILES

Date: January 10, 2023
Data Sources: OWRD, Crook Co. GIS, OGIC, ESRI

anderson perry & associates, inc.

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

AUTHORIZED POINTS OF APPROPRIATION (APOA)

FIGURE
3-3

X:\Clients\Prineville OR\1260-36 WSMP update\GIS\1260-36_WSMP_update.aprx, 1/10/2023, 7:41 AM, DMC

Chapter 4 - Water Storage

Introduction

This chapter presents information about the City of Prineville's water storage facilities and discusses the purpose for storage in municipal water systems. The condition and needs of the City's existing storage reservoirs are outlined, recommended storage requirements to meet current and 2042 design criteria are presented, and the types of storage facilities generally available are outlined. Cost estimates for storage reservoir improvements are presented at the end of this chapter.

General

Water storage facilities are constructed to serve several purposes. First, storage reservoirs are often used to provide control for well or booster pump system operation. When a reservoir drops a few feet or more from the full level, the water level can be used as a control for well pump or booster pump activation. The amount of storage required for this type of control is called "operating storage." Second, stored water must be available to supply water during periods in which the demand for water exceeds the available water supply. This reserve is called "equalization storage." Third, reserve storage is usually provided to supply unusually high, short duration demands, such as fire flows. This is referred to as "fire reserve." Reserve storage is also often provided for emergencies that may arise and interfere with production from water supply sources. Such emergencies could be created by power outages, mechanical equipment failure, or sudden water contamination. The amount of storage to be provided for an emergency depends on the likelihood and the impact of such an occurrence. The amount of emergency storage provided usually becomes a balance between what is needed and what can be afforded. This storage allowance is usually called "emergency reserve." Finally, a certain amount of water within the water storage reservoirs is not usable in the system due to physical constraints such as inlet/outlet piping or pump suction limitations. This storage is referred to as "dead storage."

Storage facilities can be located at approximately the same elevation as the water distribution system. Storage facilities of this type require continuous operation of a booster pump system to maintain distribution system pressure. Storage facilities can also be elevated, in which case the water is stored at an elevation considerably above the distribution system to generate adequate system pressure. For example, a water elevation 120 feet above a distribution system would be required to generate a distribution system static pressure of approximately 50 pounds per square inch. Reservoirs may be elevated by locating them on natural ground high enough above the service area or by construction on top of a steel support frame.

Storage reservoirs are generally constructed of steel, reinforced concrete, or prestressed concrete. The choice is usually based on an economic analysis made for the particular installation. Reservoirs may be constructed either above ground or buried, with the choice made on cost, location, and community acceptance. The remainder of this chapter reviews the City's existing storage facilities, presents a discussion of future storage needs, and provides alternatives for satisfying those needs.

Existing Facilities

The City's existing municipal water storage consists of six water storage reservoirs with a total storage volume of 4.5 million gallons (MG). Refer to an overview of the reservoirs in Chapter 1 and Table 4-1 below for a summary of operational parameters and age.

TABLE 4-1
SUMMARY OF SYSTEM RESERVOIRS

Reservoir	Volume (MG)	Base Elevation (feet)*	Overflow Elevation (feet)*	Height (feet)	Completion Date
Ochoco Heights Reservoir No. 1	0.5	2,937	2,987	50	1955
Ochoco Heights Reservoir No. 2	0.5	2,937	2,987	50	1964
American Pine Reservoir	1.0	2,951	2,984	33	2002
Barnes Butte Reservoir	0.5	3,064	3,104	40	1978
Airport No. 1 Reservoir	1.0	3,380	3,404	24	1996
Airport No. 2 Reservoir	1.0	3,378	3,404	26	2014
Total	**4.5**				

** Elevations are based on North American Vertical Datum 88.*

The most recent detailed inspections of the six reservoirs were completed in September 2018 by Inland Potable Services, Inc., of Centennial, Colorado. Copies of the available inspection reports for the reservoirs are included in Appendix I. Additional information was gathered from inspection video from each reservoir. Table 4-2 summarizes the existing conditions and recommendations provided by Inland Potable Services, Inc., for each reservoir.

TABLE 4-2
EXISTING CONDITIONS AND RECOMMENDATIONS

Reservoir	Inspection Summary	Recommendations
Airport No. 1	The exterior and interior of the reservoir were generally found to be in good condition.	Install gasket on access hatch. Replace vent screen.
Airport No. 2	The exterior and interior of the reservoir were generally found to be in good to excellent condition.	
Ochoco Heights No. 1	The reservoir exterior was generally found to be in fair to good condition, with surface corrosion ranging from less than 1 percent to 10 percent. The interior of the reservoir was generally found to be in good to fair condition, with micro and macro blistering, heavy corrosion in areas, sediment staining, coating delamination, and up to 10 percent corrosion noted.	Install gasket on access hatch. Sandblast and recoat interior of the reservoir Repair the epoxy coating on the exterior of the reservoir.
Ochoco Heights No. 2	The exterior of the reservoir was generally found to be in good condition, with up to 5 percent surface corrosion.	Install gasket on access hatch. Sandblast and recoat interior of the reservoir.

Reservoir	Inspection Summary	Recommendations
	The interior of the reservoir was generally found to be in good to fair condition, with pitting, 10 percent rust nodules, and up to 16 percent corrosion noted.	Repair the epoxy coating on the exterior of the reservoir.
Barnes Butte	The reservoir was generally found to be in good condition.	Install gasket on access hatch.
American Pine	The reservoir was generally found to be in good condition.	Install gasket on access hatch.

Based on reservoir operation and historic sediment volume deposited in the reservoirs, inspections are recommended to be completed every three to seven years. The Ochoco Heights reservoirs are recommended to be cleaned and inspected within the next fiscal year to develop a re-coating plan in the near future.

System Pressures Provided by the Reservoirs

The City of Prineville currently has six pressure zones serving the distribution system. Where practical, the distribution system is gravity-fed from the reservoirs. Chapter 5 provides further detail of the existing pressure zones. Fire flow capacity and the evaluation of the distribution system are also discussed in Chapter 5, as is the water modeling performed as part of this Water System Master Plan (WSMP), which considers varying system demand conditions and their impact on distribution system pressures.

Storage Requirements

Water storage is usually provided for several purposes. Various methods are used to calculate the volumes of each type of storage component required. Most involve a rational approach to estimating the volume of each storage component consisting of operating, equalization, fire reserve, emergency reserve, and dead storage. The decision can then be made as to which component controls and which storage volumes will be necessary. For example, the decision may be made to provide storage for operating, equalization, and fire reserve only, assuming any emergency storage would be available from the fire reserve or the City's wells with backup power capacity. All five of the storage components listed below were considered when evaluating the City's potential storage needs. Refer to the design criteria presented on Figure 2-3 in Chapter 2 for further information on the storage components discussed herein.

Operating Storage

Operating storage is generally provided to facilitate operation of wells or booster pumps in a water system. For example, when water system demands result in the water level lowering in a reservoir, the water level will reach a certain point that can be used to trigger activation of well pumps to refill the reservoir. The storage needed to activate water supply sources is typically referred to as operating storage. This zone of operation can be set as desired but is often set to help ensure circulation occurs during each pump run cycle, allowing water to cycle through the reservoir to help maintain water quality while keeping the reservoir as full as possible.

Equalization Storage

Equalization storage should be provided to balance the difference between peak hour demand and water supply capacity during a peak day demand period. An empirical method for estimating the required equalization storage uses the difference between the peak hourly flow and the peak water supply availability for a specific number of peak hours per day. For the purposes of this evaluation, 2-1/2 hours of peak hourly flow has been assumed. Based on providing the current estimated peak hourly flow of 8,250 gallons per minute (gpm) for 2-1/2 hours and using the current pumping capacity available of approximately 6,436 gpm, 272,100 gallons of equalization storage is currently required. The required equalization storage is anticipated to increase to 992,100 gallons in the 20-year design period to accommodate an anticipated increase in population (if additional water supply sources are not developed).

Fire Reserve

Reserve storage for fire suppression is usually determined from either the Insurance Services Office, Inc. (ISO) recommended fire flow or the fire flow recommended by the City's fire chief. Based on the typical maximum fire flow recommended by ISO, a 3,500 gpm fire flow with a 2-hour duration has been set as the design fire flow for the City, as discussed in Chapter 2. A total of 420,000 gallons of fire reserve storage is needed to sustain a fire flow of 3,500 gpm for a 2-hour duration.

Emergency Reserve

Emergency storage is usually provided for a minimum of one to three days' supply in the event of a power outage, mechanical problems, or other problems that would interrupt the reliable supply of water. In most cases, this would be the minimum amount of time to repair or replace a well pump or other equipment. Generally, the City has emergency power supply provisions to operate wells in the event of a power outage and would be less reliant on reserves should a power outage occur. Currently, to serve the City for one day of emergency reserve at the average daily demand, 1,936,600 gallons would be needed. This amount is anticipated to increase to 3,747,000 gallons in the year 2042.

Dead Storage

Dead storage represents the water stored in the reservoirs that cannot be utilized due to physical constraints such as inlet/outlet piping configuration. This makes a portion of stored water not available to be drawn out of the reservoirs. For the purposes of this WSMP, 5 percent of the total storage volume is used to represent dead storage.

The City's water storage reservoirs provide the operating storage, equalization storage, fire reserve, dead storage, and emergency reserve for the existing pressure zones. It should be noted that not all pressure zones are tied to a specific reservoir. For example, the Valley Floor Pressure Zone can receive water from the Ochoco Heights reservoirs and the Airport reservoirs. The Airport reservoirs supply water to the Valley Floor Pressure Zone through two pressure reducing valves (PRV). The Barnes Butte Pressure Zone receives water from the Barnes Butte Reservoir. The Williamson Pressure Zone receives water from the Barnes Butte Reservoir and the Ochoco Heights reservoirs through the Combs Flat, Wilco, and Williamson PRVs. The Valley Floor Pressure Zone is also able to send water to the higher Airport Area Pressure Zone through a booster pump station located adjacent to the City's wastewater treatment facility. Refer to Chapter 5 for further discussion on the City's pressure zones and system operation.

Storage Components Summary

Considering all five of the storage components discussed previously, it appears the current storage of 4.5 MG is adequate to meet current demand; however, an additional 1.4 MG is recommended to meet projected 2042 demands. Additional storage capacity and upgrades to current storage facilities are currently proposed in both the Capital Improvements and System Development Charge (SDC) Plans, which are discussed further in Chapter 6.

Current Storage Improvements

The area in and around the City of Prineville has numerous desirable qualities that certain large commercial industries have discovered. These qualities include robust electric and communication infrastructure, a moderate climate, qualified workforce, and state-level tax incentives. As these large commercial industries have established themselves in Prineville, there are understandable concerns about existing City infrastructure and its ability to serve the large commercial clients while maintaining reliable, quality service to its residents. In response to these concerns, some large commercial industries have approached the City and proposed funding of specific capital improvements to meet their needs. These proposed improvements currently consist of a 1.5 MG reservoir near the Airport No. 1 and Airport No. 2 Reservoirs, a large-diameter water transmission main line, and construction of an aquifer storage and recovery injection and recovery well. Preliminary design work has already begun for these initial improvements. Other possible improvements include additional storage, well capacity, and system piping improvements. Construction of these proposed improvements could provide the needed additional storage capacity without modifications to existing storage or construction of new storage by the City.

Future Growth

Anticipated future growth in the east portion of Prineville (south of Barnes Butte) may occur in areas that cannot be served by the current water system pressure zones' existing capacity. Establishing an addition to the Williamson Pressure Zone to provide adequate system capacity for future development on the east side of Prineville is recommended. It is further recommended to construct an additional 1.0 MG reservoir to supply the new Williamson Pressure Zone with necessary operation, equalization, fire reserve, and emergency reserve storage. The location of this reservoir is generally anticipated to be located approximately 1/2 mile south of Highway 26 and 1 mile east of Highway 380 at an approximate ground elevation of 3,060 feet, which is the same elevation as the Barnes Butte Reservoir. The implementation period for construction of this improvement is dependent on the rate of demand increases in east Prineville.

Operation and Maintenance

As noted previously in this chapter, the City of Prineville has conducted periodic inspections of its reservoirs. These inspections indicate Ochoco Reservoirs No. 1 and 2 are deteriorating and require maintenance. The recommended maintenance requires the draining of one of the reservoirs, sandblasting, and recoating of both the interior and exterior surfaces. To achieve the best results, this work should be completed in the summer months. The downside is that the summer months have the greatest water usage and removing a reservoir from service for maintenance could leave the system vulnerable to peak demand conditions.

Due to current conditions, removal of one of the Ochoco Heights reservoirs from the system to complete the recommended maintenance operations is not recommended. A new 1.5 MG reservoir is recommended to be constructed alongside the existing reservoirs. The design criteria on Figure 2-3 show the City will need an additional 1.4 MG storage for the 20-year planning period. However, the life of a properly maintained storage reservoir can be more than 50 years. The relative comparative cost of constructing a 1.5 MG reservoir to replace the existing 0.5 MG reservoir is an advantageous investment for the City for long-term planning purposes. Once the new reservoir is constructed and in operation, one of the existing 0.5 MG reservoirs can be taken out of service to complete renovations and repairs. Once the rehabilitation work is complete, the renovated and repaired reservoir would work in conjunction with the new reservoir, providing a total of 2.0 MG storage at the site. The second existing 0.5 MG reservoir would be demolished.

It should be noted that the proposed 1.5 MG reservoir planned for the airport area would still require improvements to the Ochoco Heights reservoirs. Improvements are needed to facilitate continued operation of the Ochoco booster pump station, which utilizes the Ochoco Heights reservoirs as an intake and would require significant modification to boost distribution system pressure to serve both the Ochoco Heights and Northridge Pressure Zones.

Cost Estimates

The anticipated cost to construct a new 1.5 MG reservoir, rehabilitate one of the existing 0.5 MG reservoirs, replace the Ochoco booster pump station, and decommission the second existing 0.5 MG reservoir is $7,230,000 (2023 cost). These improvements are anticipated to be included on the City's SDC Funded Projects list. The anticipated cost for a new 1.0 MG reservoir to serve an expanded pressure zone in east Prineville is $8,775,000. SDCs are anticipated to help pay for this construction, as the reservoir will serve future growth. Further discussion regarding capital improvements projects, SDCs, and detailed breakdowns of estimated costs is provided in Chapter 6.

Summary

The City currently has six operating storage reservoirs with a total volume of 4.5 MG. With the exception of the Ochoco Heights reservoirs, the existing condition of these reservoirs is generally good to very good. However, improvements and rehabilitation are recommended for the Ochoco Heights reservoirs. The storage needed for the 2042 planning period is approximately 5.9 MG, so an additional 1.4 MG of storage is recommended. Anticipated future growth in east Prineville will require additional storage capacity to serve an expanded pressure zone. A new reservoir is recommended to be constructed with the projected growth in east Prineville to provide adequate system pressures and fire protection. The lower elevations of the expanded pressure zone would be served by gravity flow from the new reservoir. A booster pump station would be necessary to provide adequate pressures to fill the new reservoir.

Due to the logistics and coordination to provide needed maintenance to the existing Ochoco Heights reservoirs, a new larger reservoir is recommended to be constructed at the site. This would enable the existing reservoirs to continue to serve the system as the new reservoir is constructed. Once in operation, the new reservoir could then serve the system as one of the existing reservoirs is repaired and the other is demolished. Upon completion, a more reliable and easier-to-maintain system would be in place.

The proposed 1.5 MG reservoir to be located near the existing Airport reservoirs presents an opportunity for needed future storage as well as the ability to gravity-feed lower elevation portions of the distribution system. While the proposed Airport reservoir improvements are identified to provide storage for specific large commercial clients, the ability to utilize these improvements system-wide during normal operating conditions will provide the system with improved resiliency, capacity, and reliability.

Chapter 5 - Distribution System

Introduction

This chapter discusses the City of Prineville's existing water distribution system, which delivers water to residential and commercial users. Components of the distribution system include pipelines, valves, pressure reducing valves (PRVs), booster pump stations (BPSs), water meters, water service lines, and fire hydrants. The distribution system has been evaluated for both present and future needs. Recommended distribution system Improvements have been developed to address existing identified deficiencies and provide future service to help meet both Oregon Health Authority - Drinking Water Services (DWS) requirements and Oregon Fire Code (OFC) fire flow requirements.

Existing System

The City's distribution system main lines are composed of several types of pipe including steel, asbestos cement (AC), ductile iron (DI), polyvinyl chloride (PVC), and wood stave.

The existing distribution system layout, including pipe size and locations, is shown on Figure 5-1, Existing Water System Map with Pressure Zones. Available resources were utilized to verify the map is as accurate as possible. However, there may be inaccuracies in the depiction of the water distribution system layout, and the possibility exists that water distribution system lines and other features are present at locations not shown on the map or are not positioned as shown. Figure 5-1 has been prepared electronically, and if distribution system main lines or other system features are added in the future, the map can easily be updated as improvements occur, to allow the City to always have the most accurate map available for City staff use.

The map developed as part of this Water System Master Plan (WSMP) shows that approximately 92 percent of the distribution system piping is composed of 6-inch diameter or larger pipes. The remaining 8 percent are 4-inch diameter or smaller pipes. The 4-inch diameter or smaller pipes limit hydraulic capacity and are too small to support fire hydrants.

Since the 2018 WSMP, the City has replaced more than 11,000 feet of undersized or deteriorating main line pipe within the system, as well as the associated water services, valves, and fire hydrants. These ongoing projects have improved available fire flows and circulation and reduced the frequency of needed repairs.

In general, the distribution system is fairly well-looped. Some dead-end and/or undersized main lines exist that can limit capacity and water circulation in the system. These areas are discussed in more detail later in this chapter.

The City has indicated the majority of the water main lines in the distribution system are generally in good condition. However, it is recommended the remaining 300 feet of existing wood stave lines in the system be replaced. A breakdown of the City's pipelines by pipe diameter is provided on Table 5-1.

TABLE 5-1
SUMMARY OF SYSTEM PIPELINES

Pipe Diameter (inches)	Total Length (feet)	Total Length (miles)	Percent of Total System Piping
2 or Smaller	11,862	2.2	3
3	1,623	0.3	Less than 1
4	18,816	3.6	4
6	57,338	10.9	14
8	177,762	33.7	43
10	18,385	3.5	4
12	93,958	17.8	23
16	34,090	6.5	8
18	3,173	0.6	Less than 1
TOTAL	**417,007**	**79.0**	**100**

Booster Pump Stations

The City's water system includes three major BPSs that increase system pressures in areas that cannot be served adequately by gravity. These BPSs do not have any known deficiencies and appear to be sized appropriately for the current demand. The American Pine BPS has a capacity of 2,500 gallons per minute (gpm), which is generally adequate to provide fire flows for the majority of the predominately residential service area. The Ochoco Heights BPS has a capacity of 1,500 gpm, which provides adequate fire flow for the majority of its residential service area. There are other limitations due to small diameter mains within the Ochoco Heights Pressure Zone that limit fire flow for isolated areas of this zone.

In 2019, as part of the Airport Industrial Park Utility Extension (AIPUE) project, a BPS was constructed at the wastewater treatment plant to provide redundant service and to act as an aquifer storage and recovery source for the airport area. The 125 and 250 horsepower booster pumps supply water to the airport area at 500 gpm and 1,000 gpm, respectively, at 240 pounds per square inch (psi) to overcome the elevation difference of approximately 390 feet. The BPS is supplied by a 16-inch water line that crosses under the Crooked River and is connected along Highway 26. The BPS discharges through a 16-inch water line that connects at the Prineville Airport. An 8-inch PRV is also installed at the BPS location to allow water to flow from the airport area to the valley floor.

Due to a pipe size restriction at the Highway 126 crossing, the Airport Area Pressure Zone includes a separate BPS for the purpose of increasing pressure to provide adequate fire flows within this zone. Fire flow tests performed by City staff indicated the BPS is no longer needed and is recommended to be abandoned.

Currently, PRVs are located on the discharge side of the American Pine and Ochoco Heights BPSs to regulate pressure. Equipping these BPSs with variable frequency drives will allow the BPSs to adjust motor/pump speed based on demand conditions to help keep the desired downstream pressure constant and allow the PRVs to be abandoned. The ability to adjust motor/pump speed will provide for more efficient operation of the pumps and reduced utility charges to the City.

Table 5-2 summarizes the flow capacities and pumps installed at each existing booster pump station.

TABLE 5-2
SUMMARY OF BOOSTER PUMP STATIONS

Booster Pump Station	Flow
American Pine BPS	Two 250 gpm domestic pumps
	Two 1,000 gpm fire flow pumps
Ochoco Heights BPS	Three domestic pumps - 200, 400, and 900 gpm, respectively
AIPUE BPS	Two domestic pumps - 500 and 1,000 gpm, respectively

Water Meters

All services within the City's system are metered. Currently, the City is in the process of replacing all its residential meters with automatic meter reading (AMR) meters. City staff monitor and test meters monthly for atypical reads and/or missing data and repair or replace meters as necessary. Between 2017 and 2021, the City replaced 1,107 meters in the system.

Water Loss

The City has successfully implemented several water management and conservation measures including conducting annual water audits; replacing residential meters with AMR meters, including software to improve leak detection; utilizing a computerized bulk water station to more accurately track bulk water consumption; continuing to replace old, deteriorating distribution piping; encouraging conservation efforts through education programs; and providing free conservation items to water customers. These important conservation efforts continue to provide beneficial results to the community and its resources.

The City should continue to encourage water conservation through the measures described above along with continuing to investigate other reuse, recycling, and non-potable water use opportunities. In addition, the City should continue to encourage other high-water-use facilities to develop and implement their own internal water conservation plans.

Distribution System Pressure

As discussed in Chapter 4, the City has six pressure zones serving the distribution system, with system pressures provided by the elevation of the reservoirs and BPSs for areas of the system that cannot be served by gravity. A summary of the pressure zones is included on Table 5-3, and the pressure zones are shown on Figure 5-1.

TABLE 5-3
SUMMARY OF PRESSURE ZONES

Pressure Zone	Ground Elevation Currently Served (feet)[1]		Hydraulic Control Element	Hydraulic Grade Line (feet) (Tank Full or PRV Setting)	Typical Pressure Range (psi)[2]
Valley	2,918	2,846	Ochoco Heights Reservoirs	2,983	30 to 60
Barnes Butte	2,981	2,906	Barnes Butte Reservoir	3,099	50 to 80
Williamson	3,029	2,884	Williamson PRV	3,097 (82 psi)	30 to 90
Ochoco Heights	2,961	2,885	Ochoco Heights BPS with PRV	3,120 (80 psi)	65 to 100
Northridge	3,056	2,922	American Pine Reservoir BPS with PRV	3,136 (80 psi)	35 to 90
Airport	3,288	3,025	Airport Reservoirs	3,402	65 to 240[3]

[1] Service elevations do not include locations in the immediate vicinity of reservoirs, PRVs, or BPSs.

[2] Pressure range estimated based on computer water model under 2022 average daily demand (ADD) conditions. Pressures reported do not necessarily reflect service line pressures at places of distribution and include portions of the system used for storage and conveyance where no services exist.

[3] Pressure on upstream side of AIPUE PRV.

The Valley Floor Pressure Zone is the largest zone and is served by five groundwater wells that pump directly into the distribution system: Yancey No. 2 and 3, Lamonta, 4th Street Deep, and Stadium Wells. This pressure zone is also supplied by the Water Treatment Plant (WTP), which provides approximately 1,990 gpm to the Valley Floor area. The wells supply system pressure to the distribution system while also providing flow to fill the reservoirs.

The Barnes Butte Pressure Zone is served by gravity from the Barnes Butte Reservoir. The reservoir is filled by the Barney and Stearns groundwater wells within the zone. Water from Barnes Butte can supplement the system's lower pressure zones through the Williamson, Wilco, and Combs Flat PRVs. These PRVs are adjusted higher in the summer and lower in the winter.

The Ochoco Heights Pressure Zone receives its water from the Ochoco Heights reservoirs. The reservoirs supply water to the Ochoco Heights BPS to help serve the pressure zone. A PRV is located on the discharge side of the BPS to regulate pressure.

The Northridge Pressure Zone receives water from the American Pine Reservoir. The reservoir supplies water to the American Pine BPS to serve the pressures zone. A PRV is located on the downstream side of the BPS to regulate pressure. The American Pine Reservoir is filled from the Ochoco Heights BPS. A control valve on the inlet is used to fill the reservoir based on level readings from a transducer inside the reservoir. A PRV is located on the discharge side of the BPS to regulate pressure.

The Airport Area Pressure Zone is served by gravity from the Airport reservoirs. This pressure zone includes three groundwater wells that fill the Airport reservoirs and one groundwater well that pumps directly into the distribution system. Water from the Airport Area Pressure Zone can supplement the Valley Floor Pressure Zone through the Park Drive and AIPUE PRVs.

A proposed connection is identified in the Capital Improvements Plan (CIP) between the Ochoco Heights Pressure Zone and the lower pressure zones to be completed as soon as budget allows. The proposed connection will resolve a current issue where places of distribution on N.E. Wayfinder Drive, N.E. Stringline Court, and N.E. Angler Street within the Williamson Pressure Zone are significantly higher in elevation than lower lying areas, thus lowering residual system pressure below the 20 psi threshold during fire flow demands. With the addition of a PRV near N.E. Wayfinder Drive and N.E. Laughlin Road, the distribution locations with higher elevations become part of the Ochoco Heights Pressure Zone, and modeled available fire flow to the remaining portions in the Williamson Pressure Zone increase from existing conditions. The connection and PRV will be set such that flow between the Ochoco Heights Pressure Zone and lower pressure zones will occur only under extreme conditions. This improvement is identified in Chapter 6.

According to the hydraulic model completed as part of this WSMP, the normal operating pressures in the system during the 2022 ADD range from approximately 30 to 90 psi, as depicted on Figure 5-2. However, these extremes are not indicative of typical places of delivery, which more generally range from 34 to 102 psi. But some areas of higher and lower pressure do exist. Higher and lower pressures are typically near reservoirs, on the intake or discharge of BPSs, or on a bluff where no service lines or fire hydrants exist. The City generally has adequate pressure throughout the system. It should be noted that portions of the system provide pressures in excess of what is typically recommended for residential fixtures, appliances, etc. The City should maintain an educational program to ensure residents are aware that PRVs need to be installed on individual services in high pressure areas. System pressures are discussed in more detail later in this chapter.

Fire Protection

General

The City's existing water supply, storage, and distribution systems provide adequate fire protection to the majority of the water system, although certain areas of the City do not have adequate fire protection. The DWS regulations and the 2019 OFC require the entire water system remain above 20 psi residual pressure while fire flow demands are placed on the system. The City generally has adequate pressure in the system during fire flow events but has a few isolated areas that do not have adequate pressures and/or the recommended fire flows discussed in Chapter 2. A computer model of system fire flows, along with recommended improvements to address fire flow deficiencies, is discussed in more detail later in this chapter.

Fire Hydrant Flow Tests

For this WSMP, the City completed flow tests on fire hydrants in the distribution system to help with water model calibration. The flow and pressure data gathered during the flow tests were used to compare water model pressures to data collected in the field and, if necessary, to adjust the model input data so the model more closely resembled the field results. Based on the hydrants tested as part of the hydrant flushing plan, fire flows ranged from approximately 422 to 2,573 gpm with residual pressures of 36 to 82 psi at nearby hydrants. These are the measured flows observed during flow tests. Higher fire flows may be available if more than one hydrant is tested at a time and system pressures are allowed to drop further.

Theoretical Fire Flows

In some cases the available flow from a fire hydrant is calculated using a theoretical formula. The formula assumes the water supply "feeding" the tested area is generally not limited and the 20 psi residual pressure resulting from the fire flow occurs where the hydrants are being tested. In reality, there are likely other connections in the distribution system, such as users in the City on small diameter main lines or at higher elevation areas that would fall below 20 psi sooner than the formula predicts. Considering this, the theoretical formula can overestimate available fire flows at 20 psi. The hydraulic computer modeling, completed as part of this WSMP and discussed later in this chapter, is believed to present more accurate available fire flows throughout the City.

Fire Hydrant Limitations

The fire flow tests completed by the City are generally conducted by opening one fire hydrant at a time. If large enough main lines are present, individual fire hydrants can typically provide flows in the range of 800 to 1,200 gpm from a small port and nearly 2,000 gpm from both small ports and the larger "pumper" port, assuming the hydrant has a large port. During a fire there will be water use from other users on the system, so the actual available flow in the distribution system will be less due to other uses and pipeline pressure losses resulting from higher flows.

Generally, the City's water system provides adequate fire flows. The discussion presented herein is intended to provide caution concerning the actual available fire flows from the City's distribution system and fire hydrants. Considering the limitations previously discussed, the City's water system appears limited in its capacity to meet a fire flow of 1,000 to 2,500 gpm in a few areas of the City. System improvements are needed to provide the recommended fire flows of 1,000 gpm for some residential areas and 3,500 gpm for some commercial areas while maintaining 20 psi in the system.

Fire Hydrant Coverage

The OFC outlines maximum recommended fire hydrant spacing depending on several factors, such as the area's fire flow requirements and number of available fire hydrants, and if the area is on a dead-end street, has limited access, etc. As required by the 2019 OFC, the maximum spacing between any two hydrants for a fire flow requirement of 1,750 gpm or less is 500 feet, and is as little as 350 feet for a fire flow requirement of 3,500 to 4,000 gpm. The maximum required distance from any point of a street or road frontage to a hydrant is 250 feet for 1,750 gpm or less and 210 feet for 3,500 to 4,000 gpm. It is recommended the City install fire hydrants in areas that need improved coverage as part of an improvements project. All fire hydrant installations should be reviewed and approved by the City's fire chief.

Water System Modeling

General

As part of this WSMP, a detailed water model of the City's water system was reviewed and updated to analyze system pressures, hydraulic capacity, and available fire flows from the City's fire hydrants. A general description and the results of each computer run performed for both the existing and improved water systems are described herein.

The City's existing water distribution system model contains all existing piping and water system elements, excluding the wellfield wells feeding the WTP. For this WSMP, a hydraulic model previously developed by DOWL during preparation of the 2018 WSMP was imported into InfoWater Pro 2023, reviewed, and updated with water main extension projects completed since 2018. User demands for the year 2022 and 2042 ADD and Peak Daily Demand (PDD) were incorporated for the scenarios presented herein. Elevations at the locations of new water system features, such as pipe connections and wells, were obtained from as-built drawings provided by the City.

The computer model evaluates pressure and flows in the distribution system during a simulated water use demand scenario. Typical water system demands used for the computer model include the ADD and the PDD previously discussed in Chapter 2. Typical water system pressures are determined during the ADD. Available fire flows are determined during the PDD.

The computer model also utilizes detailed information regarding the distribution system pipes. Each individual pipe is assigned a roughness coefficient based on the type of pipe material, such as PVC, DI, AC, steel, etc. This allows the water model program to calculate water main line pressure losses under any desired demand condition, including fire flow analyses. Junctions are used to represent fittings where pipe intersections occur and are assigned an elevation. Water demands are placed on the distribution system at each junction (node) to simulate ADD or PDD use demands.

Model Overview

The hydraulic model of the City's water distribution system was developed utilizing the InfoWater Pro modeling system by Innovyze. Demand scenarios for years 2022 and 2042 were derived from the design criteria presented in Chapter 2. Fire flow test data, provided by the City, were used to check accuracy and calibrate the computer model compared to field conditions. The model was calibrated by adjusting pipe roughness coefficients to simulate available flows and system pressures similar to those reported during the City's fire hydrant tests, where possible. Discrepancies that may exist between the model and system conditions in the field can be due to incorrect pipe sizes, missing pipe connections, or other unknown field conditions. In general, the model depicts the existing system conditions relatively well based on the majority of the available hydrant test data.

A water model run provides distribution system pipe flows and junction pressure under a given demand on the system. To represent current conditions, the year 2022 water system demands were distributed among the junctions in the distribution system based on water meter usage records. To represent future conditions in the year 2042, demands were added for existing properties within the urban growth boundary (UGB). The anticipated increase in demand from year 2022 to 2042 was distributed between properties not currently connected to the system. The ground elevation of each growth area was also evaluated to determine the pressure zone the area could most reasonably connect to. The demand conditions used in modeling the system are as follows:

- **Year 2022 ADD**. The current ADD for the City is estimated to be 184 gallons per capita day (gpcd) or 1,340 gpm at the current connected population of 10,525.
- **Year 2042 ADD**. The future ADD for the City is estimated to be 255 gpcd or 2,610 gpm at a future connected population of 14,722.
- **Year 2022 PDD**. The current PDD for the City is estimated to be 452 gpcd or 3,300 gpm at the current connected population of 10,525.

- **Year 2042 PDD**. The future PDD for the City is estimated to be 452 gpcd or 4,620 gpm at a future connected population of 14,722.

The existing system pressures under the 2022 ADD scenario are presented on Figure 5-2. Figure 5-2 shows the system has a few areas with pressures below 35 psi. Improvements are required to provide additional pressure to the system in these areas. As previously discussed, portions of the system provide pressures in excess of what is typically recommended for residential fixtures, appliances, etc. In areas with higher-than-average pressures provided by the system, the City should continue to inform citizens of the high pressures and ensure that individual PRVs are installed on service lines.

Figure 5-3 presents the fire flow available in the existing system under the 2022 PDD. As previously discussed, fire flow capacity of 1,500 gpm is recommended in residential areas, 2,500 gpm for industrial and commercial areas, and approximately 3,500 gpm in areas where the Insurance Services Office, Inc., report identified higher flows are needed, such as schools and hospitals. Figure 5-4 identifies the areas in the system not capable of providing the recommended fire flow of the underlying zone. Some areas of the northeast quadrant and higher elevation areas of the City are largely unable to provide recommended fire flows to portions of residential and commercial areas. The deficiencies are due in part to small diameter (less than 6-inch) pipelines in the system, higher elevation areas not adequately served by existing pressure zones, and the inability of the existing system to distribute high flows without excessive pressure loss.

The majority of the City's water supply is located in the Airport Area Pressure Zone. Water from this pressure zone has two ways to feed the lower Valley Floor Pressure Zone: an 8-inch diameter pipeline with a PRV and a 16-inch diameter pipeline and 8-inch PRV. Improvements since the 2018 WSMP have increased available water supply capacity significantly within the lower Valley Floor Pressure Zone. These improvements include upgrades to existing wells, new wells, and the new Crooked River Wellfield and WTP, which have reduced the need to regularly provide water to the lower Valley Floor Pressure Zone from the Airport Area Pressure Zone.

Limitations of Water Model Results

Reported fire flows from the water model analysis indicate theoretical distribution system piping capacity. Actual field conditions and headloss in fire hydrants may reduce fire flows beyond what is indicated. Individual fire hydrants also generally have a maximum capacity of 1,000 to 1,500 gpm, so multiple hydrants may need to be operated to attain the flows indicated in the model.

Undersized Main Lines

The City, like many municipalities, has adopted minimum water main line size standards, requiring at least 8-inch diameter main lines be installed. The significant capacity advantages of an 8-inch diameter main line compared to a 6-inch line normally outweigh the additional cost to install an 8-inch line.

For the purpose of this WSMP, undersized mains have been identified as those mains that do not allow the fire flow demand and minimum pressure criteria shown on Figure 2-3 in Chapter 2 to be met. Approximately 24,900 feet of small diameter pipelines (less than 6-inch and not including water service pipelines) are located within the City's distribution system.

In addition to these undersized main lines, physical restraints, such as higher elevation areas in the City, result in a few low system pressure areas.

Recommended Distribution System Improvements

In general, the City's distribution system is fairly well-looped and provides adequate system-wide pressures under normal operating conditions. Fire flow availability is limited in areas of the system due to several undersized main lines and areas of higher elevation. The undersized main lines in the system result in fire flow capacity limitations and water circulation issues. Some of these lines have been recommended for upgrading where improved fire flow capacities are needed. It is recommended the City complete improvements to the distribution system to eliminate as many undersized main lines as possible and provide improved system fire flow capacities in areas lacking adequate fire flows. Key water system improvements have been identified to address deficiencies identified in this WSMP:

- Improve System Distribution
    - Construct a new transmission main, BPS, PRV, and reservoir to serve the eastern portion of the City. In addition, this improvement will also eliminate some of the low pressure issues currently experienced in the system at higher elevations.
    - Construct a new transmission main line from the east side of the City to the northeast area. This improvement will be a source of redundant supply to the Northridge and Ochoco Heights Pressure Zones.
- Improve Water Quality and Circulation
    - Replace old, undersized, deteriorating pipe.
    - Increase flow capacity to the existing system to provide adequate fire flows to residential and commercial areas.
    - Replace existing small diameter or wood stave pipe. Upsize and/or loop water pipes in key locations to increase fire flow.
- Improve the System to Serve Future Growth
    - Construct future mains, reservoirs, PRVs, and BPSs to serve growth within the UGB.
- Increase Service Area to Connect all Residents Within the City Limits
    - Connect existing residences in the vicinity of the Fairview, Crestview, and Seehale areas to City water. These residences are shown on Figure 6-3 in Chapter 6.

The recommended distribution system improvements are shown on Figure 5-5. The future conditions water model incorporates the recommended improvements and future growth areas and demands. Figure 5-6 depicts the year 2042 ADD system flows and residual system pressures. System pressures are adequate with the recommended improvements, and many of the isolated low pressure areas under existing conditions have been eliminated. Areas of marginal pressure (35 to 45 psi) in the Valley Floor Pressure Zone are also improved. The majority of reservoirs are filling under peak day conditions, indicating the system has adequate supply. One exception is the American Pine Reservoir, which is draining under peak day conditions. This is likely due to the Ochoco Heights PRV, which limits the filling rate of the reservoir. The PRV setting may need to be adjusted in the future to allow the filling rate of the reservoir to match the PDD of the Northridge Pressure Zone.

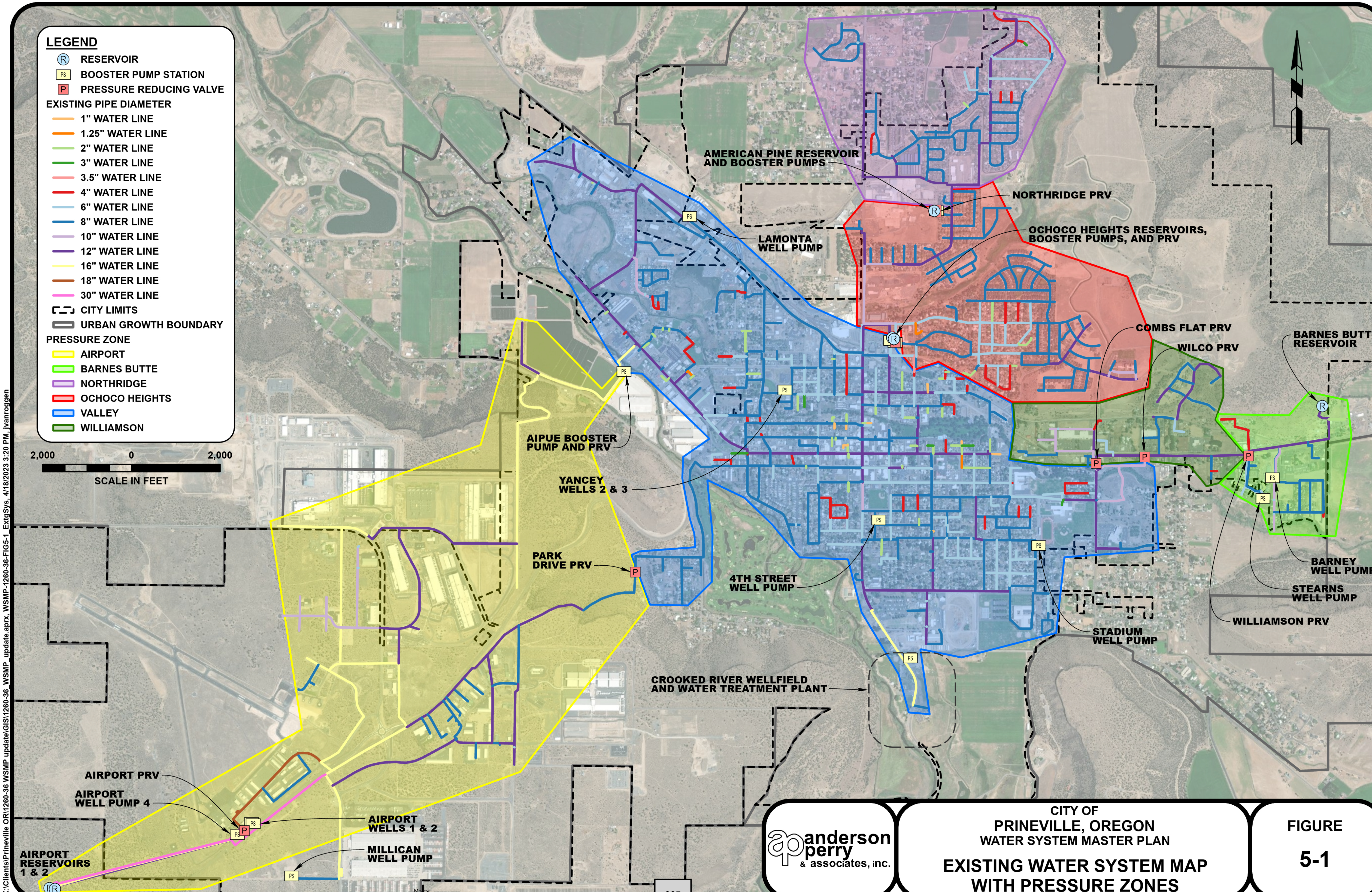
Figure 5-7 depicts the year 2042 available fire flows with the recommended water system improvements. Fire flow availability is generally adequate under future 2042 conditions with the recommended improvements. Figure 5-8 identifies the areas in the system not capable of providing the recommended fire flow of the underlying zone with the recommended improvements under the 2042 PDD.

Maintenance Records

One of the important operational functions related to the City's distribution system is maintaining accurate records of various system components. These records become valuable over time in planning future improvements and replacing old or deteriorated components. It is recommended the City continue to track and keep accurate records of all distribution system components. The City should continue monitoring residential meters monthly, test compound meters annually, check hydrants annually for proper operation, and exercise all water valves annually, with records kept on their operating condition, location, etc. The City should also have a program in place to have all backflow prevention devices checked annually, either by property owners or the City.

Summary

In general, the City's distribution piping system is in relatively good condition, although a few isolated areas currently cannot provide adequate fire flow, and water circulation is limited. Undersized and old distribution system piping within the City contribute to specific areas of low fire flow capacity and issues with water circulation. Improvements outlined in this chapter include replacing old, undersized, and deteriorating lines and adding additional distribution piping to improve system looping, circulation, and fire flow capacities. These improvements were selected to address key areas of concern to improve capacity in the system and are prioritized and further discussed as part of the CIP and System Development Charge Plan presented in Chapter 6. Also included in Chapter 6 are detailed breakdowns of estimated costs.



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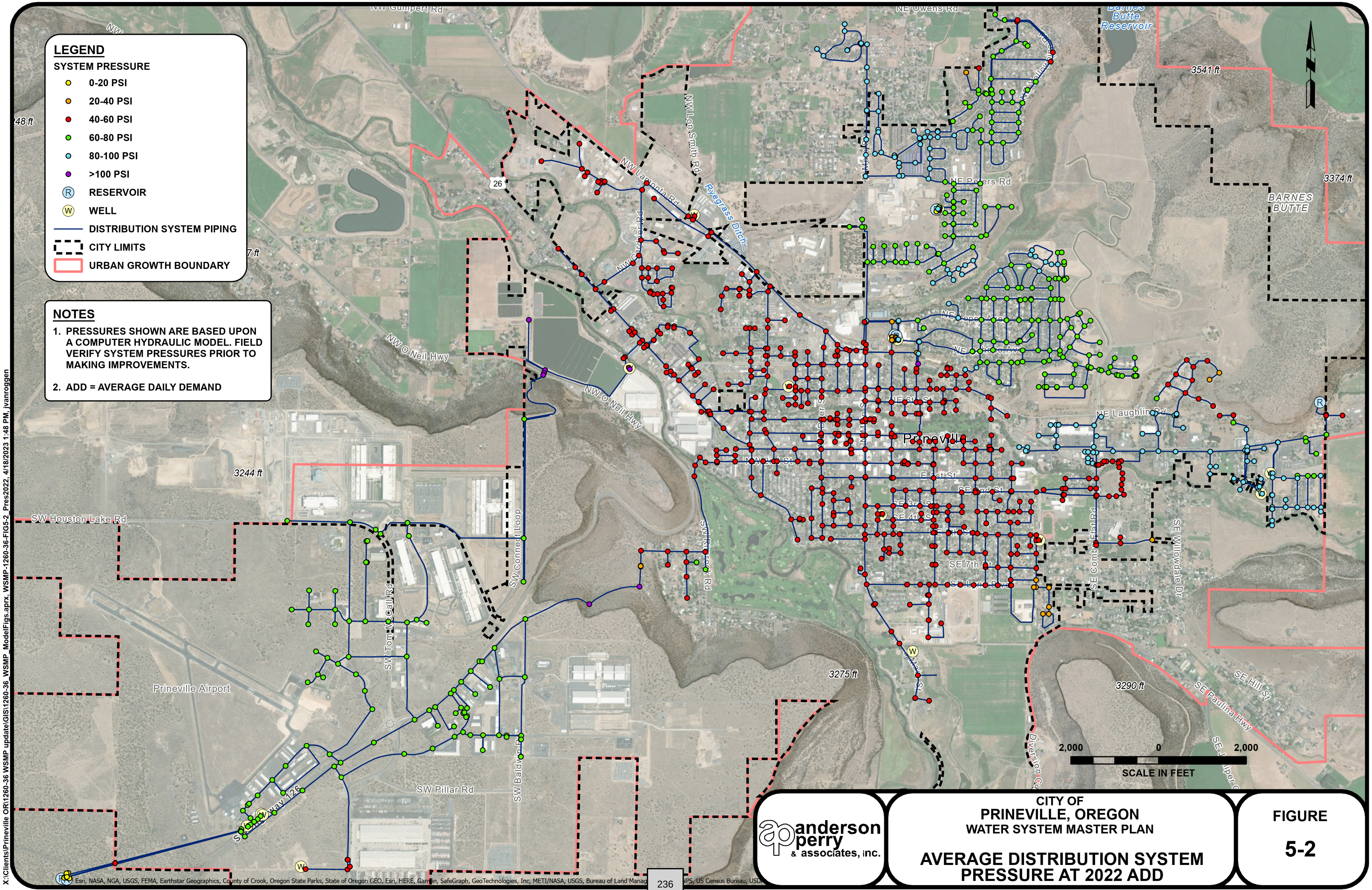

NOTES

1. PRESSURES SHOWN ARE BASED UPON A COMPUTER HYDRAULIC MODEL. FIELD VERIFY SYSTEM PRESSURES PRIOR TO MAKING IMPROVEMENTS.
2. ADD = AVERAGE DAILY DEMAND

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

AVERAGE DISTRIBUTION SYSTEM PRESSURE AT 2022 ADD

FIGURE
5-2

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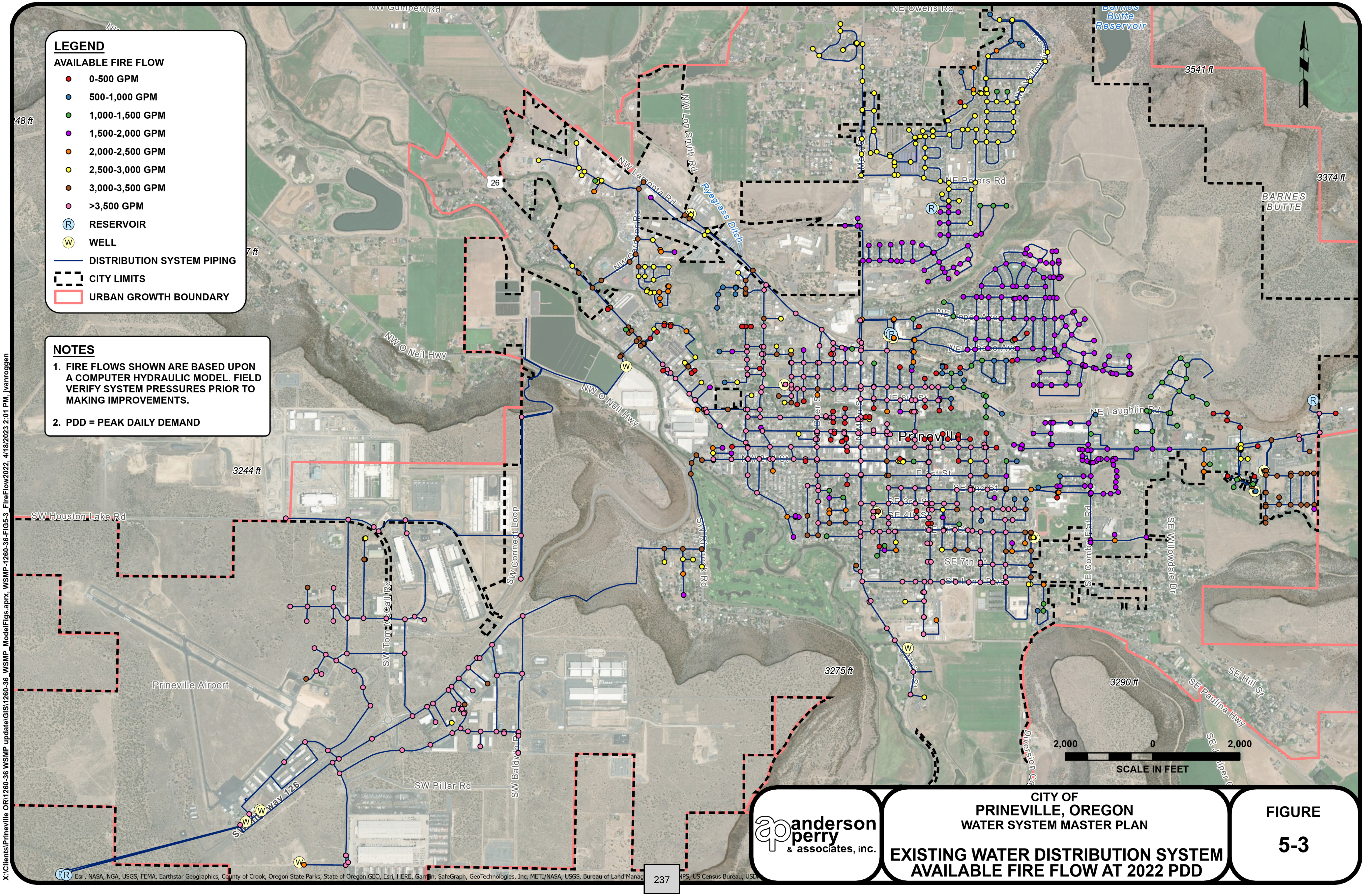

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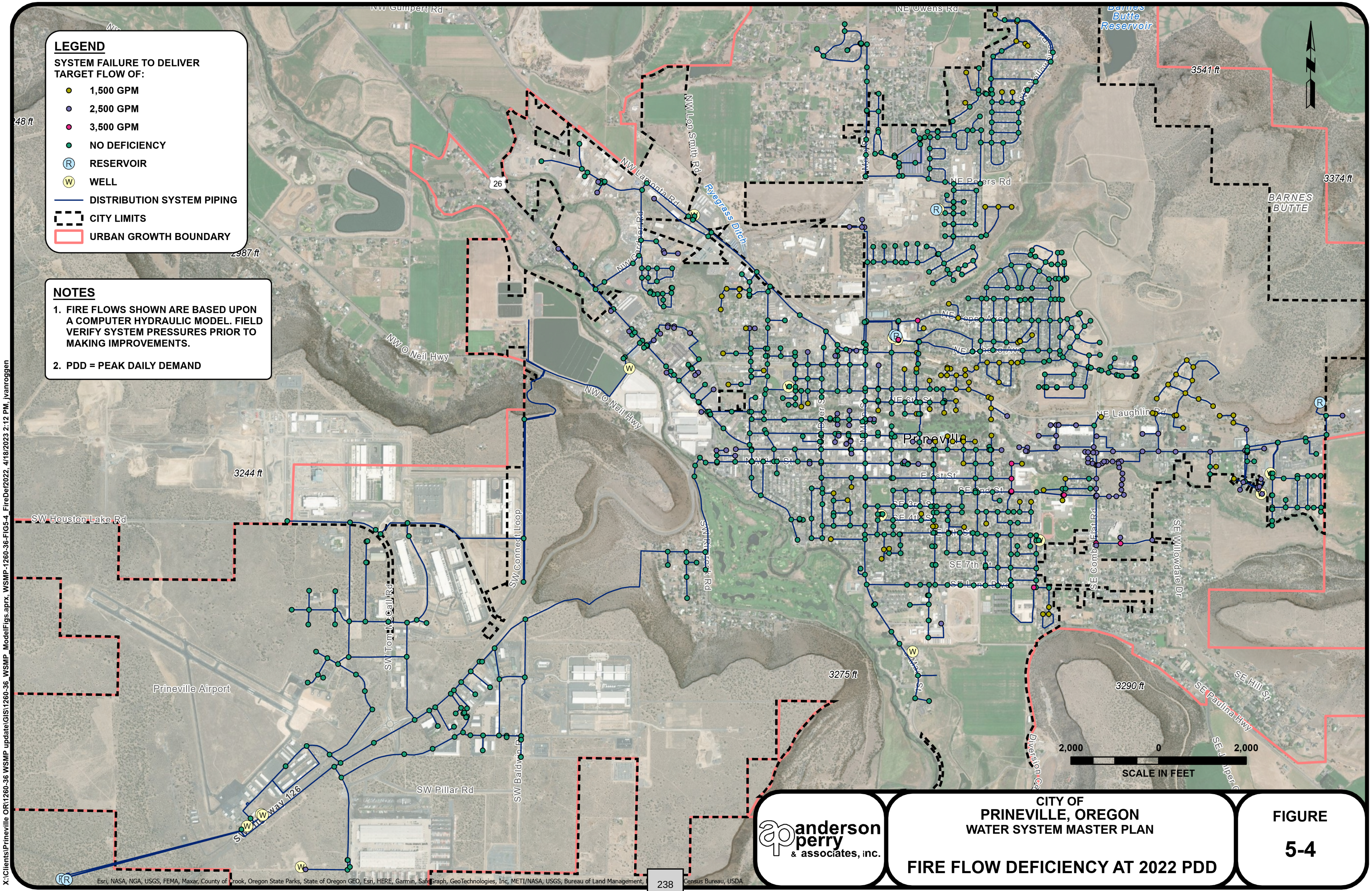

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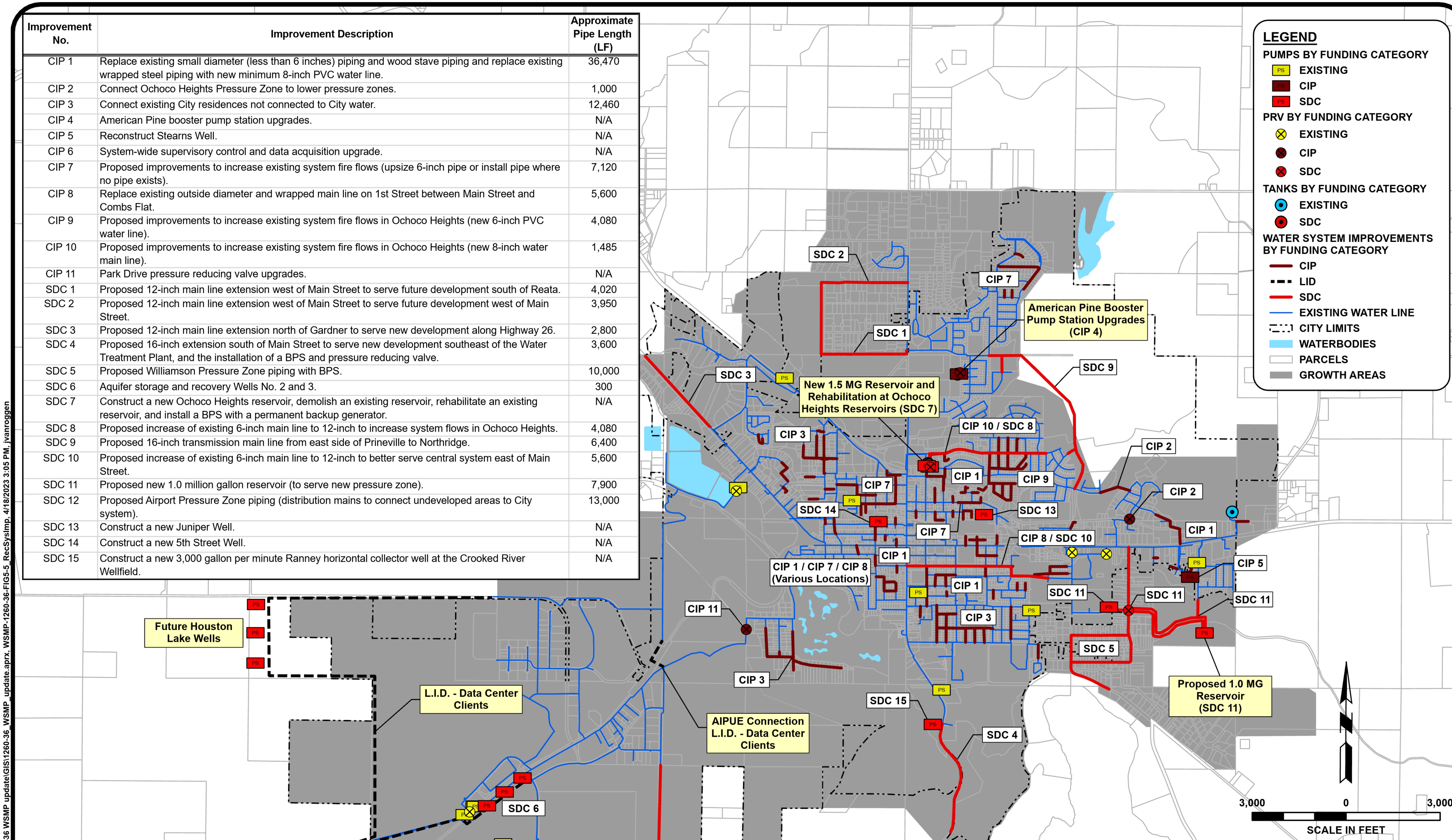
Improvement No.	Improvement Description	Approximate Pipe Length (LF)
CIP 1	Replace existing small diameter (less than 6 inches) piping and wood stave piping and replace existing wrapped steel piping with new minimum 8-inch PVC water line.	36,470
CIP 2	Connect Ochoco Heights Pressure Zone to lower pressure zones.	1,000
CIP 3	Connect existing City residences not connected to City water.	12,460
CIP 4	American Pine booster pump station upgrades.	N/A
CIP 5	Reconstruct Stearns Well.	N/A
CIP 6	System-wide supervisory control and data acquisition upgrade.	N/A
CIP 7	Proposed improvements to increase existing system fire flows (upsize 6-inch pipe or install pipe where no pipe exists).	7,120
CIP 8	Replace existing outside diameter and wrapped main line on 1st Street between Main Street and Combs Flat.	5,600
CIP 9	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 6-inch PVC water line).	4,080
CIP 10	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 8-inch water main line).	1,485
CIP 11	Park Drive pressure reducing valve upgrades.	N/A
SDC 1	Proposed 12-inch main line extension west of Main Street to serve future development south of Reata.	4,020
SDC 2	Proposed 12-inch main line extension west of Main Street to serve future development west of Main Street.	3,950
SDC 3	Proposed 12-inch main line extension north of Gardner to serve new development along Highway 26.	2,800
SDC 4	Proposed 16-inch extension south of Main Street to serve new development southeast of the Water Treatment Plant, and the installation of a BPS and pressure reducing valve.	3,600
SDC 5	Proposed Williamson Pressure Zone piping with BPS.	10,000
SDC 6	Aquifer storage and recovery Wells No. 2 and 3.	300
SDC 7	Construct a new Ochoco Heights reservoir, demolish an existing reservoir, rehabilitate an existing reservoir, and install a BPS with a permanent backup generator.	N/A
SDC 8	Proposed increase of existing 6-inch main line to 12-inch to increase system flows in Ochoco Heights.	4,080
SDC 9	Proposed 16-inch transmission main line from east side of Prineville to Northridge.	6,400
SDC 10	Proposed increase of existing 6-inch main line to 12-inch to better serve central system east of Main Street.	5,600
SDC 11	Proposed new 1.0 million gallon reservoir (to serve new pressure zone).	7,900
SDC 12	Proposed Airport Pressure Zone piping (distribution mains to connect undeveloped areas to City system).	13,000
SDC 13	Construct a new Juniper Well.	N/A
SDC 14	Construct a new 5th Street Well.	N/A
SDC 15	Construct a new 3,000 gallon per minute Ranney horizontal collector well at the Crooked River Wellfield.	N/A



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CITY OF
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WATER SYSTEM MASTER PLAN

RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS

FIGURE 5-5

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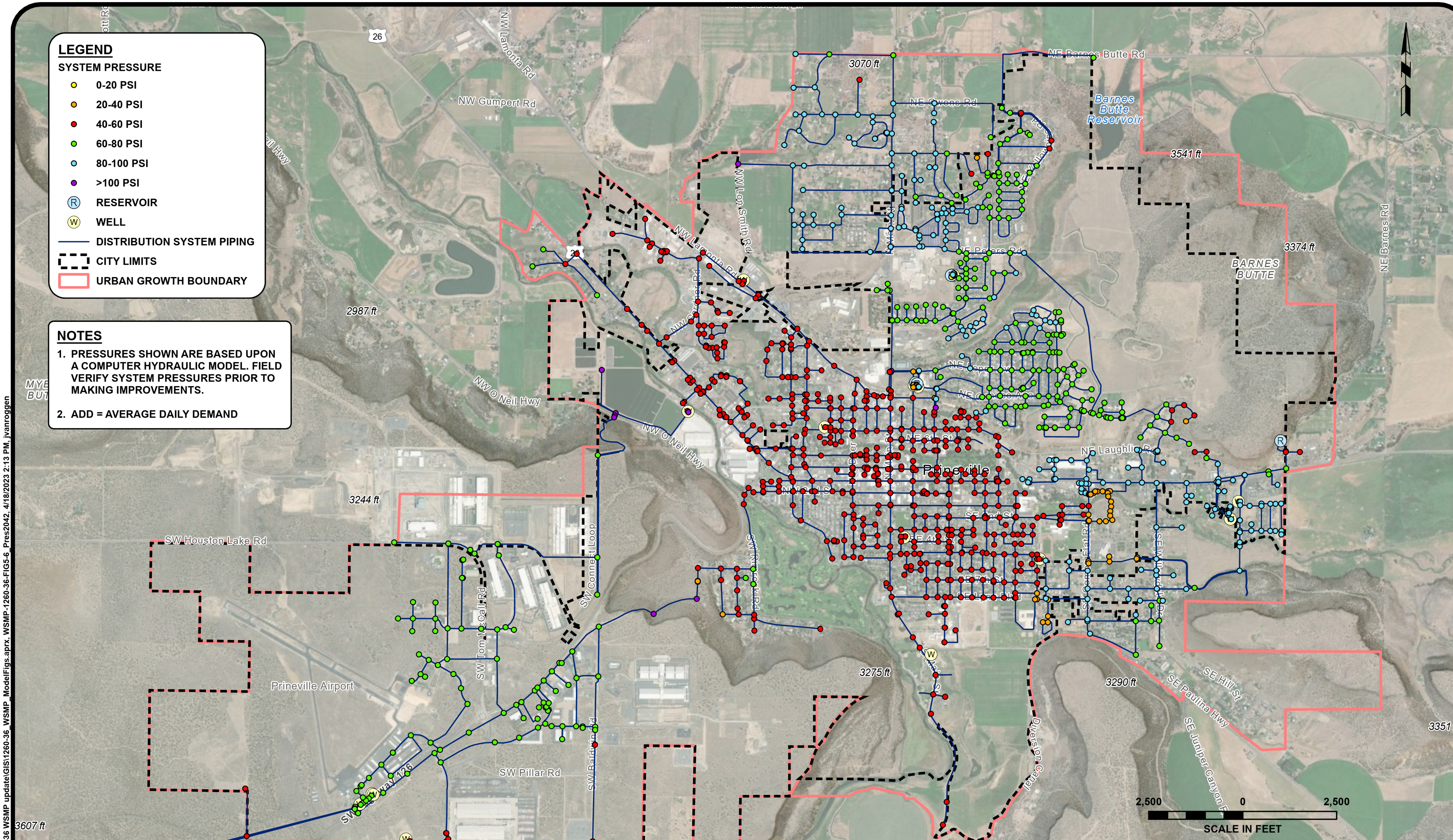

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CITY OF
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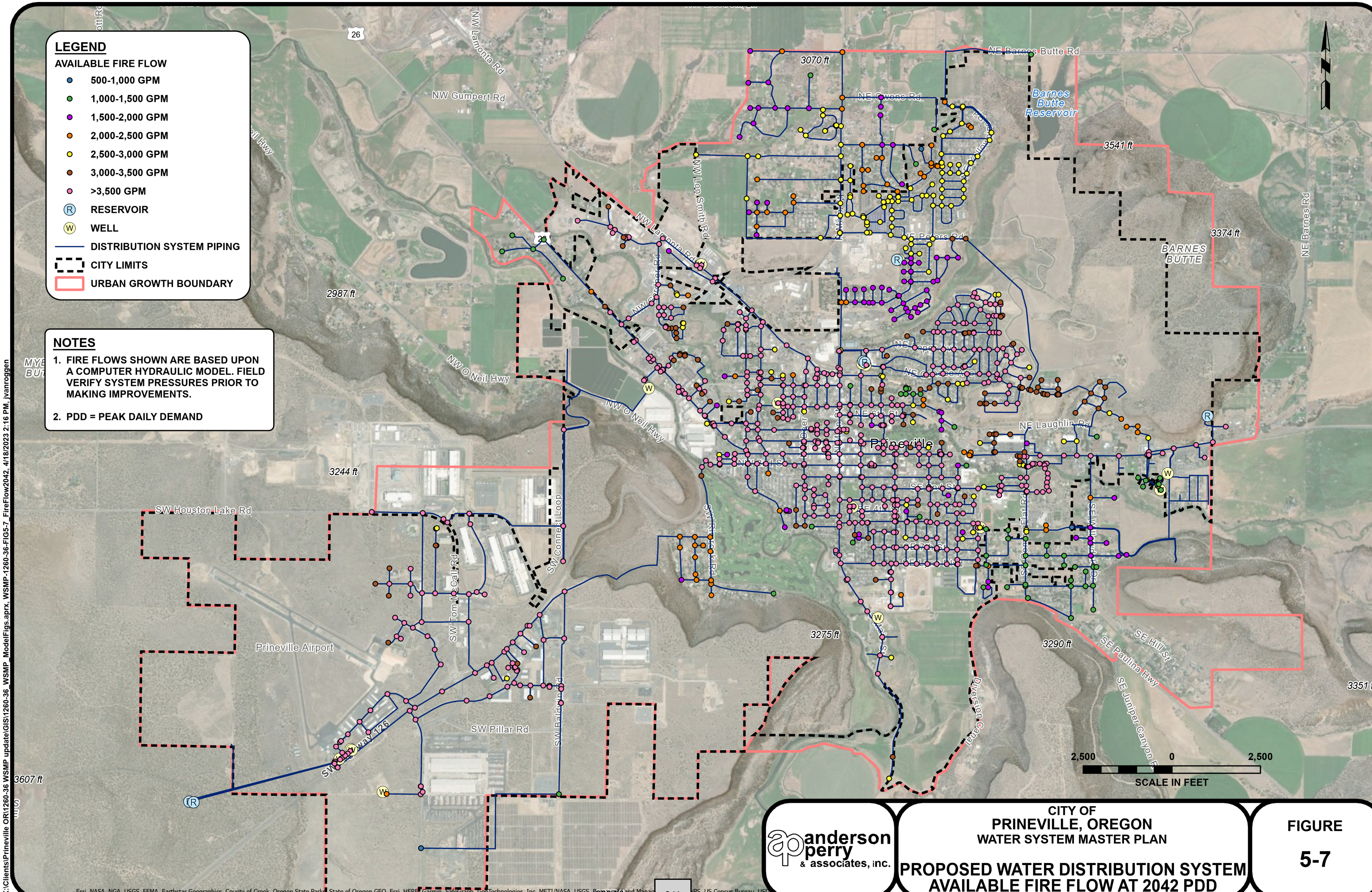
WATER SYSTEM MASTER PLAN

AVERAGE DISTRIBUTION SYSTEM PRESSURE AT 2042 ADD

FIGURE
5-6



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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

PROPOSED WATER DISTRIBUTION SYSTEM AVAILABLE FIRE FLOW AT 2042 PDD

FIGURE
5-7

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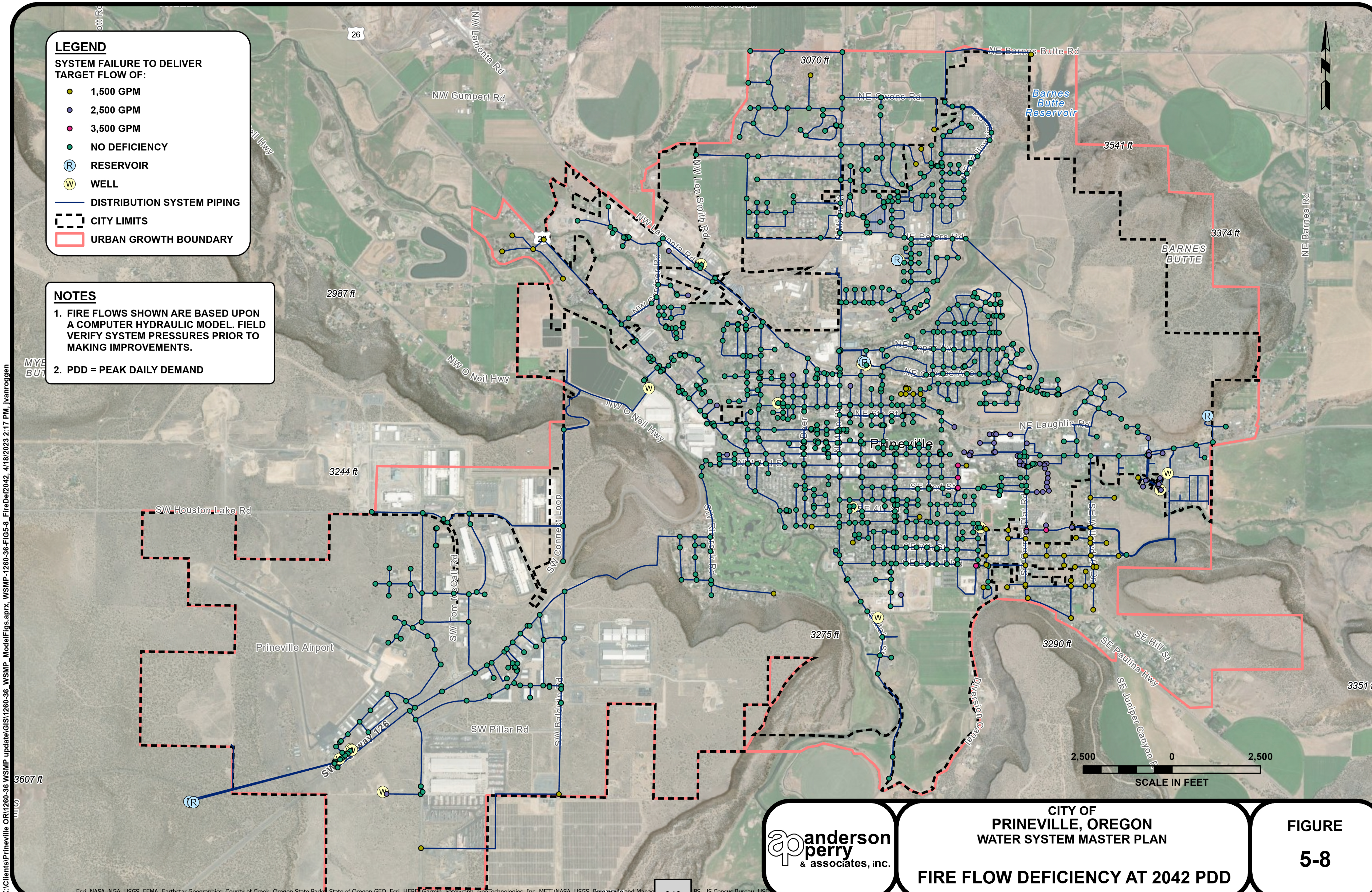
Esri, NASA, NGA, USGS, FEMA, Earthstar Geographics, County of Crook, Oregon State Parks, State of Oregon GEO, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, NPS, US Census Bureau, USDA


LEGEND
SYSTEM FAILURE TO DELIVER TARGET FLOW OF:
1,500 GPM
2,500 GPM
3,500 GPM
NO DEFICIENCY
RESERVOIR
WELL
DISTRIBUTION SYSTEM PIPING
CITY LIMITS
URBAN GROWTH BOUNDARY
NOTES
1. FIRE FLOWS SHOWN ARE BASED UPON A COMPUTER HYDRAULIC MODEL. FIELD VERIFY SYSTEM PRESSURES PRIOR TO MAKING IMPROVEMENTS.
2. PDD = PEAK DAILY DEMAND
NW Gumpert Rd
NW Lamonta Rd
NE Barnes Butte Rd
NE Ochoco Rd
Barnes Butte Reservoir
3070 ft
3541 ft
3374 ft
BARNES BUTTE
NE Barnes Rd
NW Lon Smith Rd
NE Peters Rd
2987 ft
NW O Neil Hwy
NE Laughlin Rd
Prineville
3244 ft
SW Houston Lake Rd
SW Connect Loop
SW Tom McCall Rd
Prineville Airport
SW Pillar Rd
SW Baldwin Rd
3275 ft
3290 ft
SE Hill St
SE Paulina Hwy
SE Juniper Canyon Rd
Diversion Canal
3351 ft
3607 ft
2,500 0 2,500
SCALE IN FEET
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CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
FIRE FLOW DEFICIENCY AT 2042 PDD
FIGURE 5-8
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Esri, NASA, NGA, USGS, FEMA, Earthstar Geographics, County of Crook, Oregon State Parks, State of Oregon GEO, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA

Chapter 6 - Summary of Proposed Improvements and Capital Improvements Plan

Introduction

This chapter summarizes the proposed improvements to the water system identified as part of this Water System Master Plan (WSMP) to address deficiencies and support anticipated growth and increased demands. The System Development Charge (SDC), Capital Improvements Plan (CIP), and Local Improvement District (LID) improvements categories are identified and discussed. Priorities for improvements under the CIP category are outlined chronologically, while SDC improvement costs are provided in no particular order. Estimated costs to complete the improvements are also presented. It should be noted that environmental, cultural, and natural resources costs have been applied individually to improvements as the majority of the improvements are within existing areas of disturbance. However, any required environmental, cultural, or natural resources permitting shall be completed as required.

Categories of Improvements

The City of Prineville is proposing to complete water system improvements utilizing two funding categories, as follows:

CIP - Improvements identified under the CIP category include capital improvements projects that need to be completed to address existing system deficiencies irrespective of growth.

SDC - Improvements identified under the SDC category have been developed to address those needs in the system to specifically support growth and associated increased system demands.

A third category to fund improvements is potentially available. This category is the formation of LIDs. Oregon Revised Statutes (ORS) Chapter 223.001 provides the statutory definition of an LID. An LID is an area a city council determines should be benefited by public improvement with the improvement being financed by the City and repaid by owners of benefited properties. It should be noted that the implementation of both SDCs and LIDs are governed by Oregon state law. Consultation with the City's attorney is advised prior to implementing either SDC or LID improvements and associated charges.

Summary of Improvements

Presented hereafter is a summary of the proposed improvements identified based on the evaluation and computer water modeling efforts completed as part of this WSMP. Figure 6-1 presents a map of the system that shows the proposed CIP improvement locations along with a table inset describing the improvements. Figure 6-2 presents a map of the system that shows the proposed SDC-funded improvement locations along with a table inset describing the improvements. For a more comprehensive discussion with respect to the different elements (supply, storage, and distribution) of the water system and detailed evaluation, the reader is encouraged to reference other chapters of this WSMP.

Water Supply

As discussed in Chapter 2, the City has enough source capacity to meet current demands. The peak daily flow requirements, assuming the wells operate 18 hours per day, are estimated to be approximately 4,405 gallons per minute (gpm) and 6,960 gpm for current and projected future (2042) system demands, respectively. The current combined instantaneous water right withdrawal allowance from all well sources is 6,991 gpm, with an available pumping capacity of 6,436 gpm. Therefore, the City's pumping capacity can exceed the available permitted supply capacity, as well as the current demands. However, it is recommended that the City continue to pursue improvements to increase source capacity as well as redundancy in the system. Proposed source improvements include the recommendations below.

As discussed in Chapter 3, it is recommended that the Stearns Well be reconstructed. This well was completed in 1973 and has been used as the primary water source for the City since its construction. The well's capacity has begun to decrease as its casing has deteriorated and the water-bearing zone has become restricted with rust, sand, and corrosion. Reconstruction of the Stearns Well will be an important improvement to the water system, as this well will continue to operate as a primary water source for the east side of the City.

As also discussed in Chapter 3, the most feasible option to provide additional pumping capacity is the drilling and development of additional aquifer storage and recovery (ASR) injection and recovery wells in the Deschutes Regional Aquifer. The expansion of the ASR program has the potential to provide additional capacity through the use of stored system water, as well as native groundwater, within permit limitations. Additionally, further expansion of the Water Treatment Plant to its design capacity of 3,000 gpm should be explored through the addition of a third filter train and additional source water to provide the additional 1,000 gpm of capacity. It is recommended that one or both of these options be pursued for completion within the next 10 years.

Water Storage

Currently, the City has six operating storage reservoirs with a total volume of 4.5 million gallons (MG). With the exception of the Ochoco Heights reservoirs, the existing condition of the reservoirs is generally good to very good. Based on the projected storage needs for the year 2042 planning period, an additional 1.4 MG of storage capacity is recommended to meet future demands. Additionally, replacement and rehabilitation improvements are recommended for the Ochoco Heights reservoirs and have been included in the SDC category.

Anticipated future growth in the east and southeast portions of the City will require the addition of a new reservoir and pressure reducing valve (PRV) connected to the existing Valley Floor Pressure Zone. A new 1.0 MG reservoir is recommended to be constructed to serve the growth in this area. The proposed reservoir would be constructed at an elevation similar to the Barnes Butte Reservoir to permit gravity service of the Valley Floor area while maintaining pressure downstream of the Combs Flat, Wilco, and Williamson PRVs. This additional downstream pressure will maintain system pressures upstream as well as water levels in the Barnes Butte Reservoir.

As discussed in Chapter 4, it is recommended that a 1.5 MG reservoir be constructed at the existing Ochoco Heights reservoirs site. This will enable the existing reservoirs to continue to serve the system as the new reservoir is constructed. Once the new reservoir is constructed and in operation, one of the existing 0.5 MG reservoirs can be taken out of service to complete renovations and repairs. Once the rehabilitation work is complete, the renovated and repaired reservoir will work in conjunction with the new reservoir, providing a total of 2.0 MG of storage at the site. The second existing 0.5 MG reservoir will be demolished. These proposed improvements have been included in the SDC category.

Water Distribution

As outlined in detail in Chapter 5, the City's distribution system is generally well-looped and provides adequate system-wide pressures under normal operating conditions. Due to several undersized main lines and areas of higher elevation, fire flow availability is limited in certain areas of the system. The undersized main lines in the system result in fire flow capacity limitations and water circulation issues. Some of these lines, where improved fire flow capacities are needed, are recommended for upgrading. It is recommended the City complete improvements to the distribution system to eliminate as many deteriorating and undersized main lines as possible and provide improved system fire flow capacities in areas lacking adequate fire flows. Key water distribution system improvements have been identified to meet the following objectives:

- Improve water quality and circulation by replacing old, undersized, and deteriorating pipe. Increase flow capacity to the existing system to provide adequate fire flows to residential, commercial, and industrial areas.
- Construct new water mains and services to City residences not currently connected to the water system in the Fairview, Crestview, and Seehale areas.
- Create a connection between the Ochoco Heights Pressure Zone and the lower pressure zones. A connection from Barnes Butte Elementary School to N.E. Laughlin Road with a PRV will provide this needed connection.
- Replace existing small diameter or wood stave water pipes. Upsize and/or loop water pipes in key locations to increase fire flow.
- Construct a new transmission main, booster pump station (BPS), PRV, and reservoir to serve the eastern portion of the City. This improvement will also eliminate some of the low pressure issues currently experienced in the system associated with high elevation areas. This improvement will also be a source of redundant supply for the other pressure zones.
- Construct new water main lines to service the Melrose/Willowdale area.
- Construct a new BPS with backup power generation to replace the existing Ochoco Heights BPS.
- Upgrade electrical and controls at the American Pine BPS.
- Perform system-wide upgrades for the supervisory control and data acquisition (SCADA) and control systems.
- Improve the distribution system to serve future growth.
- Construct future mains and BPSs to serve growth within the urban growth boundary.

Connecting Existing City Residences Not Currently Connected to City Water

Approximately 330 residences within the city limits in the Fairview, Crestview, and Seehale areas are currently not connected to City water. These residences are identified on Figure 6-3. The necessary distribution system improvements to connect these residences is identified as CIP 3 in the CIP.

The installation of new infrastructure to connect existing City residences poses a challenge in identifying the proper funding category to address these improvements. SDC, CIP, and LID guidelines share positive and negative requirements related to these improvements; however, an additional funding strategy may need to be pursued. The use of each category for funding these improvements is outlined below:

System Development Charge

Water distribution infrastructure does not exist in the locations not currently connected to City water, although it is nearby. The lack of existing infrastructure lends itself to the use of SDC funds for these improvements. However, as this is an existing area, the use of a reimbursement fee for the cost of construction may create reimbursement fees that are unaffordable to many residents. Treating existing residences as new developments without creating excess capacity with value that can be reimbursed may create significant cost burdens that will likely be unpopular, specifically because additional users beyond those identified are unlikely to use the new improvements.

Capital Improvements Plan

The improvements are identified as CIP 3 in the CIP with estimated costs of $6,271,900. The City will fund a portion of the improvements with standard connection and usage fees assessed to the newly connected residences and the remaining costs included in the CIP.

Local Improvement District

The formation of an LID for these improvements could be a means for equitable reimbursement of the improvements. In terms of affordability, this will need to be addressed, as the cost for the improvements imposed on the individual connections will be approximately $19,570. It should be noted that LIDs are historically difficult to manage and rely solely on the residents' ability to afford the required fee. However, it is possible that the City could offer low-interest financing or fee reductions for low-income households.

Infill System Development

A separate funding category to address connecting existing residences to City water could be developed. Improvements to the distribution system without a specific need for additional capacity improvements could be evaluated as a different type of improvement, sharing components of both CIP and SDC funding. In this scenario, the City could fund a portion of the improvements under the CIP category. While not addressing an existing deficiency, the proposed improvements do create new loop connections and pathways within the distribution system to assist with water circulation and fire flow. By utilizing the

SDC Reimbursement Fee component to address the remaining costs, the City could offer low-interest financing and fee reductions to low-income residents to avoid financial hardship. The SDC Reimbursement Fee in this funding category would be similar to an LID rather than the development of additional capacity that would be reimbursed through future connections (as many of these areas are unlikely to see future connections). However, a Buildable Lands Inventory is recommended for each area to determine if the potential for future connections exists.

Infill System Development funding requires an assessment of the worth of the proposed improvements to the City. Those improvements include additional fire flow and water circulation that should be of value. Additionally, the value of the improvement in future rates and connection fees, as well as the value of those improvements regarding fire protection, should be assessed.

Once the value of the improvements to the City has been determined, the remaining cost can be isolated and reviewed. This remaining cost could then be divided proportionately according to service type and size and be equally distributed accordingly to those residents connecting to the improvement. In most cases, the service connection sizes will be the same but a factor for additional service connection sizes should be created that can be applied consistently should a similar situation arise. The factor should be a multiplier rather than a dollar figure because costs of improvements will fluctuate.

To meet these objectives, the recommended distribution system improvements have been identified and are shown on Figure 6-1 for CIP Improvements and Figure 6-2 for SDC Improvements.

Capital Improvements Plan

A CIP provides a framework to prioritize and implement a city's facility and infrastructure asset improvement process over a specified time period. A CIP is a financing and construction plan for projects that require significant capital investment and are essential to safeguarding the financial health of a city, while providing continued delivery of utility and other services to residents and businesses.

As part of this WSMP, the City is developing a CIP based on identified deficiencies and improvements required to address the City's water system needs for the next 20 years. The CIP will need to be reviewed and updated periodically (at least every five years) to accommodate changing community needs, additional improvements that may be identified through time, and changes in financial resources. The CIP will list the City's capital improvements projects, place the projects in a priority order (subject to periodic review), and schedule the projects for funding and construction. Additionally, improvements may be prioritized as components of another project, such as a street improvements project. The schedule of these other improvements will have an impact on the priorities identified in the CIP if water system upgrades are needed within a broader project area.

The CIP is a tool to be used in the development of responsible and progressive financial planning and generally complies with the City's financial policies. City policies and the CIP form the basis for making annual capital budget decisions and supporting the City's continued commitment to sound, long-term financial planning.

The CIP identifies and prioritizes short-, medium-, and long-term projects of all types based on the water system master planning process. Water system improvements projects will be coordinated with the annual budget process to maintain full utilization of available resources. For each improvements project, the CIP provides a variety of information including a project description and the service needing to be addressed, a proposed timetable, and proposed funding levels. Water system improvements projects will be prioritized with the most urgent projects first. Ongoing operating costs are not included in the CIP estimated project costs. It should be noted that while improvements projects are listed in order of priority, the ability to fund the project will determine the length of time to complete the entirety of the identified improvements. For this reason, these improvements will need to be further evaluated based on priority improvements to be funded individually, along with other necessary projects.

Development of a CIP is a collaborative effort between the City manager and engineer, City Council members, department heads, and the City's engineering and financial consultants. City staff participate in CIP development via specific master plans and other planning tools. Major improvements projects require City Council interaction during project development and where funding allocations are made.

Identified Capital Improvements Plan Improvements and Estimated Costs

This section describes identified improvements included in the CIP funding category. Priorities are outlined chronologically, and the estimated costs of the various CIP improvements are presented. The CIP improvements outlined are intended to correct deficiencies identified in the existing system and provide the means to connect a portion of those residences located in the City to the municipal water system.

Proposed Improvements to be Completed within 10 Years

CIP 1 - Replace Existing Small Diameter (less than 6 inches) Piping and Wood Stave Pipe and Replace Existing Wrapped Steel Piping with New Minimum 8-inch Polyvinyl Chloride Water Line

CIP 1 has been designated as a top priority to be completed by the City. The improvements identified are intended to improve water quality and circulation by replacing old, undersized, deteriorating pipe and increase flow capacity to the existing system to provide adequate fire flows to residential, commercial, and industrial areas. This includes replacing approximately 300 feet of remaining wood stave pipe. It is recommended that 8-inch pipe be the minimum size installed. However, pipe size will be determined by the flow requirements in the area.

CIP 1 has been identified as requiring up to 40 years for completion due to the number of pipe replacements needed. However, the City is currently replacing pipes annually in conjunction with other projects as funding allows and will continue to do so until all necessary pipe replacements are complete.

CIP 2 - Connect Ochoco Heights Pressure Zone to Lower Pressure Zones

This improvement will provide a needed connection between the Ochoco Heights Pressure Zone and the lower pressure zones to allow for two-way movement of water between the zones as needed.

CIP 3 - Connect Existing City Residences Not Connected to City Water

Improvements include installing new water lines in the Fairview, Crestview, and Seehale areas. The improvements will include fire hydrants, new service line connections to the main line, new service lines, and new water meters. Constructing these improvements will provide the main water line necessary to allow the residences in the Fairview, Crestview, and Seehale areas to connect to the municipal water system.

CIP 4 - American Pine Booster Pump Station Upgrades

This improvement will replace the existing electrical and controls system at the American Pine BPS with variable frequency drives to allow the removal of the restrictive PRV used on the discharge piping. Along with an improved controls system, the BPS will be able to operate more efficiently, requiring fewer site visits and adjustments.

CIP 5 - Reconstruct Stearns Well

The Stearns Well was constructed in 1973 and is experiencing a reduction in specific capacity. A reconstruction of this important water source will allow it to be brought to current standards and improve its overall production, reliability, and efficiency.

CIP 6 - System-wide Supervisory Control and Data Acquisition Upgrade

These improvements will upgrade the existing SCADA hardware and the SCADA operating system to a standardized system capable of continued upgrades as SCADA technology improves. The current system does not allow for ongoing upgrades and has begun to fail, requiring additional water system personnel time to observe and report on system conditions.

CIP 7 - Proposed Improvements to Increase Existing System Fire Flows (Upsize 6-inch Pipe or Install Pipe Where No Pipe Exists)

These improvements include the replacement of undersized main lines or the installation of new main lines. The pipeline installations will improve system flows and water circulation within the system.

CIP 8 - Replace Existing Outside Diameter and Wrapped Main Line on 1st Street Between Main Street and Combs Flat

This improvement will replace the existing outside diameter (O.D.) and wrapped steel 6-inch pipe on First Street. This existing main line has deteriorated and should be replaced. SDC 10 will increase the size of the main line to 12 inches in diameter.

CIP 9 - Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights (New 6-inch Polyvinyl Chloride Water Line)

This improvement will replace the existing O.D. and wrapped steel 6-inch pipe on Loper Avenue. The existing main line has deteriorated and should be replaced. SDC 8 will increase the size of the main line to 12 inches in diameter.

Proposed Improvements to be Completed in 10 to 20 Years

CIP 10 - Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights (New 8-inch Water Main Line)

These improvements include the installation of new 8-inch polyvinyl chloride water lines and associated appurtenances in Ochoco Heights to increase the existing fire flow capacity in the area.

CIP 11 - Park Drive Pressure Reducing Valve Upgrades

These improvements will upgrade the existing Park Drive PRV with new piping and a PRV control system.

The identified improvements categorized under the CIP funding category are shown on Figure 6-1, estimated costs are presented on Figure 6-4, and a summary of the improvements and estimated costs are shown on Figure 6-5. It should be noted that the reference numbers shown on the figures have been assigned based on City-established priorities (1 being the highest and 11 the lowest).

Improvements Included in the System Development Charge Funding Category

This section summarizes and describes those identified improvements that have been included in the SDC funding category. The estimated costs of the various improvements are also presented.

System Development Charge Fee Categories

ORS 223.297 to 223.314 require that SDCs be divided into two fee categories, as follows:

Reimbursement Fee

This fee establishes the value of the unused capacity of the existing system infrastructure. The value of the unused capacity can be assessed to future connections until the excess capacity is exhausted. This fee is levied upon new developments to contribute a proportionate share of the cost of constructing existing facilities with the capacity to serve new developments. The Reimbursement Fee is based on original construction costs and the remaining capacity of the system component.

Capital Improvement Fee

This fee establishes the cost of planned capital improvements to be constructed within the planning period. This cost is levied upon new developments to provide funding for planned capital improvements projects, to increase system capacity, and to provide the needed service.

The Reimbursement Fee and the Capital Improvement Fee are combined to result in the total SDC fee.

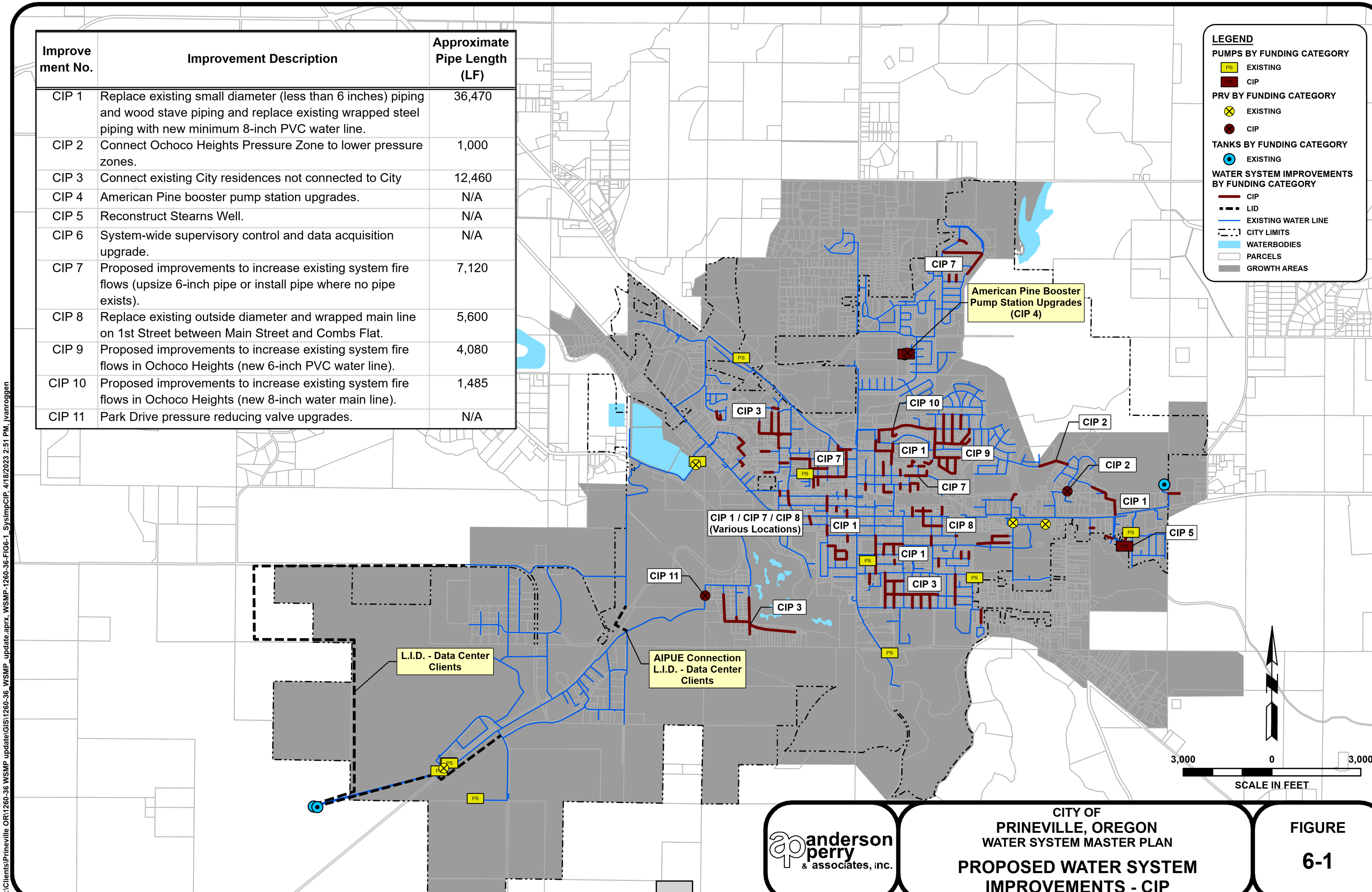
Establishment of System Development Charges

State of Oregon SDC statutes require the City to develop a methodology for establishing an SDC fee schedule. These fees can be assessed to new developments requiring City water services. Additional detailed discussions of the SDC methodologies and a comprehensive SDC analysis are presented in an SDC study prepared by GEL Oregon, Inc., as part of the overall water system planning effort.

Identified System Development Charge Improvements and Estimated Costs

As discussed earlier, improvements for the 20-year planning period have been identified that are necessary to support future development and expand the water system. The identified improvements in the SDC funding category are shown on Figure 6-2, estimated costs are presented on Figure 6-6, and a summary of the improvements and estimated costs is shown on Figure 6-7. Figure 6-2 also includes improvements that have been assumed to be completed by the formation of LIDs. Estimated costs for assumed LIDs were not developed as part of this WSMP, as that is beyond the scope of work associated with this WSMP. It should be noted that the reference numbers shown on the figures have been arbitrarily assigned and are not in order of priority. It is not possible to assign priorities to the improvements identified under the SDC funding category, as they are development driven and it is unknown which areas of the City will develop first or how quickly development will occur within the City.

Improvement No.	Improvement Description	Approximate Pipe Length (LF)
CIP 1	Replace existing small diameter (less than 6 inches) piping and wood stave piping and replace existing wrapped steel piping with new minimum 8-inch PVC water line.	36,470
CIP 2	Connect Ochoco Heights Pressure Zone to lower pressure zones.	1,000
CIP 3	Connect existing City residences not connected to City	12,460
CIP 4	American Pine booster pump station upgrades.	N/A
CIP 5	Reconstruct Stearns Well.	N/A
CIP 6	System-wide supervisory control and data acquisition upgrade.	N/A
CIP 7	Proposed improvements to increase existing system fire flows (upsize 6-inch pipe or install pipe where no pipe exists).	7,120
CIP 8	Replace existing outside diameter and wrapped main line on 1st Street between Main Street and Combs Flat.	5,600
CIP 9	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 6-inch PVC water line).	4,080
CIP 10	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 8-inch water main line).	1,485
CIP 11	Park Drive pressure reducing valve upgrades.	N/A



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CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

PROPOSED WATER SYSTEM IMPROVEMENTS - CIP

FIGURE 6-1

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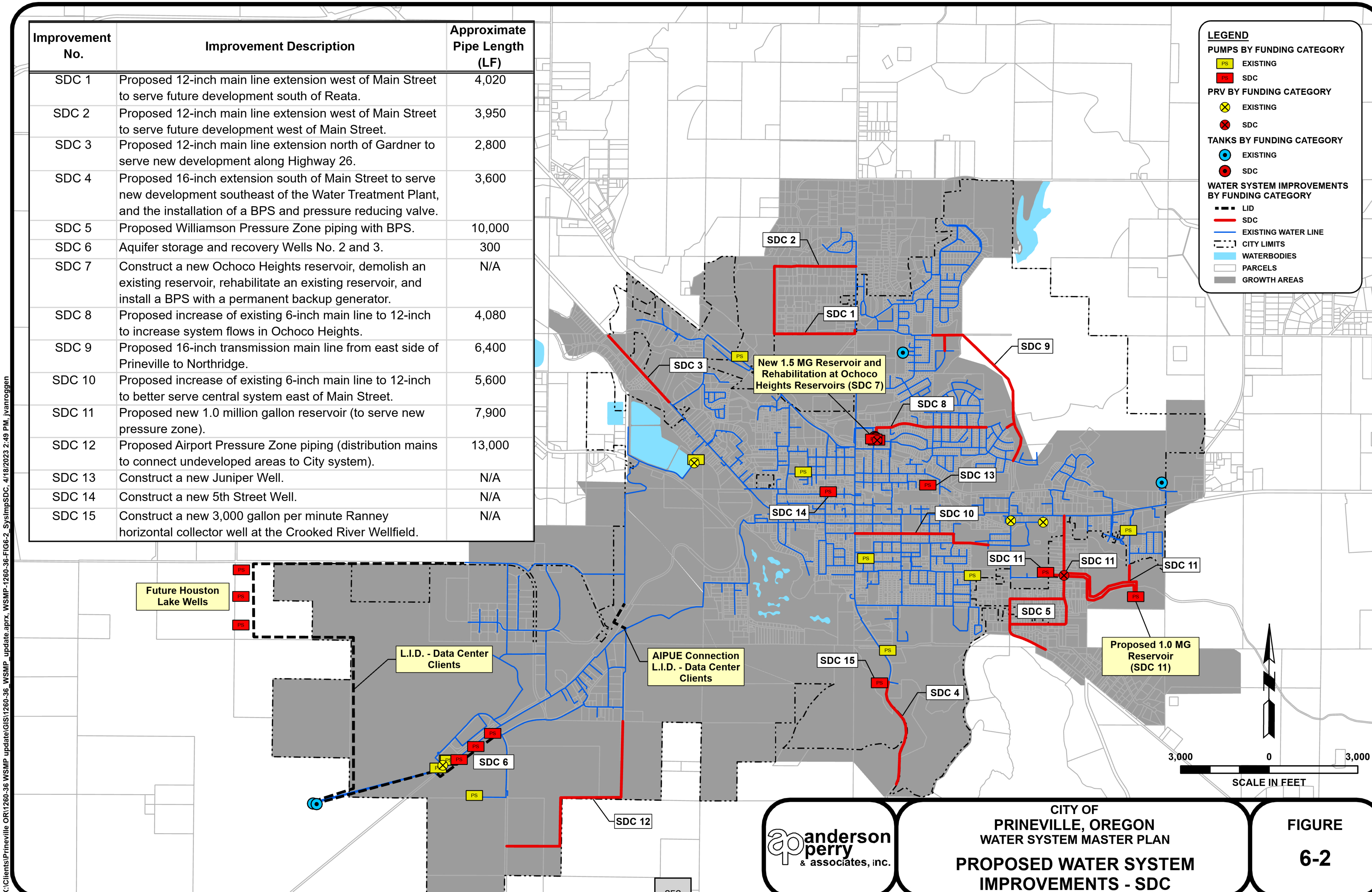
Improvement No.	Improvement Description	Approximate Pipe Length (LF)
SDC 1	Proposed 12-inch main line extension west of Main Street to serve future development south of Reata.	4,020
SDC 2	Proposed 12-inch main line extension west of Main Street to serve future development west of Main Street.	3,950
SDC 3	Proposed 12-inch main line extension north of Gardner to serve new development along Highway 26.	2,800
SDC 4	Proposed 16-inch extension south of Main Street to serve new development southeast of the Water Treatment Plant, and the installation of a BPS and pressure reducing valve.	3,600
SDC 5	Proposed Williamson Pressure Zone piping with BPS.	10,000
SDC 6	Aquifer storage and recovery Wells No. 2 and 3.	300
SDC 7	Construct a new Ochoco Heights reservoir, demolish an existing reservoir, rehabilitate an existing reservoir, and install a BPS with a permanent backup generator.	N/A
SDC 8	Proposed increase of existing 6-inch main line to 12-inch to increase system flows in Ochoco Heights.	4,080
SDC 9	Proposed 16-inch transmission main line from east side of Prineville to Northridge.	6,400
SDC 10	Proposed increase of existing 6-inch main line to 12-inch to better serve central system east of Main Street.	5,600
SDC 11	Proposed new 1.0 million gallon reservoir (to serve new pressure zone).	7,900
SDC 12	Proposed Airport Pressure Zone piping (distribution mains to connect undeveloped areas to City system).	13,000
SDC 13	Construct a new Juniper Well.	N/A
SDC 14	Construct a new 5th Street Well.	N/A
SDC 15	Construct a new 3,000 gallon per minute Ranney horizontal collector well at the Crooked River Wellfield.	N/A



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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

PROPOSED WATER SYSTEM IMPROVEMENTS - SDC

FIGURE 6-2

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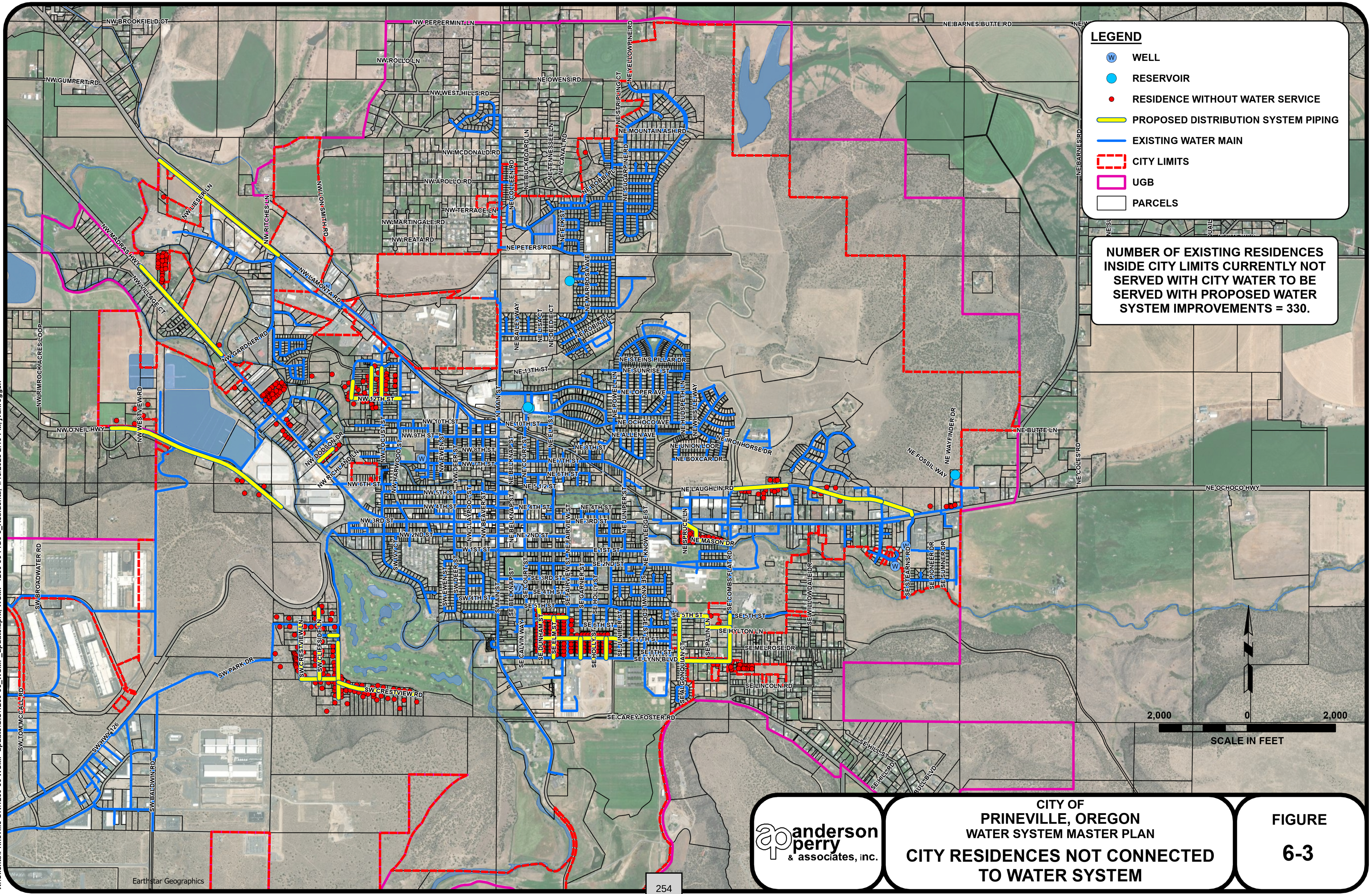

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
CITY RESIDENCES NOT CONNECTED TO WATER SYSTEM

FIGURE
6-3

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CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED CIP-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE
(YEAR 2023 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 1: Replace Existing Small Diameter (Less than 6 inches) Piping and Wood Stave Piping and Replace Existing Wrapped Steel Piping with New Minimum 8-inch Polyvinyl Chloride Water Line					
1	Mobilization/Demobilization	LS	$ 507,000	All Req'd	$ 507,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	275,000	All Req'd	275,000
3	8-inch Polyvinyl Chloride Water Line, including Valves and Fittings	LF	140	36,470	5,105,800
4	New Fire Hydrant and Auxiliary Valve	EA	7,500	160	1,200,000
5	Existing Water Service Connection to New Main Line	EA	400	500	200,000
6	Existing Fire Hydrant Connection to Main Line	EA	2,000	15	30,000
7	New Water Service (to Existing Lot, including Service Line and Meter)	EA	2,800	318	890,400
8	Connection to Existing Main Line	EA	5,000	130	650,000
9	Asphalt Surface Restoration	SY	40	45,000	1,800,000
				Estimated Construction Cost	**$ 10,659,000**
				Construction Contingency Cost (15%)	1,598,000
				Total Estimated Construction Cost	**$ 12,257,000**
				Preliminary, Design, and Construction Engineering (20%)	2,451,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 14,708,000**

CIP = Capital Improvements Plan

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 2: Connect Ochoco Heights Pressure Zone to Lower Pressure Zones					
1	Mobilization/Demobilization	LS	$ 75,000	All Req'd	$ 75,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	135,000	All Req'd	135,000
3	12-inch Polyvinyl Chloride Water Line, including Valves	LF	300	1,000	300,000
4	Pressure Reducing Valve	LS	50,000	All Req'd	50,000
5	New Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	2	15,000
6	New Water Service (to Existing Lot, including Service Line and Meter)	EA	3,000	330	990,000
7	Connection to Existing Main Line	EA	5,000	14	70,000
8	Asphalt Surface Restoration	SY	90	500	45,000
9	Gravel Surface Restoration	SY	30	1,500	45,000
				Estimated Construction Cost	**$ 1,725,000**
				Construction Contingency Cost (15%)	258,000
				Total Estimated Construction Cost	**$ 1,983,000**
				Preliminary, Design, and Construction Engineering (20%)	396,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 2,379,000**

CIP = Capital Improvements Plan

Page 2 of 7

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 3: Connect Existing City Residences Not Connected to City Water					
1	Mobilization/Demobilization	LS	$ 216,000	All Req'd	$ 216,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	135,000	All Req'd	135,000
3	8-inch Polyvinyl Chloride Water Line, including Valves	LF	140	12,460	1,744,400
4	New Fire Hydrant and Auxiliary Valve	EA	7,500	27	202,500
5	New Water Service (to Existing Lot, including Service Line and Meter)	EA	3,000	330	990,000
6	Connection to Existing Main Line	EA	5,000	14	70,000
7	Asphalt Surface Restoration	SY	40	29,700	1,188,000
				Estimated Construction Cost	**$ 4,546,000**
				Construction Contingency Cost (15%)	681,000
				Total Estimated Construction Cost	**$ 5,227,000**
				Preliminary, Design, and Construction Engineering (20%)	1,045,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 6,272,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 4: American Pine Booster Pump Station Upgrades					
1	Mobilization/Demobilization	LS	$ 11,000	All Req'd	$ 11,000
2	Variable Frequency Drive Upgrade - Pumps	LS	100,000	All Req'd	100,000
3	Supervisory Control and Data Acquisition/Instrumentation Upgrade	LS	100,000	All Req'd	100,000
4	Remove Existing Pressure Reducing Valve	LS	25,000	All Req'd	25,000
				Estimated Construction Cost	**$ 236,000**
				Construction Contingency Cost (15%)	35,000
				Total Estimated Construction Cost	**$ 271,000**
				Preliminary, Design, and Construction Engineering (20%)	54,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 325,000**

CIP = Capital Improvements Plan

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 5: Reconstruct Stearns Well					
1	Mobilization/Demobilization	LS	23,000	All Req'd	$ 23,000
2	Well Construction	LS	150,000	All Req'd	150,000
3	Provide and Install Pump	LS	50,000	All Req'd	50,000
4	Electrical and Controls	LS	75,000	All Req'd	75,000
5	Chlorination System	LS	25,000	All Req'd	25,000
6	Mechanical and Piping	LS	50,000	All Req'd	50,000
7	Well Building Improvements	LS	100,000	All Req'd	100,000
8	Fencing and Gate	LS	10,000	All Req'd	10,000
				Estimated Construction Cost	**$ 483,000**
				Construction Contingency Cost (15%)	72,000
				Total Estimated Construction Cost	**$ 555,000**
				Preliminary, Design, and Construction Engineering (20%)	111,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	27,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 693,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 6: System-wide Supervisory Control and Data Acquisition Upgrade					
1	Mobilization/Demobilization	LS	50,000	All Req'd	$ 50,000
2	Supervisory Control and Data Acquisition/Instrumentation Upgrade	LS	1,000,000	All Req'd	1,000,000
				Estimated Construction Cost	**$ 1,050,000**
				Construction Contingency Cost (15%)	157,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 1,207,000**

CIP = Capital Improvements Plan

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 7: Proposed Improvements to Increase Existing System Fire Flows (Upsize 6-inch Pipe or Install Pipe Where No Pipe Exists)					
1	Mobilization/Demobilization	LS	$ 85,000	All Req'd	$ 85,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	125,000	All Req'd	125,000
3	8-inch Polyvinyl Chloride Water Line, including Valves	LF	140	7,120	996,800
4	New Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	13	97,500
5	Existing Fire Hydrant Connection to New Main Line	EA	2,000	5	10,000
6	New Water Service (to Existing Lot, including Service Line and Meter)	EA	2,800	120	336,000
7	Connection to Existing Main Line	EA	5,000	6	30,000
8	Asphalt Surface Restoration	SY	60	1,750	105,000
				Estimated Construction Cost	**$ 1,786,000**
				Construction Contingency Cost (15%)	267,000
				Total Estimated Construction Cost	**$ 2,053,000**
				Preliminary, Design, and Construction Engineering (20%)	410,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 2,463,000**

CIP = Capital Improvements Plan

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NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 8: Replace Exisiting Outside Diameter and Wrapped Main Line on 1st Street Between Main Street and Combs Flat					
1	Mobilization/Demobilization	LS	$ 49,000	All Req'd	$ 49,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	6-inch Polyvinyl Chloride (PVC) Water Line	LF	120	5,600	672,000
4	6-inch Gate Valve	EA	2,000	9	18,000
5	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	6	45,000
6	Connection to Existing Main Line	EA	1,000	9	9,000
7	New Water Service (to Existing Lot, including Service Line and Meter)	EA	1,500	53	79,500
8	Asphalt Surface Restoration	SY	60	2,250	135,000
				Estimated Construction Cost	**$ 1,033,000**
				Construction Contingency Cost (15%)	154,000
				Total Estimated Construction Cost	**$ 1,187,000**
				Preliminary, Design, and Construction Engineering (20%)	237,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	59,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 1,483,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 9: Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights (New 6-inch Polyvinyl Chloride Water Line)					
1	Mobilization/Demobilization	LS	$ 38,000	All Req'd	$ 38,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	35,000	All Req'd	35,000
3	6-inch PVC Water Line	LF	120	4,080	489,600
4	6-inch Gate Valve	EA	2,000	7	14,000
5	Connection to Existing Main Line	EA	1,200	17	20,400
6	New Water Service (to Existing Lot, including Service Line and Meter)	EA	1,500	29	43,500
7	Asphalt Surface Restoration	SY	60	2,800	168,000
8	Gravel Surface Restoration	SY	30	150	4,500
				Estimated Construction Cost	**$ 813,000**
				Construction Contingency Cost (15%)	121,000
				Total Estimated Construction Cost	**$ 934,000**
				Preliminary, Design, and Construction Engineering (20%)	186,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	46,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 1,166,000**

CIP = Capital Improvements Plan

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED CIP-FUNDED IMPROVEMENTS
PRELIMINA[RY] COST ESTIMATE

FIGURE
6-4
CONT'D.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 10: Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights (New 8-inch Water Main Line)					
1	Mobilization/Demobilization	LS	$ 26,000	All Req'd	$ 26,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	30,000	All Req'd	30,000
3	8-inch Polyvinyl Chloride Water Line, including Valves	LF	140	1,685	235,900
4	New Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	3	22,500
5	Existing Fire Hydrant Connection to New Main Line	EA	2,000	3	6,000
6	New Water Service (to Existing Lot, including Service Line and Meter	EA	3,000	29	87,000
7	Connection to Existing Main Line	EA	5,000	7	35,000
8	Asphalt Surface Restoration	SY	60	1,850	111,000
				Estimated Construction Cost	**$ 554,000**
				Construction Contingency Cost (15%)	83,000
				Total Estimated Construction Cost	**$ 637,000**
				Preliminary, Design, and Construction Engineering (20%)	127,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 764,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
CIP 11: Park Drive Pressure Reducing Valve Upgrades					
1	Mobilization/Demobilization	LS	$ 1,500	All Req'd	$ 1,500
2	Temporary Protection and Direction of Traffic/Project Safety	LS	5,000	All Req'd	5,000
3	8-inch Ductile Iron Pipe including Restraints and Fittings	LF	300	40	12,000
4	Concrete Vault Modifications	LS	7,500	All Req'd	7,500
5	Existing Pressure Reducing Valve Modifications	LS	5,000	All Req'd	5,000
				Estimated Construction Cost	**$ 31,000**
				Construction Contingency Cost (15%)	4,000
				Total Estimated Construction Cost	**$ 35,000**
				Preliminary, Design, and Construction Engineering (20%)	7,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 42,000**

CIP = Capital Improvements Plan

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED CIP-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE 6-4 CONT'D.

CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED CIP-FUNDED IMPROVEMENTS
AND ESTIMATED PROJECT COSTS
(YEAR 2023 COSTS)

Improvement No.[1]	Improvement Description	Approximate Pipe Length (LF)	Total Estimated Costs	Time Frame When Improvements Completed
CIP 1	Replace existing small diameter (less than 6 inches) piping and wood stave piping and replace existing wrapped steel piping with new minimum 8-inch PVC water line.	36,470	$ 14,708,000	0 to 40 years
CIP 2	Connect Ochoco Heights Pressure Zone to lower pressure zones.	1,000	2,379,000	0 to 10 years
CIP 3	Connect existing City residences not connected to City water.[2]	12,460	6,272,000	0 to 10 years
CIP 4	American Pine booster pump station upgrades.	N/A	325,000	0 to 10 years
CIP 5	Reconstruct Stearns Well.	N/A	693,000	0 to 10 years
CIP 6	System-wide supervisory control and data acquisition upgrade.	N/A	1,207,000	0 to 10 years
CIP 7	Proposed improvements to increase existing system fire flows (upsize 6-inch pipe or install pipe where no pipe exists).	7,120	2,463,000	0 to 20 years
CIP 8	Replace existing outside diameter and wrapped main line on 1st Street between Main Street and Combs Flat.[3]	5,600	1,483,000	0 to 20 years
CIP 9	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 6-inch PVC water line).[4]	4,080	1,166,000	0 to 20 years
CIP 10	Proposed improvements to increase existing system fire flows in Ochoco Heights (new 8-inch water main line).	1,485	764,000	0 to 20 years
CIP 11	Park Drive pressure reducing valve upgrades.	N/A	42,000	10 to 20 years
TOTAL ESTIMATED CIP-FUNDED IMPROVEMENTS COST (2023 DOLLARS)			**$ 31,502,000**	

[1] Improvements listed in order of City-identified priority, with CIP 1 being the highest priority and CIP 11 being the lowest. CIPs 1, 3, and 10 will be pursued as funding allows. Individual improvements will be selected due to extreme deficiency, increased maintenance costs, system growth, or the ability to coordinate work with other City projects.

[2] Funding source to be determined.

[3] Replacement cost only. Increase in size for future growth capacity captured in SDC 10.

[4] Replacement cost only. Increase in size for future growth capacity captured in SDC 8.

LF = linear feet
N/A = not applicable
PVC = polyvinyl chloride
SDC = system development charge

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED CIP-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS

FIGURE
6-5

CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED SDC-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE
(YEAR 2023 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 1: Proposed 12-inch Main Line Extension West of Main Street to Serve Future Development South of Reata					
1	Mobilization/Demobilization	LS	$ 56,000	All Req'd	$ 56,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	12-inch Polyvinyl Chloride (PVC) Water Line	LF	250	4,020	1,005,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	8	60,000
5	12-inch Butterfly Valve	EA	4,000	8	32,000
6	Connection to Existing Main Line	EA	5,000	1	5,000
	Estimated Construction Cost				**$ 1,183,000**
	Construction Contingency Cost (15%)				177,000
	Total Estimated Construction Cost				**$ 1,360,000**
	Preliminary, Design, and Construction Engineering (20%)				272,000
	Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)				68,000
	TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)				**$ 1,700,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 2: Proposed 12-inch Main Line Extension West of Main Street to Serve Future Development West of Main Street					
1	Mobilization/Demobilization	LS	$ 64,000	All Req'd	$ 64,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	12-inch PVC Water Line	LF	250	3,950	987,500
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	8	60,000
5	12-inch Butterfly Valve	EA	4,000	8	32,000
6	Connection to Existing Main Line	EA	5,000	1	5,000
7	Asphalt Surface Restoration	SY	60	3,100	186,000
	Estimated Construction Cost				**$ 1,360,000**
	Construction Contingency Cost (15%)				204,000
	Total Estimated Construction Cost				**$ 1,564,000**
	Preliminary, Design, and Construction Engineering (20%)				272,000
	Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)				78,000
	TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)				**$ 1,914,000**

SDC = system development charge

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 3: Proposed 12-inch Main Line Extension North of Gardner to Serve New Development Along Highway 26					
1	Mobilization/Demobilization	LS	$ 33,000	All Req'd	$ 33,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	35,000	All Req'd	35,000
3	12-inch Polyvinyl Chloride (PVC) Water Line, Including Valves	LF	200	2,800	560,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	6	45,000
5	12-inch Butterfly Valve	EA	4,000	4	16,000
6	Connection to Existing Main Line	EA	5,000	1	5,000
7	Permanent Seeding	AC	7,500	1.3	9,750
				Estimated Construction Cost	**$ 704,000**
				Construction Contingency Cost (15%)	105,000
				Total Estimated Construction Cost	**$ 809,000**
				Preliminary, Design, and Construction Engineering (20%)	161,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (5%)	40,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 1,010,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 4: Proposed 16-inch Extension South of Main Street to Serve New Development Southeast of the Water Treatment Plant, and the Installation of a Booster Pump Station and Pressure Reducing Valve					
1	Mobilization/Demobilization	LS	$ 85,000	All Req'd	$ 85,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	50,000	All Req'd	50,000
3	16-inch PVC Water Line	LF	260	3,600	936,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	20	150,000
5	16-inch Butterfly Valve	EA	5,000	20	100,000
6	Booster Pump Station[1]	LS	300,000	All Req'd	300,000
7	Pressure Reducing Valve	LS	50,000	All Req'd	50,000
8	Connection to Existing Main Line	EA	5,000	2	10,000
9	Asphalt Surface Restoration	SY	60	1,900	114,000
				Estimated Construction Cost	**$ 1,795,000**
				Construction Contingency Cost (15%)	269,000
				Total Estimated Construction Cost	**$ 2,064,000**
				Preliminary, Design, and Construction Engineering (20%)	412,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	103,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 2,579,000**

[1] Booster pump station includes concrete masonry unit building; pumps; piping valves; electrical, controls, and instrumentation; site work; painting; security fencing; an access road; and telemetry and supervisory control and data acquisition development.

SDC = system development charge

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED SDC-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE
6-6
CONT'D.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 5: Proposed Williamson Pressure Zone Piping with Booster Pump Station					
1	Mobilization/Demobilization	LS	$ 167,000	All Req'd	$ 167,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	40,000	All Req'd	40,000
3	Right-of-Way/Easements	LS	25,000	All Req'd	25,000
4	12-inch Polyvinyl Chloride (PVC) Water Line	LF	200	7,200	1,440,000
5	8-inch PVC Water Line, including Valves and Fittings	LF	140	2,800	392,000
6	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	20	150,000
7	12-inch Butterfly Valve	EA	4,000	8	32,000
8	Booster Pump Station[1]	LS	300,000	All Req'd	300,000
9	Pressure Reducing Valve	LS	50,000	All Req'd	50,000
10	Connection to Existing Main Line	EA	5,000	1	5,000
11	Asphalt Surface Restoration	SY	40	22,000	880,000
12	Gravel Surface Restoration	SY	30	1,500	45,000
	Estimated Construction Cost				**$ 3,526,000**
	Construction Contingency Cost (15%)				528,000
	Total Estimated Construction Cost				**$ 4,054,000**
	Preliminary, Design, and Construction Engineering (20%)				810,000
	Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)				202,000
	TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)				**$ 5,066,000**

[1] Booster pump station includes concrete masonry unit building; pumps; piping valves; electrical, controls, and instrumentation; site work; painting; security fencing; an access road; and telemetry and supervisory control and data acquisition development.

SDC = system development charge

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED SDC-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE
6-6
CONT'D.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 6: Aquifer Storage and Recovery Wells No. 2 and 3					
1	Mobilization/Demobilization	LS	$ 167,000	All Req'd	$ 167,000
2	Well Construction	LS	300,000	All Req'd	300,000
3	Well Pump Purchase and Installation	LS	250,000	All Req'd	250,000
4	Downhole Injection Valves	LS	400,000	All Req'd	400,000
5	Mechanical Piping, Fittings, and Valves	LS	500,000	All Req'd	500,000
6	Electrical and Controls	LS	500,000	All Req'd	500,000
7	Chlorination Systems	LS	150,000	All Req'd	150,000
8	Well Buildings	LS	300,000	All Req'd	300,000
9	Backup Generator System (300 kilowatt)	LS	300,000	All Req'd	300,000
10	Pump to Waste (Complete)	LS	250,000	All Req'd	250,000
11	Fence and Gate	LS	150,000	All Req'd	150,000
12	Gravel Access/Parking	LS	100,000	All Req'd	100,000
13	Connect to Existing Piping	LS	10,000	All Req'd	10,000
14	12-inch Polyvinyl Chloride Water Line	LF	300	300	90,000
15	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	2	15,000
16	Connection to Existing Main Line	EA	5,000	2	10,000
17	Gravel Surface Restoration	SY	30	750	22,500
	Estimated Construction Cost				**$ 3,515,000**
	Construction Contingency Cost (15%)				527,000
	Total Estimated Construction Cost				**$ 4,042,000**
	Preliminary, Design, and Construction Engineering (20%)				808,000
	Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)				202,000
	TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)				**$ 5,052,000**

SDC = system development charge

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED SDC-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE 6-6 CONT'D.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE

SDC 7: Construct a New Ochoco Heights Reservoir, Demolish an Existing Reservoir, Rehabilitate an Existing Reservoir, and Install a Booster Pump Station with a Permanent Backup Generator

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
1	Mobilization/Demobilization	LS	$ 239,000	All Req'd	$ 239,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	10,000	All Req'd	10,000
3	Site Earthwork and Foundation	LS	300,000	All Req'd	300,000
4	1.5 Million Gallon (MG) Reservoir	LS	3,000,000	All Req'd	3,000,000
5	Painting of New Reservoir	LS	200,000	All Req'd	200,000
6	Site Piping, Valves, and Appurtenances	LS	200,000	All Req'd	200,000
7	Telemetry and Supervisory Control and Data Acquisition Development	LS	75,000	All Req'd	75,000
8	Existing 0.5 MG Reservoir Rehabilitation (Sandblast and Recoat Interior)	SF	40	6,520	260,800
9	Existing 0.5 MG Reservoir Rehabilitation (Sandblast, Steel Repairs, and Recoat Exterior)	SF	30	6,520	195,600
10	Booster Pump Station[1]	LS	300,000	All Req'd	300,000
11	Backup Generator	LS	150,000	All Req'd	150,000
12	Temporary Barricades, Scaffolding, Runoff Control, and Existing Materials Disposal	LS	50,000	All Req'd	50,000
13	Demolition of Second Existing Reservoir	LS	50,000	All Req'd	50,000
				Estimated Construction Cost	**$ 5,031,000**
				Construction Contingency Cost (15%)	754,000
				Total Estimated Construction Cost	**$ 5,785,000**
				Preliminary, Design, and Construction Engineering (20%)	1,157,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	289,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 7,231,000**

[1] Booster pump station includes a concrete masonry unit building, pumps, piping valves, site work, painting, security fencing, and an access road.

SDC = system development charge

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 8: Proposed Increase of Existing 6-inch Main Line to 12-inch to Increase System Flows in Ochoco Heights					
1	Mobilization/Demobilization	LS	$ 37,000	All Req'd	$ 37,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	35,000	All Req'd	35,000
3	12-inch Polyvinyl Chloride (PVC) Water Line	LF	100	4,080	408,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	5	37,500
5	12-inch Butterfly Valve	EA	2,000	7	14,000
6	Connection to Existing Main Line	EA	1,800	17	30,600
7	New Water Service (to Existing Lot, including Service Line and Meter)	EA	1,500	29	43,500
8	Asphalt Surface Restoration	SY	60	2,800	168,000
9	Gravel Surface Restoration	SY	30	150	4,500
				Estimated Construction Cost	**$ 779,000**
				Construction Contingency Cost (15%)	116,000
				Total Estimated Construction Cost	**$ 895,000**
				Preliminary, Design, and Construction Engineering (20%)	179,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	44,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 1,118,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 9: Proposed 16-inch Transmission Main Line from East Side of Prineville to Northridge					
1	Mobilization/Demobilization	LS	$ 100,000	All Req'd	$ 100,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	50,000	All Req'd	50,000
3	16-inch PVC Water Line	LF	260	6,400	1,664,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	7	52,500
5	16-inch Butterfly Valve	EA	5,000	14	70,000
6	Connection to Existing Main Line	EA	5,000	5	25,000
7	Asphalt Surface Restoration	SY	60	2,350	141,000
				Estimated Construction Cost	**$ 2,103,000**
				Construction Contingency Cost (15%)	315,000
				Total Estimated Construction Cost	**$ 2,418,000**
				Preliminary, Design, and Construction Engineering (20%)	483,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	120,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 3,021,000**

SDC = system development charge

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 10: Proposed Increase of Existing 6-inch Main Line to 12-inch to Better Serve Central System East of Main Street					
1	Mobilization/Demobilization	LS	$ 42,000	All Req'd	$ 42,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	12-inch Polyvinyl Chloride Water Line	LF	100	5,600	560,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	6	45,000
5	12-inch Butterfly Valve	EA	2,000	9	18,000
6	Connection to Existing Main Line	EA	1,000	9	9,000
7	New Water Service (to Existing Lot, including Service Line and Meter)	EA	1,500	53	79,500
8	Asphalt Surface Restoration	SY	60	2,250	135,000
				Estimated Construction Cost	**$ 914,000**
				Construction Contingency Cost (15%)	137,000
				Total Estimated Construction Cost	**$ 1,051,000**
				Preliminary, Design, and Construction Engineering (20%)	210,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	52,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 1,313,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 11: Proposed New 1.0 Million Gallon Reservoir (to Serve New Pressure Zone)					
1	Mobilization/Demobilization	LS	$ 290,000	All Req'd	$ 290,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	Site Earthwork and Foundation	LS	250,000	All Req'd	250,000
4	1.0 Million Gallon Reservoir	LS	2,000,000	All Req'd	2,000,000
5	Painting of Reservoir	LS	200,000	All Req'd	200,000
6	Site Piping, Valves, and Appurtenances	LS	350,000	All Req'd	350,000
7	Security Fencing and Improvements	LS	100,000	All Req'd	100,000
8	16-inch Transmission Line, including Valves	LF	400	3,700	1,480,000
9	12-inch Fill Line, including Valves	LF	300	4,200	1,260,000
10	Telemetry and Supervisory Control and Data Acquisition Development	LS	150,000	All Req'd	150,000
				Estimated Construction Cost	**$ 6,105,000**
				Construction Contingency Cost (15%)	915,000
				Total Estimated Construction Cost	**$ 7,020,000**
				Preliminary, Design, and Construction Engineering (20%)	1,404,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	351,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 8,775,000**

SDC = system development charge

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED SDC-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE 6-6 CONT'D.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 12: Proposed Airport Pressure Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)					
1	Mobilization/Demobilization	LS	$ 181,000	All Req'd	$ 181,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	12-inch Polyvinyl Chloride (PVC) Water Line	LF	250	13,000	3,250,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	7	52,500
5	12-inch Butterfly Valve	EA	4,000	15	60,000
6	Connection to Existing Main Line	EA	5,000	2	10,000
7	Gravel Surface Restoration	SY	30	7,500	225,000
				Estimated Construction Cost	**$ 3,804,000**
				Construction Contingency Cost (15%)	570,000
				Total Estimated Construction Cost	**$ 4,374,000**
				Preliminary, Design, and Construction Engineering (20%)	874,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	218,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 5,466,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 13: Construct a New Juniper Well					
1	Mobilization/Demobilization	LS	$ 29,000	All Req'd	$ 29,000
2	Well Construction	LS	160,000	All Req'd	160,000
3	Well Pump Purchase and Installation	LS	50,000	All Req'd	50,000
4	Mechanical Piping, Fittings, and Valves	LS	25,000	All Req'd	25,000
5	Electrical and Controls	LS	25,000	All Req'd	25,000
6	Chlorination Systems	LS	10,000	All Req'd	10,000
7	Well Buildings	LS	150,000	All Req'd	150,000
8	Backup Generator Systems (300 kilowatt)	LS	100,000	All Req'd	100,000
9	Fence and Gate	LS	25,000	All Req'd	25,000
10	Gravel Access/Parking	LS	10,000	All Req'd	10,000
11	Connect to Existing Piping	LS	5,000	All Req'd	5,000
12	12-inch PVC Water Line	LF	200	100	20,000
13	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	1	7,500
				Estimated Construction Cost	**$ 617,000**
				Construction Contingency Cost (15%)	92,000
				Total Estimated Construction Cost	**$ 709,000**
				Preliminary, Design, and Construction Engineering (20%)	141,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 850,000**

SDC = system development charge

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 14: Construct a New 5th Street Well					
1	Mobilization/Demobilization	LS	$ 29,000	All Req'd	$ 29,000
2	Well Construction	LS	160,000	All Req'd	160,000
3	Well Pump Purchase and Installation	LS	50,000	All Req'd	50,000
4	Mechanical Piping, Fittings, and Valves	LS	25,000	All Req'd	25,000
5	Electrical and Controls	LS	25,000	All Req'd	25,000
6	Chlorination Systems	LS	10,000	All Req'd	10,000
7	Well Buildings	LS	150,000	All Req'd	150,000
8	Backup Generator Systems (300 kilowatt)	LS	100,000	All Req'd	100,000
9	Fence and Gate	LS	25,000	All Req'd	25,000
10	Gravel Access/Parking	LS	10,000	All Req'd	10,000
11	Connect to Existing Piping	LS	5,000	All Req'd	5,000
12	12-inch Polyvinyl Chloride Water Line	LF	200	100	20,000
13	Fire Hydrant and Auxiliary Valve Assembly	EA	7,500	1	7,500
				Estimated Construction Cost	**$ 617,000**
				Construction Contingency Cost (15%)	92,000
				Total Estimated Construction Cost	**$ 709,000**
				Preliminary, Design, and Construction Engineering (20%)	141,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 850,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 15: Construct a New 3,000 Gallon Per Minute Ranney Horizontal Collector Well at Crooked River Wellfield					
1	Mobilization/Demobilization	LS	$ 110,000	All Req'd	$ 110,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	100,000	All Req'd	100,000
3	Dewatering	LS	250,000	All Req'd	250,000
4	Caisson Construction	LS	200,000	All Req'd	200,000
5	Horizontal Well Construction	LF	3,500	300	1,050,000
6	Booster Pump Station[1]	LS	300,000	All Req'd	300,000
7	Electrical and Controls	LS	250,000	All Req'd	250,000
8	Connection to Existing Main Line	EA	5,000	2	10,000
9	Gravel Surface Restoration	SY	30	1,500	45,000
				Estimated Construction Cost	**$ 2,315,000**
				Construction Contingency Cost (15%)	347,000
				Total Estimated Construction Cost	**$ 2,662,000**
				Preliminary, Design, and Construction Engineering (20%)	532,000
				Environmental Report, Cultural Resource Investigation, Permitting, and Plan Reviews (5%)	133,000
				TOTAL ESTIMATED IMPROVEMENT COST (2023 DOLLARS)	**$ 3,327,000**

[1] Booster pump station includes concrete masonry unit building, pumps, piping valves, site work, painting, security fencing, and an access road.

SDC = system development charge

anderson perry & associates, inc.

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED SDC-FUNDED IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE 6-6 CONT'D.

CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED SDC-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS
(YEAR 2023 COSTS)

Improvement No.[1]	Improvement Description	Approximate Pipe Length (LF)	Total Estimated Costs
SDC 1	Proposed 12-inch main line extension west of Main Street to serve future development south of Reata.	4,020	$ 1,700,000
SDC 2	Proposed 12-inch main line extension west of Main Street to serve future development west of Main Street.	3,950	1,914,000
SDC 3	Proposed 12-inch main line extension north of Gardner to serve new development along Highway 26.	2,800	1,010,000
SDC 4	Proposed 16-inch extension south of Main Street to serve new development southeast of the Water Treatment Plant, and the installation of a BPS and pressure reducing valve.	3,600	2,579,000
SDC 5	Proposed Williamson Pressure Zone piping with BPS.	10,000	5,066,000
SDC 6	Aquifer storage and recovery Wells No. 2 and 3.	300	5,052,000
SDC 7	Construct a new Ochoco Heights reservoir, demolish an existing reservoir, rehabilitate an existing reservoir, and install a BPS with a permanent backup generator.	N/A	7,231,000
SDC 8[2]	Proposed increase of existing 6-inch main line to 12-inch to increase system flows in Ochoco Heights.	4,080	1,118,000
SDC 9[3]	Proposed 16-inch transmission main line from east side of Prineville to Northridge.	6,400	3,021,000
SDC 10	Proposed increase of existing 6-inch main line to 12-inch to better serve central system east of Main Street.	5,600	1,313,000
SDC 11	Proposed new 1.0 million gallon reservoir (to serve new pressure zone).	7,900	8,775,000
SDC 12	Proposed Airport Pressure Zone piping (distribution mains to connect undeveloped areas to City system).	13,000	5,466,000
SDC 13	Construct a new Juniper Well.	N/A	850,000
SDC 14	Construct a new 5th Street Well.	N/A	850,000
SDC 15	Construct a new 3,000 gallon per minute Ranney horizontal collector well at the Crooked River Wellfield.	N/A	3,327,000
	TOTAL ESTIMATED SDC-FUNDED IMPROVEMENTS COST (2023 DOLLARS)		**$ 49,272,000**

[1] The SDC-funded improvements are not listed in order of priority. The improvement to be completed first will depend on where growth and development occur within the City.

[2] Cost to increase in size for future growth. Replacement cost shared with CIP 9.

[3] Cost to increase in size for future growth. Replacement cost shared with CIP 8

BPS = booster pump station

CIP = Capital Improvements Plan

LF = linear feet

N/A = not applicable

SDC = system development charge

anderson perry & associates, inc.

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED SDC-FUNDED IMPROVEMENTS AND ESTIMA[...] PROJECT COSTS

FIGURE 6-7

Chapter 7 - Project Financing and Implementation

Introduction

This chapter briefly outlines alternatives for financing the City of Prineville's water system improvements. A summary of state and federal funding programs is presented, including a review of funding options potentially available to the City for the water system improvements. To construct some or all of the proposed improvements, a financing plan acceptable to the City must be developed to complete the improvements. Because of the estimated cost of the improvements, it is recommended the City pursue financing resources for some of the proposed improvements utilizing a low-interest loan coupled with grant funds, if available.

The City's current water rate structure is regularly reviewed as part of the City's overall water and wastewater infrastructure planning process. Some discussion of the existing rate structure and how it affects the City's eligibility for certain funding programs is provided herein. The City's annual review of water rate options is used to evaluate the ability of the current rate structure to fund the identified and recommended system improvements while maintaining adequate revenue to support operation and maintenance (O&M) and other system expenditures.

Current Water Use Rates and Revenue

The O&M of the existing water system is financed through the City's annual budget. The City's fund includes expenses and revenues for the water system. Revenue is obtained from water user billings, system development charges, and connection fees.

Water Use Rates

The current base water rate per month for residential services inside the city limits is $20.12 plus $2.25 per unit of consumption. Each unit is 750 gallons or 100 cubic feet. The base water rate per month for commercial services inside the city limits is dependent on meter size and starts at $20.12 for a 3/4-inch meter and increases to $579.53 for a 6-inch meter. The commercial base rate includes a base volume of usage varying by meter size. After the base usage is surpassed, a consumption charge of $2.25 per unit is added. The current residential and commercial monthly water rates are summarized on Table 7-1. The City also utilizes a tiered usage rate system. The current tiered usage rates are summarized on Table 7-2.

TABLE 7-1
2021 RESIDENTIAL AND COMMERCIAL WATER RATE INFORMATION

Meter Size	Units Included	Base Rate Per Month	Water Usage Rate (per 750 gallons/ 100 cubic feet)[1]
3/4-inch	0	$20.12	$2.25
1-inch	0	$31.70	$2.25
1-1/2-inch	0	$60.43	$2.25
2-inch	0	$95.03	$2.25

Meter Size	Units Included	Base Rate Per Month	Water Usage Rate (per 750 gallons/ 100 cubic feet)[1]
3-inch	0	$175.85	$2.25
4-inch	0	$291.18	$2.25
6-inch	0	$579.53	$2.25

[1]*Rate for 1 to 25 units (100 cubic feet).*

TABLE 7-2
TIERED USAGE WATER RATES

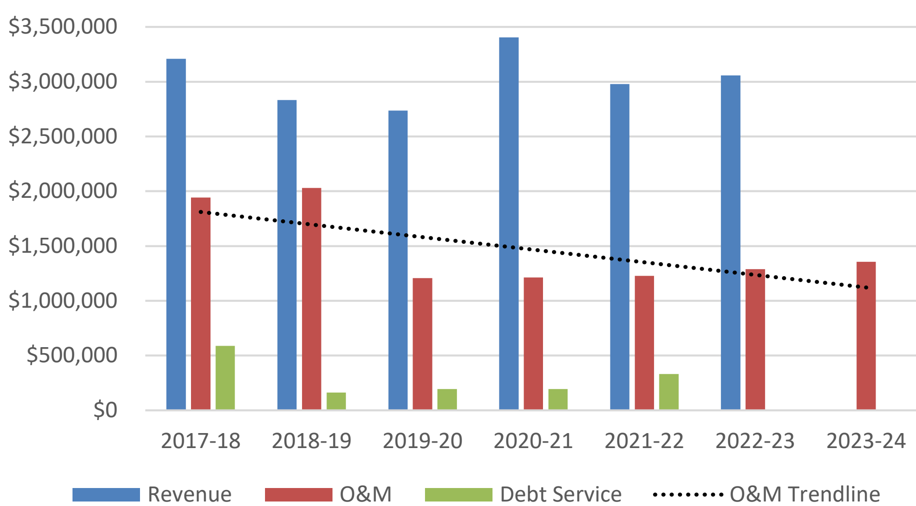
Usage Tier	Units Included	Water Usage Rate (per 750 gallons/ 100 cubic feet)[1]
Tier 1	0 to 25	$2.25
Tier 2	26 to 37	$2.47
Tier 3	38 and over	$2.38

[1]*Rate for 1 to 25 units (100 cubic feet).*

Current Financial Status

The City conducts regular audits to assess its financial position and the accuracy of the budget process. According to the Annual Comprehensive Financial Report for Fiscal Year Ending June 30, 2021, prepared by the City, operating revenues generated were approximately $3.4 million versus system O&M expenses of approximately $1.2 million. A graphical plot of the City's water system budget, with revenue and expenditures, is shown on Chart 7-1. O&M costs have been projected to the 2023-24 fiscal year by applying a 5.1 percent inflation rate.

CHART 7-1
HISTORICAL AND PROJECTED BUDGET



City expenses are expected to increase as water system additions and repairs are implemented. As these improvements are implemented, the City may need to consider increasing user water rates to increase revenue. Other options to fund improvements are outlined below.

Water System Improvements Funding

To complete the water system improvements discussed in Chapter 6, the City may choose to obtain outside funding assistance. A number of state and federal grant and loan programs can provide assistance on municipal improvement projects to utility districts, cities, and counties. These programs offer various levels of funding aimed at different types of projects. These include programs administered by the U.S. Department of Agriculture Rural Development (RD), the U.S. Economic Development Administration (EDA), Business Oregon, and others.

These agencies can provide low-interest loan funding and possibly grant funding for assisting rural communities on public works projects. Some of the funding programs provide funding only if the improvements address documented water quality compliance or health issues.

Summary of Potential Funding Programs

The following section briefly summarizes the primary funding programs available to assist the City with a water system improvements project. Most of these agencies will require an increase in water rates to support a loan for water system improvements, both as a condition of receiving monies and prior to being considered for grant funds. It should be noted the monthly user rates discussed in this section can represent a combination of monthly usage fees and taxes.

Federal Grant and Loan Programs

Rural Development

RD can provide financial assistance to communities with a population under 50,000 through the Water and Waste Disposal Loan Guarantees Program. Under the loan program, the City can seek private lender funding for projects with the agency providing loan guarantee to the lender on behalf of the City.

U.S. Economic Development Administration

The EDA has grant and loan funds similar to those available through the Business Oregon - Special Public Works Fund (SPWF) program. Monies are available to public agencies to fund projects that stimulate the economy of an area, and the overall goal of the program is to create or retain jobs. The EDA has invested a great deal of money in Oregon to fund public works improvement projects in areas where new industries were locating or planned to locate in the future. In addition, the agency has a program known as the Public Works Impact Program to fund projects in areas with extremely high rates of unemployment. This program is targeted toward creating additional jobs and reducing the unemployment rate in the area. If the City's water system improvements can be linked directly to commercial or industrial job creation and/or job retention, the City could be in a competitive position to receive funding from the EDA.

State Grant and Loan Programs

Business Oregon - Safe Drinking Water Revolving Loan Fund

This is primarily a loan program for the construction and/or improvement of public and private water systems to address regulatory compliance issues. This is accomplished through two separate programs: the Safe Drinking Water Revolving Loan Fund (SDWRLF) for collection, treatment, distribution, and related infrastructure, and the Drinking Water Protection Loan Fund for protection of sources of drinking water prior to system intake. The SDWRLF program normally lends up to $6 million per project. Awards of $3 million and above are subject to review by the Infrastructure Finance Authority. Loan amounts greater than $6 million are available on a limited basis and must be approved by the Oregon Health Authority's Drinking Water Advisory Committee. The standard SDWRLF loan term is 20 years or the useful life of project assets, whichever is less. Loan terms of up to 30 years may be available for "disadvantaged communities" but shall not exceed the expected useful life of the improvements funded. This program offers subsidized interest rates for all successful projects. Interest rates for a standard loan start at 80 percent of the state/local bond rate. Interest rates for loans to disadvantaged communities are based on a sliding scale between the interest rate for a standard loan and 1 percent. Communities may be eligible for some of the principal on their SDWRLF loan to be "forgiven." This forgivable loan feature is similar to a grant and is offered to disadvantaged communities. Special consideration, including partial principal forgiveness, is provided to projects qualifying or having Green Project Reserve components. The SDWRLF program appears to be a beneficial funding source for the City to pursue.

Water/Wastewater Financing Program

This is a loan and grant program that provides for the design and construction of public infrastructure when needed to ensure compliance with the Safe Drinking Water Act (SDWA) or the Clean Water Act (CWA). To be eligible, a system must have received, or is likely to soon receive, a notice of non-compliance by the appropriate regulatory agency associated with the SDWA or CWA.

While the Water/Wastewater financing program is primarily a loan program, grants are available for municipalities that meet eligibility criteria. The loan/grant amounts are determined by financial analysis of the applicant's ability to afford a loan (debt capacity, repayment sources, current and projected utility rates, and other factors). The maximum loan term is 25 years or the useful life of the infrastructure financed, whichever is less. The maximum loan amount is $10 million per project and is determined by financial review and may be offered through a combination of direct and/or bond-funded loans. Loans are generally repaid with utility revenues or voter-approved bond issues. A limited tax general obligation pledge may also be required. Creditworthy applicants may be funded through the sale of state revenue bonds.

The maximum grant is $750,000 per project based on a financial analysis. An applicant is not eligible for grant funds if the applicant's annual median household income (MHI) is equal to or greater than 100 percent of the state average MHI for the same year. Projects that serve primarily low- and moderate-income communities (Head Start, emergency/homeless shelters, etc.) are eligible regardless of the community income level.

Community Development Block Grant Program

The primary objective of the Community Development Block Grant (CDBG) program is development of viable (livable) urban communities by expanding economic opportunities and providing decent housing and a suitable living environment principally for persons of low and moderate incomes (LMIs).

This is a federally funded grant program. The state receives an annual allocation from Housing and Urban Development for the CDBG program. Grant funding is subject to applicant need, availability of funds, and any other restrictions in the state's Method of Distribution (i.e., program guidelines). It is not possible to determine how much, if any, grant funds may be awarded prior to an analysis of the application and financial information. However, in recent years, the maximum grant funds available to a given project were limited to $2.5 million.

Eligibility for the CDBG program requires that greater than 51 percent of persons within the community fall into the LMI category. According to the 2021 5-Year American Community Survey utilized by Business Oregon, in 2021 approximately 55.3 percent of the City's population was within the LMI category. This puts the City above the threshold criteria to qualify for CDBG funds, but the City has a good chance of obtaining funding if a potential compliance issue is identified.

Special Public Works Fund

The SPWF program was established by the Oregon Legislature in 1985 to provide primarily loan funding for municipally owned infrastructure and other facilities that support economic and community development in Oregon. Loans and grants are available to municipalities for planning, designing, purchasing, improving, and constructing municipally owned facilities; replacing owned essential community facilities; and emergency projects as a result of a disaster.

For design and construction projects, loans are primarily available; however, grants are available for and limited to projects that will create and/or retain traded-sector jobs. A traded-sector industry sells its goods or services into nationally or internationally competitive markets. The maximum grant award is $500,000 or 85 percent of the project cost, whichever is less. The grant amount per project is based on up to $5,000 per eligible job created or retained. Loans range in size from less than $100,000 to $10 million. The SPWF is able to offer very attractive interest rates that reflect tax-exempt market rates for very good quality creditors. Loan terms can be up to 25 years or the useful life of the project, whichever is less. If the City can tie the needed improvements to job creation, the SPWF may be a potential funding source for water system improvements.

For Business Oregon Programs - Contact Regional Development Officer

Since program eligibility and funds availability may change from year to year, potential applicants are encouraged to contact their respective Regional Development Officer to obtain the most accurate and up-to-date information for each program.

Potential Rate Requirements to Fund System Improvements

To be eligible for RD grant and loan funds, the City must have average water use costs that are comparable to similar systems in the area. Once the City begins to evaluate potential funding sources and attends a "One Stop" meeting (discussed later in this chapter), RD will provide an estimate of the water rates required for the City to be eligible for low-interest loans and grants.

Business Oregon is currently using 1.25 percent of a community's five-year MHI as the basis for residential monthly water user cost requirements to be eligible for grant funding. In the City's case, the average five-year MHI is $42,298. This MHI results in a required monthly residential water user cost of $44.06 to qualify for low-interest loan or grant funding. Business Oregon's residential rate requirement is also based on an assumed residential use of 7,500 gallons per month. With the City's current rates, $20.12 is charged as a base rate and an additional $2.25 per 750 gallons of water use is also charged. If a residential water user consumed 7,500 gallons, the associated cost would be $42.62. Therefore, it appears the City would need to increase its monthly water rate by $1.44 to meet the 1.25 percent MHI threshold to obtain low-interest loans and/or grant funds through Business Oregon. However, additional rate increases may be required to fund the full scope of the proposed water system improvements.

Project One Stop Meeting

To evaluate all potential project funding options, a One Stop meeting is generally requested by a city. One Stop meetings are often scheduled in Salem where representatives of RD, Business Oregon, and other funding agencies meet with the city to discuss the project and funding needs. This joint meeting provides a forum to evaluate and identify the most suitable funding package for the project and the city. To avoid requiring city representatives to travel to Salem, Business Oregon can hold these meetings locally and/or via a videoconference. After the meeting, the city is usually invited to submit a funding application to the preferred funding program(s) identified in the One Stop meeting.

Local Financing Options

Regardless of the ultimate project scope and agency from which funds are obtained, the City of Prineville may need to develop authorization to incur debt (i.e., bonding) for the selected project improvements. The need to develop authorization to incur debt depends on funding agency requirements and provisions in the City Charter. The need for bonding by the City has been eliminated by most state funding programs. However, if a bond election is required, there are generally two options the City may use for its bonding authority: general obligation bonds and revenue bonds. General obligation bonds require a vote of the people to give the City the authority to repay the debt service through tax assessments, water revenues, or a combination of both. The City's taxing authority provides the guarantee for the debt. Revenue bonds are financed through water system revenues. Authority to issue revenue bonds can come in two forms. One would be through a local bond election similar to that needed to sell a general obligation bond, and the second would be through Council action authorizing the sale of revenue bonds, if the City Charter allows. If more than 5 percent of the registered voters do not object to the bonding authority resolution during a 60-day remonstrance period, the City would have authority to sell these revenue bonds.

Oregon law currently requires a 50 percent voter turnout to pass a bonded debt tax measure, unless the election is held in November of an even-numbered year. November elections in even-numbered years require only a majority of those who voted to pass a bonded debt tax measure. Due to current tax measure limitations in Oregon, careful consultation with experienced, licensed bonding attorneys should be made if the City begins to obtain bonding authority for the proposed water system improvements.

Private/Public Funding Partnership

Specific users seeking to reserve water system capacity have proposed fully or partially funding certain water system improvements specifically to increase available system capacity for their use. While these specific improvements are intended to augment existing facilities for the benefit of the customer, they will also benefit the operation of the entire system and a majority of system users. Currently, the proposed improvements are additional storage reservoirs, transmission and distribution main lines, and drinking water wells. While no specific timeline has been provided for the proposed improvements, the possibility of a private/public funding partnership for system improvements should be further evaluated.

Project Implementation

For the City to successfully implement the water system improvements evaluated in this Water System Master Plan and presented in the City's Capital Improvements Plan, the City will need to coordinate directly with RD, Business Oregon, and other potential funding agencies if they elect to pursue federal, state, and/or potential local financing opportunities provided through low-interest loans and potential grants.

The City should work closely with its citizens through public meetings to inform them of system needs and the potential for increased water user costs. To reduce the financial impact to users, the City could seek low-interest loans coupled with grant funds. Increasing rates, as required, will adequately fund O&M of the existing and improved water system and keep up with inflation.

Implementation Steps

Should the City wish to proceed with water system improvements, the following Implementation Plan outlines the key steps the City would need to undertake. The following implementation steps and stated completion dates are presented as general guidance only and provide the estimated time needed to complete projects of this complexity and magnitude. The dates are subject to change and will depend on economic conditions within the community, and implementation of the project could be delayed due to economic conditions.

Item No.	Implementation Item	Time Frame
1.	Submit draft WSMP to the City and agencies for review.	May 2023
2.	Finalize and adopt the WSMP.	June 2023
3.	Attend One Stop meeting.	Winter 2023-24
4.	Prepare and submit funding application(s) to appropriate agency(ies).	Spring 2024
5.	Finalize project funding.	Summer 2024
6.	Design system improvements.	Summer 2023 through Summer 2024
7.	Submit design documents for agency review.	Summer 2024
8.	Advertise, bid, and award construction project.	Winter 2024-25

Item No.	Implementation Item	Time Frame
9.	Project construction.	Spring 2025 through Winter 2025-26
10.	Project startup and construction completion.	Spring 2026
11.	Project closeout.	Summer 2026

Summary

The water system improvements outlined herein are anticipated to provide the City with a higher quality water system with significantly improved reliability. The funding sources outlined in this chapter are potential sources of loans and grants for the City to consider if improvements projects are pursued.

STAFF REPORT

MEETING DATE:	6/25/2024	**PREPARED BY:**	Joshua Smith
SECTION:	Public Hearing	**DEPARTMENT:**	Planning

CITY GOAL(S): Position the City for the Future, Provide Quality Municipal Services

SUBJECT: Chapter 8 Amendment to the City's Comprehensive Plan.

Wastewater Facility Plan 2024 update

Water Systems Plan 2023 update.

REASON FOR CONSIDERATION: These plans are necessary for the continued operations of the City's water and wastewater facilities and to meet the needs of projected growth of the community.

FISCAL IMPACT: Adoption of these plans determine the City's need to budget for capital improvement projects and generates the estimates our system development charges (SDCs) are based on. The methodology for adjusting the City's SDCs will be adopted separately.

RECOMMENDATION: Staff recommends adoption of the revised Chapter 8 and the water and wastewater plans as written. Also see attached Planning Commission recommendation.

RELATED DOCUMENT(S): The plans are too large to print in a packet. A link to the plans and the updated Chapter 8 was provided by e-mail on 5/30/2024 and provided below.

https://nextcloud.cityofprineville.com/s/gw4ETKegDCtKtE3

City of Prineville
Department of Planning & Community Development
Planning Commission Recommendation

File No.:	AM-2024-102
Applicant:	City of Prineville
Notice to DLCD:	4/23/2024
PC Review:	Initial review 1/30/2024, Final review 3/19/2024
PC Public Workshop:	4/16/2024
Public Notice:	Newspaper Notice – 5/7/2024 Mailed Notice – 4/25/2024
Public Hearing:	Planning Commission – 5/21/2024
Staff:	Joshua Smith, Planning Director
Proposal:	Legislative Amendments to amend the City's Comprehensive Plan Map and Zoning Map. The primary purpose of these amendments is to reconcile discrepancies between the Comprehensive Plan Map designations, the Zoning Map and existing uses of multiple properties within City limits.
Applicable Criteria:	ORS – 227 & 197, OAR – 660-015 (Goal 2 & 10), City Comprehensive Plan, Land use Code Chapter 153 sections 153.230 – 153.236 & 153.252, 153.256.030

Background:

City zoning works on a two-map system, the Comprehensive Plan Map (Comp Plan) and a Zone Map. The Comprehensive Plan Map provides basic zone designations (base zone) of residential, commercial, industrial and open space. The zoning map refines these designations into multiple zones within each designation. In 2007 the City adopted its first Comprehensive plan and map, separating itself from the County. At that time an existing County map from 1984 was used as the base map for the plan, with the zoning map at the time filling in the rest of the Urban Growth Boundary. This created discrepancies where not all zones align with their Comprehensive Plan designations. This was a known issue. At the time a zone error map was also created to identify zones that may need to change. The intent was to amend these errors as they became necessary or appropriate. Many of the areas have already been amended. This proposal focuses on an area with conflicting designations and zones where the current residential and commercial uses of the properties are clear.

Findings:

The following addresses goal 10 and describes each exhibit and the reason for the change.

Statewide Planning Goal 10, ***To provide for the housing needs of citizens of the state.*** These proposed changes will have a positive impact on the housing capacity of the City. The purpose of these changes is to reconcile discrepancies between the comprehensive plan designation, zoning and existing uses. These discrepancies have created problems with lending, primarily for residential uses. The amendments will have little effect on the City's Housing needs analysis. The changes are on properties with existing residential or commercial developments. The amendment on Exhibit C, will allow additional residential development where the current designation prohibits it.

AM-2024-102
Amending Zoning and Comp Plan maps

Exhibit A – The properties outlined in yellow on this exhibit, are currently designated as "Light Industrial" on the Comprehensive Plan Map. The area is currently zoned Commercial (C2) and is almost entirely developed as commercial with a multi-family development on the south end. The Comprehensive Plan designation, is proposed to change from "Light Industrial" to "Outlying Commercial". This change in designation aligns with the current Commercial (C2) zoning. The current zoning of this area is not proposed to change. Changing the designation will help maintain a commercial zoning buffer between the light industrial zoning to the east and proposed residential zoning to the west as shown on Exhibit D.

Exhibit B – The properties outlined in yellow on this exhibit, are currently designated "Residential" on the Comprehensive Plan Map. The area is currently zoned Commercial (C2) with half of the area consisting of commercial uses. At the workshop on April 16th, it was requested that this area remain commercially zoned. The Planning Commission acknowledged this request as a natural extension of the commercial zoning to the east. The Comprehensive plan designation, is proposed to change from "Residential" to "Outlying Commercial". This change in designation aligns with the current Commercial (C2) zoning. The current zoning of this area is not proposed to change.

Exhibit C – The properties outlined in yellow on this exhibit, are currently designated "Light Industrial" on the Comprehensive Plan Map. The area is entirely residential and currently zoned Commercial (C2). The Comprehensive plan designation, is proposed to change from "Light Industrial" to "Residential". The Zoning is proposed to change from "Commercial (C2)" to "Residential (R4)" as shown on Exhibit D.

Exhibit D – The properties outlined in yellow on this exhibit, are currently zoned "Commercial (C2)", but are entirely developed as residential. The Comprehensive Plan designation, is proposed to change as described in Exhibit C. The Zoning is proposed to change from "Commercial (C2)" to "Residential (R4)", to align with the current and proposed Comprehensive Plan designation and current residential uses.

Planning Commission Conclusions and Recommendation:
Based on the findings stated above, the Planning Commission finds these changes to be necessary to preserve the integrity of our zoning maps and to prevent any unnecessary hardships for property owners. The Planning Commission recommends adotion of these zone changes as presented.

EXHIBITS
Exhibit A, B, C & D showing existing plan designations and zoning and stating the proposed change.

Marty Bailey: W Martin Bailey Date: 5-21-24
Planning Commission Chair

Designation of July as Park and Recreation Month

WHEREAS parks and recreation programs are an integral part of communities throughout this country, including **Prineville, Oregon**; and

WHEREAS our parks and recreation are vitally important to establishing and maintaining the quality of life in our communities, ensuring the health of all citizens, and contributing to the economic and environmental well-being of a community and region; and

WHEREAS parks and recreation programs build healthy, active communities that aid in the prevention of chronic disease, provide therapeutic recreation services for those who are mentally or physically disabled, and also improve the mental and emotional health of all citizens; and

WHEREAS parks and recreation programs increase a community's economic prosperity through increased property values, expansion of the local tax base, increased tourism, the attraction and retention of businesses, and crime reduction; and

WHEREAS parks and recreation areas are fundamental to the environmental well-being of our community; and

WHEREAS parks and natural recreation areas improve water quality, protect groundwater, prevent flooding, improve the quality of the air we breathe, provide vegetative buffers to development, and produce habitat for wildlife; and

WHEREAS our parks and natural recreation areas ensure the ecological beauty of our community and provide a place for children and adults to connect with nature and recreate outdoors; and

WHEREAS the U.S. House of Representatives has designated July as Parks and Recreation Month; and

WHEREAS **Prineville, Oregon** recognizes the benefits derived from parks and recreation resources

NOW THEREFORE, BE IT RESOLVED BY the **Prineville City Council** that July is recognized as Park and Recreation Month in the city of Prineville.

Given under my hand on this _____ day of ______, 2024.

(Add sections for official seal, signature(s) and date.)

City Manager Update to Council

June 25, 2024

Public Safety / Dispatch

A final job offer to Thomas Woodward was made last week. He is a 14 year law enforcement veteran. He passed all requirements (psych, background, etc.) He will be moving here from eastern Oregon and starting with us in August.

Please welcome Taylor Johnson to our team as the new evidence technician. Taylor is a PUS graduate with a BS degree in Criminal Justice. She also has a photography background.

A couple more lateral officers have applied and we will be starting the interview process soon.

PD has been busy with rodeo activities and has OSP assisting with the rodeo and traffic.

Public Works

The Peters Road sidewalk project from Yellowpine to Mariposa has been completed.

Another project completed is the 30" Waterline Resiliency project in the airport area. This was a major improvement to our water system that was funded entirely by Meta and Apple. The project is live and operational and has increased available fire flows and pressures in the airport industrial area.

The annual paving projects have been award and is expected to occur in August.

Taylor Northwest is expected to begin site work in July on the Combs Flat to Peter's Road extension project and the OID canal piping project.

Our street crew have been very busy with the Crooked River Roundup related events including the Stampede Street Party and cattle drive.

Railroad

The Railroad remains very busy with new commodities moving through.

Meadow Lakes Golf

Meadow Lakes has remained very busy this June.

The rock work on the front entrance area has been completed and the landscaping around the clubhouse is just finishing up and looking nice.

Two new Gators for the golf course arrived this last week and one more is scheduled to be shipped soon.

Airport – No Update

Planning

Planning has been busy with wrapping up master plans and has had a couple of pre-application meetings on various potential development projects.

Human Resources

The recruitment for our new Police Chief is underway still with the tentative next round of candidates meet-and-greet tentatively scheduled for July 24th and interview panels conducting interviews on July 25th.

Information Technology – No Update

Finance

The city won the budget award for the 19th year in a row! The onsite audit was rescheduled to June 28th. Staff did a great job getting all of the audit materials requested to the auditors quicker than the auditors anticipated.

City Recorder/Risk Management – No Update

City Legal – No Update

EDCO – No Update

Public Relations

The social media content for July is ready to roll out through the month. As always, biggest focus is on fireworks safety, wildfire preparedness and water conservation.

Mayor/Council

We have two workshops coming up. July 9th we will be giving an update on the Strategic Priorities steps and on the 23rd is a joint workshop with the Planning Commission on the Transportation Systems Plan. You will be receiving calendar invites for both, if you haven't already.

Other

ORDINANCE NO. 1291

AN ORDINANCE AMENDING THE CITY OF PRINEVILLE ZONING MAP AND COMPREHENSIVE PLAN MAP, TO RECONCILE DISCREPANCIES BETWEEN THE TWO MAPS & EXISTING LAND USE

WHEREAS, the City of Prineville desires to reconcile discrepancies between its Zoning map, Comprehensive Plan map and existing land use; and

WHEREAS, Prineville Code establishes the policy and procedure allowing the Planning Commission to initiate amendments to the zoning and Comprehensive Plan Maps; and

WHEREAS, all required notice was provided in accordance with state law and city ordinance, including notice to the State Department of Land Conservation and Development, newspaper notice and notice to neighboring property owners; and

WHEREAS, the City Planning Commission reviewed the proposal on January 30th, 2024 with a final review on March 19th 2024 and a noticed public workshop on April 16th, 2024 in order to solicit comments from property owners; and

WHEREAS, the City Planning Commission held a public hearing on May 21st, 2024 in order to solicit comments from property owners, neighbors and other members of the community; and

WHEREAS, after hearing no citizen opposition at the hearing and considering the staff report and all items in the record of planning application AM-2024-102, the Planning Commission voted unanimously to recommend the City Council approve the proposed amendments; and

WHEREAS, the City Council reviewed the Planning Commission's recommendation on May 28th, 2024 and accepted their recommendation.

NOW, THEREFORE, THE PEOPLE OF THE CITY OF PRINEVILLE ORDAIN AS FOLLOWS:

1. The City zoning map and Comprehensive Plan map shall be amended as shown on Exhibit A, B, C & D and described in the Planning Commission's Recommendation on Exhibit E.

Presented for the first time at a regular meeting of the City Council held on June 11, 2024, and the City Council finally enacted the foregoing ordinance this **____** day of June, 25 2024.

____
Jason Beebe
Mayor

ATTEST:

____
Lisa Morgan, City Recorder

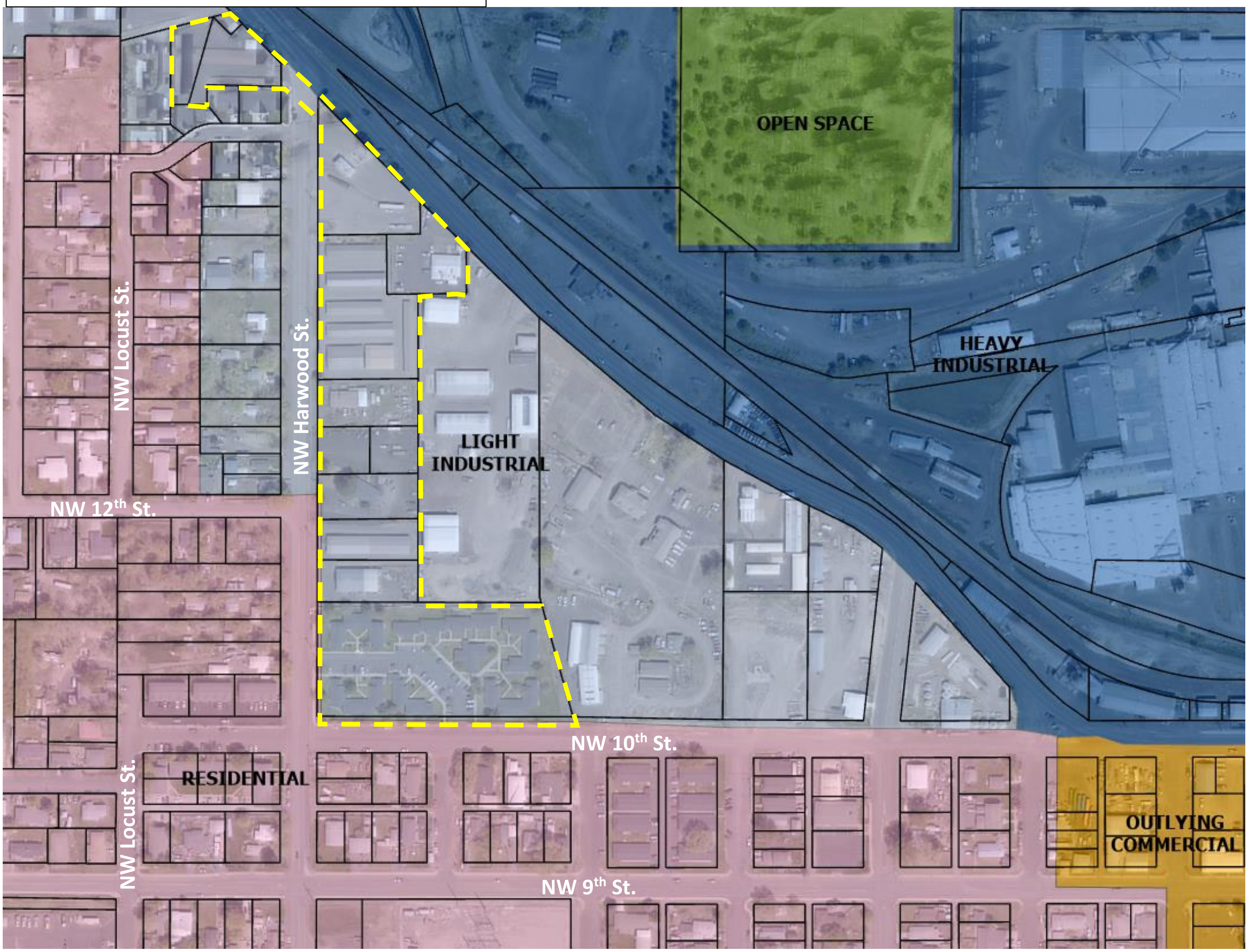
Ordinance# 1291

Exhibit A

Map & Tax lots: 141631DB00200, 300, 305 – 308, 310, 311, 401 & 402
141631A001100 & 1300

Comprehensive Plan Designation: Light Industrial *change to* Outlying Commercial

Comprehensive Plan Map **prior** to Amendment



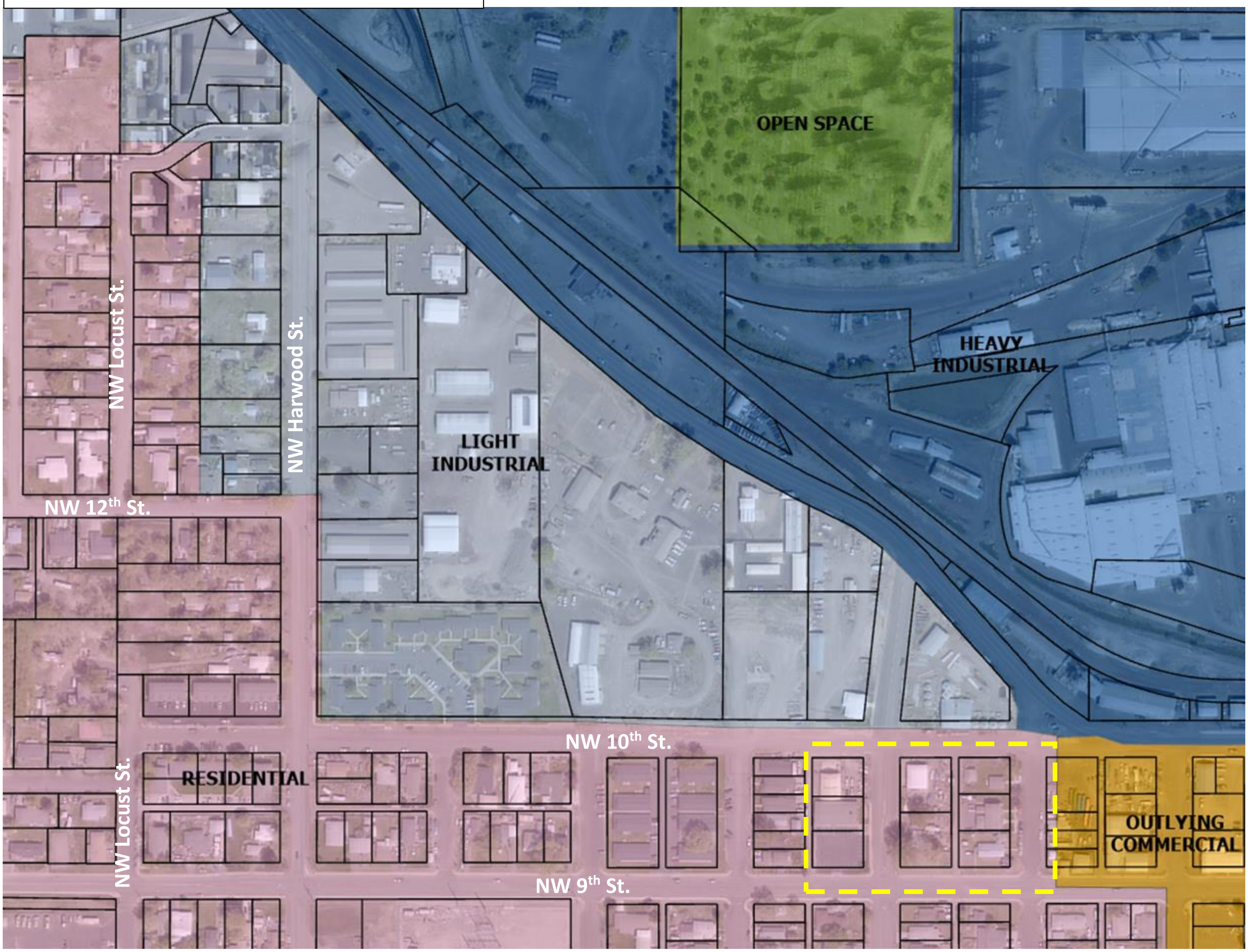
Ordinance# 1291

Exhibit B

Map & Tax lots: 141631DD06200 – 6400, 800, 900, 901, 1000 & 1100

Comprehensive Plan Designation: **Residential** *change to* **Outlying Commercial**

Comprehensive Plan Map **prior** to Amendment



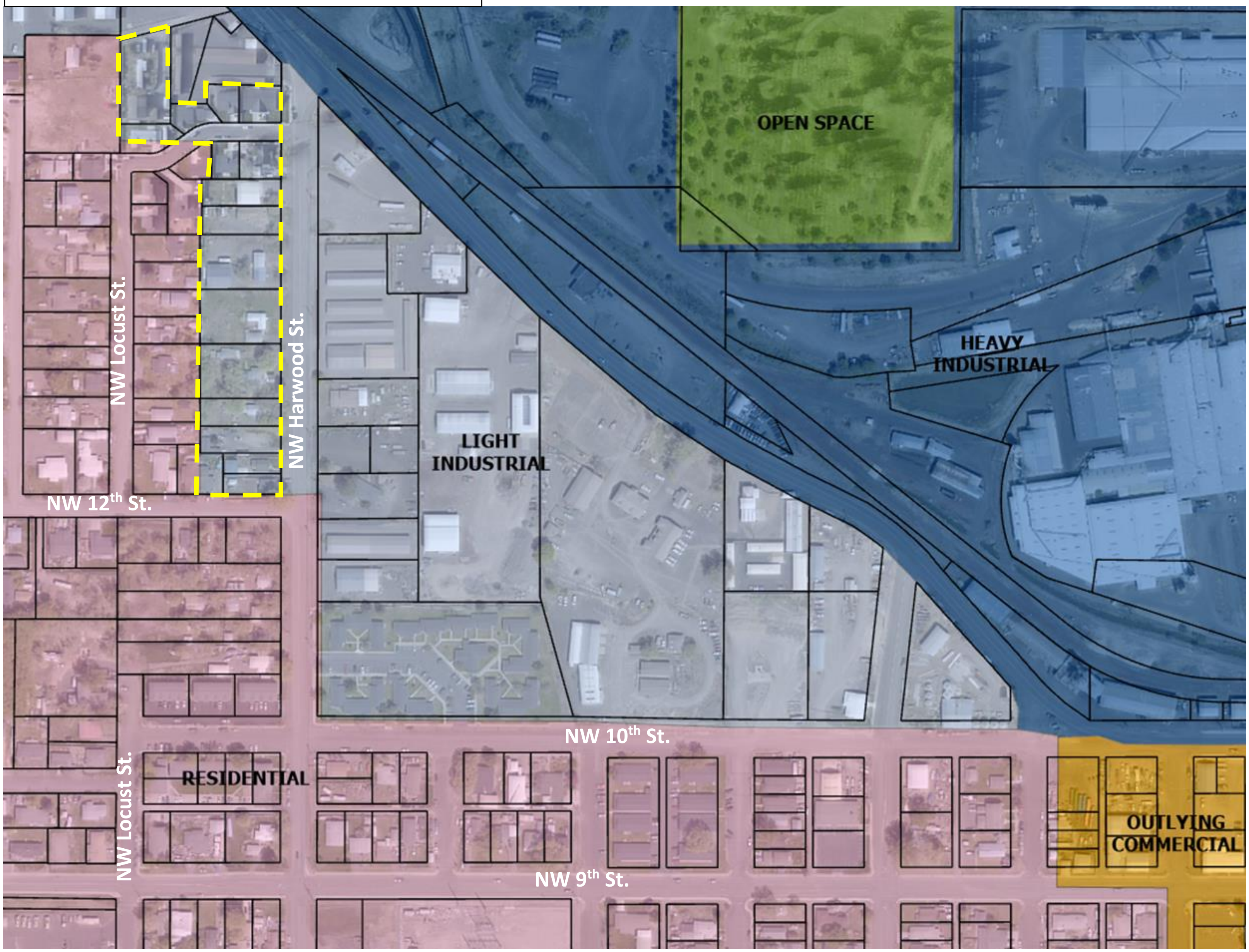
Ordinance# 1291

Exhibit C

Map & Tax lots: 141631DB00900, 901, 1000, 1100, 1200, 1300, 1401, 1500, 1600 & 2301
141631A001000, 1500 – 1504 & 1506

Comprehensive Plan Designation: **Light Industrial** *change to* **Residential**

Comprehensive Plan Map **prior** to Amendment



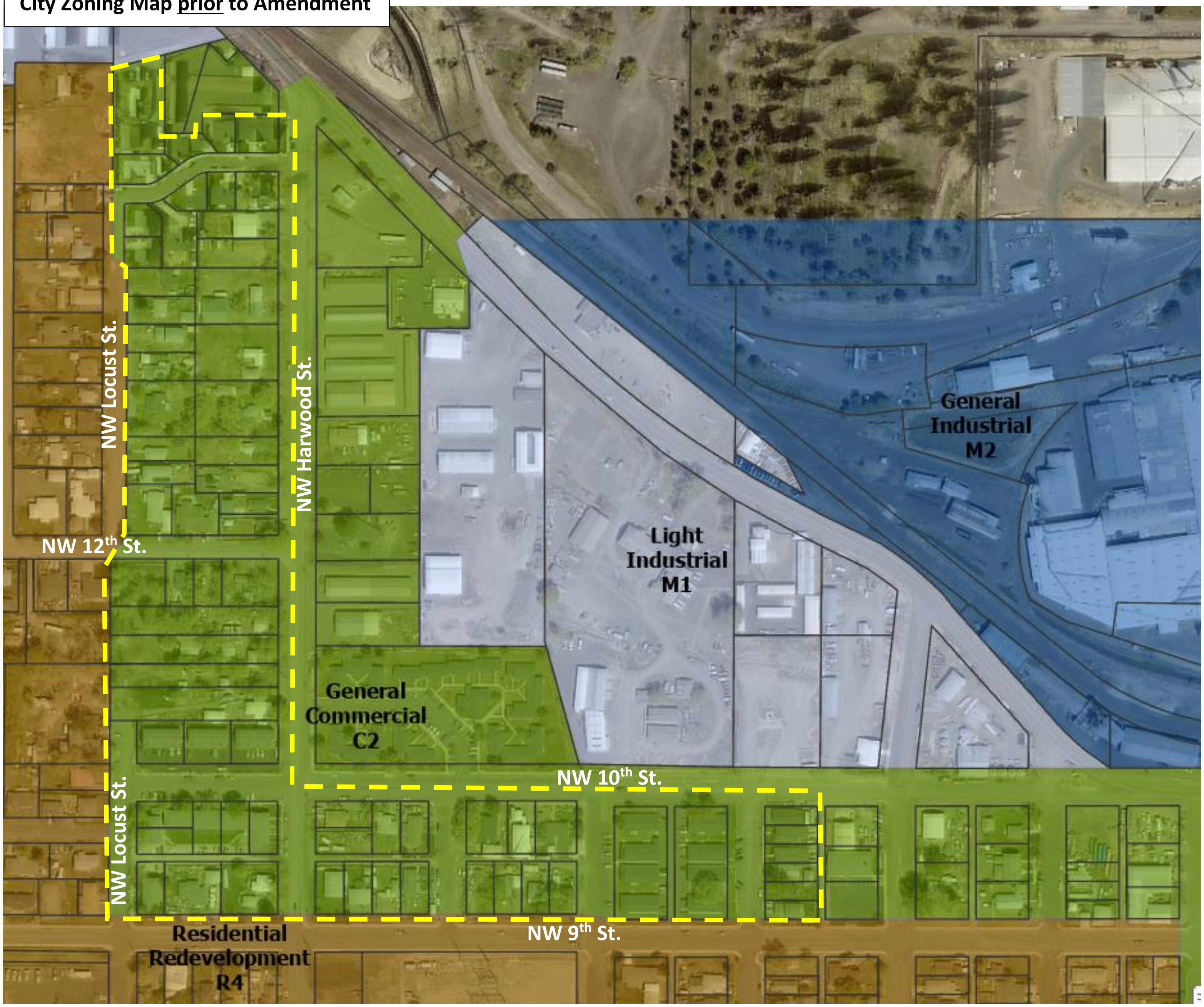
Ordinance# 1291

Exhibit D

Map# & Tax lots: 141631DB00800 – 802, 900, 901, 1000 - 1300, 1401, 1500, 1600, 2301, 2500, 2501 & 2600 – 3100
141631A001000, 1500 – 1504 & 1506
141631DC00100, 200, 2900, 2901, 3200 – 5300
141631DD06500 - 6900

Zoning Map: **General Commercial (C2)** *change to* **Residential Redevelopment (R4)**

City Zoning Map prior to Amendment



City of Prineville
DEPARTMENT OF PLANNING & COMMUNITY DEVELOPMENT
PLANNING COMMISSION RECOMMENDATION

File No.:	AM-2024-102
Applicant:	City of Prineville
Notice to DLCD:	4/23/2024
PC Review:	Initial review 1/30/2024, Final review 3/19/2024
PC Public Workshop:	4/16/2024
Public Notice:	Newspaper Notice – 5/7/2024 Mailed Notice – 4/25/2024
Public Hearing:	Planning Commission – 5/21/2024
Staff:	Joshua Smith, Planning Director
Proposal:	Legislative Amendments to amend the City's Comprehensive Plan Map and Zoning Map. The primary purpose of these amendments is to reconcile discrepancies between the Comprehensive Plan Map designations, the Zoning Map and existing uses of multiple properties within City limits.
Applicable Criteria:	ORS – 227 & 197, OAR – 660-015 (Goal 2 & 10), City Comprehensive Plan, Land use Code Chapter 153 sections 153.230 – 153.236 & 153.252, 153.256.030

Background:
City zoning works on a two-map system, the Comprehensive Plan Map (Comp Plan) and a Zone Map. The Comprehensive Plan Map provides basic zone designations (base zone) of residential, commercial, industrial and open space. The zoning map refines these designations into multiple zones within each designation. In 2007 the City adopted its first Comprehensive plan and map, separating itself from the County. At that time an existing County map from 1984 was used as the base map for the plan, with the zoning map at the time filling in the rest of the Urban Growth Boundary. This created discrepancies where not all zones align with their Comprehensive Plan designations. This was a known issue. At the time a zone error map was also created to identify zones that may need to change. The intent was to amend these errors as they became necessary or appropriate. Many of the areas have already been amended. This proposal focuses on an area with conflicting designations and zones where the current residential and commercial uses of the properties are clear.

Findings:
The following addresses goal 10 and describes each exhibit and the reason for the change.

Statewide Planning Goal 10, ***To provide for the housing needs of citizens of the state.*** These proposed changes will have a positive impact on the housing capacity of the City. The purpose of these changes is to reconcile discrepancies between the comprehensive plan designation, zoning and existing uses. These discrepancies have created problems with lending, primarily for residential uses. The amendments will have little effect on the City's Housing needs analysis. The changes are on properties with existing residential or commercial developments. The amendment on Exhibit C, will allow additional residential development where the current designation prohibits it.

AM-2024-102
Amending Zoning and Comp Plan maps

Exhibit A – The properties outlined in yellow on this exhibit, are currently designated as "Light Industrial" on the Comprehensive Plan Map. The area is currently zoned Commercial (C2) and is almost entirely developed as commercial with a multi-family development on the south end. The Comprehensive Plan designation, is proposed to change from "Light Industrial" to "Outlying Commercial". This change in designation aligns with the current Commercial (C2) zoning. The current zoning of this area is not proposed to change. Changing the designation will help maintain a commercial zoning buffer between the light industrial zoning to the east and proposed residential zoning to the west as shown on Exhibit D.

Exhibit B – The properties outlined in yellow on this exhibit, are currently designated "Residential" on the Comprehensive Plan Map. The area is currently zoned Commercial (C2) with half of the area consisting of commercial uses. At the workshop on April 16th, it was requested that this area remain commercially zoned. The Planning Commission acknowledged this request as a natural extension of the commercial zoning to the east. The Comprehensive plan designation, is proposed to change from "Residential" to "Outlying Commercial". This change in designation aligns with the current Commercial (C2) zoning. The current zoning of this area is not proposed to change.

Exhibit C – The properties outlined in yellow on this exhibit, are currently designated "Light Industrial" on the Comprehensive Plan Map. The area is entirely residential and currently zoned Commercial (C2). The Comprehensive plan designation, is proposed to change from "Light Industrial" to "Residential". The Zoning is proposed to change from "Commercial (C2)" to "Residential (R4)" as shown on Exhibit D.

Exhibit D – The properties outlined in yellow on this exhibit, are currently zoned "Commercial (C2)", but are entirely developed as residential. The Comprehensive Plan designation, is proposed to change as described in Exhibit C. The Zoning is proposed to change from "Commercial (C2)" to "Residential (R4)", to align with the current and proposed Comprehensive Plan designation and current residential uses.

<u>Planning Commission Conclusions and Recommendation:</u>
Based on the findings stated above, the Planning Commission finds these changes to be necessary to preserve the integrity of our zoning maps and to prevent any unnecessary hardships for property owners. The Planning Commission recommends adotion of these zone changes as presented.

<u>EXHIBITS</u>
Exhibit A, B, C & D showing existing plan designations and zoning and stating the proposed change.

Marty Bailey: W Martin Bailey Date: 5-21-24
Planning Commission Chair

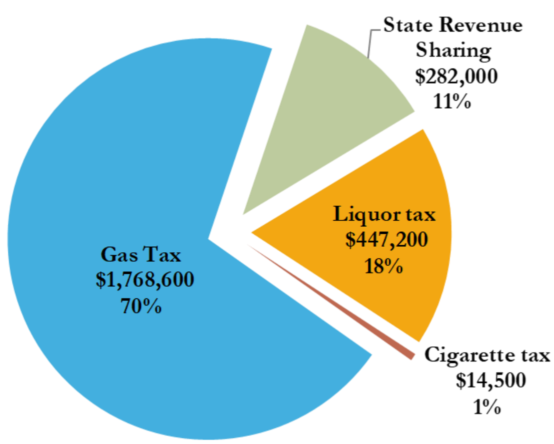
STAFF REPORT

MEETING DATE:	6/25/2024	**PREPARED BY:**	Lori Hooper
SECTION:	Resolutions	**DEPARTMENT:**	Finance Department
CITY GOAL:	Fiscal Responsibility		
SUBJECT:	Accepting State Revenue Sharing – Resolution 1597		

REASON FOR CONSIDERATION: It is necessary to hold a public hearing annually with the budget committee and an additional hearing with the City Council, along with a resolution, in order to receive revenue sharing from the State of Oregon. A public hearing was held on June 5th and the budget committee approved the acceptance of Oregon State Revenue Sharing for the use of operations in the Transportation Fund. At the June 25th council meeting, another public hearing will be held and Resolution 1597 will need to be voted on by the City Council in order to finish the process for FY 25.

BACKGROUND: For FY 24 and FY 25, the budget committee approved and the council adopted a biennial budget. State Revenue Sharing was proposed, approved and adopted for the use in the Transportation Fund in both years. Below is the breakdown for the use of State Revenue Sharing Funds that was adopted in the biennial budget.

Description	Fund	Proposed Use	FY 24 Adopted	FY 25 Adopted	BN 25 Adopted
Liquor tax	General	Public safety	$ 221,400	$ 225,800	$ 447,200
Cigarette tax	General	Public safety	$ 7,500	$ 7,000	$ 14,500
Gas Tax	Transportation	Street/bike lane maintenance	$ 883,800	$ 884,800	$ 1,768,600
State Revenue Sharing	Transportation	Street/bike lane maintenance	$ 141,000	$ 141,000	$ 282,000
					$ 2,512,300



FISCAL IMPACT: For FY 25, the amount of estimated revenue totals $141,000.

RECOMMENDATION: Staff recommends the approval of accepting State Revenue Sharing as presented in the BN 25 budget by the budget committee.

RESOLUTION NO. 1597

A RESOLUTION DECLARING THE CITY OF PRINEVILLE'S ELECTION TO RECEIVE STATE REVENUE SHARING

WHEREAS, the Legislature of the State of Oregon has provided for the apportionment of certain revenues to the cities of the State of Oregon; and

WHEREAS, such legislation provides that a city, in order to participate in the sharing of those certain revenues, must express an election to receive such funds, which election must be made prior to June 30 of the fiscal year; and

WHEREAS, the City of Prineville desires to receive a portion of such funds;

NOW THEREFORE, the City of Prineville resolves as follows:

1. Pursuant to ORS 221.770, the City of Prineville does hereby elect to receive its proportionate share of the revenues to be apportioned to the cities by the State of Oregon for the fiscal year 2024-25, and the City Manager of the City of Prineville is directed to take such steps as are necessary to carry out the intent of this Resolution.

Approved by the City Council this 25th day of June, 2024.

____
Rodney J. Beebe, Mayor

ATTEST:

____
Lisa Morgan, City Recorder

I, Lisa Morgan, City Recorder, certify that a public hearing before the Budget Committee was held on June 5th, 2024, and a public hearing before the City Council on June 25th, 2024, giving citizens an opportunity to comment on use of State Revenue Sharing.

____
Lisa Morgan, City Recorder

RESOLUTION NO. 1598
CITY OF PRINEVILLE, OREGON

A RESOLUTION ESTABLISHING FEES AND CHARGES FOR THE CITY OF PRINEVILLE FOR FISCAL YEAR 2024-2025

The Prineville City Council specifically finds that:

Whereas, various City Ordinances and state statutes allow the City of Prineville ("City") to establish certain fees by Resolution; and

Whereas, the City desires to establish and recover certain City costs from fees and charges levied in providing City services, products, and regulations; and

Whereas, the City Manager has caused review of all City fees and charges and determined the costs of such fees and charges; and

Now, Therefore, the City of Prineville Resolves as follows:

1. That the fee and charge schedule attached as Exhibit A, which is incorporated herein, is hereby adopted with said fees and charges to be effective July 1, 2024 and continue in effect until modified by the Prineville City Council.

Approved by the City Council this 25th day of June, 2024.

____
Rodney J. Beebe, Mayor

ATTEST:

____
Lisa Morgan, City Recorder

Rate Schedule FY 24-25
Exhibit A

		Base 24-25 Charge	Additional Charges / Comments
1.0	**Police**		
1.1	**Police Personnel Outside Services**		
1.1.1	Sergeant	**83.00**	**Per hour**
1.1.2	Officer	**71.62**	**Per hour**
1.1.3	Reserve Officer	**43.20**	**Per hour**
1.1.4	Vehicle	**60.50**	**Per hour**
1.2	**Copies of Documents / Reports**		
1.2.1	Copies of Documents / Reports (Minimum Charge)	**15.00**	**Additional fees may apply**
1.2.2	Per Page (After 10 Pages)	**0.25**	
1.3	**Copies of CDs/DVDs/Thumb Drives**	**40.00**	**Per media type**
1.4	**Tow Fees**	**126.00**	**Per vehicle, per incident**
1.5	**Burn Barrel Permits**	**34.00**	**Annual permit**
1.6	**Transient Vendor's License**		
1.6.1	Three Day License	**35.00**	
1.6.2	Thirty Day License	**50.00**	**per 30 consecutive days. Maximum 4 consecutive months**
1.7	**Social Gaming License**	**205.00**	**Annual**
1.8	**Liquor License**		
1.8.1	New Application for Permanent License	**100.00**	
1.8.2	Change of Ownership	**75.00**	
1.8.3	Annual Renewal of Permanent License	**35.00**	
1.8.4	Temporary (Event)	**100.00**	
1.8.5	Renewal of Temporary License		**May be reduced to 35.00 per event under authority and discretion of**
	(Within 18 months after paying initial temporary license fee)		**the Chief of Police or their designee.**
1.9	**Taxicab License**		
1.9.1	Annual License	**50.00**	
1.9.2	Additional Vehicle	**25.00**	
1.10	**Administrative Research**	**66.15**	**Per hour (one hour minimum)**

		Base 24-25 Charge	Additional Charges / Comments
2.0	**Community Development**		
2.1	**Sign Permits**	**3.00**	**Per sq. ft.**
2.2	**Site Plan Review - New Residential Buildings**		
2.2.1	1 - 2 Dwellings / Accessory Dwelling Units (ADU)	**165.00**	
2.2.2	Multi-family (3 - 4 Dwellings)	**484.00**	
2.2.3	Manufactured Home in Park	**56.00**	
2.2.4	Accessory structures & additions	**56.00**	
2.3	**Site Plan Review - New Commercial and Industrial Buildings**		
2.3.1	1 - 10,000 sq. ft.	**1,172.00**	
2.3.2	10,001 - 20,000 sq. ft.	**1,673.00**	
2.3.3	20,001 - 100,000 sq. ft.	**2,844.00**	
2.3.4	100,001 sqft. and Over	**3,861.00**	
2.4	**Site Plan Review - Commercial and Industrial**		
2.4.1	Minor or No Structural Development	**585.00**	
2.4.2	Expansion of Existing Use or Building < 25.00%	**50.00% of fee listed above**	
2.4.3	Change of Use (Existing Building)	**170.00**	
2.5	**Conditional Use Permits - Residential**		
2.5.1	1 - 2 Dwellings	**293.00**	**Plus 250.00 if hearing required**
2.5.2	Multi-family (5+ Dwellings)	**2,010.00**	
2.5.3	Manufactured Home Park	**4,328.00**	
2.5.4	RV Park	**2,233.00**	
2.5.5	Use Change	**572.00**	
2.6	**Conditional Use Permits - Commercial and Industrial**		

2.6.1	1 - 10,000 sq. ft.	**1,563.00**	
2.6.2	10,001 - 20,000 sq. ft.	**2,233.00**	
2.6.3	20,001 - 100,000 sq. ft.	**3,299.00**	
2.6.4	100,001 sq. ft. and Over	**4,628.00**	
2.6.5	Expansion of Existing Conditional Use < 25.00%	**50.00% of fee listed above**	
2.6.6	Change of Use (No New Structures)	**758.00**	
2.6.7	Hearings Fee for Type I, II, III and IV in Addition to CUP Fee	**800.00**	
2.7	**Other Applications**		
2.7.1	Home Occupations	**285.00**	**Plus 250.00 if hearing required**
2.7.2	Telecommunications Tower / Co-locate	**4,234.00**	
2.7.3	Revision / Amendment	**Up to 75.00% of new application fee**	
2.7.4	Reconsideration	**994.00**	
2.7.5	Declaratory Ruling	**1,242.00**	**Plus hearings fee if required**
2.7.6	Street Renaming	**414.00**	**Plus cost of sign(s)**
2.7.7	Measure 49 Claim	**2,777.00**	**Refundable if approved**
2.7.8	Miscellaneous Requests	**294.00**	**Plus 250.00 if hearing required**
2.7.9	Other Miscellaneous Requests	**Charged at actual cost per hour**	
2.8	**Nonconforming Use Determination**		
2.8.1	Administrative	**200.00**	
2.8.2	Planning Commission	**500.00**	
2.9	**Variance Application**		
2.9.1	Major	**891.00**	
2.9.2	Minor	**303.00**	**Plus 250.00 if hearing required**
2.9.3	Riparian Adjustment - Single Family and Duplex Residential	**528.00**	
2.9.4	Riparian Adjustment - Multi-family and Commercial	**758.00**	
2.10	**Land Partitioning Applications**		
2.10.1	Major Partition	**3,917.00**	
2.10.2	Minor Partition	**2,010.00**	
2.10.3	Boundary Line Adjustment	**700.00**	
2.10.4	Lot Consolidation	**300.00**	
2.10.5	Final BLA Plat	**100.00**	**60.00 per lot GIS fee (see fee 2.19)**
2.10.6	Final Partition Plat	**300.00**	**60.00 per lot GIS fee (see fee 2.19)**
2.10.7	Final Lot Consolidation Plat	**100.00**	**60.00 per lot GIS fee (see fee 2.19)**
2.11	**Subdivisions**		
2.11.1	Outline Development Plan (ODP)	**3,138.00**	**Does not include Tentative Plan Review**
2.11.2	Planned Unit Development (PUD) 5 Acres or Less	**6,105.00**	**Includes Tentative Plan Review *Requires final plat fee prior to signature**
2.11.3	Planned Unit Development (PUD) Over 5 Acres	**10,590.00**	**Includes Tentative Plan Review *Requires final plat fee prior to signature**
2.11.4	Tentative Plans (Includes ODP & Cluster Developments)	**3,143.00**	**Plus 30.00 per additional lot *Requires final plat fee prior to signature**
2.11.5	Final Plat	**914.00**	**Plus 15.00 per lot & 60.00 per lot GIS fee (see fee 2.19)**
2.11.6	Final Plat Extensions	**681.00**	
2.11.7	Revision / Amendment	**40.00% of new application fee**	
2.12	**Comprehensive Plan Amendment**		
2.12.1	Map Amendment and / or UGB Expansion 20 Acres or Less	**5,230.00**	
2.12.2	Map Amendment and / or UGB Expansion 20 - 80 Acres	**7,845.00**	
2.12.3	Map Amendment and / or UGB Expansion Over 80 Acres	**13,598.00**	
2.12.4	Text Amendment (Consistent with Intent of Comprehensive Plan)	**6,276.00**	
2.13	**Zoning Ordinance Amendment**		
2.13.1	Ordinance Text Amendment (Major)	**5,978.00**	
2.13.2	Ordinance Text Amendment (Minor)	**2,907.00**	
2.13.3	Zoning / Overlay Map Amendment	**3,331.00**	
2.13.4	Street or Alley Vacation	**1,618.00**	
2.13.5	Regulating Master Plan (Mixed Use Zone)	**7,158.00**	
2.14	**Appeals**		
2.14.1	To Planning Commission	**377.00**	
2.14.2	To City Council	**2,645.00**	
2.15	**Document Purchase**		
2.15.1	Photocopies / Printed Reports / Documents (8.5" x 11" & 11" x 17")	**0.53**	**Per page after first five pages**
2.15.2	Large Format Copies (Over 11" x 17")	**2.54**	**Per page**
2.15.3	Maps	**7.33**	**[illegible]num (actual costs)**

2.16	**Annexation**		
2.16.1	Petition to Annex	**343.00**	
2.17	**Pre-Application Conference**	**50.00 per hour (after first hour), applicable to application fee**	
2.18	**Crook County Parks & Recreation SDC Fee**		
2.18.1	Single-family	**4,433.77**	
2.18.2	Multi-family	**4,125.87**	
	******Note: Parks & Recreation fees are regulated by Crook County and are subject to change.******		
2.19	**GIS Fee**	**60.00**	
	******Note: GIS fees are per parcel and are subject to change by Crook County.******		
		Base 24-25 Charge	**Additional Charges / Comments**
3.0	**Public Works Review Fees**		
3.1	**Water System Analysis (Fire Flow)**	**1,250.00**	
3.2	**Sewer System Analysis (Capacity)**	**1,500.00**	
3.3	**Sidewalk Permit**	**165.00**	
3.4	**Right of Way Permit (Base)**	**250.00**	**Includes 20 sq. ft.**
3.4.1	Per sq. ft. For Cuts Over 20 sq. ft.	**4.00**	
3.5	**Special Permits and Agreements**	**Charges will be on a per hour basis**	
3.6	**Outside Consultant Review**	**Actual cost of consultant**	
		Base 24-25 Charge	**Additional Charges / Comments**
4.0	**System Development Charges (SDC)**		
4.1	**Transportation SDC Fees**		**May meet 10.00% rule**
4.1.1	Single Family Dwelling (One Peak Hour Trip)	**5,849.32**	**No Transportation SDC charged to accessory dwellings**
4.1.2	Per Weekday Peak Hour Trip of Adjacent Street Traffic*	**5,849.32**	
	* Based on ITE Trip Generation Manual 11th Edition		
4.2	**Water SDC Fees**		
4.2.1	3/4" Meter (1 EDU) - Maximum 810 gpd	**6,202.83**	**No Water SDC charged to accessory dwellings unless meter added or size increased**
4.2.1.1	Water SDC Breakdown - 3/4" Meter		
4.2.1.2	Improvement Fee	**5,129.74**	**82.70%**
4.2.1.3	Reimbursement Fee	**777.84**	**12.54%**
4.2.1.4	Administration Fee	**295.25**	**4.76%**
	Total Water SDC	**6,202.83**	
4.2.2	1" Meter (1.67 EDU) - Maximum 1,353 gpd	**10,358.66**	
4.2.3	1.5" Meter (3.33 EDU) - Maximum 2,697 gpd	**20,655.30**	
4.2.4	2" Meter (5.33 EDU) - Maximum 4,317 gpd	**33,060.90**	
4.2.5	3" Meter (10 EDU) - Maximum 8,100 gpd	**62,027.96**	
4.2.6	4" Meter (16.67 EDU) - Maximum 13,503 gpd	**103,400.61**	
4.2.7	6" Meter (33.33 EDU) - Maximum 26,997 gpd	**206,739.16**	
4.2.8	8" Meter (53.33 EDU) - Maximum 43,197 gpd	**330,795.08**	
4.2.9	Per Additional 810 Gallons per Day (gpd) Over Maximum	**6,202.83**	
4.3	**Wastewater SDC Fees**		
4.3.1	3/4" Meter (1 EDU) - Maximum 260 gpd	**3,172.19**	**No Wastewater SDC charged to accessory dwellings unless water meter added or size increased**
4.3.1.1	Wastewater SDC Breakdown - 3/4" Meter		
4.3.1.2	Improvement Fee	**974.81**	**30.73%**
4.3.1.3	Reimbursement Fee	**2,046.38**	**64.51%**
4.3.1.4	Administration Fee	**151.00**	**4.76%**
	Total Wastewater SDC	**3,172.19**	
4.3.2	1" Meter (1.67 EDU) - Maximum 434 gpd	**5,297.53**	
4.3.3	1.5" Meter (3.33 EDU) - Maximum 866 gpd	**10,563.35**	
4.3.4	2" Meter (5.33 EDU) - Maximum 1,386 gpd	**16,907.70**	
4.3.5	3" Meter (10 EDU) - Maximum 2,600 gpd	**31,721.75**	
4.3.6	4" Meter (16.67 EDU) - Maximum 4,334 gpd	**52,880.17**	
4.3.7	6" Meter (33.33 EDU) - Maximum 8,666 gpd	**105,728.59**	

4.3.8	8" Meter (53.33 EDU) - Maximum 13,866 gpd	**169,172.10**	
4.3.9	Per Additional 810 Gallons per Day (gpd) Over Maximum	**3,172.19**	
		Base 24-25 Charge	**Additional Charges / Comments**
5.0	**Water Rates & Fees**		
5.1	**Residential Rates**		
5.1.1	Senior Citizen / Disabled Persons Discount	**(5.12)**	**Per month (income must qualify), 24.00% of base fee**
5.1.2	Monthly Water Rates (Minimum Charges)		
5.1.2.1	3/4" Meter	**21.34**	
5.1.2.2	1" Meter	**33.63**	
5.1.2.3	1.5" Meter	**64.11**	
5.1.2.4	2" Meter	**100.82**	
5.1.2.5	3" Meter	**186.56**	
5.1.2.6	4" Meter	**308.99**	
5.1.2.7	6" Meter	**614.83**	
5.1.3	Commodity Charge		
5.1.3.1	3/4" to 6" Meter		
5.1.3.1.1	Tier I	**2.39**	**Per unit (100 cubic feet) of water used from 1 - 25 units**
5.1.3.1.2	Tier II	**2.62**	**Per unit (100 cubic feet) of water used from 26 - 37 units**
5.1.3.1.3	Tier III	**2.98**	**Per unit (100 cubic feet) of water used 38 units and over**
		Base 24-25 Charge	**Additional Charges / Comments**
5.1.4	Suspension Fee		
5.1.4.1	During Business Hours	**75.00**	
5.1.4.2	Suspension Reconnect After Business Hours	**25.00**	**Charged Monday - Friday 3:00pm to 8:00am. All hours on weekends/holidays.**
	(Charged in addition to business hours suspension fee)		
5.1.5	Service Charge		
5.1.5.1	After Business Hours	**50.00**	
5.1.5.2	After Unauthorized Use	**50.00**	
		Base 24-25 Charge	**Additional Charges / Comments**
5.2	**Commercial & Industrial Rates**		
5.2.1	Monthly Water Rates (Minimum Charges)		
5.2.1.1	3/4" Meter	**21.34**	**0 units included**
5.2.1.2	1" Meter	**33.63**	**0 units included**
5.2.1.3	1.5" Meter	**64.11**	**0 units included**
5.2.1.4	2" Meter	**100.82**	**0 units included**
5.2.1.5	3" Meter	**186.56**	**0 units included**
5.2.1.6	4" Meter	**308.99**	**0 units included**
5.2.1.7	6" Meter	**614.83**	**0 units included**
5.2.2	Commodity Charge		
5.2.2.1	3/4" to 6" Meter		
5.2.2.1.1	Tier I	**2.39**	**Per unit (100 cubic feet) of water used from 1 - 25 units**
5.2.2.1.2	Tier II	**2.62**	**Per unit (100 cubic feet) of water used from 26 - 37 units**
5.2.2.1.3	Tier III	**2.98**	**Per unit (100 cubic feet) of water used 38 units and over**
		Base 24-25 Charge	
5.2.3	Suspension Fee		
5.2.3.1	During Business Hours	**75.00**	
5.2.3.2	Suspension Reconnect After Business Hours	**25.00**	**Charged Monday - Friday 3:00pm to 8:00am. All hours on weekends/holidays.**
	(Charged in addition to business hours suspension fee)		
5.2.4	Service Charge		
5.2.4.1	After Business Hours	**50.00**	

5.2.4.2	After Unauthorized Use	**50.00**	
		Base 24-25 Charge	
5.2.4	Bulk Water Rates		
5.2.4.1	First 24 units	**15.11**	**Per unit (100 cubic feet) used up to 24 units with a half unit monthly minimum**
5.2.4.2	Additional	**13.55**	**Per unit (100 cubic feet) used over 24 units**
5.2.5	Monthly Standby Fire Protection		
5.2.5.1	2" or Less	**22.09**	
5.2.5.2	3"	**28.19**	
5.2.5.3	4"	**34.52**	
5.2.5.4	6"	**46.28**	
5.2.5.5	8"	**53.30**	
5.2.5.6	10" or Above	**64.25**	
		Base 24-25 Charge	
5.3	**Water Connection**		
5.3.1	1"	**987.96**	**Plus actual cost of meter**
5.3.2	1.5"	**2,256.28**	**Plus actual cost of meter**
5.3.3	2"	**2,719.10**	**Plus actual cost of meter**
5.3.4	3"	**4,472.50**	**Plus actual cost of meter**
5.3.5	4"	**4,571.88**	**Plus actual cost of meter**
5.3.6	6"	**6,445.45**	**Plus actual cost of meter**
5.4	**Water Meters**		
5.4.1	3/4" Meter	**305.87**	
5.4.2	1" Meter	**445.69**	
5.4.3	1.5" Meter	**748.07**	
5.4.4	2" Meter	**898.39**	
5.4.5	Larger Sizes	**Call for pricing**	
5.5	**Water Account Deposit**	**60.00**	
5.6	**Meter Test Fee**	**85.00**	
5.7	**Delinquent Fee (Late Fee)**	**1.50%**	
5.8	**Penalty Fee (For Items Sent to Lien)**	**10.00%**	
	******Note: The base charge for water service shall apply at all times whether or not the property is occupied. ******		
		Base 24-25 Charge	**Additional Charges / Comments**
6.0	**Sewer Fees and Charges**		
6.1	**Residential Rates**		
6.1.1	Senior Citizen / Disabled Persons Discount	**(7.08)**	**Per month (income must qualify), 12.00% of base fee**
6.1.2	Monthly Flat Rate	**59.00**	**Per dwelling unit**
6.2	**Commercial Rates**		
6.2.1	General Service Uses		
6.2.1.1	Monthly Flat Rate	**59.00**	**Per dwelling unit**
6.2.2	Large General Service Uses		
6.2.2.1	Flat Rate	**59.00**	
6.2.2.2	Metered or Estimated Water Usage in Excess of 5 Units per Month	**7.02**	**Per excess unit (100 cubic feet)**
6.2.3	Industrial Use	**To be determined on a case by case basis**	
6.3	**Connection Fee**	**1,019.37**	
6.4	**Sewer Deposit**	**120.00**	
6.5	**Delinquent Fee (Late Fee)**	**5.00**	**Plus 1.00%**
6.6	**Penalty Fee (For Items Sent to Lien)**	**10.00%**	
	******Note: The base charge for sewer service shall apply at all times whether or not the property is occupied. ******		
		Base 24-25 Charge	**Additional Charges / Comments**
7.0	**Franchise Fees and Other Taxes**		

7.1	**Transient Room Tax**		
7.1.1	Transient Room Tax	**8.50%**	
7.2	**Franchise Fees**		
7.2.1	Cascades Natural Gas	**5.00%**	
7.2.2	Crestview Cable	**5.00%**	
7.2.3	Pacific Power	**5.00%**	
7.2.4	Prineville Disposal	**5.00%**	
7.2.5	CenturyLink	**7.00%**	
7.3	**Privilege Tax**		
7.3.1	Third-party Electricity / Natural Gas Suppliers	**5.00%**	
		Base 24-25 Charge	**Additional Charges / Comments**
8.0	**Administrative Fees and Charges**		
8.1	**Photocopies / Printed Reports**	**0.40**	**Per page after first five pages**
8.2	**Fax Charges**		
8.2.1	First Page	**2.50**	
8.2.2	Each Additional Page	**1.30**	**Per page**
8.3	**Public Records Fees (Non-Police)**		
8.3.1	Transmitted by Email (Per Page to 10MB in Size)	**5.00**	**For records relating to the Police Department, refer to fees in section 1.0**
8.3.2	Transmitted by Fax (First Page)	**2.50**	
8.3.3	Transmitted by Fax (Each Additional Page - 10 Page Limit)	**1.30**	
8.3.4	Records Copied to CD (Each CD) or Thumb Drive	**7.50**	
8.3.5	True Copy Certification	**5.00**	
8.4	**NSF Charges**	**33.00**	
8.5	**Notary Fee**	**10.00**	**Per page notarized**
8.6	**Research / Accounting**	**Actual cost incurred**	
8.7	**Lien Search Fee**	**25.00**	
		Base 24-25 Charge	**Additional Charges / Comments**
9.0	**Citywide Standard Hourly Billing Rate**		
9.1	**Multiplier**	**2.75 x employee hourly pay rate**	

RESOLUTION NO. 1599
CITY OF PRINEVILLE, OREGON

A RESOLUTION APPROVING A RATE INCREASE FOR SOLID WASTE FRANCHISEE SERVICES

A. The City of Prineville ("City") granted Allied Waste Transfer Services of Oregon, LLC, dba Republic Services of Oregon ("Republic") an exclusive franchise for solid waste services within the city limits of Prineville.

B. Each year, Republic may file an application for an adjustment in rates.

C. Republic filed an application for an adjustment to their rates of a 14 percent (14%) increase; however, after negotiations with the City's Solid Waste Advisory Committee, adjusted the application to a 10 percent (10%) increase.

D. The rate increase request was based on several factors including increased costs for labor, fuel, disposal, repairs, maintenance, and recycling.

E. A public hearing was held by the Prineville City Council on June 25,2024.

NOW, THEREFORE, the City of Prineville resolves that Republic shall be allowed to increase its rate of services, effective July 1,2024 as set forth on the attached schedule.

Approved by the City Council this ____ day of June 2024.

____
Rodney J. Beebe, Mayor

ATTEST:

____
Lisa Morgan, City Recorder

SERVICE	7/1/2023	7/1/2024
RESIDENTIAL		
35 GALLON TRASH + 95 GALLON RECYCLE WEEKLY	$17.38	$19.12
35 GALLON TRASH + 95 GALLON RECYCLE E4W	$11.70	$12.87
65 GALLON TRASH + 95 GALLON RECYCLE WEEKLY	$27.50	$30.25
65 GALLON TRASH + 95 GALLON RECYCLE E4W	$16.13	$17.74
95 GALLON TRASH + 95 GALLON RECYCLE WEEKLY	$35.65	$39.22
95 GALLON TRASH + 95 GALLON RECYCLE E4W	$22.44	$24.68
ADDITIONAL 95 GALLON RECYCLE CART	$1.32	$1.45
95 GALLON YARD DEBRIS EOW	$18.18	$20.00
95 GALLON YARD DEBRIS E4W	$12.12	$13.33
EXTRA BAG TRASH	$4.85	$5.33
BULK PICK UP	$18.83	$20.72
EXTRA YARD DEBRIS PER YARD (DO NOT BAG)	$4.85	$5.33
CONTAMINATION IN RECYCLE CART	$13.08	$14.39
GO BACK FEE	$9.94	$10.94
COMMERCIAL		
1 YARD SERVICED ONCE PER WEEK	$74.56	$82.01
Each Additional Service Per Week		$56.72
1.5 YARD SERVICED ONCE PER WEEK	$94.66	$104.12
Each Additional Service Per Week		$76.82
2 YARD SERVICED ONCE PER WEEK	$119.59	$131.55
Each Additional Service Per Week		$111.68
3 YARD SERVICED ONCE PER WEEK	$155.51	$171.06
Each Additional Service Per Week		$154.70
4 YARD SERVICED ONCE PER WEEK	$189.38	$208.32
Each Additional Service Per Week		$176.89
5 YARD SERVICED ONCE PER WEEK	$234.89	$258.37
Each Additional Service Per Week		$222.78
6 YARD SERVICED ONCE PER WEEK	$280.41	$308.45
Each Additional Service Per Week		$264.13
OCC CONTAMINATION FEE (PER YARD)	$22.27	$24.50
ADDITIONAL FEES		
LEED Reporting Fee	$242.46	$266.71
SERVICE INTERRUPT	$35.00	$38.50
CART RENTAL	$6.79	$7.47
COMMERCIAL CONTAINER REMOVAL	$64.74	$71.21
ROLL CART REPLACEMENT	$70.62	$77.68

STAFF REPORT

MEETING DATE:	6/25/2024	**PREPARED BY:**	Casey Kaiser
SECTION:	Resolutions	**DEPARTMENT:**	Public Works
CITY GOAL:	Quality Municipal Services & Programs		
SUBJECT:	Resolution 1600 authorizing contract for the Water Treatment Plant Operations and Development		

REASON FOR CONSIDERATION:
The proposed contract is for the continued development and ongoing daily operations and maintenance of the Water Treatment Facility. The contract includes 24 hour a day monitoring and response, troubleshooting, water quality testing, and daily data logging and recording. The proposed contract would begin on July 1st, 2024 and continue for one year.

BACKGROUND:
The Water Treatment Plant has been in operation under the direction of Divergent Engineering since May of 2023. The first-year contract was significantly larger due to several one time projects including removal of the pumps and cleaning of the well screens, testing equipment upgrades, meter replacement, chlorine pump upgrades, and filter media replenishing.

During this past year the average daily plant production has increased approximately 300,000 gallons per day. The contract has worked very well for the City and has resulted in consistent performance of the plant, improved capacity, and improved overall operations. Divergent has responded quickly to after-hours issues and completed any needed upgrades and repairs to the plant and well field.

FISCAL IMPACT:
The total cost associated with the contract is $79,560.00

RECOMMENDATION:
Staff recommends authorizing the annual contract with Divergent Engineering for the continued development, operation and maintenance of the Water Treatment Plant for the City of Prineville.

RESOLUTION NO. 1600
CITY OF PRINEVILLE, OREGON

A RESOLUTION APPROVING A PERSONAL SERVICES AGREEMENT WITH DIVERGENT ENGINEERING SERVICES, LLC TO PROVIDE ENGINEERING SERVICES REGARDING PRINEVILLE WATER TREATMENT PLANT OPERATIONS

RECITALS:

A. City of Prineville ("City") Resolution No. 1266 authorizes the City Council acting as the Contract Review Board for the City to award personal service contracts according to specific criteria that are applicable to the services provided.

B. Engineering services are considered personal services pursuant to City Resolution 1266.

C. On April 25, 2023, the Prineville City Council, after a noticed public hearing, approved a personal services agreement with Divergent Engineering Services, LLC ("Divergent") to provide engineering services regarding Prineville Water Treatment Plant Operations for a period of one year.

D. The City requires further assistance from Divergent to provide engineering services regarding the Prineville Water Treatment Plant Operations. Divergent has provided a proposal as set forth on Exhibit A of this Resolution.

E. Pursuant to City Resolution No. 1266, the City Council makes the following findings as their basis of the selection of Divergent for a personal services contract:

1. Total costs to the City for delivery of services:

   - The total costs are estimated not to exceed $79,560.00.

2. Expertise of Divergent in the required area of specialty:

   - Divergent is familiar with the Water Treatment Plant design and has experience with the plant operations and the water treatment technology utilized. Divergent has the required Oregon Health Authority Drinking Water System Operator Level 2 Certification and is Registered in the State of Oregon as a Professional Civil Engineer with a focus in Water Resources and Environmental.

3. References regarding prior work done by the Divergent:

   - City has been provided sufficient references regarding past work completed by Divergent.

4. Capacity and capability to perform the work, including any specialized services within the time limitations for the work:

- Divergent has the capacity and capability to perform the work within the time limitations. Divergent has relationships with capable vendors to provide the required specialty for different components of the facility.

5. Educational and professional records, including past records of performance on contracts with governmental agencies and private parties with respect to cost control, quality of work, ability in schedules, and contract administration, where applicable:

- See Factors 2 and 8.

6. Availability to perform the assignment and familiarly with the area in which the specific work is located:

- Divergent is available to perform the work.

7. Timelines of delivery of service:

- Divergent can deliver the services requested within the timeline required by the City.

8. Experience in working with the City:

- Divergent staff has a long history of working with the City. City staff found Divergent's work highly satisfactory, timely provided, and reasonably priced.

9. Knowledge of the City's needs and desires related to the Contact:

- Divergent has provided engineering services on this project for the past year and is fully aware of the City's needs and desires related to the project. Divergent has the institutional knowledge regarding the City's needs and desires regarding the Water Treatment Plant.

Now, Therefore, the City of Prineville Resolves as Follows:

1. That the City Council, serving in its role as the Local Contract Review Board for the City, hereby approves the City executing a personal services contract with Divergent Engineering Services, LLC, to provide engineering services related to the Prineville Water Treatment Plant and authorizes the City Manager to executed, on behalf of the City, such contract and any other related documents.

Passed by the City Council this ____ day of June, 2024.

____
Rodney J. Beebe, Mayor

ATTEST:

____
Lisa Morgan, City Recorder

Prineville Water Treatment Facility Proposal June 13, 2024

Ongoing Operations Proposal

- Contract term 7/1/2024 - 6/30/2025
    - Divergent will provide
        - 24/hr per day monitoring and response
        - Collaboration with City PW Department
        - Testing 5 days per week
        - Record keeping
        - Inventory and subcontractor management
        - Maintain facility
        - Scheduling of process maintenance
        - Continuous updating of O&M and Standard Operating Procedures
        - Work with School District to develop educational opportunities
        - Manage and Collaborate on the design of a pure oxygen injection system to optimize the Ammonia Oxidizing Bacteria
        - Manage and Collaborate on the design of a future horizontal well
        - Manage and Collaborate on the expansion of the WTF from 2,000 gpm to 3,500 gpm
        - Manage and Collaborate on the redesign of the backup electrical generator to support the well field as well as the treatment facility
        - Confirm State acceptance of the plant and perform all testing and reporting as required by State
- Consideration:
    - $6.630.00 monthly
    - $79,560.00 annually
        - Some or all subcontractors and materials can be billed directly to the City at the City's discretion
        - Items billed through Divergent will incur an 8% overhead markup
- In the event the City would like to cancel the contract and provide staffing, Divergent agrees to train and support City staff as needed

EXHIBIT A
PAGE 1 OF 1