

1. 9:30 A.M. Agenda

Documents:

[2021-11-04 Council Agenda.pdf](#)

2. Meeting Materials

Documents:

[October 2 Email From Doug Conner.pdf](#)

[Mary Deriberprey Letter.pdf](#)

[Oregon Planning Goal.pdf](#)

[Yachats Comprehensive Plan Goal K.pdf](#)

[Putting The People In Planning.pdf](#)

[Public Involvement Checklist.pdf](#)

[Public Participation In Land Use Planning \(2015\) From Friends.org 2015_1.Pdf](#)

[WWS FAC Plan.pdf](#)

[Facilities Plan V3 -Wastewater Master Plan.pdf](#)

[2021-09 Financial Report Council_1.Pdf](#)

[2021-09 Financial Report Debt Services_1.Pdf](#)

[2021-09 Financial Report Urban Renewal_1.Pdf](#)

[2021-09 Fund Balances And Contract Exp_1.Pdf](#)



**CITY OF YACHATS
CITY COUNCIL WORK SESSION & COUNCIL MEETING
Yachats OR
Thursday, November 4, 2021 at 9:30am
To Be Held Via Zoom**

AGENDA

Join Zoom Meeting

<https://us02web.zoom.us/j/88376972670>

Meeting ID: 883 7697 2670

One tap mobile

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+1 669 900 6833 US (San Jose)

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Work Session

I. Public Participation Plan (Oregon Planning Goal 1: CITIZEN INVOLVEMENT)

The Yachats City Council meetings are open to the public and interested citizens are invited to attend. These are open meetings under Oregon law, but a work session is not a community forum; audience participation is at the discretion of the Council. Meetings are audio-recorded. The meeting are accessible to persons with disabilities. For accommodations, please call (541) 547-3565, or Oregon Relay 1-800-735-2900 TDD) two days in advance. City of Yachats does not discriminate on the basis of race, color, religion, creed, gender, national origin, age, disability, marital or veteran status, sexual orientation, or any other legally protected status. Sign language or foreign language interpreter may be available, with advance notice. Call City Hall at 541-547-3565 or Oregon Relay 1-800-735-2900 (TDD) two days in advance.

Posted Revised 10/27/2021



Regular Council Meeting

- I. Announcements, Correspondence, Proclamation
- II. Public Comment: **Topics not listed on the agenda**
5-minute limitation per person
- III. New Business
 - a. Assistance for unhoused during severe weather
 - b. Wastewater Master Plan (11 AM: Guest Chris Brugato of Westech Engineering Inc.)
 - c. Volunteer Application of Adam Altson – Parks & Commons Commission
- IV. Old Business
 - a. City Manager recruitment: Vote anticipated
- V. City Manager Report
- VI. Other Business
 - a. From Mayor
 - b. From Council
 - c. From Staff

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Re: Citizen involvement committee Council discussion

Douglas Conner <lemoco@me.com>

Sat 10/2/2021 11:39 AM

To: Leslie Vaaler <Leslie@YachatsMail.org>; Lance Bloch <lancebloch1@gmail.com>

Thanks for keeping me in the loop on this.

If I might offer you another bit of advice, it would be this: The core component of Oregon Goal 1 and Yachats Goal K is a Public Participation Plan. The CIC is but one required part of that Plan.

Rather than having a discussion about the CIC, I would have a discussion about the Public Participation Plan. We need a commitment to create a Public Participation Plan before we dive into the weeds of creating the components of that plan. The task of creating the Plan and its components could be given to the Planning Commission, in coordination with the public.

Thanks again for your commitment to address this issue.
Doug

From: Mary D <mfrand2001@gmail.com>
Sent: Tuesday, November 2, 2021 9:28 PM
To: Leslie Vaaler <Leslie@YachatsMail.org>
Subject: homeless and severe weather in Yachats

Hi Leslie, I'm sending you a proposal that I hope you can forward to the council members. Nan Scott will help me join the zoom Council meeting on Thursday at 9:30 AM. I teach a class at 11 AM so I'll be leaving the meeting around 10:30 AM. Pastor Bob said he would join by zoom also.

"The true measure of any society can be found on how it treats its most vulnerable members." Gandhi

Proposal: Allow homeless to sleep in shelter behind Commons when severe weather criteria is met.

Q. What weather criteria?

A. When temperature dips to 38 degrees F or below and/or severe wind and rain are predicted. (i.e. bomb cyclone)

Q. Who would make the decision to unlock the shelter?

A. An established committee of 4 volunteers would decide. (Possible volunteers: Jill McLane, Pastor Bob, Nan Scott, Gerald Stanley, Mary Deriberprey)

Q. Who would have the key?

A. One or all 4 of the committee members.

Q. Hours shelter would be unlocked?

A. 7:00 PM to 7:00 AM.

Q. Who would clean up the shelter and lock it back up in the morning?

A. Jill McLane has volunteered to do this.

Q. Bathroom facility?

A. Port-a potty in Commons parking lot.

Q. Where do the homeless go during the day in severe weather when the shelter is locked up for the day?

A. Jill hands them a paper with names and phone numbers of services in Waldport and Florence. (i.e. SOS and 3RC)

Q. How long will this severe shelter service in Yachats be offered?

A. November – March (trial basis).

Q. Will there be any supervision during the night?

A. No.

Q. Will Covid restrictions apply?

A. Signs will be posted but not enforced.

Q. What is expected from the City Council?

A. Discuss the proposal at your convenience; give or deny permission to unlock the shelter as per criteria.

Proposed by Jill McLane

Written by Mary Deriberprey

Sent from [Mail](#) for Windows

Oregon's Statewide Planning Goals & Guidelines

GOAL 1: CITIZEN INVOLVEMENT

OAR 660-015-0000(1)

To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.

The governing body charged with preparing and adopting a comprehensive plan shall adopt and publicize a program for citizen involvement that clearly defines the procedures by which the general public will be involved in the on-going land-use planning process.

The citizen involvement program shall be appropriate to the scale of the planning effort. The program shall provide for continuity of citizen participation and of information that enables citizens to identify and comprehend the issues.

Federal, state and regional agencies and special-purpose districts shall coordinate their planning efforts with the affected governing bodies and make use of existing local citizen involvement programs established by counties and cities.

The citizen involvement program shall incorporate the following components:

1. Citizen Involvement -- To provide for widespread citizen involvement.

The citizen involvement program shall involve a cross-section of affected citizens in all phases of the planning process. As a component, the program for citizen involvement shall include an officially recognized committee for citizen involvement (CCI) broadly

representative of geographic areas and interests related to land use and land-use decisions. Committee members shall be selected by an open, well-publicized public process.

The committee for citizen involvement shall be responsible for assisting the governing body with the development of a program that promotes and enhances citizen involvement in land-use planning, assisting in the implementation of the citizen involvement program, and evaluating the process being used for citizen involvement.

If the governing body wishes to assume the responsibility for, development as well as adoption and implementation of the citizen involvement program or to assign such responsibilities to a planning commission, a letter shall be submitted to the Land Conservation and Development Commission for the state Citizen Involvement Advisory Committee's review and recommendation stating the rationale for selecting this option, as well as indicating the mechanism to be used for an evaluation of the citizen involvement program. If the planning commission is to be used in lieu of an independent CCI, its members shall be selected by an open, well-publicized public process.

2. Communication -- To assure effective two-way communication with citizens.

Mechanisms shall be established which provide for effective communication between citizens and elected and appointed officials.

3. Citizen Influence -- To provide the opportunity for citizens to be involved in all phases of the planning process.

Citizens shall have the opportunity to be involved in the phases of the planning process as set forth and defined in the goals and guidelines for Land Use Planning, including Preparation of Plans and Implementation Measures, Plan Content, Plan Adoption, Minor Changes and Major Revisions in the Plan, and Implementation Measures.

4. Technical Information -- To assure that technical information is available in an understandable form.

Information necessary to reach policy decisions shall be available in a simplified, understandable form. Assistance shall be provided to interpret and effectively use technical information. A copy of all technical information shall be available at a local public library or other location open to the public.

5. Feedback Mechanisms -- To assure that citizens will receive a response from policy-makers.

Recommendations resulting from the citizen involvement program shall be retained and made available for public assessment. Citizens who have participated in this program shall receive a response from policy-makers. The

rationale used to reach land-use policy decisions shall be available in the form of a written record.

6. Financial Support -- To insure funding for the citizen involvement program.

Adequate human, financial, and informational resources shall be allocated for the citizen involvement program. These allocations shall be an integral component of the planning budget. The governing body shall be responsible for obtaining and providing these resources.

GUIDELINES

A. CITIZEN INVOLVEMENT

1. A program for stimulating citizen involvement should be developed using a range of available media (including television, radio, newspapers, mailings and meetings).

2. Universities, colleges, community colleges, secondary and primary educational institutions and other agencies and institutions with interests in land-use planning should provide information on land-use education to citizens, as well as develop and offer courses in land-use education which provide for a diversity of educational backgrounds in land-use planning.

3. In the selection of members for the committee for citizen involvement, the following selection process should be observed: citizens should receive notice they can understand of the opportunity to serve on the CCI; committee appointees should receive official notification of their selection; and

committee appointments should be well publicized.

B. COMMUNICATION

Newsletters, mailings, posters, mail-back questionnaires, and other available media should be used in the citizen involvement program.

C. CITIZEN INFLUENCE

1. Data Collection - The general public through the local citizen involvement programs should have the opportunity to be involved in inventorying, recording, mapping, describing, analyzing and evaluating the elements necessary for the development of the plans.

2. Plan Preparation – The general public, through the local citizen involvement programs, should have the opportunity to participate in developing a body of sound information to identify public goals, develop policy guidelines, and evaluate alternative land conservation and development plans for the preparation of the comprehensive land-use plans.

3. Adoption Process – The general public, through the local citizen involvement programs, should have the opportunity to review and recommend changes to the proposed comprehensive land-use plans prior to the public hearing process to adopt comprehensive land-use plans.

4. Implementation - The general public, through the local citizen involvement programs, should have the opportunity to participate in the development, adoption, and application of legislation that is needed to carry out a comprehensive land-use plan. The

general public, through the local citizen involvement programs, should have the opportunity to review each proposal and application for a land conservation and development action prior to the formal consideration of such proposal and application.

5. Evaluation - The general public, through the local citizen involvement programs, should have the opportunity to be involved in the evaluation of the comprehensive land use plans.

6. Revision - The general public, through the local citizen involvement programs, should have the opportunity to review and make recommendations on proposed changes in comprehensive land-use plans prior to the public hearing process to formally consider the proposed changes.

D. TECHNICAL INFORMATION

1. Agencies that either evaluate or implement public projects or programs (such as, but not limited to, road, sewer, and water construction, transportation, subdivision studies, and one changes) should provide assistance to the citizen involvement program. The roles, responsibilities and timeline in the planning process of these agencies should be clearly defined and publicized.

2. Technical information should include, but not be limited to, energy, natural environment, political, legal, economic and social data, and places of cultural significance, as well as those maps and photos necessary for effective planning.

E. FEEDBACK MECHANISM

1. At the onset of the citizen involvement program, the governing body should clearly state the mechanism through which the citizens will receive a response from the policy-makers.

2. A process for quantifying and synthesizing citizens' attitudes should be developed and reported to the general public.

F. FINANCIAL SUPPORT

1. The level of funding and human resources allocated to the citizen involvement program should be sufficient to make citizen involvement an integral part of the planning process.

Goal K. Public Involvement in Land Use Planning

The City encourages the public to participate in governmental decision-making processes by providing policies and procedures and access to public information.

Policies

1. The City shall institute a program that enables the community to identify and comprehend relevant issues, obtain public information and participate in public hearings and other forums on issues related to the growth and development of the City.
2. The City shall review its comprehensive plan, inventory data information and applicable ordinances, and determine what revisions and/or additions, if any, are appropriate at least every five years. Review through a public process shall be initiated by the City Planning Commission.
3. The comprehensive plan for the City shall be filed in the City Office and shall be made available to the public at the City Office, the online document library, and the Yachats Public Library.
4. The City shall follow the notice and procedural requirements of the Oregon Public Meetings law.
5. The City shall encourage opportunities for public involvement and networking.

Proposed Action

The City shall continue to use the adopted public involvement plan.

Goal L. Beaches

The City shall work to enhance existing access points to its beaches and protect its beaches from erosion and other degradation.

Policies

1. The City shall, in conjunction with applicable County, State and Federal agencies, prohibit residential, commercial and industrial buildings or development on beaches and along waters of the state.
2. The City shall improve public access to the beach and river shores by acquiring land and easements.
3. The City shall accept donations and dedications of land and easements for public access, open space, and habitat protection.
4. The City shall identify appropriate sites for emergency and public access to the beach.

Putting the People in Planning



A guide for local governmental agencies in Oregon

June 30, 2019

Acknowledgments

These guidelines were developed by the Oregon Department of Land Conservation and Development (DLCD) in consultation with the Land Conservation and Development Commission (LCDC) Citizen Involvement Advisory Committee (CIAC). The following people actively participated in their preparation:

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Tool Box (Appendix Materials Provided Separately)

A - Public Involvement Process Checklist

B - Audience Identification Exercise - Instructions and Worksheets

C - Public Involvement Plan Template

D -Additional Resources and Links



1. Introduction

1 Introduction

1.1 Oregon's Statewide Planning Goals

In Oregon, 19 statewide land use planning goals help to shape the quality of life and character of Oregon's communities, foster the development of healthy livable places, and protect Oregon's agricultural and natural resources. City and county governments across the state work under the umbrella of these statewide goals to implement local land development policies, programs and plans. The Oregon Department of Land Conservation and Development (DLCD) helps to support the statewide goals, by providing guidance and technical assistance to the cities and counties that are responsible for land use planning.

Oregon recognizes that effective public involvement is key to the successful implementation of land use plans. It is no accident that the statewide planning goal with top billing, Goal 1, requires local agencies to meaningfully engage the public in the land use planning process. Under Goal 1, governmental agencies are asked to:

- Provide for widespread public involvement in all phases of the planning process,
- Provide for two-way communication between members of the public and decision makers as plans are prepared, assuring that responses to public inquiries and input are provided;
- Make technical information available and understandable.

A small agency with a large mandate, DLCD is charged with helping local agencies successfully align their land use plans and processes with the statewide planning goals. The Oregon Land Conservation and Development Commission (LCDC), which oversees DLCD's work, has charged a Citizens Involvement Advisory Committee (CIAC) with developing these "Putting the People in Planning" guidelines to help promote the principles of Goal 1.

1.2 What Makes a Great Public Involvement Program?

Community engagement is foundational to successful public plans and projects. By gathering and using information from multiple points of view, agencies can ensure that plans reflect their community's varied needs and concerns. Engaging the public in a meaningful way as decisions are made is key, rather than simply conducting participation activities because they are required. A great public involvement program gives participants assurance that they will be heard, and gives elected leaders confidence that decisions will be balanced and positioned for the public good.

1.2.1 Benefits to Local Agencies and Planning Practitioners

Effective public involvement requires *active outreach*. This means that agencies must proactively seek out their intended audiences and work hard to elicit input and feedback. But resources are limited, and agencies cannot force people to participate. So why should local agencies commit the time and resources to do public involvement well? Consider these benefits:

Public confidence. Broad participation helps give elected leaders confidence in their decisions. It also fosters the public's trust in government, solidifying an agency's legitimacy and building the personal and professional credibility of agency staff.

Better decisions. Community members have intimate knowledge of the places they live, work, shop and recreate. They can point out potential benefits of planning decisions as well as help to head off unintended consequences. Also, as agencies seek to make data-driven decisions, thoughtful analysis of information collected from the public involvement process provides elected leaders and planners with data and information that reflects the public will, helping them to justify the outcome and decisions made.

Balanced perspective. As more views are gathered, it is more likely a plan will reflect a community's needs and address its most important concerns.

1.2.2 Benefits for Community Members

Members of the public may experience these benefits from a well-designed public involvement program:

Putting the People in Planning

Increased knowledge. Public involvement provides opportunities for community members to increase their understanding of places that matter to them, and to become educated about planning concepts and processes.

Ownership. People tend to accept decisions that they help to make in the interest of the public good, even if the decisions are hard or personally disadvantageous.

Giving Back and Paying Forward. Public participation strengthens the democratic process, helping people to realize their responsibilities to each other in creating a shared vision for the future. Many of the positive things we enjoy about the places we live today are the direct result of participation by community members who have gone before. By participating in planning for the future, people can help to shape the character and sustainability of their community for generations to come.

1.3 Putting the People in Planning: A Tool Kit for Practitioners

1.3.1 Who is the Audience for These Guidelines?

Putting the People in Planning is intended as a resource for city and county staff with land use planning responsibilities in Oregon. DLCDD's principal purpose in preparing the Putting the People in Planning guidelines is to help local governmental agencies successfully engage the public as they develop and implement important land use plans. With that said, concepts, strategies and suggestions provided in the Putting the People in Planning tool kit may be applied to improve public participation in many other areas of government service as well.

1.3.1 Guidance Plus Practical Tools

Putting the People in Planning is a tool kit consisting of multiple parts:

- **This Guidance Document.** This document provides information on how to plan and prepare an effective outreach program, and highlights strategies for communicating with the public throughout the process.
- **Appendix of Tools.** In addition to these written guidelines, we have assembled several tools that local agencies can put to immediate use, including:

Putting the People in Planning

- **Public Involvement Checklist** – a simple checklist covering many of the suggestions contained in this document that can be used to prompt you to consider best practices as you design and implement your outreach program.
- **Audience Identification Tools** – Worksheets and an online tutorial to help your planning team organize thoughts about the potential impacts, benefits and stakeholders for your planning project.
- **Public Involvement Plan Template** – An editable template in MS Word format that you can download and use to create a customized public involvement plan for your planning project.
- **Additional Resources and Links** – A list of publications, training opportunities and links to valuable guidance and tools provided by other organizations. The online realm is in continual flux. To minimize the potential for broken links or redirection to outdated materials, this primary guidance document contains only select links to long-standing foundational resources that are unlikely to change. Appendix D, however, includes a number of additional links and resources that practitioners may find valuable. By placing them in a single list, it is hoped that they will be easier to update and maintain over time.

LCDC's Citizen Involvement Advisory Committee welcomes suggestions and input for future updates of these guidelines. Our mission is your success.



2. Preparing and Planning Your Outreach Effort

2 Preparing and Planning Your Outreach Effort

2.1 The Planning Cycle

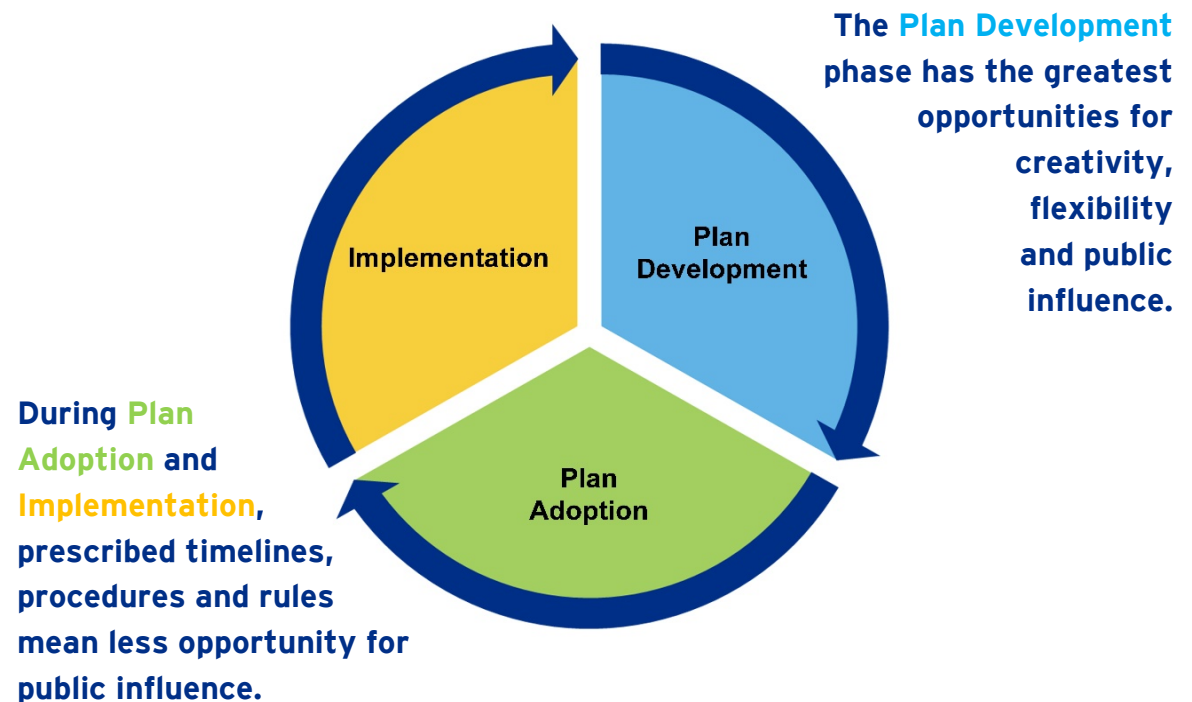
Planning is a cyclical process, and public involvement opportunities in some phases of the planning cycle are necessarily more rigid than in other phases.

Figure 1 shows a simplified planning cycle. Generally, plans are developed, then adopted, then implemented.

Later, the plan development process begins again, either to make interim refinements based on lessons learned during implementation, or to replace an outdated plan altogether. New planning recommendations are then forwarded for adoption and the cycle continues.

From a public involvement standpoint, **plan development** is the least rigid of these three phases, often allowing considerable creativity and timeline flexibility. An effective public participation program during plan development can head off many issues later during adoption and implementation.

Figure 1. The Planning Cycle



During **plan adoption**, timelines and procedures for public review and comment are prescribed by a local agency's administrative rules and procedures.¹ There is less opportunity for members of the public to influence plan recommendations at this stage. Rather, public participation efforts during plan adoption are often focused on explaining how and why recommendations were made and communicating information on comment deadlines and public hearing procedures.

During **plan implementation**, recommendations developed and adopted during the previous two phases are put into action. During the implementation phase, members of the public may begin to see real-world effects of the plan such as zone change applications and land development proposals that may directly benefit or impact their daily lives. Like the plan adoption phase, however, public participation during plan implementation is often limited by strict timelines, procedures and rules related to legal standing, notices, and appeals.

Therefore, an effective public involvement program means starting early -- engaging people during plan development, when there is time to identify and work through creative ideas, issues and concerns. While these Putting the People in Planning guidelines are predominantly focused on public involvement strategies for plan development, Appendix D provides additional resources and example publications that may be helpful in communicating the rules and procedures that people must follow to be heard during plan adoption and implementation.

2.2 Communicating Your Purpose and Desired Outcomes

2.2.1 Purpose Statement

Clarity of purpose is essential before embarking on any planning effort. This means being able to explain what is prompting your agency to develop the plan or study, and what you intend the planning process to achieve. A purpose statement needs to clearly state the principal problems or issues that the planning work is intended to address. Explaining the consequences of doing nothing can also help to reinforce the need for the plan or study.

¹ Administrative procedures, including criteria and timelines for public review and comment on land use planning, zoning and development decisions, are typically included in a local agency's land development code. In Oregon, local agencies are expected to make decisions on land use applications within 120 days of the date the application is considered complete. See ORS 227.178 (cities) and ORS 215.427 (counties).

Desired outcomes in a purpose statement should be articulated *in broad terms*, rather than pre-determining specific results. For example, perhaps the desired outcome is simply resolution of a principal problem or issue. Perhaps you hope to re-align planned land uses with a new community vision. Or maybe you need a plan that will guide land development activities for the next 20 years.

If you anticipate a controversial planning process, your purpose statement can also include wording to affirm your agency's authority and responsibility to take on the planning effort, underscore the credentials of your planning team, and reinforce the legitimacy of the planning process.

FRAMING AN EFFECTIVE PURPOSE STATEMENT:

- **What primary problems or issues will be addressed?**
- **What is the desired outcome of the plan development process, in broad terms?**
- **What responsibility or authority does your agency have?**
- **What expertise does the planning team bring to the table? Why are they the right people to develop the plan?**
- **What are the consequences of doing nothing?**

SAMPLE PURPOSE STATEMENT

Apple Glen Neighborhood Plan

In Deciduous City, the Apple Glen neighborhood has been “rediscovered” after decades of decline. Recent zoning code amendments have set the stage for more commercial uses and greater residential densities. These changes are attracting new development, and while each new commercial building or apartment complex may technically comply with the City’s new zoning code, Apple Glen residents feel their neighborhood identity is disappearing.

The Apple Glen neighborhood is at a crossroads. Without a plan, recent development trends in the neighborhood will be allowed to continue. Although many are unhappy with the current trends, residents are divided over whether to try to preserve the retro character of the neighborhood’s bygone days, or to establish a new vision for the future. A neighborhood vision and planning process offers the best chance to work through these issues and determine a path forward together.

The Deciduous City Council is willing to consider special development standards for Apple Glen, provided that they are based on a neighborhood plan with broad input from residents, landowners and developers. Development standards that bring cohesion to the character of new development and help shape the neighborhood’s future will be a key outcome of the plan.

2.2.2 Public Involvement Objectives

In addition to being clear on the reasons for developing the plan, it is important to be transparent about your reasons for engaging the public in the process -- beyond simply complying with the laws and rules that require you to do so.

A key objective for any public involvement program is to provide clear information about the process and timeline for decision-making, including when and how people can weigh in on plan recommendations.

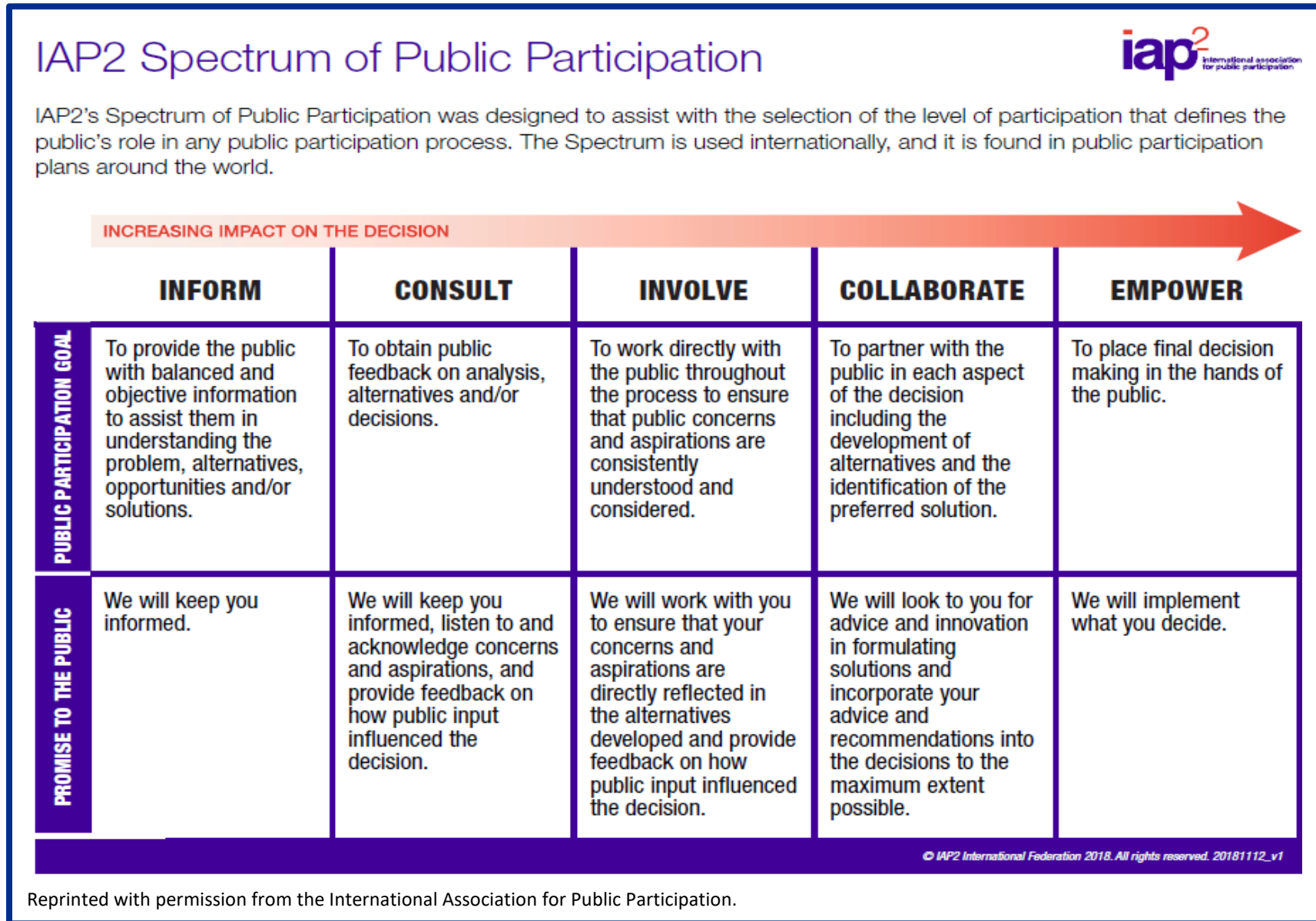
In defining additional public involvement objectives, consider:

- How much influence will the public have in developing planning concepts? Will people be encouraged to come up with their own ideas, or will the planning team provide concepts for their feedback? The International Association for Public Participation (IAP2) has developed a “Spectrum of Public Participation” that can help to articulate how much influence the public may expect to have in your planning process. See Figure 2.
- Is the outcome pre-determined? While this situation is generally at odds with good community planning practices, it is sometimes a political reality. If there is already an agency-preferred solution at the onset of the planning process and the outreach effort is simply intended to validate it, be upfront about it. Hidden agendas are frustrating for community members who take the time and trouble to participate in a planning process. Honest disclosure provides the best shot at preserving your planning team’s credibility under this scenario.

SAMPLE PUBLIC INVOLVEMENT OBJECTIVES:

- **Clearly articulate the process for decision-making and opportunities for input or influence.**
- **Communicate accurate, understandable and timely information throughout the planning process.**
- **Give potentially affected people and interest groups opportunities to express concerns so that they can be considered as the plan is developed.**
- **Get broad, inclusive community feedback on concepts developed by the planning team.**
- **Comply with Title VI of the Civil Rights Act, Environmental Justice and Oregon’s Statewide Planning Goal 1.**

Figure 2. IAP2 Spectrum of Public Participation



2.3 Planning Audience

Most planning efforts affect a wide variety of people with many different interests. Because of this, it is unlikely that everyone will agree 100 percent with every aspect of your plan. Two-way communication between the planning team and people who may be affected by plan outcomes is important, to help the team identify and understand different interests and concerns. Getting a handle on potential audiences and interests early will help your team pick appropriate outreach strategies and shape the plan to fit the public's overall needs.

2.3.1 The Study Area

A first step to identifying the planning audience is to define the study area. Is it regional? City-wide? Neighborhood-specific? After defining your planning area boundary, consider whether your plan may have effects on people or agencies who may be nearby but outside of the boundary. If so, you may wish to expand the area used to identify potential constituents.

2.3.2 Disadvantaged and Under-Represented Populations

Federal law requires that “no person shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.”² In addition, the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income was the subject of an Executive

TITLE VI AND ENVIRONMENTAL JUSTICE POPULATIONS

- **Ethnic minority populations (African American, Hispanic, Asian, Native American, and Pacific Islander populations)**
- **Elderly populations**
- **Low-income populations (median household income at or below the poverty line)**
- **Disabled populations (both mental and physical disabilities)**
- **Limited English Proficiency populations.**

² Title VI of the Civil Rights Act of 1964.

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Order signed by President William J. Clinton in 1994, to avoid disproportionate environmental and human health effects of governmental actions on minority and low-income people. This concept is referred to as “Environmental Justice”.

While every local planning study may not be specifically funded with federal dollars, most local governmental agencies do receive federal funds in some manner, either through direct federal grants or through programs administered by state agencies. And regardless, strategies for reaching and engaging disadvantaged populations are best practices for any public planning process.

You will need to do some analysis to determine where disadvantaged populations exist in and around your planning area. The US Census and American Community Survey are typical data sources for this, and the US EPA has an online tool, [EJSCREEN](https://www.epa.gov/ejscreen)³, that can help with simple Environmental Justice population maps. The Oregon Department of Transportation's [TransGIS](https://gis.odot.state.or.us/transGIS/)⁴ site also allows users to query Environmental Justice populations above a defined threshold by zip code. Urban areas with populations greater than 50,000 typically have a regional metropolitan planning organization (MPO) that may also be a good resource for this information. For large or complex plans, it is a good idea to engage the assistance of a GIS analyst.

A high-level scan can be performed first, to help the planning team identify potential disadvantaged populations which may be interested in, or affected by, the plan. A more detailed analysis may be needed later to understand the specific impacts resulting from the plan recommendations.

2.3.3 Potential Interested Parties, Champions, and Opponents

Taking an hour to brainstorm the planning audience before developing a public involvement plan can help tailor public involvement strategies for maximum effectiveness. Appendix B provides instructions and worksheets for an audience identification exercise that can help the planning team anticipate broader public interests, including people and groups that may be supportive or opposed.

³United States Environmental Protection Agency, Environmental Justice Screening and Mapping Tool. (2018, August 2). <https://www.epa.gov/ejscreen>

⁴Oregon Department of Transportation, ODOT TransGIS. (Accessed 2019, May 3.) <https://gis.odot.state.or.us/transGIS/>

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Use this initial brainstorming exercise to organize thoughts about:

- Potential planning impacts and benefits, affected individuals and groups;
- Potential champions and opponents;
- Initial key messages;
- Strategies that are likely to be effective at reaching and engaging affected people and groups.

Levels of interest in the plan are likely to vary. And people's interest and support for potential planning recommendations may change as the plan takes shape. While it may not be possible to anticipate every benefit, impact or concern that may arise during the planning process, taking the time to think through the possibilities early on will help you prepare for many likely stakeholder reactions.

Figure 3 suggests a way to think about how people may react to the planning process or potential plan recommendations.

Table 1 explains how outreach and participation activities can be designed to match anticipated levels of interest and support.

Figure 3. Levels of Interest and Support

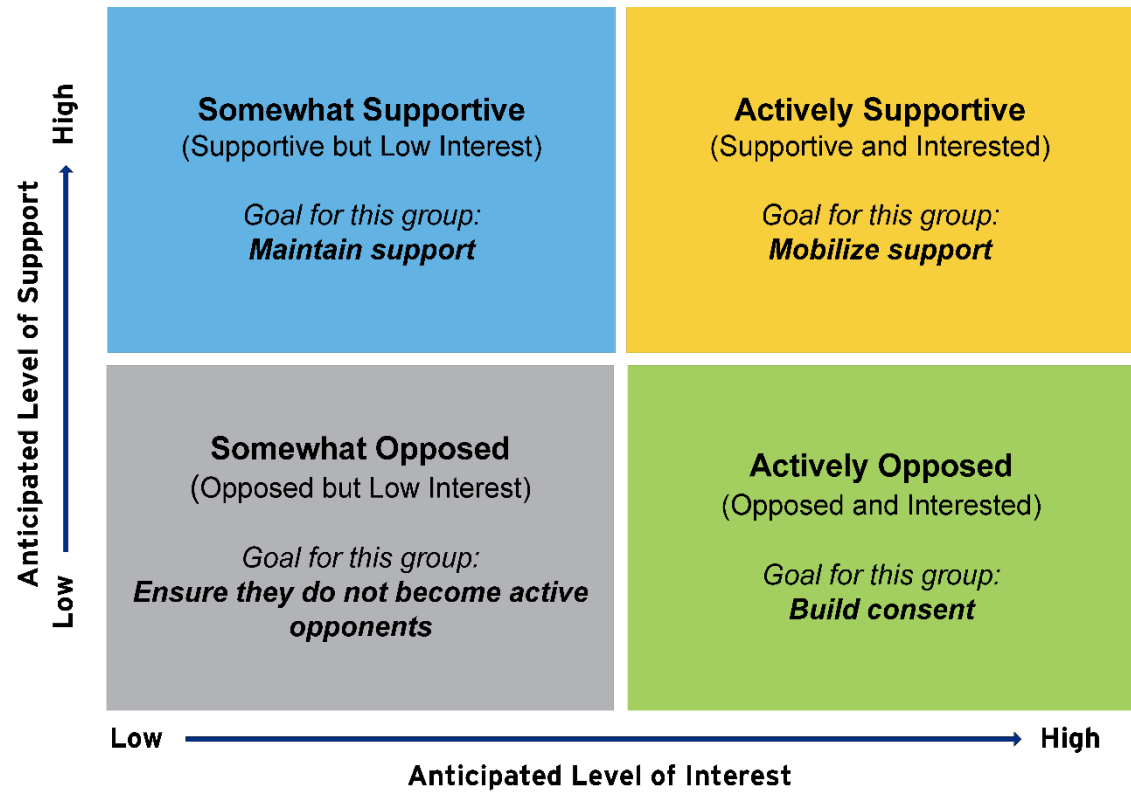


Table 1. Addressing Different Levels of Public Interest and Support

Somewhat Supportive Some people may be generally supportive of potential planning outcomes, but not all that interested in participating in the process. For supportive but low-interest stakeholders, passive types of outreach activities, primarily to keep them notified and informed may be enough.	Actively Supportive Some stakeholders may be supportive of possible planning outcomes and motivated to participate. For these people, two-way communication channels are important, so that they have an opportunity to not only follow along as the plan unfolds, but also to provide input and feedback along the way. Supportive and interested stakeholders may become active champions of plan recommendations later.
Somewhat Opposed Some people may be generally opposed to potential plan recommendations, but not to the point where they are motivated to participate in the planning process. While they may not initially appear to be interested, people and groups in this category have the potential to become active opponents, often late in the planning process after a significant amount of work has been accomplished. Consider more assertive, targeted strategies for keeping potentially opposed people notified and informed. Encouraging these stakeholders to take advantage of opportunities for input and feedback during the planning process will help you to understand the reasons behind potential objections and avoid surprises when the plan moves to the adoption process. Having educational information ready to help correct misconceptions can also be helpful for this group.	Actively Opposed It is not uncommon for complex plans to have people who are active opponents. Often, these are people who may fear that plan recommendations could be significantly detrimental to them or an aspect of the community that they care deeply about. Some active opponents may be motivated to attempt to obstruct the plan adoption or implementation process. For stakeholders in this category, consider more structured, in-person public involvement opportunities to help build a common understanding and informed consent. While some opponents may never agree with the ultimate plan recommendations, if they feel the planning team has made a concerted effort to listen, understand and address their issues, they are much less likely to take drastic action to block plan adoption. Where large opposition groups exist, engaging a professional facilitator can be helpful to work through potential issues.

2.3.4 Reaching Your Audience

You will usually need to go beyond general public notifications and press releases to make sure your audience is aware and informed of participation opportunities. Look for opportunities to meet with your audience where they are by taking advantage of local gathering places – churches, activity centers, etc. – where community groups already tend to congregate.

Setting up communication channels with target audiences early makes it easier to disseminate information and solicit input as the plan unfolds. General best practices for communication and outreach are discussed in Chapter 3. In addition, Table 2 below provides specific suggestions for reaching targeted populations or groups that may be found in your planning area. This list is not exhaustive; rather, it is intended to help spark ideas for reaching your unique audience.

Table 2. Outreach to Specific Groups

Target Population or Group	Possible Outreach Strategies*
Young People	• Coordinate with school districts offices to disseminate notices. • Send notifications to school districts, colleges and universities, including student body associations and student newspapers. • Reach out to high school social studies and civics teachers. • Coordinate with local business leadership or mentoring programs for young professionals.
Older People	• Send notifications to senior centers. • Consider large print versions of hard copy information.
Low Income People	• Coordinate with transit and human services transportation providers to get notifications to transit riders. • Post notices with local offices of Oregon Department of Human Services, Social Security Administration and public libraries. • Reach out to neighborhood councils in areas with concentrations of low-income populations.

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Target Population or Group	Possible Outreach Strategies*
Disabled People	• Make sure all public events are held in locations that are ADA compliant and wheelchair accessible. • Coordinate with paratransit providers and/or local disability support services offices to disseminate notices. • Use the ADA checklist⁵ to assess your website accessibility.
People with Limited English Proficiency	• Reach out to churches that offer services in languages indicated by your Environmental Justice scan. (see Section 2.3.2.) • Look for radio stations with programs in languages indicated by your Environmental Justice scan. • Prepare translated hand-out materials. • Offer translation services upon request at public meetings.
Tribal Populations⁶	• Coordinate with the tribal planning director for advice on interacting with tribal members and potential meeting venues. • Publish notices in tribal newspapers/newsletters. • Request an opportunity to present to the tribal council.
Business Interests	• Coordinate with chambers of commerce to disseminate notices. • Request an opportunity to present to chamber members, or other local business/civic groups. • Advertise in the local business journal. • Contact leaders of local-chapter professional organizations.
* This list is not exhaustive! Use it to help generate your own ideas for reaching select groups within your planning area.	

⁵ The United States Department of Justice Civil Rights Division provides technical assistance documents related to the Americans with Disabilities Act (ADA) for state and local governments. A website accessibility checklist is available at <https://www.ada.gov/pcatoolkit/chap5chklist.htm>. (Retrieved April 30, 2019.)

⁶ Oregon maintains a government-to-government relationship with each federally recognized tribal nation in the state. Under ORS.182 162-168, each state agency is responsible for developing and implementing state programs that affect tribes. If your planning area includes or impacts tribal lands or people, a special consultation process may be needed. Contact your regional DLCD representative to coordinate this.

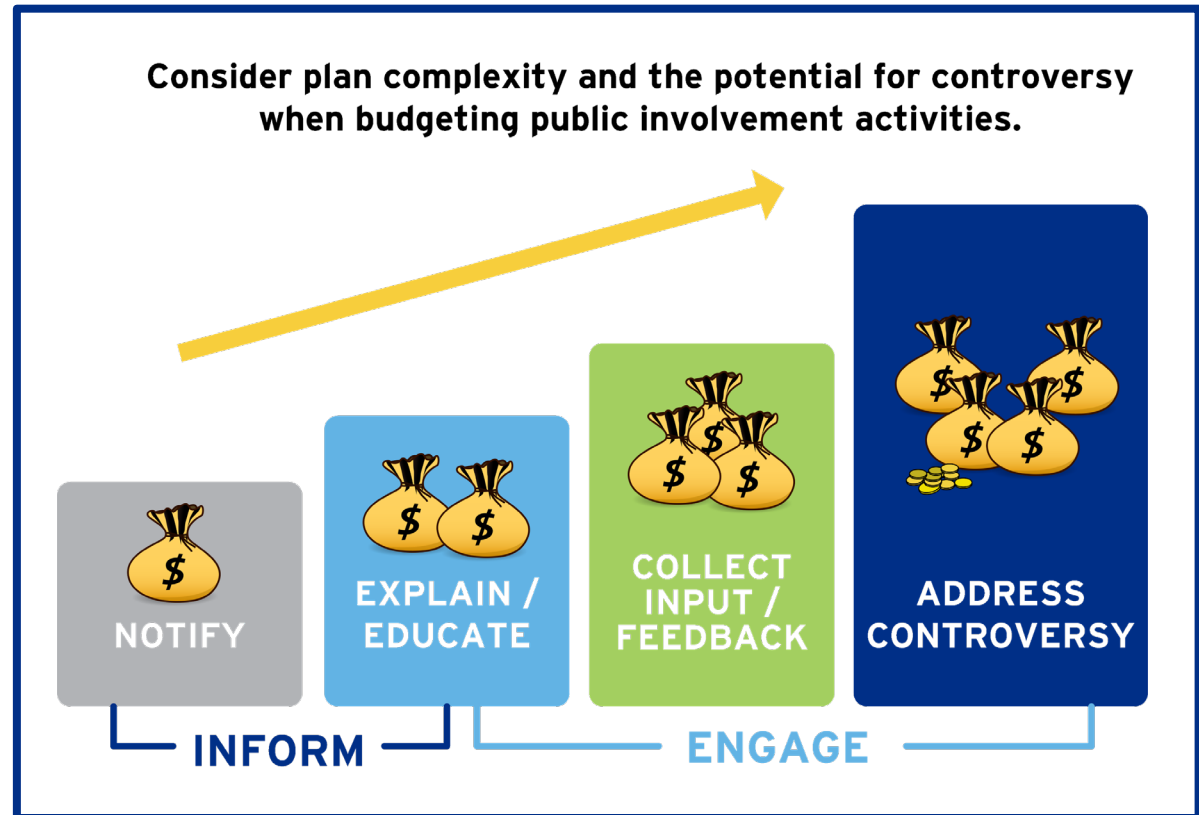
2.4 Preparing Your Public Involvement Plan

2.4.1 Budgeting for Outreach

Good planning is people intensive. This means a significant portion of the plan development budget will likely be spent on outreach and engagement activities. And, the level of complexity and controversy you anticipate during plan development will have a direct bearing on the amount of resources needed to accomplish the plan. For example, online tools may be cost effective options for public notifications or collecting input and feedback; however, controversial situations may call for more time-intensive activities using a face-to-face approach.

Often budgets for planning efforts are established long before the planning work begins. Preparing a public involvement plan is an opportunity to give your budget a reality check. While many strategies can help to make public engagement more cost effective, corners can only be cut so far. If your agency's resources are not adequate to support a level of engagement that is appropriate and necessary for your plan, consider reaching out to external partners such as stakeholder agencies, community organizations or non-profit groups to see if others have the capacity to shoulder some of the outreach effort.

Figure 4. Budgeting Considerations



In the event that adequate resources for public involvement are simply not available, decision makers should consider whether it is wise proceed with the planning effort until this can be resolved. In rare situations where it may be necessary to proceed, the reasons for limiting public access to the planning process must be clearly explained to the public.

2.4.2 Public Involvement Plan Components

An effective public involvement plan should contain these core elements:

- Study area description, including a map.
- Planning purpose and desired outcomes (see section 2.2.1 for suggestions on how to craft a purpose statement).
- Public involvement objectives (see section 2.2.2 for suggestions).
- Information on how recommendations or decisions will be made during the planning process. A timeline showing how public involvement activities will relate to key decisions or milestones is helpful. Information on how public input will be used as decisions are made should also be included.
- Communication protocols for the project, including how the planning team will handle public inquiries, media relations, interactions with other agencies or tribal governments, and methods for documenting the outreach process.
- Description of any general outreach materials to be prepared, such as a website, brochures, flyers, fact sheets, etc.
- Communication and engagement activities planned, including specific strategies for reaching and engaging your target audiences.

Appendix C provides an editable template that can be customized to document your anticipated public outreach and engagement activities.

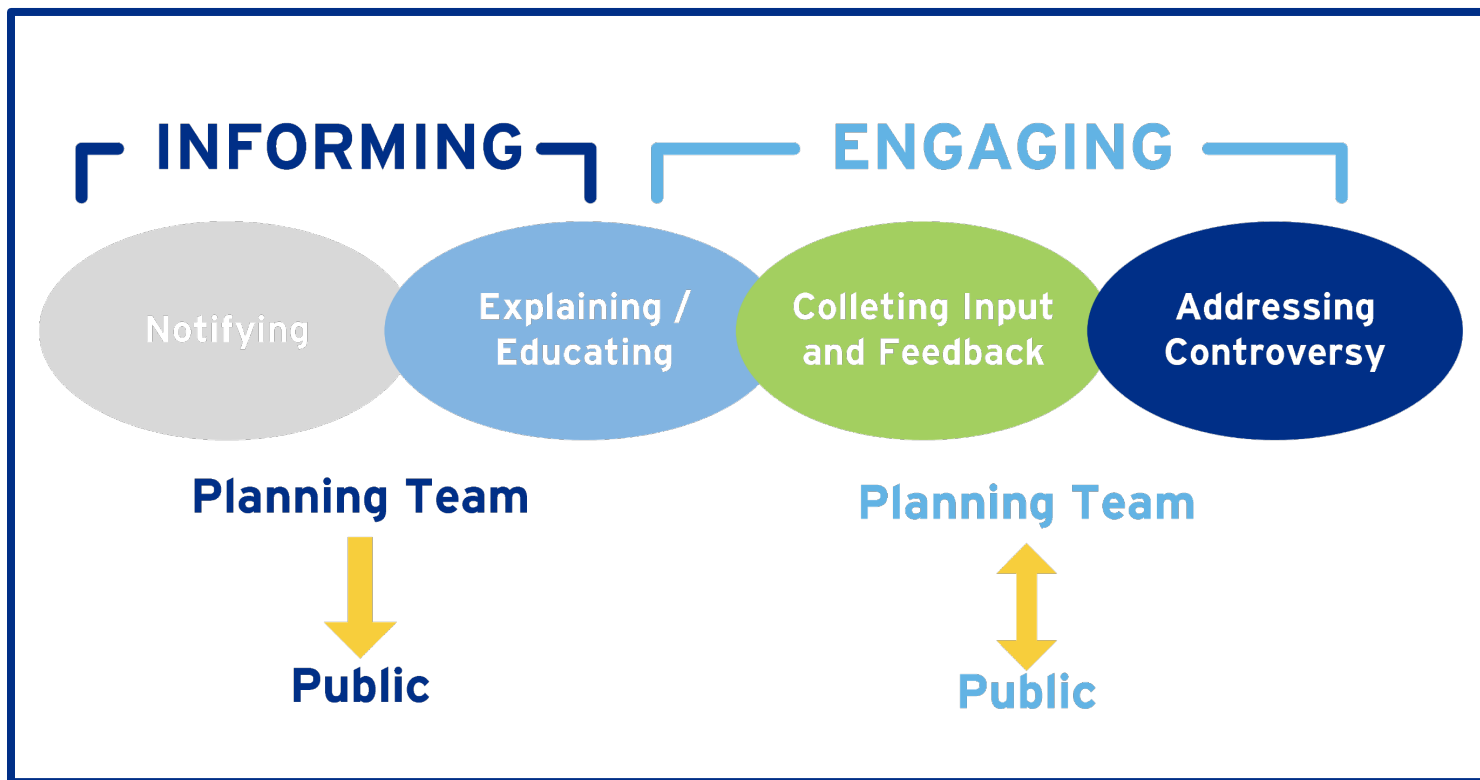


3. Tools and Strategies

3 Tools and Strategies

Tools and strategies for public engagement range from communicating information about the plan and planning process to engaging people in two-way collaboration. Most public involvement programs will require activities for one-way communications from the project team (such as project notifications, or information about the study or process), as well as two-way communication to collect input and feedback. Complex plans may require higher levels of two-way engagement, to understand and address significant barriers or concerns.

Figure 5. The Communication Continuum



3.1 Key Communication Principles

The public's trust in government can be a fragile thing, and an agency's approach to public communications can either elevate or diminish this trust. It can be easy to lose the public's trust, and difficult to regain it once lost. An open and transparent public process is key to the successful development, adoption and implementation of any plan.

As public involvement activities are performed, these core communication practices can establish the planning team's credibility and help to maintain trust:

- **Be truthful.**
- **Be crystal clear about the public's ability to influence or drive decisions.** People need to understand how their input will be used. The IAP2 "Spectrum of Public Participation" can help to clarify and articulate the level of influence that the public can expect to have in the planning process. (See Figure 2.)
- **Listen.** And seriously consider what you are hearing. Don't just wait for your chance to talk.
- **Focus on interests, not positions.** Ask "why" to get at the reasons behind positions taken by members of the public.
- **If you don't know, say so.** Then follow up.
- **If you're wrong, admit it.**
- **Be reliable.** Follow through on all commitments, whether written or verbal.

3.2 Explaining Planning Concepts to Lay Audiences

Helping people to understand complex planning concepts is a chief objective of the public involvement process.

Boil it down; don't dumb it down. Brevity is important, but no one appreciates being talked down to.

Answer the “why should they care?” question. To communicate planning concepts in a way that is both interesting and comprehensible, provide context that is meaningful for the audience. Working through an audience identification exercise at the beginning of the planning process (see Section 2.3) will help identify how planning concepts may affect various individuals and groups. In conveying complex information, a sentence or two to explain why your audience should care can help people grasp the meaning and importance of the information.

Avoid jargon and acronyms. Straightforward everyday language is essential.

For example, statements like this are frustrating for members of the public who may be seeking information about the process:

“TSP deliverables will be reviewed by a PAC with representation from the CPC, B-PAC, COG, EDC, DLCD, ODOT, OHA and ODEQ, before submission to the CPC for ultimate consideration by the City Council.”

Plain language is better. For example,

“The planning team will work with an advisory group that includes organizations with land use,

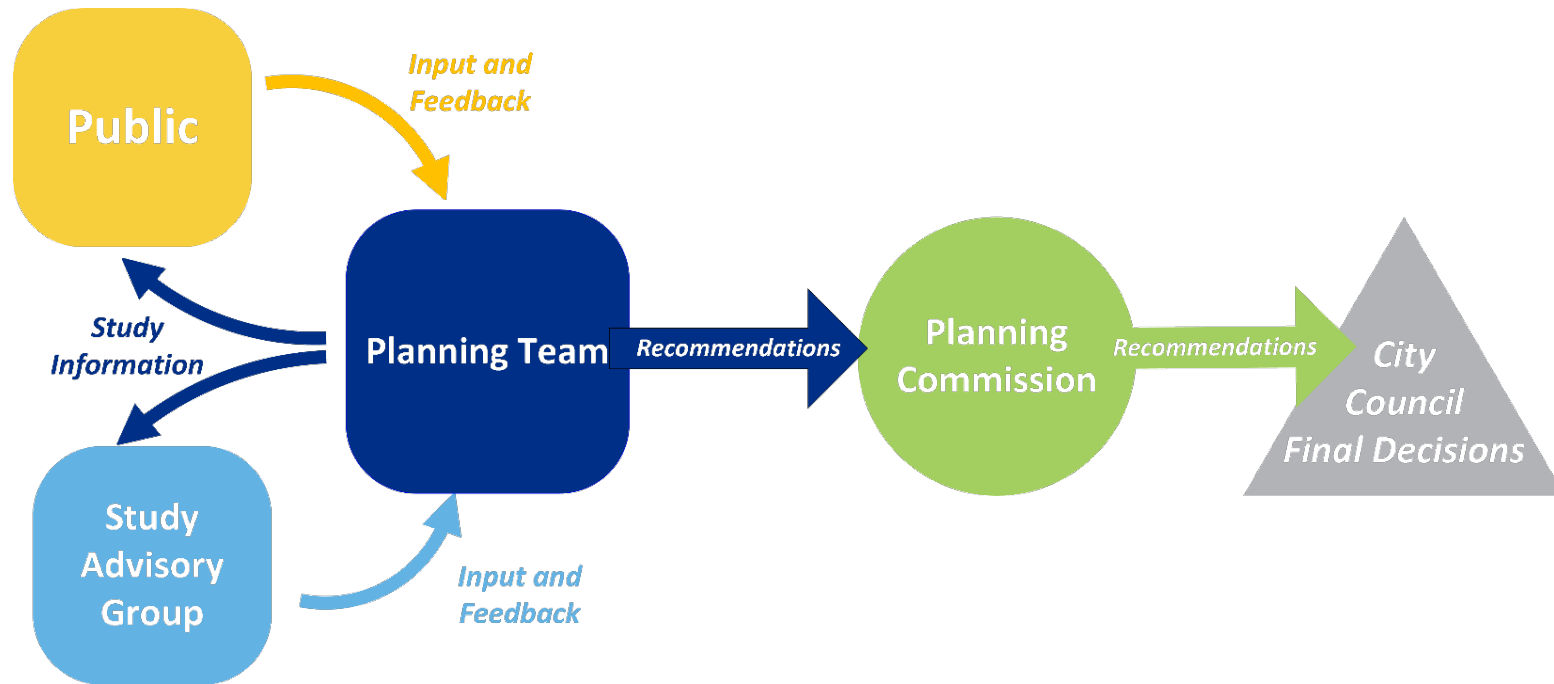
“Remember that there is a difference between using language that is simple (easy to understand), and simplistic (treating the problem as if it is not actually very complex at all). Keep your words as simple and clear as possible and use real-life examples and illustrations where possible. But don’t patronize your audience by pretending that something is not as complicated as it really is.”

*-- Dr. Emily Grossman, Science Communicator
How to Present Complex Ideas Clearly
The British Council, Voices Magazine, May 2015*

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transportation, health, economic and environmental responsibilities, before making recommendations to the planning commission and city council. A full list of the organizations involved is available on our website if you're interested."

Even better, a simple infographic makes the point at a glance:



3.3 Informing

“Informing” includes notifying people and explaining information about the planning study. Table 3 describes techniques and strategies that could be considered for informational objectives. These are primarily one-way communication tools. Strategies that encourage a two-way dialogue (see Section 3.4) are often more effective for educational objectives.

Table 3. Tools for Informing

Tool	Description and Strategies for Use	Best for	
		Notifying	Explaining/ Educating
Briefing	A presentation given in-person, or a brief informational paper, often tailored to a specific person or group such as an elected official, policy board, neighborhood council, or a civic organization.		✓
Brochure	An informational handout, usually printed, to provide general information about the planning study and process.	✓	✓
Community Profile	A compilation of general demographic information about people in the study area. A community profile might include information on population, age distribution, ethnicity distribution, income levels, housing units, household size, existing land uses, or other relevant facts. A community profile could be printed or made available online.		✓
Direct Mail	Distribution of information about the planning study or planning process via the U.S. Postal Service. Direct mail campaigns can be costly but provide a level of certainty that affected interests have been notified. Where cost is a concern, an initial direct mail campaign could direct people to an online source for future updates, or let people know how they may sign up to receive future notifications and information via email.	✓	✓

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Tool	Description and Strategies for Use	Best for	
		Notifying	Explaining/ Educating
Displays	Posters, banners or other large-size documents suitable for displaying on easels, walls or other vertical spaces. Displays may be used to provide information at a specific public meeting. Or, they may be designed as self-explanatory materials that can be left unattended in a public space over a certain period of time for people to peruse at their convenience.		✓
Email	Compiling an email list of interested parties and providing periodic email updates is a cost-effective way to communicate information about the plan and planning process.	✓	✓
Fact Sheet	Typically, a one to two-page document, either printed as a handout or made available online, that provides information about the plan or a specific planning topic. Fact sheets are useful in helping to dispel misinformation. A complex planning study might have separate fact sheets for a variety of individual topics.		✓
FAQs (Frequently Asked Questions)	A set of questions and responses about the planning study, or specific planning topics used to educate the planning audience and reduce misinformation. This is a useful item to include in a media packet .		✓
Flyer	A one-page, one-sided handout suitable for posting in public places, often with brief information about the plan and upcoming outreach activities. Other agency	✓	

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Tool	Description and Strategies for Use	Best for	
		Notifying	Explaining/ Educating
	partners, such as transit providers, or social services offices, can often help to post or distribute flyers.		
Infographics	A compilation of images and/or charts with minimal text, that helps to explain a planning concept or process. Infographics can be useful at multiple levels ranging from an “at-a-glance” overview of a specific topic or an explanation of a more complex process. For example, A flow chart of your planning process may be a helpful infographic that can be used as a stand-alone document or inserted in other outreach materials.		✓
Media Packet	Providing “ready to publish” information about the planning study or process for those in the media industry can be an effective way of managing your message and reducing the spread of misinformation. A basic media packet might include a press release , a study area map, fact sheet or FAQ’s , timeline, and perhaps an infographic about the planning process or a specific topic. A media packet could be made available online for download by media outlets.	✓	✓
News Articles	Information about the project that is published in print or online, usually at no cost to the planning study. Providing information in a press release or media packet can help to encourage news outlets to publish stories. Some publications may allow a planning team member or a local elected official to contribute an article as a guest columnist. Others may seek out interviews with members of the	✓	✓

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Tool	Description and Strategies for Use	Best for	
		Notifying	Explaining/ Educating
	planning team or others. For complex or controversial plans, it is important to establish the planning team as the official, legitimate source of information. The planning team may wish to sit down with local news editors to ask for assistance in making sure published stories are balanced and factual.		
Newsletter	Typically, a one to four-page document, either mailed, emailed, handed out, or posted online, that is updated and distributed periodically throughout the planning study. Newsletters provide a status report, explaining plan recommendations as they unfold, as well as the reasons behind the recommendations. In addition, newsletters can communicate next steps and explain any upcoming participation opportunities.	✓	✓
Newspaper Ads	Purchased space in a print or online publication, typically used to notify people of input opportunities. (While less common, larger planning projects with significant budgets may sometimes purchase bigger advertising spaces to display or explain specific plan recommendations.)	✓	
Online Ads	Advertisements placed with online search engines, third-party websites, online publications, or other online services to notify people of input opportunities.	✓	
Presentations	Speaking to groups about the planning study or process, often using a slide show.	✓	✓

Putting the People in Planning

Tool	Description and Strategies for Use	Best for	
		Notifying	Explaining/ Educating
Press Release	A text document, typically one page or less, sent to news outlets to provide information about the planning study and process, including announcing upcoming milestones or public involvement opportunities.	✓	
Reports	The planning study may produce interim reports or technical memos, such as a community profile or an existing conditions report, that can provide valuable information for interested parties. Including executive summaries can be helpful for a lay audience.		✓
Social Media	A host of social networking applications can be used to help disseminate plan information. These tools require careful planning to determine if and how social media interactions will be used during the planning process. For example, perhaps the planning team wishes to use social media to get the word out about a specific event but does not have the resources to monitor and respond to ongoing social media discussions. In this case, messaging should be clear that social media comments will not be monitored or considered by the project team. Instead, people could be directed to official input channels.	✓	
Speakers' Bureau	Enlisting volunteers from outside the planning team to present information to community groups can be a budget-sensitive way to expand the reach of a public involvement program. Care is needed, however, to confirm that volunteer		✓

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Tool	Description and Strategies for Use	Best for	
		Notifying	Explaining/ Educating
	speakers are well-educated on the salient planning issues and topics, and to make sure that no unintended bias or alternative agendas are introduced.		
Translated or Alternate Format Materials	If a scan indicates the planning area has concentrations of people with limited English proficiency, preparing translated versions of informational materials such as brochures , flyers or newsletters may be important. ⁷ It may also be desirable to provide these general informational materials in a large-print format to assist older or visually impaired participants.	✓	✓
TV or Radio Spots	A public service announcement (PSA) can be written and sent to local radio and television stations. PSA's are often communicated by media outlets free of charge to help raise awareness of topics that are in the public interest. The planning team typically has no influence on when a PSA will air, however. Purchased radio or TV spots are another option. An independent production company may be hired to develop an audio or video advertisement. Or a media	✓	

⁷ Executive Order 13166, signed by President George W. Bush on August 11, 2000, requires that agencies who are recipients of federal funds take reasonable steps to ensure meaningful access to their programs and activities by people with limited English proficiency. Agencies often ask if there is a population threshold or other quantifiable factor that would indicate when accommodation should be provided; however, this is a judgment call to be made on a case by case basis. Generally, agencies should consider four factors: 1. The number or proportion of people with limited English proficiency that will be affected by planning decisions; 2. The frequency with which limited English speaking people will come in contact with the planning process; 3. The nature and importance of the plan to people's lives; and 4. The cost of accommodation and resources available to the planning agency. For additional information, refer to the Federal Interagency Website on Limited English Proficiency at www.lep.gov.

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Tool	Description and Strategies for Use	Best for	
		Notifying	Explaining/ Educating
	station may have its own production capabilities and can work with the planning team to create a customized script or video about the project for a fee.		
TV, Radio or Newspaper Interviews	Advance preparation is important if there is a chance someone from the project team may be asked for an interview by a television, radio station or print publication. As part of your public involvement planning, be sure to identify who is authorized to speak to the media about the project and direct any interview requests to that person. Strategize key messages with your planning team and create an FAQs document to help prepare responses to questions that your spokesperson may be asked. Also see guidance above for news articles .	✓	✓
Website	An online presence for most planning studies has become a standard practice. If your agency has a website, perhaps a new page can be created for your specific planning project. Alternatively, if a separate website for the planning study is desired, many low-cost website builders are available that allow someone with little or no web design experience to create an effective site for disseminating information. (See Section 3.4.1 for discussion of online tools for two-way interaction.)		✓

3.4 Engaging

“Engaging” means having **two-way** communication with the public as plans are prepared and decisions are made. This section highlights interactive strategies that can generate meaningful input and feedback from the public, helping people to become knowledgeable participants in the planning process. Engagement strategies can also help to manage and resolve controversial situations.

3.4.1 Tools for Input, Feedback and Developing an Informed Public

Advisory Committees. Oregon Statewide Planning Goal 1 requires governments to have a committee for public involvement, to monitor and encourage public participation in planning. This committee may be helpful in an advisory capacity as the plan is developed. Alternatively, you may wish to form a plan-specific committee by either supplementing the general public involvement committee with people representing additional interests or establishing a separate advisory group altogether.

A written charter is recommended for any advisory committee, to explain the purpose of the committee, membership criteria, committee and individual member roles and responsibilities, and how the committee’s activities will be documented and used during the planning process.



Advisory Committee: Carlton Pool House Restoration

The City of Carlton appointed a Project Citizen Advisory Committee to spearhead the restoration of the Municipal Pool House after a narrow defeat of a local bond measure. A broadly representative group, committee members became active champions for the project, leading public outreach activities for the City and ultimately shepherding the project through to a successful completion.

The City received an ACE (Achievement in Community Engagement) Award for empowering community members to mobilize support, in order to accomplish a beneficial public project.

Meetings. Public workshops, open houses, neighborhood meetings and similar forums are useful for giving the public access to the planning team, to ask questions or have more in-depth discussions. Public meeting locations should be selected carefully to avoid physical barriers for people with limited mobility or who rely on assistive devices. Accommodation for people with other disabilities may need to be provided upon request.

Stakeholder Interviews. Telephone or in-person interviews with key constituents may be helpful at the beginning of a planning project to identify issues of importance and concerns that may need to be addressed.

Community Conversations. Meeting people where they already spend time can be an effective way to capture broad input from community members who may not otherwise participate in the planning process. Consider bringing planning project information to community events, churches, schools and universities, and other venues where people congregate and socialize. Request opportunities to get on agendas for civic group meetings such as neighborhood councils, tribal councils, chambers of commerce, Rotary clubs, Toastmasters, etc. Cultural events and festivals sponsored by minority groups are excellent places to interact with potential planning stakeholders.

ADDRESSING CULTURAL AND LINGUISTICAL BARRIERS

People from diverse cultural backgrounds, especially those with limited English proficiency, are often underserved by conventional outreach methods. Failing to account for cultural diversity in your planning process can set up de facto barriers to full participation.

- **Seek out and consult with cultural leaders in the community, to identify potential barriers and ways to overcome them. Ask for help in educating your planning team on cultural norms and expectations of the groups you need to reach.**
- **Go to where the people are! Meeting locations which may seem unconventional, but which are familiar and comfortable for your audience, can help underserved people feel more confident in participating.**
- **Religious organizations, immigrant services, regional health professionals and other community and social service organizations who routinely interact with people from diverse cultures may have good advice for making connections and communicating effectively.**

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Small group meetings at the neighborhood level can help lessen the intimidation factor, especially for participants from diverse cultural backgrounds, or those who are participating in a planning process for the first time.

Translation Services. Making translation services available at public meetings or for individual stakeholder discussions may be important if the study area includes concentrations of people with limited English proficiency⁸, or if a planning participant requires sign language translation. A number of Oregon firms offer translation services for a fee, including many in the Portland area. Nearby colleges and universities can sometimes be a potential source of volunteer translators. When it is necessary to enlist the services of a translator at a distance, web conferencing can help to control costs by eliminating the need for travel.

Focus Groups. A focus group is a tool often used in market research. It involves convening a small group of people who generally represent the demographic makeup of a given geographic area. Researchers use these small groups to solicit reactions and perceptions about a specific topic or product. For development of land use plans, a focus group can be helpful in vetting public information to make sure it is clear and understandable, and to explore how the broader public might respond to certain planning concepts or regulatory proposals. Using a neutral third-party to facilitate focus groups is usually a good idea, to ensure the planning team is not introducing their own biases into focus group questions or interpretation of responses.

Online Engagement Tools. Online tools have evolved to allow for robust community interaction and can have significant advantages. They can cost-effectively reach a broad cross-section of the community and are especially effective at providing participation opportunities for people who are short on time, lack transportation, or are uncomfortable attending public meetings. Additionally, online educational tools can be designed with varying levels of detail for different audiences.

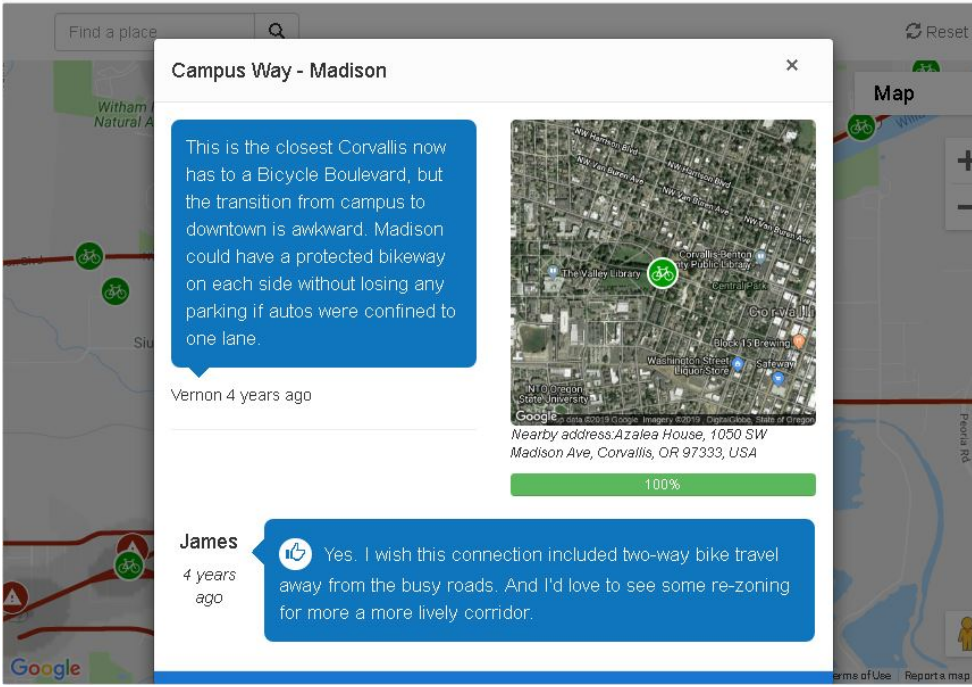
⁸ Ibid.

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If desired, online comments can be made visible to other participants, improving the transparency of the planning process. Another advantage is that data is also easily compiled to help monitor how many people are accessing online information or linking to specific topics.

While there may be important reasons to provide opportunities for face-to-face interaction in many planning processes, nearly all plans will benefit from online interaction. At the basic level, providing a way for people to learn about the plan and submit comments online is helpful. Where greater online interaction is desired, online discussion forums or webcasts can allow people to interact with each other or with the planning team to discuss planning concepts. Some specialized webtools allow participants to explore the potential impacts of their own ideas and choices, to become more informed about planning concepts.

Surveys, Polls and Questionnaires. Surveys can be an efficient way to gather and organize information from large numbers of people. Examples include formal public opinion surveys with statistical validity, more general community surveys, questionnaires that allow for open-ended questions and detailed responses, or even keypad polling during large group meetings to quickly assess group opinions and reactions.



Online Engagement: Corvallis Interactive Mapping Tool

For a Transportation System Plan update, the City of Corvallis used an interactive mapping tool to collect information from the public on known transportation issues. Participants could click on the map to describe areas of concern for later review by the planning team. Other members of the public could view and comment on posted issues, prompting a community dialogue.

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Surveys, polls and questionnaires need to be carefully designed. Unclear questions can lead to large numbers of non-responses or erroneous findings. Consider these tips to help avoid unintended bias and low response rates:

- Check to make sure that questions are posed from a neutral standpoint since phrasing that unintentionally evokes positive or negative reactions can introduce bias.
- Prioritizing questions that are most important and reducing the number of less important questions is a good idea. “Survey fatigue” can occur if respondents are asked to answer a large number of questions or read long narratives before answering, leading to incomplete surveys.
- Take care to use color schemes that are simple, neutral and professional-looking since the survey instrument itself can evoke unintended reactions if people are turned off by distracting colors or graphics.
- It is a good idea to explain upfront how responses will be used, and whether or not individual responses will remain anonymous.
- Timing can also be important. During certain times (such as in the summer and fall months leading up to a presidential election, for example), planning projects may compete for public attention with other issues. Community members can experience polling fatigue during these times and may be less likely to respond.

3.4.2 Addressing Controversy

People experiencing anxiety about potential planning outcomes may react toward others in ways that are uncomfortable or unpleasant. It can be tempting to avoid direct contact with prickly people when controversial situations arise. However,

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managing controversy absolutely requires an in-person approach. And, it takes time. A foundation of trust is necessary for open, honest dialogue and trust building is usually accomplished through multiple face-to-face interactions. Providing opportunities for structured, facilitated dialogue can promote a civil discourse between groups of people who may disagree with each other, or with potential plan recommendations.

Consider the following approach for building community consent in controversial situations:

- **Listen.** An initial listening session to air and understand differences can help open a constructive dialogue. Focus on *interests*, not *positions*: Ask “why” often, to get at the reasons behind controversial positions. Avoid the temptation to respond with immediate answers, and rather take listening session input “under advisement”. Especially avoid discounting any input or suggestion at this stage no matter how impractical it may seem. The purpose of the listening session should be to do just that – listen!
- **Think.** Give careful thought to the input received, especially the “why” behind concerns heard at the listening session, before the next interaction.



Managing Controversy: Bend Urban Growth Boundary

The City of Bend received an ACE (Achievement in Community Engagement) Award for their people-centered process to resolve controversial Urban Growth Boundary expansion issues. The City's process included three technical advisory committees, representing a broad cross section of the community, who participated in 41 meetings over a 20-month period. Online interaction extended the reach of the project to members of the general public.

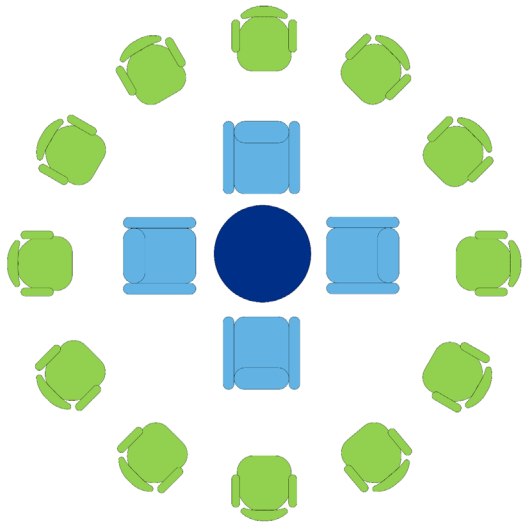
In addressing a controversial situation, this successful effort demonstrated the importance of taking time to build an informed public and collaboratively generate solutions.

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- **Explore.** This is the time to get creative and identify possible alternatives for addressing concerns raised. Focus on looking for alternatives that address the “why” behind the concern, rather than the concern itself. You may wish to explore alternatives internally with your planning team before taking ideas back to your constituents. Or, if a stated objective of your public involvement process is to empower community members, direct collaboration with the individual or group raising objections may be helpful here.
- **Discuss.** Convene a discussion of alternatives with the affected people. Whenever possible, bring more than one option to the table that your planning team can live with.
- **Repeat.** Several rounds of listening, exploration and discussion may be needed to ultimately determine a path forward.

When You Can Compromise No Further.

Note that public “consent” may not be “consensus”. For complex plans, it is unlikely that every stakeholder will agree 100% with every plan recommendation. Planning decisions need to be good for a majority of



“SAMOAN CIRCLE ”

- To speak a person must be seated in a center (blue) chair. Those in the outer circle (green chairs) or anywhere else in the room must remain silent.
- A person may come to the center as often as they like, whenever there is an open seat, and remain as long as they like.
- A person in the center may invite anyone else to join them in an open chair.
- When the center chairs are full and others wish to speak, standing and hovering behind the center chairs is allowed (without vocalizing.)

**Structured Listening Technique for
Discussing Controversial Subjects**

A “Samoan Circle” is an example of a discussion technique that can help groups to articulate and understand opposing issues. The process, which encourages civility and humanizes interactions, can be tailored to groups ranging in size from 10 to several hundred participants. Although the exercise is structured, the discussion is owned by participants, not the presenter - a powerful way to show a planning team’s desire for open and honest dialogue.

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people over a long period of time, not just immediately expedient. And, decisions should never compromise the ability of future generations to meet their needs. Consent building looks for common ground where it can be found, without undermining the integrity of plan recommendations, unreasonably delaying the process, or giving disproportionate weight to the concerns of a small group of vocal opponents.

In working through controversial issues, there may come a point when all practical ideas have been exhausted, yet objections persist. A relationship of trust and respect between the planning team and potential opponents is crucial to helping people to understand and accept a greater public good. A planning team's sincere commitment to consent-building can reduce the potential for stakeholders to take drastic actions to block plan adoption or implementation later in the process, even if they are not happy with the outcome.

3.5 Selecting the “Right” Outreach Techniques

Table 4 provides a high-level summary of many tools and strategies described in these guidelines, including a comparative assessment of the resources needed to implement them.

Table 4. Matching Outreach Strategies with Your Audience, Budget and Participation Objectives

Tool or Strategy (Click on the tool or strategy name to be taken to the relevant section in these guidelines.)	Suitable for			Cost Level \$ Low \$\$ Med \$\$\$ High	Planning Team Time Commitment ○ Low ◐ Med ● High	Participant Time Commitment ○ Low ◐ Med ● High	Notes
	Informing/ Educating	Collecting Input and Feedback	Addressing Controversy				
Advisory Committees	✓	✓	✓	\$ to \$\$\$	●	●	Third-party facilitator can be helpful in controversial situations.
Briefing	✓			\$	○	○	
Brochure	✓			\$	○	○	

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Tool or Strategy (Click on the tool or strategy name to be taken to the relevant section in these guidelines.)	Suitable for			Cost Level \$ Low \$\$ Med \$\$\$ High	Planning Team Time Commitment ○ Low ◐ Med ● High	Participant Time Commitment ○ Low ◐ Med ● High	Notes
	Informing/ Educating	Collecting Input and Feedback	Addressing Controversy				
Community Conversations	✓	✓	✓	\$\$	●	◐	
Community Profile	✓			\$\$	◐	○	
Direct Mail	✓			\$ to \$\$\$	◐	○	Cost depends on number of mailing recipients
Displays	✓			\$\$	◐	○	
Email	✓	✓		\$	◐		
Fact Sheet	✓			\$	○	○	
FAQs	✓			\$	○	○	
Flyer	✓			\$	○	○	
Focus Groups		✓		\$\$	●	●	Third party facilitator is a good idea.
Infographics	✓			\$	◐	○	
Media Packet	✓			\$	◐	○	Need to keep media files updated to avoid misinformation.
Meetings - Public Workshop	✓	✓		\$ to \$\$	●	●	
Meetings - Open House	✓	✓		\$ to \$\$	●	◐	
Meetings - Consent Building	✓	✓	✓	\$ to \$\$\$	●	●	Facilitation consultant can be helpful in controversial situations.
News Articles	✓			\$	○	○	
Newspaper Ads	✓			\$\$	○	○	

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Tool or Strategy (Click on the tool or strategy name to be taken to the relevant section in these guidelines.)	Suitable for			Cost Level \$ Low \$\$ Med \$\$\$ High	Planning Team Time Commitment ○ Low ◐ Med ● High	Participant Time Commitment ○ Low ◐ Med ● High	Notes
	Informing/ Educating	Collecting Input and Feedback	Addressing Controversy				
Online Ads	✓			\$\$	○	○	
Online Engagement Tools	✓	✓		\$ to \$\$	◐	◐	Simple online review and comment opportunities are straightforward and inexpensive. Consider consultant assistance for design of other interactive tools.
Presentations	✓			\$\$	◐	○	
Reports	✓			\$	◐	◐	Consider creating executive summaries for technical reports
Social Media	✓	See notes		\$	○ to ●	○	Monitoring and responding to social media comments may require a significant effort.
Press Release	✓			\$	○	○	
Speakers' Bureau	✓			\$\$	◐	○	Time commitment for volunteer speakers can be ◐ to ●
Stakeholder Interviews		✓		\$	◐	◐	
Surveys - Online		✓		\$	◐	◐	Online survey tools can reduce the level of effort needed to compile and

Putting the People in Planning

Tool or Strategy (Click on the tool or strategy name to be taken to the relevant section in these guidelines.)	Suitable for			Cost Level \$ Low \$\$ Med \$\$\$ High	Planning Team Time Commitment ○ Low ◐ Med ● High	Participant Time Commitment ○ Low ◐ Med ● High	Notes
	Informing/ Educating	Collecting Input and Feedback	Addressing Controversy				
							summarize survey findings.
Surveys - Emailed or Hard Copy		✓		\$	●	◐	
Surveys - In-Person		✓		\$ to \$\$\$	●	◐	
Surveys - Keypad Polling		✓		\$	○	○	Useful in large group meetings.
Surveys - Statistically Valid		✓		\$\$\$	●	◐	Hiring a public opinion research consultant is a good idea when statistical validity is needed.
Translated or Alternate Format Materials	✓	✓		\$	◐	○	
Translation Services	✓	✓		\$\$	◐	○	
TV or Radio Spots	✓			\$ to \$\$	◐	○	Public service announcements are aired for free. Paid spots are also an option.
TV, Radio or Newspaper Interviews	✓			\$	◐	○	Prepare carefully.
Website	✓	✓		\$	◐	○	

3.6 Monitoring, Evaluating and Documenting Your Public Involvement Program

3.6.1 Checking In on How It's Going

Statistics such as public meeting attendance and website hits can be tracked as the planning process moves forward. After the first significant outreach event, it is a good idea to review and assess whether public participation is in line with your expectations or if an adjustment is needed.

Low turnout at meetings can indicate more promotion may be needed, or perhaps a shift toward more online participation opportunities may be warranted. Low participation rates online may indicate that interactive tools are too complicated, or written information is confusing. Asking for feedback from those who take advantage of participation opportunities may help to identify things that may be inadvertently discouraging others from participating and generate ideas for increasing participation rates.

3.6.2 Measuring Performance

Measures for gauging the effectiveness of your public involvement program can be tied back to the objectives you identified when first preparing your public involvement plan (See Section 2.2.2.).

Data is needed to assess performance. While it is fairly easy to track numbers of meeting attendees or numbers of website hits, these numbers do not tell you much about the effectiveness of your information and communication methods. Including an evaluation form for participants to complete as they take advantage of input and feedback opportunities can be helpful.

Table 5 demonstrates how performance measures could be linked back to initial objectives for a public involvement program.

Table 5. Example Public Involvement Performance Measures

Example Public Involvement Objective	Possible Ways to Measure
Clearly articulate the process for decision-making and opportunities for input or influence. Communicate accurate, understandable and timely technical information throughout the planning process.	• Ask participants to complete an evaluation form to rate the clarity of information about the process and planning concepts.
Give potentially affected people an opportunity to express concerns so that they can be considered as the plan is developed.	• Were notices broadly distributed? (Y/N) • Did the planning team provide targeted notifications to potentially affected people or groups? (Y/N) • Were opportunities to provide input and feedback convenient and considerate of the public's time? (Y/N)
Get balanced community feedback on concepts developed by the planning team.	• Number of participants providing feedback. • Geographic distribution of participants providing feedback (such as a zip code tally). • Did comments received reflect a variety of interests and needs? (Y/N)
Comply with Title VI of the Civil Rights Act, Environmental Justice rules and Oregon's Statewide Planning Goal 1.	• Did the planning team provide targeted notifications to disadvantaged or under-represented people or groups? (Y/N) • Was accommodation available for people with disabilities or language barriers? (Y/N)

3.6.3 Documentation

While the plan development process is underway, it is important to keep a log of questions, comments and suggestions received from the public, and notes on how the planning team addressed them. A key tenant of Oregon Statewide Planning Goal 1 is that members of the public are entitled to receive a response from their policymakers. Having an organized log of comments and responses from the planning process that can be made available to the public will help to facilitate this. For large numbers of similar comments, providing a synthesis that can be reported back to the public may be more appropriate than repetitively responding to each individual comment.

As the plan development stage comes to a close, it is important to compile and retain copies of all public notifications, press releases, news articles, meeting attendance rosters, and other outreach materials. These documents may be needed later to demonstrate input and feedback opportunities that were offered, and to help quantify and characterize levels of participation.

For documentation requirements in later stages of the planning cycle (plan adoption and implementation), refer to the administrative procedures in your agency's land development code.

Tool Box (Appendix Materials Provided Separately)

A - Public Involvement Process Checklist

B - Audience Identification Exercise - Instructions and Worksheets

C - Public Involvement Plan Template

D -Additional Resources and Links

APPENDIX A

Public Involvement Process Checklist

Preliminary Preparation

✓	Activity/Strategy
	Define the desired outcome of the land use plan
	Determine the level of influence that the public will have in the planning process
	Determine the study area and any extended areas of influence
	Research and document demographics of the planning area → Scan for Title VI and Environmental Justice populations
	Identify the planning audience and key stakeholders → Which constituents are likely to see a disproportionate or unique <u>positive</u> impact from the project outcomes? → Which constituents are likely to see a disproportionate or unique <u>negative</u> impact from the project outcomes?
	Brainstorm initial key messages
	Determine funding available for the public involvement effort
Tools	
▪ Participation ladders (e.g. IAP2 Spectrum of Public Participation) ▪ Audience Identification Exercise (See Putting the People in Planning Appendix B) ▪ Budget	

Public Involvement Plan

✓	Activity/Strategy
	Define public involvement objectives
	Define the process for making planning recommendations and decisions
	Define communication protocols, including → Public inquiries → Media relations → Interactions with other agencies or tribal governments → Methods for documenting the outreach process
	Describe general outreach materials to be prepared
	Describe the specific tools that will be used to inform and engage each stakeholder group, including culturally and linguistically appropriate methods for each audience
	Confirm that available budget and resources aligns with the level of effort needed. Resolve disparities if necessary.
	Assign roles and responsibilities for implementing public involvement activities
	Determine key community input points, such as → Agree on existing conditions → Develop alternatives → Select preferred alternative
	Develop a schedule for public involvement activities
	Identify feedback loops/mechanisms to ensure the process is transparent
	Develop criteria or measures to evaluate success
Tools:	
▪ Public Involvement Plan Template (See Putting the People in Planning Appendix C) ▪ US Census, EPA “EJSCREEN” tool, or ODOT TransGIS tool	

Informing

✓	Activity/Strategy
	Identify the communication tools that are best suited to reach intended audience(s)
	Provide notification with enough lead time to enable effective participation
	Create a shared understanding of the project purpose and desired outcomes; provide educational opportunities for stakeholders to learn more
	Provide information in non-technical jargon using a variety of formats – text, tables and images
	Translate materials into appropriate languages according to study area demographics
	Work with project partners to disseminate information
	Work with community-based organizations to engage various constituencies
Tools	
	- Briefing - Brochure - Community Profile - Direct Mail - Displays - Email - Fact Sheet - FAQs - Flyer - Infographics - Media Packet - News Articles - Newsletter - Newspaper Ads - Online Ads - Presentations - Press Release - Reports - Social Media - Speakers' Bureau - Translated Materials - TV or Radio Spots - TV, Radio or Newspaper Interviews - Website

Engaging

✓	Activity/Strategy
	Talk with key stakeholders to better understand issues, challenges and opportunities
	Design activities to engage individuals and groups
	Ensure activities are accessible in terms of location, time, and people of varied abilities
	Identify areas of broad agreement and issues to resolve
	Use a consent-building approach to address controversy (See the Putting the People In Planning Guidelines)
Tools	
	- Advisory Committee - Open Houses - Workshops - Online Engagement Tools - Translation Services - Surveys, Polls Questionnaires - Stakeholder Interviews - Focus Groups - Community Conversations

Monitoring, Evaluating and Documenting

✓	Activity/Strategy
	Determine how to measure the outreach objectives identified in your public involvement plan
	Monitor participation and adjust approach if needed
	Maintain a log of public comments and responses
	Record and report the results of engagement efforts
Tools	
	- Participant Feedback Forms - Public Comment Log

Public Participation in Land Use Planning:

Transforming Aspiration into Realization



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Introduction

Public participation is the first goal in Oregon's land use planning program. Why? Beginning in the 1960s and '70s, our nation witnessed an emerging demand for the integration of social, political, and environmental concerns in public decision making. When "*sagebrush subdivisions, coastal condomania, and the ravenous rampages of suburbia*" threatened Oregon's quality of life and economic base, Oregonians demanded greater participation in the land use decisions impacting their communities. The Oregon legislature adopted Senate Bill 100 in 1973 to reflect Oregonians' ethic of land stewardship.¹ The bill established the land use planning system, which included a strong public participation component.

Civic leaders, legislators, the governor, the Land Conservation and Development Commission (LCDC), and others recognized that the success of Oregon's land use program would depend on input from Oregonians. Thus, LCDC undertook a robust public participation initiative, mobilizing more than 10,000 Oregonians, distributing more than 100,000 informational pamphlets and questionnaires, and holding nearly 100 statewide workshops.^{2 3} This process bore the heart of the program: the 19 statewide planning goals. These goals still guide Oregon's land use program today. The first goal in Oregon's land use planning program is *Citizen Involvement*.

Goal 1 requires local governments to provide opportunities for the public to be involved in crafting the land use plans of their communities. While this objective is still worthwhile 40 years later, public participation in the program has dwindled. Today's implementation of Goal 1 fails to meet both its early successes and today's expectations for multiple engagement methods that reach diverse communities. Instead, most local governments meet a bare minimum level of notice, using mailed and sometimes e-mail notice to those already on a local government mailing list, holding public hearings after much discussion of a development has occurred privately between applicants and local staff, and without providing for things that would make it easier for more to attend, like bus passes and child care. As methods and information about how to effectively involve the public in government decision-making have evolved over the past 40 years, Goal 1 has stagnated. Now, meaningful public participation often occurs outside of the Goal 1 processes, if it occurs at all.

Key Findings:

Goal 1 and many local Citizen Involvement Programs (CIP) have not been updated since the beginning years of SB 100. Local land use plans were meant to be vibrant documents that were periodically updated with widespread involvement from residents. Over the years, however, the Oregon Legislature has curtailed the requirement that cities and counties update their comprehensive plans and CIPs, effectively removing or restricting critical opportunities for public participation in changing land use policy and preventing the evolution of Goal 1.⁴

The effectiveness of Goal 1 and local CIPs cannot be monitored or evaluated because the Goal does not contain qualitative or quantitative performance measurements and DLCD has not adopted any.

¹ Oregon Department of Land Conservation and Development, "History of Oregon's Land Use Planning," *Oregon.Gov.* Web. Accessed 01 June 2014 from <http://www.oregon.gov/LCD/Pages/history.aspx>

² Ame, John. "History of Land Use in Oregon." *Land Use Explorer* (2008). Web. Accessed on 07 May 2014 from <http://oregonexplorer.info/landuse/HistoryLandUseOregon>

³ Ame, John (2008)

⁴ Oregon Department of Land Conservation and Development, "Urban & Rural Issues," *Oregon.Gov.* Web. Accessed 9 July 2014 from <http://www.oregon.gov/LCD/Pages/urbanrural.aspx>

Some local governments are averse to public participation. Some, but not all, local governments tend to view public involvement as somewhere between a necessary evil and an outright annoyance, prompting many jurisdictions to do the bare minimum to provide public involvement in making individual land use decisions.

The public is largely unaware of the significance of Oregon's land use planning program. Without ongoing education and engagement, Oregonians are uninformed or disenchanted with the program, and opportunities to improve the program from public input are lost.

The majority of local Committees for Citizen Involvement (CCI) are made up solely of a jurisdiction's planning commission. Enhancing or evaluating Citizen Involvement Programs (CIP) may not be a top priority for planning commissioners, and this has led to little or no evolution of local CIPs or public participation processes.

Goal 1's guidelines are antiquated, ambiguous, and lack teeth. The indicators following each guideline are not enforceable by LCDC, so local governments that do not strictly adhere to their CIPs do not face consequences.

An Overview of Oregon's Land Use Program

The foundation of Oregon's land use planning program is its 19 statewide land use goals, each of which addresses a single topic. These topics include farm and forest land conservation, natural resource protection, housing, air and water quality, coastal resources, economic development, and urban growth. Every city and county in Oregon is required to complete a comprehensive plan consistent with the applicable statewide goals.⁵ The comprehensive plan should include an inventory of local resources used to establish long-range land use objectives, policies, and zoning ordinances. LCDC must review every local comprehensive plan to see whether it complies with the statewide Goals, and "acknowledge" those that do, while sending back those that do not. By the mid-1980s, LCDC had acknowledged every city and county land use plan.

The phases of the planning process can be grouped into three categories: plan development, plan implementation, and plan revision.⁶

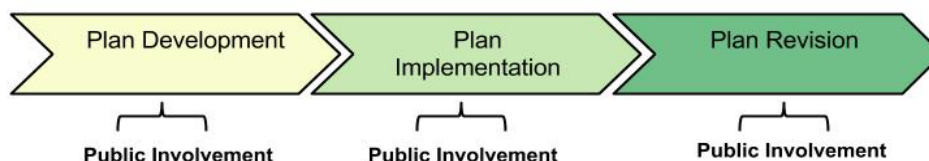


Fig. 1 . The linear progression of the three phases in the planning process as they relate to public involvement

Plan development, or creation, is the first phase of any planning process and shapes subsequent land use policy, with few procedural limitations on public participation. It often starts with a community visioning process. **Plan implementation** is the continuous process of applying the policy developed in the plan development stage. Here, the public can be involved in making quasi-judicial, or individual, land use decisions. **Plan revision** is the process of

⁵ Goal 15 deals with conservation of the natural, historical, agricultural, and recreational qualities of the Willamette River Greenway. Goal 16 protects Oregon estuaries and associated wetlands. Goals 17, 18, and 19 address protection of Oregon's coastal shorelands, beaches and dunes, and marine resources.

⁶ CIAC (2008)

evaluating and updating land use policy to keep current with changing needs. For example, if a town attracts younger families with children or has an aging population, housing needs will change. Several new employers concentrated in one area and new shopping centers might cause congestion, necessitating a revised transportation plan. Cities often need to plan for new schools, parks, and hospitals. As long as the local plans are kept up to date, the upfront planning process works well. Periodic review was the mechanism designed by the Oregon Legislature to ensure that comprehensive plans, including the local implementation of Goal 1, were completely updated on a regular schedule. Additionally, the post acknowledgement plan amendment (PAPA) process (i.e. piecemeal changes to comprehensive plans, including Goal 1 processes) gives localities the opportunity to make smaller changes in between periodic reviews.

Oregon's land use planning program is designed so that public involvement at the beginning is a prerequisite to major decisions about how to designate and zone land. Some examples of designations are "exclusive farm use," "high density housing," "mixed use development," or "heavy industry." Then, as site-specific development applications are submitted over the following years, those individual local decisions about whether an application conforms to the underlying plan and zone are intended to be relatively straightforward. Of course, because the land use program gives local governments substantial discretion in how and under what conditions development occurs (for example, height and setback requirements, transportation infrastructure requirements, etc.), and because some issues cannot be determined until there is an actual development application (for example, impact on nearby natural resources), those local decisions often require additional information and public input. Oregon's land use planning framework allows local governments to make land use decisions more representative of public need than many other states.⁷

An Overview of Goal 1

The structure of Goal 1 is a blueprint for local governments to follow when designing their own CIPs.⁸ It contains six guidelines: citizen involvement, communication, citizen influence, technical information, feedback mechanisms, and financial support.

Goal 1 requires each local government to establish a CCI, whose only responsibility is promoting and enhancing public participation in planning in that community.⁹ However, the goal allows local governments, including elected city councils and county commissioners, to assume that responsibility themselves, or assign it to the appointed planning commission.

Goal 1 also requires every city and county in Oregon to "develop a [CIP] that insures the opportunity for citizens to be involved in all phases of the planning process."¹⁰ Regardless of the composition of the CCI, it is responsible for assisting the local government in developing, implementing, and evaluating its CIP.

⁷ This is in contrast to land use processes in many other states, in which there is little upfront planning and instead, each development application undergoes much longer and sometimes somewhat inconsistent analysis.

⁸ CIAC (2008)

⁹ Citizen Involvement Advisory Committee (CIAC). "Putting the People in Planning: A Primer on Public Participation in Planning." 3rd (2008): Web. Accessed 12 May 2014 from

http://www.oregon.gov/LCD/docs/publications/putting_the_people_in_planning.pdf

¹⁰ Oregon Department of Land Conservation and Development, "GOAL 1: Citizen Involvement OAR 660-015-0000(1)," Oregon.Gov. Web. Accessed 12 May 2014 from <http://www.oregon.gov/LCD/docs/goals/goal01.pdf>

At the state level, the Citizen Involvement Advisory Committee (CIAC) is responsible for monitoring every city's and county's citizen involvement program. Together, the CIAC and every locality's CCI are responsible for enhancing public involvement in planning.

Stuck in the Past: Archaic Goal, Unevaluated Plans

Goal 1 was designed in 1974 to guide local governments in fostering public involvement while developing comprehensive land use plans. Since then, it has been amended only once, in 1988.¹¹ The goal contains language that indicates its old age. The term "citizen," used heavily throughout the document, is the most obvious remnant of the Goal's beginning years.¹²

The Goal gives local governments flexibility to design CIPs that are not one-size-fits-all.¹³ Once local governments obtain state approval for their own CIP programs, the Goal no longer applies directly. After they are approved, each locality's CIP is the document that controls public involvement in their jurisdiction. In the '70s, most local governments designed their CIPs with limited time, staff, and public participation expertise.¹⁴ During the "acknowledgement phase," beginning in the late '70s and ending in 1986, LCDC and the CIAC approved local CIPs using equally limited public involvement expertise. In a 2008 survey, 50% of counties and 21 of the 25 cities that responded indicated that they have not updated their CIPs since the original acknowledgement phase.¹⁵

What caused the stagnation? A comprehensive plan's goals, policies, and objectives need continuous data collection and evaluation to reflect a community's changing values, economic trends, and population growth. In 1980, the Oregon Legislature designed "periodic review" as the tool to require every city and county to periodically perform a holistic evaluation of every goal within their plan and update the plan where necessary.

Beginning in 1999, however, the state legislature passed a series of bills weakening the aim of, and the opportunities for, periodic review (SB 543 (1999), SB 920 (2003), and HB 3310 (2005)).¹⁶ Today, out of Oregon's 246 cities and 36 counties, periodic review is required in only a few dozen of the state's largest cities and counties.¹⁷ Even among these, local jurisdictions are legally required only to consider goals related to the "fundamental building blocks of local planning: housing, economic development, transportation, public facilities and services, and urban land supply;" leaving the review of Goal 1 (public participation), Goal 3 (Agricultural Lands), Goal 4 (Forest Lands), Goal 5 (Natural Resources, Scenic and Historic Areas, and Open Spaces), Goal 6 (Air, Water, and Land Resource Quality), Goal 7 (Areas Subject to Natural Hazards), and Goal 13 (Energy Conservation) to the discretion of jurisdictions.¹⁸ As a result, most local comprehensive land use plans have not been thoroughly

¹¹ Oregon Department of Land Conservation and Development, "Goal Adoption Amendment Dates," *Oregon.gov*. (March 12 2010). Web. Accessed 25 June 2014. Web.

¹² Interview with Sy Adler, 12 June 2014. As a political term, it does not capture the growing number of undocumented members of Oregon's population. The shift from "citizen" to "public" would be a political choice based on values, but a shift will make community engagement in land use more meaningful

¹³ Interview with Faust, Steve & Jim Owens, 17 June 2014.

¹⁴ Interview with Mitch Rohse, 10 June 2014.

¹⁵ The Institute for Natural Resources. "The Oregon Land Use Program: An Assessment of Selected Goals." (August 2008). Web. Accessed 4 September 2014 from http://landuselaw.wustl.edu/articles/FINAL_REPORT_Land_Use_Project_Aug_2008.pdf

¹⁶ Ame, John (2008)

¹⁷ CIAC (2008)

¹⁸ Oregon Department of Land Conservation and Development, "Urban & Rural Issues," *Oregon.Gov*. Web. Accessed 9 July 2014 from <http://www.oregon.gov/LCD/Pages/urbanrural.aspx>

updated in many years, including their Goal 1 elements. Thus, public participation, considered fundamental in 1973, has not been evaluated by many cities.

Why was Periodic Review Curtailed? The periodic review process necessitates the availability of grants, local funding, staff, motivated elected officials, and an engaged public to effectively complete the process. Additionally, assessing whether an update is even needed requires a bulk of information on each component of a local comprehensive plan. To date, the statewide land use planning program does not have a “goals-specific, integrated system for data gathering, tracking, and reporting.”¹⁹ Lacking a system to continuously collect goal-specific data makes the periodic review process a weighty procedure in which local governments have no way to quickly evaluate the effectiveness of their comprehensive plans. After local governments and the state devoted large amounts of resources to develop comprehensive plans in the beginning years of SB 100, the periodic review process met a reduced political will to revisit and reinvest in subsequent years. The absence of an effective process to update comprehensive plans and CIPs has led to many challenges in Oregon’s land use planning program and public participation, including:

- **Dissatisfaction. Public** dissatisfaction with aspects of the statewide land use program – some focused, some unfocused, and some the result of misplaced blame on the statewide land use program – reflects that, in part, many Oregonians no longer feel connected to their local land use planning process and have not been able to influence those plans to represent their changing communities. This disconnect contributed to piecemeal legislative changes, several ballot initiatives,²⁰ the Big Look Task Force,²¹ and many local initiatives to require voting on city annexations.²² These political challenges are evidence that the program needs an effective process to reflect the changing demographics, needs, and views of all Oregonians.
- **No Ideal Substitute for Changing Land Use Policy.** Local governments exempt from periodic review are incrementally making significant changes to local land use policy through the PAPA process.²³ This procedure cannot be a substitute for a revised periodic review process because:
 - Public Involvement in PAPAs is “limited in time and scope.”²⁴
 - PAPAs occur out of discrete needs, which are not necessarily connected with larger community needs.
 - PAPAs occur episodically, not regularly.
 - The process does not involve holistic evaluation of comprehensive plans.
- **Hindrance of Individual Land Use Decisions.** Periodic review was designed to involve Oregonians in updating comprehensive plans and zoning codes so that when it came to implementing them, individual land use decisions could be decided quickly and with minimal confrontation. By scaling down periodic

¹⁹ The Institute for Natural Resources (August 2008)

²⁰ Ballot measures to overturn the land use planning program were defeated by a margin of 57% to 43% in 1976 and 61% to 39% in 1978. Then, during the recession of 1981-82, Measure 6 was defeated 55%-45%.²⁰ Measure 7 required the governments to reimburse land owners if regulations reduced the value of their property. It was overturned by the Oregon Supreme Court, but a similar initiative, Measure 37 was passed in 2004, requiring state or local government to compensate land owners whose property value reduced by land use regulations. Measure 49 reduced the impact of 37 by reducing compensation provisions and granted transferability or property rights. Although Measure 7 was overturned by Oregon courts and the public replaced Measure 37 with Measure 49, mitigating its most unfair aspects, these sent a message that the program was not connecting or listening enough to public concerns. The Institute for Natural Resources (August 2008)

²¹

²²

²³ Interview with Pat Zimmerman, 2 June 2014

²⁴ CIAC (2008)

review, LCDC has significantly reduced the opportunity for upfront public participation in changing land use policy, resulting too often in a disgruntled public whose only remaining opportunity for voicing policy concerns is at public hearings on individual land use decisions.

During interviews with individuals knowledgeable about public involvement in Oregon land use planning, two views on restoring periodic review stood out. Some believe it should be restored to its original capacity, requiring all local governments to review their entire comprehensive plans, not only housing, economic development, transportation, public facilities and services, and urban land supply.²⁵ Others express that the land use program cannot put too much stock in the original periodic review process because of its technical nature and the absence for meaningful public involvement.²⁶ Despite this difference in opinion, a common theme emerged – progress on Goal 1, along with public interest, understanding, and ownership of the program, have dwindled as a result of the legislative curtailment of an adequate review process. What is it about periodic review that needs restructuring?

Public Hearings are not sufficient means of Participation. In periodic review, LCDC requires local governments to provide, at a minimum, the opportunity for public comment of review materials at or before *one or more* public hearings.²⁷ Given the importance of updating local comprehensive plans to adapt to the changing needs of communities, LCDC has prescribed a minimum of public participation barely capable of accomplishing this goal. Individuals tend to show up only when they have much at stake, sometimes causing them to be perceived as reactors, and reinforcing polarized arguments.²⁸ In a recent study, the National Research Center found that 76% of survey respondents across the country had not attended a local public hearing in the past year.²⁹ Often, those who attend public hearings are not a broad representation of the community. Instead, they are community members who care about all aspects of land use planning and monitor much of their city's or county's land use activities. Over time, local elected officials sometimes tend to discount those from whom they hear often, or fail to hear from other community members. Or, local government bodies hear from those with a financial stake in a particular development proposal, but from no one else. The location and formalized nature of public hearings often thwarts meaningful participation -For example, they are usually held in government chambers in public buildings, which can be far away and intimidating to many people. They also have a formalized structure of testimony with time limits, and they are often held at times that are inconvenient. From the community perspective, public hearings provide the "choice of illusion,"³⁰ a façade in which the decision has already been made. Since the creation of Goal 1, collaborative participation practices and dynamic engagement methods (e.g. participatory decision making and interactive modeling) have come a long way, but the periodic review process continues to lean heavily on public hearings as the main source of public input on land use decisions. A revised review process would provide ample and diverse opportunities for meaningful participation in addition to public hearings.

²⁵ Interview with Ed Sullivan, 27 May 2014 & 4 September 2014

²⁶ Interview with John Fregonese, 16 June 2014

²⁷ Department of Land Conservation and Development. "Periodic Review: 660-025-0080," *State of Oregon*. (2013). Web. Accessed 5 August 2014 from http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_660/660_025.html

²⁸ Innes, Judith, and David Booher. "Public Participation in Planning: New Strategies for the 21st Century," *Institute of Urban & Regional Development*. (1 Nov. 2000) Web. Accessed 15 May 2014 from <http://escholarship.org/uc/item/3r34r38h>

²⁹ Maciag, Mike. "The Citizens Most Vocal in Local Government," *Governing: States and Localities*. (July 2014). Web. Accessed 3 August 2014 from <http://www.governing.com/topics/politics/gov-national-survey-shows-citizens-most-vocal-active-in-local-government.html>

³⁰ Fregonese, John and C.J. Gabbe. "Chapter 8: Engaging the Public and Communicating Successfully in Regional Planning," Taken from *Regional Planning in America. Lincoln Institute of Land Policy*. (April 2011)

Levels of Public Participation

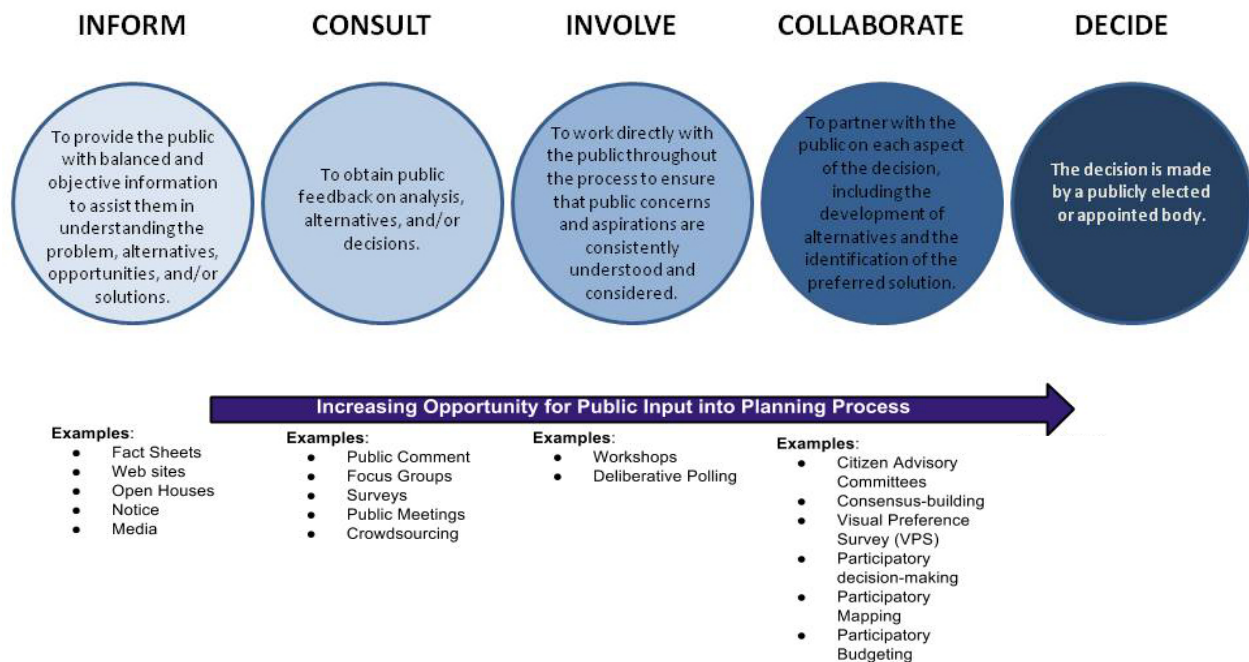


Fig. 2. The spectrum of public participation.³¹ Public hearings (aka “public meetings” or “public comment”) fall under “Consult.” A better process of plan revision will include methods of public participation that, at least, fall under “Involve,” “Collaborate,” and “Decide.”

No System to Measure Progress. Lacking goal-specific data and the tools to store and report on these data not only makes reviewing and updating comprehensive plans a huge and muddy undertaking for local governments, but it is a significant hurdle to evaluating the effectiveness of Oregon’s land use goals.³² A reinvigorated periodic review process would require DLCDC to develop “a goal-specific, integrated system for data gathering, tracking and reporting.”³³ An evaluation done by The Institute for Natural Resources concludes that the system should include.³⁴

1. Goal-specific performance measurements developed by LCDC. This is especially important for Goal 1 because lack of measurable criteria has led to variation in how each local jurisdiction interprets the Goal’s guidelines, resulting in a “great deal of confusion about what is required under Goal 1.”³⁵
2. “An integrated tracking and reporting system across agencies and levels of government...that would require reporting from local government to a central data repository, such as DLCDC.”³⁶ LCDC or a task

³¹ Taken, but adapted from: International Association of Public Participation. “IAP2 Spectrum of Public Participation.” (2007) Web. Accessed 20 October 2014 from

http://c.ymcdn.com/sites/www.iap2.org/resource/resmgr/imported/IAP2%20Spectrum_vertical.pdf

³² The Institute for Natural Resources (August 2008)

³³ The Institute for Natural Resources (August 2008)

³⁴ The Institute for Natural Resources (August 2008)

³⁵ Milgram, Jean. “Leagues Complete Survey in Jackson County,” *League of Women Voters*. (2006) Web. Accessed 2 June 2014 from <http://lwvrv.files.wordpress.com/2012/10/land-use-survey-2006.pdf>

³⁶ The Institute for Natural Resources (August 2008)

force should decide “how measures should be developed, what appropriate data sources exist, what data are needed, what entities are best to collect and report data.”³⁷

Moving Forward: Revitalizing and Restructuring Plan Revision

A **CNA** is a tool that identifies gaps between current land use conditions and the needs of the community, and prescribes a range of solutions to fill-in those missing elements. The community then turns that assessment into a specific action plan to implement appropriate solutions. It is a more effective process than Periodic Review, because it:

- Uses a system to gather the goal-specific data to evaluate and enhance comprehensive and citizen involvement plans, Goal 1.
- Provides the flexibility in using various public participation methods (in addition to public hearings) to solicit meaningful input.

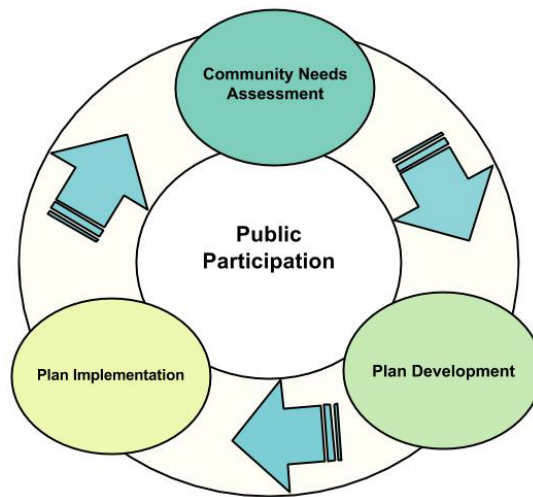


Fig. 3. The phases of land use planning in a circular perspective, with public participation at the core of the process

Some benefits of replacing periodic review with a community needs assessment are:

- **Builds Mutual Trust.** Engaging community members in a process directed toward understanding and updating comprehensive plans based on their needs and the goals increases the likelihood that community and elected officials will feel like partners jointly invested in the outcome.
- **Coordinated Public Participation Approach.** Every local government will place public participation at the forefront of reviewing plans, and collaborative coordination beyond the traditional public hearing setting will be required.
- **Research.** By developing a goal-specific integrated data system as part of conducting a CNA, local governments will provide to LCDC and DLCD data to inform a systematic evaluation of Goal 1, the public participation process, and the 18 other goals in the land use program.
- **Better Understanding of the Program.** The CNA process will strengthen public awareness of the land use goals, their role in creating a prosperous Oregon for the past 40 years, and their potential for addressing

³⁷ The Institute for Natural Resources (August 2008)

state and community needs in the future. Better understanding of the program could result in fewer costly public interventions such as appeals and ballot measures.³⁸

- **Use of 21st Century Techniques of Public Participation.** Local governments will stay current with evolving public participation tools.
- **Reduces Friction in Individual Land Use Decisions.** By presenting a transparent and accountable process for communities to engage regularly in updates of their plans, communities will have access to the appropriate policy-changing outlet.
- **Provides Flexibility.** CNA provides a systematic approach to public participation without determining the exact methods that are to be used, so governments and organizers can select most suitable methods given resource availability.

A CNA would replace periodic review and occur on a reasonable timeframe determined by LCDC. The timeframe should be driven by factors such as population growth and the size of localities. Cities within a metropolitan planning organization (MPO) could commence a CNA at the same time or on a shorter timeline than smaller cities. Whichever timeline is defined, LCDC would require all cities and counties to conduct a CNA.

Unfair Rules: State Restricts Public Participation

Some state and local government officials tend to perceive public participation in land use planning as an irritant. This opposition to providing upfront participation is reflected in the state-set notice requirements for individual land use decisions and the exorbitant price of appealing land use decisions at some local governments.

Notice Requirements Present Unequal Opportunity. Public involvement in most individual land use decisions occurs at a public hearing.³⁹ The Oregon state legislature has set procedural rules for these with the objective of providing efficiency and fairness when making decisions. Anyone who testifies orally at the hearing or submits testimony in writing has *standing* to continue their participation in the land use decision, including the right to appeal the decision of the local government. However, only those who know about a hearing will know to testify, and under current law, the *notice* that local governments are required to provide is too limited and restricts fair access to hearings on individual land use decisions. The state-set minimum notice requirement describes *who is given notice, where notice is provided, how it is delivered, and what it says*.⁴⁰ Consequently, many local governments give the bare minimum in notice.⁴¹

The statutory floor for who is required to receive notice discriminates based on whether one owns land. Only land owners “on the most recent property tax assessment roll” are required to receive notice.⁴² Renters – whether of residential, commercial, or industrial land – are not required to be given notice. This means that, for example, if a developer applies to tear down a strip mall and replace it with a pub, and if the local government provides the statutory minimum notice, the fifty renters living in the apartment complex next door to the strip mall will not receive legal notice of the opportunity to testify at the public hearing, whereas the apartment building owner, who might live out-of-state or out of the neighborhood, will. In 2010, 62.2% of Oregon’s residents were homeowners,

³⁸ The Institute for Natural Resources (August 2008.)

³⁹ For expedited and limited land use decisions, local governments are exempt from providing the opportunity for public hearing.

⁴⁰ ORS 197.763.

⁴¹ Interview with Pat Zimmerman, 2 June 2014.

⁴² ORS 197.763

and 37.8% were renters.⁴³ Local governments that follow the state's minimum notice rules are disregarding a significant portion of their populations.

In addition, where notice is provided, it is spatially unjust. If the applicant's property is:⁴⁴

- *Inside the UGB: Landowners within 100 ft of property are subject to notice;*
- *Outside the UGB and not on farm or forest zone: Landowners within 250 ft of property are subject to notice; or*
- *Within a farm or forest zone: Landowners within 500 ft of property subject to notice*

The average city block in downtown Portland is 200 feet.⁴⁵ If notice within a UGB is provided according to state requirement, only half a block of *land owners* will be notified. Renters and those beyond 100 feet away generally receive no notice. This significantly reduces the likelihood renters will participate even if changes to the neighborhood will directly affect them.

Providing notice only by mailing a paper copy, the only required method of delivering notice, is outdated. Today's technology has rapidly outpaced this method of providing notice. While many local governments deliver notice electronically, some still do not and some charge for the service. The state requirement for delivering notice should recognize and promote delivery methods better suited to increasingly standard new technologies (Internet, email, listserv, phone alerts), in addition to regular mail.

Finally, the rule on when notice is delivered is insufficient. The state requires local governments to mail notice at least 20 days before the first hearing.⁴⁶ This timeframe is not enough for the general public to review an application, prepare all the materials needed for the public hearing, gather input from their community, or reschedule their calendars to make time for these proceedings.

The Price of Appeals. Individuals, organizations, and others may appeal a land use decision made by a local government to the state Land Use Board of Appeals (LUBA). However, they can do this only after they have exhausted appeal opportunities at the local level. One example of this is if someone fought the decision by appealing a planning commission's or planning director's decision to the county commission or city council. This is complicated by the fact that some Oregon jurisdictions charge local appeal fees of thousands of dollars.⁴⁷ As the prerequisite to taking any case to LUBA, these potentially exorbitant local appeal fees confine public participation to those able to pay, significantly limiting access to the courts.

Equal Access: Remove Procedural Barriers and Cap Local Appeal Fees

State-set notice requirements should be revised to allow residents, not just land owners, the opportunity to participate in public hearings. LCDC should cap local appeal fees for quasi-judicial decisions. Removing these

⁴³ U.S. Census Bureau. "Profile of General Population and Housing Characteristics: 2010." *American FactFinder*. (2010). Web. Accessed 26 July 2014 from <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

⁴⁴ ORS 197.763

⁴⁵ Miskimins, Laurie. "The 200 Foot Block: Creating a More Walkable Portland," *Portland Bureau of Transportation*, (2 Dec. 2010). Web. Accessed on 13 June 2013 from <https://www.portlandoregon.gov/transportation/45195?a=167703>

⁴⁶ ORS 197.763

⁴⁷ Central Oregon Landwatch. "Oregon State Legislature: BLUBS, SLUBS, and Other Ignominious Attacks on Land Use Laws." *Central Oregon Landwatch*. Web. Accessed 4 August 2014 from <http://www.centraloregonlandwatch.org/our-projects/oregon-state-legislature>

procedural barriers and capping local appeal fees might well result in more upfront public participation, making for potentially lengthy public hearings. However, if the public feels they have had a chance to be heard and perhaps even influence the land use decision, this upfront participation can reduce the likelihood of time-consuming and costly appeals.

Little Evolution of Plans or Programs: Committee Dependence on Local Government

To carry out Goal 1, LCDC requires local governments to establish a committee for citizen involvement (CCI) to provide Oregonians the opportunity to shape CIPs that promote meaningful public participation at every phase of the planning process. This opportunity cannot be fully realized when local government staff, elected officials, or planning commissioners serve as the CCI. This is not a new conclusion; many observers of Goal 1 have suggested that citizen committees be independent of local governments.⁴⁸ The majority of local governments, however, still have their Planning Commission acting as their CCI.⁴⁹ In 2008, a Goal 1 evaluation surveyed cities and counties on the composition of their CCI.⁵⁰ Twenty-two out of 26 city planning directors, and 16 out of 18 counties indicated that the planning commission serves as their CCI.⁵¹ The dependence of CCIs on local government curtails the evolution of public participation programs or processes, because:

Enhancing public participation is not a priority. CCI should consist of volunteers who represent the diverse needs and perspectives of their community and are actively interested in promoting public participation in land use in their community. Planners, local government staff, or elected officials may delay evaluating citizen involvement programs or processes until they “have the time.”⁵²

There is a gap in interest. Boards of county commissioners, city council members, and planning commissioners are frequently required to hold public hearings in the process of making land use decisions or recommendations. These can be time-consuming and contentious. Thus, a conflict of interest, or the appearance of a conflict, can arise if those same officials are also charged with designing their jurisdiction’s public involvement process, since sometimes active public participation comes at the expense of a speedy hearing.

The composition does not provide a broad representation of public needs or desires. Local government staff, elected officials, or planning commissioners are professional employees of or appointed by the government. They represent a very limited portion of Oregon’s population.

Independent CCIs

The duties of CCI members require commitment from a representative public whose sole responsibility is to ensure public involvement in the planning process.⁵³ Citizen Involvement committees should be independent of the local government and any state agency. To cure this, Goal 1 should be rewritten to omit the option allowing local governments or planning commissions to assume the responsibility of the CCI.

⁴⁸ Observation has been made in the following publications: Putting People in Planning, by CIAC; Leagues Complete Survey, by Jean Milgram; Land Use: Progress and Challenges, by The League of Women Voters of Oregon

⁴⁹ Interview with Ed Sullivan, 27 May 2014 & 4 September 2014

⁵⁰ The Institute for Natural Resources (August 2008)

⁵¹ The Institute for Natural Resources (August 2008)

⁵² Interview with Damian Syrnyk, 28 May 2014

⁵³ CIAC (2008)

Immeasurable Expectations: Ineffective Goal and Plans

Each of the six guidelines in Goal 1 lacks measurable criteria. Due to the variance in how each local jurisdiction interprets these guidelines, localities are unsure what is actually required under Goal 1.⁵⁴ Instead of containing performance measurements, the guidelines are followed by indicators so antiquated and unspecific that many local government's CIPs "differ considerably in content, and none of the municipalities strictly adhere to their written plan."⁵⁵ Goal 1 is weak. Without enforceable indicators of meaningful public participation, local governments are given discretion in deciding the means of achieving each guideline.

For example, one guideline states that every local government must include a "feedback mechanism" section in their CIP. Its following indicator requires CIPs to "...state the mechanism through which the citizens will receive a response from policy-makers," and delineate "a process for quantifying...citizens attitudes."⁵⁶ This guideline and accompanying indicators present some obvious issues:

- **Lacks Specificity and Measurable Objectives:** How often will local governments provide feedback? Will the mechanism be widely available to the public, or only to a limited audience? Some local governments curtail this guideline and its indicators by publishing feedback in newspapers that are read by a narrow audience.⁵⁷
- **Unenforceable Standards:** Neither the guideline nor the following indicators are strictly enforceable by LCDC.⁵⁸ As a result, local governments can and often do the bare minimum in providing adequate feedback with the public.⁵⁹

Enforcing and Measuring Meaningful Public Participation

To modernize each guideline, LCDC should update their respective indicators to reflect 21st century expectations of meaningful public involvement. Following the update, LCDC should enforce the updated indicators via administrative rules.

Each indicator should be followed by qualitative and quantitative performance measurements to standardize and differentiate the differing levels of public participation needed to develop, review, or implement comprehensive plans and CIPs.⁶⁰ By adding performance measurements to these guidelines, local governments can strategically perform periodic evaluations on the effectiveness of their CIPs.

Unaware and Uninspired: The Generational Gap in Education and Engagement

Oregon's land use planning program is not currently benefitting all those it was designed to serve because:

Oregonians are largely unaware of the program. Neither the state nor LCDC has undertaken a major effort to educate Oregonians on the history of Oregon's land use planning program, nor its importance in shaping the

⁵⁴ Jean Milgram (2006)

⁵⁵ Jean Milgram (2006)

⁵⁶ DLCD. Goal 1.

⁵⁷ Interview with Ed Sullivan, 27 May 2014 & 4 September 2014

⁵⁸ CIAC (2008)

⁵⁹ Interview with Pat Zimmerman, 2 June 2014

⁶⁰ Interview with Jonathan Ostar, 10 July 2014

quality of life in Oregon for current and future generations.⁶¹ More than half of Oregon's population was born or has moved here since the advent of Oregon's land use program in 1973.⁶² Many come or stay due to Oregon's quality of life but are unaware that this is not by accident. Oregon's attractive quality of life is due to the very intentional land use program. **Programs and Plans lack standards.** Goal 1 requires city and county CPLs to "stimulate" public participation through:⁶³

1. a "range of available media (including television, radio, newspapers, mailings, and meetings)" and
2. land use education provided by educational institutions and *interested* institutions or agencies in land use.

If LCDC enforced these requirements, they would find many cities and counties guilty of underperforming. Often, local CPLs describe aspirational methods to stimulate public participation, but lack any means to achieve them. . Columbia County's CPL, for example, lists radio, newspaper, mailings, and public meetings as their "range of available media," but makes no commitment to actually use all of them. The County also fails to include actual *educational* opportunities.⁶⁴ Vague policies like that of Columbia County are not unique, and do not actually increase public knowledge of and engagement in local land use planning and decisions.

Without CPLs or public participation processes that actively foster public understanding of the role land use planning has played and can play in creating the communities and places they value, Oregonians may remain unmotivated and uninspired to participate in land use decision making in their neighborhoods and communities.⁶⁵

Partnerships: Engaging and Educating Oregonians

Reinvigorating Goal 1, citizen involvement plans, and public participation processes is not a small state or local government undertaking. Much needs to be done. The most effective, durable, equitable, and accountable planning processes are those that employ partnerships.⁶⁶ Below are examples of partnerships that various agencies have used to enhance the planning process and effectively engage the public:

Collaboration: Partnerships can provide volunteers or services such as child care, public transportation, and translation for key public processes.

- Example: While designing Charlottesville, Virginia's Regional Transportation plan, UnJAM 2025, the planning commission partnered with KidJAM, a children's radio company, to provide activities for youth during the public workshops (<http://www.terrain.org/articles/17/rue.htm>)

Engagement: Partnerships can aide in providing educational and research opportunities in land use planning for citizen involvement committees, students, and disadvantaged populations.

⁶¹ Interview with Ed Sullivan, 27 May 2014 & 4 September 2014

⁶² Daniels, Katherine H., and Edward J. Sullivan. "Oregon's 40-Year-Old Innovation," *Planning: American Planning Association*, (Feb. 2013) Web. Accessed 27 May 2014 from http://www.oregon.gov/LCD/docs/Oregons_40_year_old_innovation.pdf

⁶³ DLCD, Goal 1

⁶⁴ Columbia County. "Columbia County Comprehensive Plan [Citizen Involvement: Goals and Policies]," (August 1984, Integrated through April 2011) Web. Accessed 7 August 2014 from http://www.co.columbia.or.us/files/lds/2011-04%20Comp_%20Plan%20.pdf

⁶⁵ Holdar, Gina Gilbreath, and Olha Zakharchenko, eds. "Citizen Participation Handbook: People's Voice Project International Centre for Policy Studies," *"iMedia" Ltd.*, (Aug. 2002) Web. Accessed 24 June 2014 from <http://siteresources.worldbank.org/INTBELARUS/Resources/eng.pdf>

⁶⁶ European Institute for Public Participation. "Public Participation in Europe: An International Perspective." (June 2009) Web. Accessed 16 May 2014 from http://www.participationinstitute.org/wp-content/uploads/2009/06/pp_in_e_report_03_06.pdf

- Example: Oregon's Washington County partners with the Oregon State University cooperative extension services to provide a *Citizen Participation Organization Program* <http://extension.oregonstate.edu/washington/>.
- Example: Various agencies in Oregon partner with AmeriCorps's Resource Assistance for Rural Environments (RARE) program to receive assistance from graduate students in land use planning projects <http://csc.uoregon.edu/rare/node>
- Example: The City of Eugene's planning department has an internship program that offers students the opportunity to work on either zoning and land use planning projects or metropolitan and community planning projects <http://www.eugene-or.gov/index.aspx?NID=850>

Example: Washington county has partnered with the Center for Intercultural Organizing Disadvantaged populations in its Policy, Leadership and Action for Newcomers (PLAN), to involve them in promoting equitable plans http://www.interculturalorganizing.org/?page_id=2598 Local government efforts to increase partnerships will result in a better understanding and engagement of diverse communities, as well as cultivate public ownership of the land use program.⁶⁷

Conclusion

By 2040, Oregon's population is expected to grow by 46%, housing [nearly 5.2 million people](#).⁶⁸ [Public involvement in land](#) use peaked in the 1970s, but as the population grows and economies evolve, efforts to reinvigorate it are necessary to guarantee Oregon's hallmark land use program will see another 40 years.

The greatest barrier to reinvigorating public participation in land use planning is insufficient funding. More state funding is needed to assist local governments in periodically updating local comprehensive plans and to invest in a widespread effort to engage Oregonians in the significance of the land use program to their communities and livelihoods. Local governments need to invest in developing meaningful public involvement programs, and they need the funds necessary to implement them.

The environmental, cultural, and economic challenges posed by population growth demand collaboration from all Oregonians to ensure equitable participation processes and sound land use decisions. A lot has changed since the beginning of Oregon's land use planning program, but Oregonians' sense of livability and quality of life being tied to our land is unlikely to change. Providing creative, frequent, and consistent ways to engage in the decisions impacting our communities will benefit Oregonians today and tomorrow.

Recommendations:

Periodic review should be replaced with a Community Needs Assessment, a process requiring continuous data collection and collaborative public participation techniques to systematically evaluate and update comprehensive plans based off on community needs.

⁶⁷ Bureau of Planning and Sustainability. "Portland Comprehensive Plan Update Proposed Draft: Chapter 2." *PortlandOregon.gov*. (2014) Web. Accessed 12 July 2014 from <http://www.portlandoregon.gov/bps/57352>

⁶⁸ Ame, John. "Coastal Land Use," *Oregon State University*. (2007) Web. Accessed 13 June 2014 from <http://oregonexplorer.info/northcoast/CoastalLandUse0>

Opportunities for participation in individual land use decisions should be equitable. The Oregon legislature should amend notification requirements that limit equitable access to public hearings, and it should cap local appeal fees.

Local Governments should exceed perfunctory compliance with participatory requirements and provide meaningful public participation in land use planning. Sufficient funding and resources for local CICs are necessary to ensure the development of CIPs tailored to every major land use decision, plan, and process.

The public should be continuously educated about and engaged in Oregon's land use program. Engagement methods, such as partnerships, should be employed to increase public participation.

Committees for Citizen Involvement (CCI) should be independent of local government staff, elected officials, or planning commissioners. LCDC should develop administrative rules requiring local jurisdictions to establish their CCI independent from local government or state agency.

LCDC should update and enforce Goal 1 indicators to ensure a standardized method of ensuring meaningful and equitable public participation processes.

LCDC should amend Goal 1 to contain quantitative and qualitative performance measurements that will aid in evaluating and improving public participation process.

Interviews

Interview with Sy Adler, 12 June 2014

Interview with Damian Syrnyk, 28 May 2014

Interview with Ed Sullivan, 27 May 2014 & 4 September 2014

Interview with Mitch Rohse, 4 June 2014

Interview with Greg Holmes, 29 May 2014

Interview with Pat Zimmerman, 2 June 2014

Interview with Peggy Lynch, 27 May 2014

Interview with John Fregonese, 16 June 2014

Interview with Steve Faust, 17 June 2014

Interview with Jim Owens, 17 June 2014

Interview with Jonathan Ostar, 10 July 2014

Interview with Paul Leistner, 17 July 2014

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To: **Katherine Guenther, City Manager**
Mayor Vaalor & Yachats City Council

From **Public Works & Streets Commission**

Subject: City of Yachats Wastewater System Facilities Plan

The Public Works & Streets Commission has reviewed and discussed the plan with author/consultant, Westech Engineering, Inc.

The Public Works & Streets Commission approves the Plan document with only minor errors and omissions as discussed at the October 12, 2021, PW&SC meeting.

We, the Public Works & Streets Commission, recommend that City Council accept and approve the Wastewater System Facilities Plan at the November 4, 2021, council meeting.

A handwritten signature in dark ink, appearing to read "Linn West", with a horizontal line extending to the right.

Linn West, Chair

Public Works & Streets Commission



City of Yachats

WASTEWATER SYSTEM FACILITIES PLAN

Draft August 2021





Westech Engineering, Inc.
3841 Fairview Industrial Drive SE, Suite 100
Salem, OR 97302
(503) 585-2474 FAX: (503) 585-3986

WASTEWATER SYSTEM FACILITIES PLAN

CITY OF YACHATS

Draft August 2021

Prepared for
The City of Yachats
P.O. Box 345
Yachats, OR 97498

Prepared By
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Appendix B

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FOREWORD

Using this Report

This report will be used by many people whose needs for information will differ widely. Accordingly, an Executive Summary appears at the beginning of this report. The summary provides an overview of the report and presents the main conclusions. Readers may gain a good general understanding of the report and its contents by reading the summary. Additional detailed information is presented in the body of the report.

LIST OF ABBREVIATIONS

AAF	average annual flow
AC	asbestos cement
ADWF	average dry weather flow
ATS	automatic transfer switch
AWWA	American Water Works Association
AWWF	average wet weather flow
BGS	below ground surface
BOD	biochemical oxygen demand
BSF	base sewage flow
CFS	cubic feet per second
CIP	capital improvement plan
CMU	concrete masonry units
DAF	dissolved air flotation
DEQ	Oregon Department of Environmental Quality
DHS	Oregon Department of Human Services
DO	dissolved oxygen
EPA	US Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FM	force main
FPS	feet per second
FRP	fiber reinforced plastic
GPD	gallons per day
HDPE	high density polyethylene
HP	horsepower
IGA	intergovernmental agreement
KW	kilowatt
MAO	mutual agreement and order
MBR	membrane bioreactor
MBBR	moving bed bioreactor
MH	manhole
MMDWF	maximum month dry weather flow
MMWWF	maximum month wet weather flow
MG	million gallons
MGD	million gallons per day
NPDES	National Pollutant Discharge Elimination System
OAR	Oregon Administrative Rule
ODOT	Oregon Department of Transportation

OPSC	Oregon Plumbing Specialty Code
ORS	Oregon Revised Statutes
PDF	peak day flow
PHF	peak hour flow
PIF	peak instantaneous flow
PSI	pounds per square inch
PVC	Polyvinyl chloride
RPM	revolutions per minute
SBR	sequencing batch reactor
SCADA	supervisory control and data acquisition system
SCFM	standard cubic feet per minute
SDC	system development charge
SF	square feet
SRT	solids retention time
TDH	total dynamic head
TSS	total suspended solids
TV	television
UGB	urban growth boundary
USGS	United States Geological Survey
UV	ultraviolet light
VFD	variable frequency drive
WEF	Water Environment Federation
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

Summary Outline

Introduction

Project Objectives

Background Information and Need for Plan

Study Area and Planning Considerations

Regulatory Requirements

Overview of Existing Facilities

Wastewater Flows and Loads

Collection System Deficiencies and Recommended Improvements

Treatment System Deficiencies and Recommended Improvements

Recommended Capital Improvement Plan

EXECUTIVE SUMMARY

INTRODUCTION

The purpose of this study is to provide a comprehensive evaluation of the City's wastewater system with respect to its existing and future needs, identify improvements and associated costs necessary to meet those needs, and provide the City with a framework for the provision of sanitary sewer service through the year 2041.

This executive summary has been prepared to provide a concise overview of the evaluations and analyses performed in each chapter of the study. A summary of the recommended capital improvement program costs appears at the end of this summary.

PROJECT OBJECTIVES

This Wastewater Facilities Plan was completed to achieve the following objectives;

- *Evaluate Current and Future Needs*

Evaluate the City's sanitary sewerage facilities with respect to existing and future needs, identify improvements and associated costs necessary to meet those needs, and provide the City with a guide for future development of the sanitary sewerage system.

- *Satisfy Funding Agency Requirements*

As with most small municipalities, the City may have some difficulty accumulating sufficient resources to construct the required improvements. Therefore, outside funding may be desired. The federal and state funding agencies that distribute funds for public wastewater projects have published guidelines for the preparation of Facilities Plans. This plan is intended to conform to those guidelines.

BACKGROUND INFORMATION AND NEED FOR PLAN

The City of Yachats is located in southern Lincoln County approximately 24 miles south of Newport and approximately 26 miles north of Florence. The City provides sanitary sewer service for the businesses and residents located in the City. The City has a comprehensive plan that establishes an urban growth boundary (UGB). The UGB and the city limits encompass the same area which includes approximately 600 acres. The wastewater utility provides sanitary sewer service to customers located inside the city limits/UGB. The wastewater system does not provide service to any customers located outside the city limits/UGB. The City currently serves approximately 900 sewer connections. The overall population within the City is highly variable due to the high number of hotel rooms, vacation rentals, and part-time residences. The Portland State Population Research Center estimates the current population of the City to be about 760. During peak holiday weekends, the population served by the sewer system can exceed 2,000 people.

The City's wastewater system consists of a conventional gravity collection system with five pump stations and a sequencing batch reactor treatment plant. Treated effluent is discharged to

the Pacific Ocean on a year-around basis. The treatment plant is located on 7th Street, west of Highway 101.

The City's last facilities plan was completed in 2004. The wastewater treatment plant that existed at that time was unable to comply with the requirements of the NPDES permit and most the City's pump stations were in poor condition. Following the recommendations in the 2004 Facilities Plan, the City made major improvements to the system in 2008. The 2008 improvements included upgrades to four of the five pump stations and the construction of a new sequencing batch reactor wastewater treatment plant. This was a major project that dramatically improved the wastewater utility. Since the completion of the 2008 project, the City has not experienced any compliance issues and the improved system has served the City successfully. As a result of the 2008 project, the wastewater utility is in good overall condition. However, the 2008 improvements are more than 10 years old and will be 30 years old by the end of the planning period. In an effort to be proactive, the City decided to perform a new evaluation of the wastewater utility by preparing this facilities plan. This plan will replace the 2004 plan entirely and will serve as the City's primary planning document for the next planning period.

STUDY AREA AND PLANNING CONSIDERATIONS

The State of Oregon requires wastewater planning documents comply with statewide land use goals and be consistent with locally adopted comprehensive land use plans. Statewide land use Goal 11 directs local governments to establish an urban growth boundary (UGB) and provide sewer services within it. Sewer services may be provided outside the UGB if it is the only practicable alternative to mitigate a public health hazard and will not adversely affect farm or forest land. To be consistent with these requirements, the study area of this report is the area within the Yachats UGB. Therefore, this plan does not consider service to areas outside the Yachats UGB.

The improvements recommended in this plan are based on the development of land within the UGB, as well as the existing land use zoning for these areas. It is assumed that no significant development will occur within the study area that will require major changes to the existing zoning, and that there will be no significant expansions of the UGB within the study period. It is also assumed that there will be no extension of wastewater services outside of the UGB during the planning period. Changes in any of these assumptions could change the recommendations contained in this plan.

The DEQ recommends a minimum 20-year planning period for wastewater facilities planning. Based on this recommendation, the planning period for this study extends through 2041.

In order to assess the City's needs over this time, population growth projections must be made to determine future wastewater flows and loads. Based on data provided by the Portland State University Population Research Center, the population in Yachats in 2020 was about 760. The population is expected to increase to approximately 1,070 in 2041. However, Yachats, like many Oregon Coast communities, experiences seasonal changes in population as a result of hospitality and travelers. Therefore, wastewater flow projections were based on an estimated service population, which more accurately describes the number of users served by the utility. This methodology is described in more detail in Chapter 5. The population projections presented in Chapter 5 include estimates of permanent and seasonal residents. At maximum occupancy,

the existing (i.e., 2021) population is estimated to be about 2,200 people. By 2041, this value is expected to increase to about 2,850 people. It is important to note that these population projections are based on the assumption that the relative number of rental properties and seasonally-occupied homes, to the number of permanent residents remains approximately constant over time. Therefore, if more people choose to live in the City on a year-around basis, the wastewater flows will increase faster than projected in this plan. Should this occur, the City may need to increase the priority ranking of some of the recommended projects or consider updating this plan entirely. That said, most facilities plans are typically updated every 10-15 years and this interval should be sufficient to capture any changes to occupancy trends.

REGULATORY REQUIREMENTS

The City currently operates the wastewater utility under a NPDES permit issued by DEQ. These permits are typically renewed every 5 years. The City's existing permit expires in 2023 and is expected to be renewed shortly thereafter. This plan is based on the assumption that there will be no major changes to the City's permit when it is renewed.

The NPDES permit identifies the requirements under which the City must collect, treat, and dispose of wastewater and the associated byproducts. The treatment plant produces treated effluent that is discharged to the Pacific Ocean and biosolids that are disposed of by landfilling or hauling to another treatment facility. The NPDES permit lists effluent limits for organic content (BOD), the solids content (TSS), the pH, and pathogenic indicator organisms (fecal coliform and E. coli). The sequencing batch reactors reduce the BOD and TSS below the limits in the permit and the disinfection system reduces pathogenic indicator organisms below the limits in the permit. Since the completion of the 2008 upgrades, the City has not had any significant violations of these permit limits.

The NPDES permit requires that the City prepare a biosolids management plan that describes the treatment and disposal practices for biosolids. The City has a current plan that lists three disposal methods. These include landfilling, hauling to a treatment facility in Douglas County, and land-application. At the present time, the City disposes of biosolids by landfilling and hauling to another treatment plant. The City has not land-applied biosolids in recent years. Landfilling and hauling biosolids to another plant do not require the City to meet certain treatment goals for the biosolids. However, land-application of biosolids requires the production of Class B biosolids. The City's treatment plant has the ability to produce Class B biosolids. Class B biosolids must be treated using one of the EPA's Processes to Significantly Reduce Pathogens (PSRP), or an equivalent process. These processes include aerobic digestion, air drying, anaerobic digestion, composting, and lime stabilization. The City currently uses aerobic digestion supplemented with lime stabilization when needed to achieve the Class B biosolids requirements.

OVERVIEW OF EXISTING FACILITIES

Chapter 4 provides a detailed description of the existing wastewater collection and treatment facilities serving the City. The City's existing wastewater facilities consist of a conventional gravity collection system that conveys wastewater to one of five pump stations. These pump stations generally pump water through pressurized forcemain pipes that discharge to the gravity collection system that drains to the Main Pump Station. Therefore, all of the wastewater

collected in the City is ultimately routed to the Main Pump Station where it is pumped to the treatment plant headworks. Figure 4-1 in Chapter 4 is a schematic representation of the collection system. In addition to the five pump stations the collection system includes approximately 65,000 feet of gravity piping, 335 manholes, and 7,300 feet of pressurized forcemain piping. Detailed maps of the collection system are included in Appendix B.

The vast majority of the gravity collection system piping and manholes were originally installed in 1974 and were primarily constructed using asbestos cement pipe. There have been several extensions of the system to serve new developments since 1974. Most new extensions of the system utilized PVC pipe. Overall, the gravity collection piping is in good condition and is expected to serve the City for the remainder of the planning period. There are some isolated problem areas that the City will need to address during the planning period and this plan recommends three projects to address these problems. Like most municipalities in Western Oregon, the infiltration of groundwater and inflow of stormwater (collectively known as “I/I”) is a problem that requires ongoing maintenance. I/I enters the collection system and must be conveyed and treated in the same manner as wastewater. Therefore, I/I consumes conveyance capacity, consumed treatment capacity, increases power consumption costs, and increases wear and tear on the system. As such, I/I is a financial burden to the City and it makes economical sense to control it. That said, it is not practical to eliminate I/I altogether but it is reasonable to assume that management activities can keep I/I amounts from increasing over time. The City currently has a good, but somewhat informal, I/I control program. This plan recommends formalizing the I/I control program with dedicated funding on an annual basis. This funding can be used to inspect the system in order to identify problem areas and make repairs as needed.

As noted above, four of the five pump stations were upgraded as part of the 2008 project. Therefore, they are in fairly good condition. The electrical control systems for these stations will likely reach the end of their useful life due to overall age during the planning period and will need to be upgraded. The remaining pump station (i.e., Quiet Water Pump Station) was constructed in the 1980s and will likely require upgrades during the planning period due to age.

The City’s Wastewater Treatment Plant (WWTP) is located on 7th Street west of Highway 101. The WWTP consists of a headworks, a two-basin sequencing batch reactor activated sludge treatment facility, and equalization basin, an ultraviolet light disinfection facility, an ocean outfall pipe, aerobic digester, sludge storage tank, a dewatering screw press, a plant pump station, an operations building, and public works building. Treated wastewater is discharged to the Pacific Ocean on a year-around basis. An overall schematic representation of the existing wastewater treatment system is presented in Figure 4-10 in Chapter 4. The treatment plant was significantly upgraded in 2008 and has served the City well ever since. There are some issues that will need to be addressed during the planning period. Most of these are related to elements of the system that are aging and will likely reach the end of their useful lift during the planning period. These are mostly control systems and mechanical systems that are not typically designed to last more than 20 years. One of the major issues at the treatment plant is corrosion of the metal components of the public works and dewatering buildings. The metal roofing and roll up doors are badly corroded and will reach the end of their useful life during the planning period. The metal siding on these buildings is also showing early signs of corrosion and may not last the remainder of the planning period.

More detailed descriptions of the existing facilities are included in Chapter 4.

WASTEWATER FLOWS AND LOADS

Chapter 5 of the plan includes an analysis of the existing wastewater flow rates, organic loading rates, and solids loading rates to the treatment plant. Population projections and occupancy rates are used to estimate future flows and loads. The design flows and loads are used to analyze the existing systems. The design flows and loads consist of the existing and future flows and loads due to population growth. The flow and load projections are based on the following key assumptions. If any of these assumptions prove to be inaccurate over time, the City may want to consider updating this plan. That said, facilities plans are typically updated every 10-15 years and that interval should be sufficient to capture any changes in the following assumptions.

- The ratio of multi-family units to standard residential units will remain approximately equal to the present value for the remainder of the planning period.
- The ratio of hotel rooms to standard residential unity will remain approximately equal to the present value for the remainder of the planning period.
- The ratio of commercial properties to standard residential units will remain approximately equal to the present value for the remainder of the planning period.
- The occupancy rate of hotel rooms, vacation properties, and seasonal residents will remain approximately equal to the present value for the remainder of the planning period.
- No large wet-industrial users will be added to the system during the planning period.

COLLECTION SYSTEM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Chapter 6 presents an analysis of the wastewater collection system. Current operation and maintenance practices are first reviewed and one recommendation is presented. This is to formally establish an I/I correction program (Program-1) at an annual funding rate of \$30,000 per year. The purpose of this program it to perform television inspections of the gravity collection system at 5-year intervals and repair leaking manholes, mainlines, and service laterals. Background information for this recommendation is presented in Section 6.2.

In addition to operation and maintenance practices, the ability of the existing collection system to convey the anticipated wastewater flows is analyzed in Chapter 6. This analysis shows that the existing gravity collection system generally has the capacity to convey peak flows with the exception of the mainline from Manhole D-010 to D-030. To address this problem, this plan includes a project to upsize this pipe segment.

The hydraulic capacity of the pump stations and forcemain pipes are also analyzed in Chapter 6. The analysis shows that all of the pump stations and forcemain pipes have the capacity needed to convey peak flows at complete buildout of the City. Therefore, improvements to address capacity problems should not be needed during the planning period. However, several projects will be needed to address aging infrastructure. As described above and in Chapter 4, some electrical and mechanical components of the pump stations will likely reach the end of their useful life during

the planning period. The Quiet Water Pump Station is also likely to reach the end of its useful life during the planning period. Finally, the forcemain pipes for the Pontiac Pump Station and most of the Riverside Pump Station Forcemain are the original AC pipes that were installed in 1974. These pipelines will be almost 70 years old at the end of the planning period. Of all of the City's forcemain pipes, these two pipelines are the oldest and will likely reach the end of their useful life the soonest. It is likely that the existing pipes will be sufficient for the remainder of the planning period. However, in an effort to be conservative, this plan does recommend replacing these two pipelines. However, these projects are assigned a relatively low priority ranking and the City may be able to delay these projects until the next planning period if no issues are observed.

A complete listing of the recommended collection system projects is included in Chapter 6. These improvements are later prioritized in Chapter 8 to develop the recommended Capital Improvement Plan (see discussion below).

TREATMENT SYSTEM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Chapter 7 includes an analysis of the City's treatment system. The existing treatment facilities are relatively new and in good condition. As such, a major replacement project should not be needed during the planning period. The recommended improvements described in Chapter 7 are generally geared toward managing the existing infrastructure.

Several improvements are recommended in Chapter 7 to improve operations of the exiting plant. These projects include installing baggers for the headworks screen and grit removal systems, installing drying beds for biosolids management, acquiring a new biosolids disposal site, acquiring a manure spreader for biosolids disposal, and improving the air delivery system for the aerobic digester and sludge storage tank.

Another class of recommendations are projects to address maintenance items that are of a cost that is beyond what can typically be funded by the normal maintenance budget. This class of improvements includes new diffuser membranes, a new tractor for biosolids management, upgrades to the SBR, EQ Basin, and digester control systems, and upgrades to the UV disinfection control system.

Two projects are recommended to address corrosion issues. These include improvements to some of the metal components of the public works building and the dewatering building and coating of the interior concrete surfaces of the digester and sludge storage tanks.

The final two projects are recommended to address capacity issues. The first includes upsizing the outfall pipeline between the wastewater treatment plant and Ocean View Drive. This pipe segment is too small to convey the peak flows anticipated during the planning period. The second capacity improvement project includes constructing a third SBR basin. Based in the flow projections, a third basin may be needed toward the end of the planning period. However, there is considerable treatment capacity remaining in the two existing SBR basins, and the flow projection methodologies conventionally used in facilities planning tend to be fairly conservative. Therefore, it is very possible that the construction of the third SBR may be able to be delayed to

the next planning period (i.e., beyond 2041). However, for planning purposes, it is reasonable to plan for this project to occur near the end of the current planning period.

RECOMMENDED CAPITAL IMPROVEMENT PLAN

The Facilities Plan identifies a number of deficiencies and includes several recommended improvement projects. Some of these projects are more critical than others. Some projects should be constructed early in the planning period. Other projects are not needed immediately, but will be needed as the City grows and the existing system continues to age.

A prioritizing process was developed to rank the improvement projects. Factors utilized in the prioritizing process included several measures of criticality, as well as the cost/benefit ratio of each project. This process identified essential, high benefit to cost projects for early implementation, and the deferral of less critical, lower value projects. Each of the projects identified in the plan were examined and assigned a priority for implementation and appear in Table ES-1 below.

Priority 1 projects are considered to be needed immediately. They have been developed to resolve existing or near-term system deficiencies. It is recommended that Priority 1 improvements are undertaken as soon as practical. Priority 2 projects will be needed beyond the near term of the Priority 1 projects to improve the quality of service throughout the City. Although not critical at this time, they will likely be required at some point during the planning period. All of the Priority 1 and Priority 2 improvements should be included in the CIP.

Several potential funding programs are available to assist communities with the funding of major infrastructure improvements. A number of these programs are identified and discussed in Chapter 8. Even with funding assistance, increases in user rates and SDC fees are likely to be needed during the planning period to fund the recommended projects.

Table ES-1 Recommended Capital Improvement Priorities

Project Code ¹	Project	Priorit y	Total Estimated Project Cost ²
G-1	Sewer Line from King Street to 3rd Street (Manhole D-220 to Manhole D-270)	1	\$140,000
G-2	Mainline A Manhole A-040 to Manhole A-050	1	\$141,000
G-3	Mainline D Manhole D-010 to D-030, Ocean View Drive	1	\$263,000
G-4	Hanley Drive Sewer Manholes	1	\$25,000
G-5	Wastewater Collection System Design Standards	1	\$5,000
P-1	Pump Station Disconnect Panel Improvements	1	\$265,000
P-2	New Portable Generator	1	\$40,000
P-3	Quiet Water Pump Station Improvements	1	\$493,000
T-1	Headworks and Grit Removal Baggers	1	\$10,000
T-2	SBR and Digester Diffuser Membrane Replacement	1	\$15,000
T-3	New Tractor for the Treatment Plant	1	\$35,000
T-4	Public Works Building, Headworks Shelter, and Solids Handling Building Rehab	1	\$700,000
T-5	Outfall Pipeline Improvements	1	\$96,000
Subtotal Priority 1			\$ 2,228,000
P-4	Main Pump Station Improvements	2	\$382,000
P-5	Parkside Pump Station Improvements	2	\$218,000
P-6	Riverside Pump Station Improvements	2	\$218,000
P-7	Pontiac Pump Station Improvements	2	\$218,000
F-1	Pontiac Pump Station Forcemain Improvements	2	\$121,000
F-2	Riverside Pump Station Forcemain Improvements	2	\$326,000
T-6	Biosolids Drying Beds	2	\$158,000
T-7	New Biosolids Disposal Site Acquisition	2	\$50,000
T-8	Biosolids Manure Spreader	2	\$100,000
T-9	Aerobic Digester and Sludge Storage Tank Air Supply System Imps.	2	\$223,000
T-10	Aerobic Digester Tank Coating and Piping Improvements	2	\$330,000
T-11	SBR, EQ Basin, & Digester Control System Upgrades	2	\$972,000
T-12	UV Disinfection Control System Upgrades	2	\$40,000
T-13	SBR Basin #3	2	\$1,236,000
Subtotal Priority 2			\$ 4,592,000
TOTAL....			\$ 6,820,000
Recurring Annual Programs			
Pgm-1	Annual Sewer Collection System Rehabilitation Program (Program - 1)		\$30,000
Subtotal Recurring Annual Programs			\$30,000

Table ES-1 Recommended Capital Improvement Priorities

Project Code ¹	Project	Priorit y	Total Estimated Project Cost ²
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¹ Project Code Legend:

G = Gravity Sewer T = Treatment P = Pump Station F= Forcemain Pgm =
Improvement Program

² See Section 8.3 for basis of project cost estimates. Costs are in June 2021 dollars (ENR Cost Index = 12,112).

CHAPTER 1

INTRODUCTION

Chapter Outline

- 1.1 Introduction
- 1.2 Authorization
- 1.3 Purpose
- 1.4 Scope of Study
- 1.5 Previous Studies and Reports
- 1.6 Wastewater Terms and Definitions

1.1 INTRODUCTION

The City of Yachats is located on the central Oregon coast. Most of the community is located on the gentle slopes on the north and south sides of the Yachats River Estuary immediately north of Cape Perpetua. The City is located at the southern end of Lincoln County. US Highway 101 provides the main transportation route to and from the City. Yachats is located approximately 24 miles south of Newport and approximately 26 miles north of Florence.

The City was incorporated in 1966. According to estimates prepared by the Portland State Population Research Center, the current population of Yachats is about 760 people. The Urban Growth Boundary (UGB) is the same as the City Limits and encompasses approximately 600 acres. Yachats is a unique community in that it is home to a large population of part-time residents as well as a transient tourist population. Therefore, the wastewater system is designed to serve a population significantly greater than the total number of full-time residents. Due to the scenic location along the central Oregon coast, Yachats is an attractive tourist destination and the City's economy is strongly tied to tourism.

The City is served by a publicly owned and operated wastewater utility. This system consists of conventional gravity sewers, pump stations, force mains, and a wastewater treatment plant (WWTP) that is located on 7th Street. The plant uses the sequencing batch reactor (SBR) activated sludge process to provide treatment. Treated effluent is disinfected using ultraviolet light (UV) prior to discharge. Treated water is discharged from the plant into the Pacific Ocean.

The City's facilities are permitted under a National Pollutant Discharge Elimination System (NPDES) permit issued by the Oregon Department of Environmental Quality (DEQ). The City's permit was most recently renewed in 2018 and expires in 2023.

In 2004, the City prepared a Wastewater Facilities Plan that recommended major upgrades to the City's treatment plant and pump stations. These upgrades were completed in 2008 and have operated successfully since that time. Therefore, most of the improvements identified in the 2004 plan have been implemented. Also, the plan is more than 15 years old. For these reasons, the 2004 plan is becoming outdated and it is appropriate for the City to prepare a new plan at this time. This facilities plan replaces the 2004 plan entirely and will serve as the City's primary wastewater system planning document for the next planning period.

1.2 AUTHORIZATION

The City of Yachats authorized Westech Engineering to proceed with the preparation of this Wastewater Facilities Plan in the Spring of 2020. The plan has been prepared to meet the current requirements of the regulatory and funding agencies.

1.3 PURPOSE

The purpose of this plan is to provide a comprehensive evaluation of the City's wastewater system with respect to its existing and future needs, identify improvements and associated costs necessary to meet those needs, and provide the City with a framework for the provision of wastewater service through the year 2041.

This plan will assist the City in the planning and implementation of capital improvements and will assist the development community as the wastewater system is expanded for future growth. The plan will benefit the current and future residents of the City by enhancing the quality of life through improved water quality, planned growth, scheduled improvements, and an equitable distribution of improvement costs.

1.4 SCOPE OF STUDY

The scope of the Wastewater Facilities Plan is intended to comply with the applicable requirements of DEQ and the City. Study area characteristics are identified and included both physical and socioeconomic conditions. Existing population and land use are examined and projected into the future.

The existing wastewater system is investigated. Data was collected on the existing wastewater collection and treatment systems from operating records, conversations with City staff, on-site investigations, maps, as-built records, and other pertinent documentation. Existing facilities are evaluated in terms of location, sizing, capacity, condition, limitations, and performance. Consideration is given to the manner in which existing and proposed facilities could be used in the future as the study area develops to City zoning densities.

Typical wastewater characteristics are identified in terms of loads, flows, strength and I/I allowances throughout the year. Future characteristics are projected to establish capacity requirements. Flows projections are made for both dry period and wet period conditions, and unit design values are established.

The basis for planning is established. Applicable regulatory requirements are identified and addressed, including current and future treatment criteria and discharge standards. The design capacity of the City's collection piping and treatment facilities are examined to determine impacts to present and future operation of wastewater facilities. Alternatives are identified for collection, treatment, and effluent disposal/reuse. Alternatives for system administration are also identified and evaluated.

Nonviable options are screened out, and a limited number of selected alternatives are established and evaluated in detail. Finally, a recommended plan is identified that will enable the City to provide wastewater collection and treatment within the study area. This plan includes preliminary design data, capital improvement and operational costs, and a description of potential financing options.

1.5 PREVIOUS STUDIES AND REPORTS

The following reports and studies were referenced in the preparation of this study:

- *Comprehensive Land Use Plan*, City of Yachats, Yachats Oregon, February, 2019
- *Comprehensive Storm Drainage Plan*, Yachats Oregon, HGE Engineers and Planners, May 1993
- *Comprehensive Wastewater Plan*, Yachats Oregon, HGE Engineers and Planners, September 1991
- *Construction Drawings, Wastewater System Improvements*, City of Yachats, Oregon, The Dyer Partnership, Inc., May, 2007.
- *Mixing Zone Study*, City of Yachats, The Dyer Partnership, February, 2010
- *Wastewater Facilities Plan*, City of Yachats, Oregon, The Dyer Partnership, Inc., September 2004.
- *Wastewater Treatment Plant Operation and Maintenance Manual*, Yachats Oregon, HGE Engineer and Planners, March 1995

1.6 WASTEWATER TERMS AND DEFINITIONS

An understanding of key wastewater terms and definitions is necessary for an understanding of the discussions in this and subsequent sections. The following does not include all terms used in this report, but will provide a useful glossary for those readers not familiar with wastewater terminology. The different sewage flow classifications are defined in Chapter 5.

- Aerobic - Microorganisms living in the presence of free oxygen, or biological treatment processes that occur in the presence of oxygen.
- Anaerobic - Microorganisms capable of living without the presence of free oxygen, or biological treatment processes that occur in the absence of oxygen.
- Anoxic Denitrification - The process by which nitrate nitrogen is converted biologically to nitrogen gas in the absence of oxygen.
- Attached Growth Process - A biological treatment process in which the microorganisms responsible for the conversion of the organic matter or other constituents in the wastewater to gases and cell tissue are attached to some inert medium such as rocks, slag, ceramic or plastic materials. Attached growth treatment processes are also known as fixed film processes.
- Biological Treatment Processes - Treatment processes by which the stabilization and decomposition of organic material in sewage is accomplished by living microorganisms. The organic matter is used as a food source for microorganisms, and converted to forms which can either be removed from the waste stream (soluble organics) or are sufficiently stabilized to allow disposal without negatively affecting the environment (insoluble organics).
- Biological Nutrient Removal - The removal of nitrogen and/or phosphorus with biological treatment processes.
- Biosolids - Treated sludge that is removed from a treatment facility for beneficial reuse or disposal.
- BOD (Biochemical Oxygen Demand) - The amount of oxygen required to biologically stabilize the organic material in sewage by aerobic treatment processes. All references to BOD in this report are to 5-day BOD at 20°C (BOD5).

- Chlorine Residual - The measured residual of chlorine used in disinfecting wastewater. Chlorine residual can exist in two forms; combined or free. The specific form is dependent on the rate of formation, which is controlled by the pH and temperature. A free chlorine residual is the most effective in achieving disinfection.
- Denitrification - The biological process by which nitrate is converted to nitrogen and other gaseous end products.
- DEQ – Oregon Department of Environmental Quality
- Facultative Processes - Biological treatment processes in which the organisms can function in the presence or absence of molecular oxygen.
- Fecal Coliform - Bacteria which are used as an indicator of fecal pollution.
- Industrial Wastes - Wastes produced as a result of manufacturing or processing operations.
- Infiltration/Inflow (I/I) - Groundwater and stormwater which enters the sanitary sewer system.
- Excessive I/I - Portion of infiltration or inflow which can be removed from the sewerage system through rehabilitation at less cost than continuing to transport or treat that portion of I/I.
- Infiltration - Water that enters the sewage system from the surrounding soil. Common points of entry include broken pipe and defective joints in pipe and manhole walls. Although generally limited to sewers laid below the normal groundwater level, infiltration also occurs as a result of rain or irrigation water soaking into the ground and entering mains, manholes, or shallow house sewer laterals with defective joints or other faults.
- Base Infiltration - Water that enters the sanitary sewer system from the surrounding soil during periods of low groundwater levels.
- Rainfall Induced Infiltration - Additional infiltration which enters the sewerage system during and for several days after a period of rainfall. Rainfall often percolates into sewer ditches, especially ditches with granular backfill, and establishes a perched water table. This water then infiltrates into faulty sewers and manholes.
- Sludge - Solid and semisolid residuals resulting from wastewater treatment operations.
- Inflow - Stormwater runoff which enters the sewerage system only during or immediately after rainfall. Points of entry may include connections with roof and area drains, storm drain connections, holes in manhole covers in flooded streets, and manhole cones located in ditch lines and that do not have watertight joints.
- MAO – Mutual Agreement and Order
- Nitrification - The biological process by which ammonia nitrogen is converted first to nitrite, then to nitrate.
- NPDES - National Pollutant Discharge Elimination System.
- pH - The degree of acidity or alkalinity of waste water, 7.0 being neutral, a lower number being acidic, and a higher number being basic.
- Sanitary Sewage - Waterborne wastes principally derived from the sanitary conveniences of residences, business establishments, and institutions.

- Suspended Growth Process - A biological treatment process in which the microorganisms responsible for the conversion of the organic matter or other constituents in the wastewater to gases and cell tissue are maintained in suspension within the liquid.
- TSS (Total Suspended Solids) - All of the solids in sewage that can be removed by settling or filtration. The quantity of TSS removed during treatment impacts the sizing of sludge handling and disposal processes, as well as the effectiveness of disinfection.
- Wastewater - The total fluid flow in a sewerage system. Wastewater may include sanitary sewage, industrial wastes, and infiltration and inflow (I&I).

CHAPTER 2

STUDY AREA AND PLANNING CONSIDERATIONS

Chapter Outline

- 2.1 Introduction
- 2.2 Study Area
- 2.3 Study Period
- 2.4 Physical Environment
 - 2.4.1 Climate and Rainfall Patterns
 - 2.4.2 Topography
 - 2.4.3 Soils
 - 2.4.1 Geologic Hazards
 - 2.4.2 Public Health Hazards
 - 2.4.3 Energy Production and Consumption
 - 2.4.4 Water Resources
 - 2.4.5 Flora and Fauna
 - 2.4.6 Environmentally Sensitive Areas
 - 2.4.7 Air Quality and Noise
 - 2.4.8 Historic and Archeological Sites
 - 2.4.9 Threatened or Endangered Species
- 2.5 Socioeconomic Environment
 - 2.5.1 Economic Conditions and Trends
 - 2.5.2 Population and Growth Projections
 - 2.5.3 Land Use

STUDY AREA AND PLANNING CONSIDERATIONS

2.1 INTRODUCTION

The City of Yachats is located along the central Oregon coast in southern Lincoln County approximately 24 miles south of Newport and 26 miles north of Florence. US Highway 101 provides the primary access to the area from the north and south. The City owns and operates the wastewater utility that provides sanitary sewer service to the community. The City's comprehensive plan identifies an urban growth boundary (UGB) that encompasses approximately 600 acres. The City Limits and the UGB are the same. Figure 2-2, presented at the end of this chapter for formatting reasons, is a vicinity map depicting these features.

2.2 STUDY AREA

The State of Oregon requires wastewater planning documents comply with statewide land use goals and be consistent with locally adopted comprehensive land use plans. Statewide land use Goal 11 directs local governments to establish an urban growth boundary and provide sewer services within it. Sewer services may be provided outside the boundary if it is the only practicable alternative to mitigate a public health hazard and will not adversely affect farm or forest land. To be consistent with these requirements, the study area of this report is the area within the Yachats UGB. Therefore, this plan does not consider service to areas outside the Yachats UGB.

The improvements recommended in this plan are based on the development of land within the UGB in its present location, as well as the existing land use zoning for these areas. It is assumed that no significant development will occur within the study area that will require major changes to the existing zoning, and that there will be no significant expansions of the UGB within the study period. Changes in any of these assumptions could change the recommendations contained in this plan. Should significant changes in any of the above occur, this plan should be updated accordingly.

The location of the Yachats UGB and land use zoning designations are shown in Figure 2-3 presented at the end of this chapter.

2.3 STUDY PERIOD

Choosing a "reasonable" design period for which a utility system should be designed is a somewhat arbitrary decision. If the design period is too short the public faces the prospect of continual upgrades and replacements as demands exceed capacity. On the other hand, choosing a design period that is too long can lead to facilities with excess capacity that may never be needed if population growth does not occur at the projected rates. Such facilities can place an economic burden on the present population and may become obsolete before being fully utilized.

The Oregon Department of Environmental Quality (ODEQ) has established 20 years as a proper planning period for sanitary sewer system improvements. This report will evaluate the anticipated sewage collection, pumping, treatment, and disposal needs for the 20 year planning period. The collection system piping will be planned for the ultimate development of land within the UGB based on current land use designations. Although this may result in capacities greater than those needed during the 20-year planning period, sewage collection lines are, by their very nature, unsuited for incremental expansion without extensive capital outlays. The planning period used in this report is 20 years and ends in the year 2041.

It should be recognized that projections into the future are subject to many variables and assumptions, some of which may prove inaccurate. Accordingly, it is recommended that the City review its wastewater system at five-year intervals and update this report as appropriate.

2.4 PHYSICAL ENVIRONMENT

2.4.1 Climate and Rainfall Patterns

Since there is no National Weather Service recording station in Yachats rainfall and temperature data were examined from Newport, a coastal city 24 miles north of Yachats. While the data from this weather station is not specifically for Yachats, these values are generally believed to be representative for the immediate area around the City.

The climate in Yachats is similar to much of the Oregon coast with moderate temperatures year-round, little precipitation during summer months, and heavy precipitation between late fall and early spring. Average high temperatures range from the high 40's to mid 50's in the winter months and are in the 60's in the summer. Average low temperatures are in the mid 30's to low 40's in the winter, and are in the high 40's to low 50's in the summer. Days with a maximum temperature above 70°F occur only 20 times per year on average, and days with minimum temperatures below 32°F occur only 20 times per year on average.

The study area receives an average of 68 inches of precipitation annually, with the heaviest rainfall in the winter months. Precipitation extremes are somewhat difficult to verify because rainfall records are not always complete. There are relatively complete records for Newport from 1940 through 2004. Since 1940, the wettest year for the study area was 1968 resulting in an estimated 111 inches of rainfall. The driest year was 1944 when the total rainfall in Newport was approximately 43 inches. Approximately 3/4 of the annual precipitation occurs between November 1 and April 30. July is typically the driest month with an average rainfall for the month of approximately one inch.

Snow rarely falls in Newport. In the 65 year historical record, snow fell once every 5 years on average.

2.4.2 Topography

Yachats is located at the Yachats River estuary near the Coast Range foothills. The City's core commercial area is situated on a relatively flat area on the north side of the estuary and west of Highway 101. A similar flat area located on the south side of the estuary and west of Highway 101 includes a number of residential properties. The elevation of these areas varies between

about 30 and 60 feet. Moving east from Highway 101, the ground becomes steeper as the study area progresses up the coast range foothills. The highest areas on the east side of the study area are at elevations of about 700 feet. Across the entire study area, the ground generally slopes from the east to the west and several drainages cross the study area from the east to the west. The most significant of these is the Yachats River which divides the study area into areas that can be referred to as North Yachats and South Yachats.

2.4.3 Soils

The soils along the Yachats River are generally alluvial bottomland deposits that are composed of silts, sand, and gravel with some local areas of peat. The soils in the relatively flat areas of the City along Highway 101 are generally marine terrace deposits. These deposits are typically fine to medium grain friable sandstone of beach origin with thin interbeds of siltstone. The thickness of these deposits may be up to 75 feet. In upper elevations along the east side of the study area, the soils are generally rocky basaltic formations.

None of the soil types outright preclude the construction of typical wastewater facilities from a foundation stability point of view. The construction of significant structures (e.g., buildings, pump stations, treatment plant tankage, etc.) recommended in this report will require detailed geotechnical investigations during the design phase of each project.

This discussion of soil types is based on the information included in the Soil Survey of Lincoln County, Oregon prepared by the Natural Resource Conservation Service in July 1997. This document shows the approximate location of the soil types in the study area. The reader is referred to the Lincoln County Soil Survey for more detailed definitions and descriptions of the individual soil designations.

2.4.4 Geologic Hazards

Known geologic hazards within the study area include earthquakes, flooding, steep/unstable slopes, and tsunamis.

2.4.4.1 Earthquakes

The 2008 U.S. Geological Survey (USGS) National Seismic Hazard Maps display earthquake ground motions for various probability levels across the United States. These factors are applied in the seismic provisions of building codes, insurance rate structures, risk assessments, and other public policy. A review of these maps identifies Oregon as having a relatively high seismic risk. The Oregon Structural Specialty Code shares this assessment and has adopted similar ground motion data as the USGS. Seismic risk factors for structures are typically influenced by a combination of factors including the geographical location, specific building and structural configurations, and local soil types. The construction and rehabilitation of significant structures recommended by this report (buildings and hydraulic structures) will require detailed geotechnical reports and site specific seismic evaluations.

2.4.4.2 Flooding

The Yachats River is the primary stream within the study area. However, several smaller creeks and drainages cross the study area from east to west. These include Agency Creek in the northern portion of the City and Gender and Gregory Creeks in the southern portion of the City. All of

these streams have streamflow patterns similar to other Coast Range streams. It is typified by high flows during the winter and low flows during the summer months.

The Federal Emergency Management Agency (FEMA) has established a 100-year floodplain designation and insurance ratings for the study area. While sometimes referred to as the “100 year flood”, it is more accurate to consider it the flood having a 1 percent chance of occurrence in any year, or a 10 percent chance of occurrence during any 10 year period. The 100-year floodplain has been defined for the Yachats River and the coastal areas. However, 100-year floodplains have not been defined for the smaller creeks in the area.

During a FEMA defined 100-year flood, the Yachats River as well as some of the smaller creeks will rise out of their normal channel into the floodplain. Flood profiles and maps for the streams in and around the study area are included in the Flood Insurance Study prepared for Lincoln County and appear on Flood Insurance Rate Maps (FIRMs). It should be noted that the FEMA flood boundaries are based on flood elevations. Therefore, the actual inundation boundaries may vary due to localized topographical variations. Final determinations of whether a specific property is affected must be determined based on a topographic survey of the property in question.

A review of the existing flood boundary maps show that none of the City’s wastewater pump stations or the treatment plant are located within the 100 year floodplain boundary.

2.4.4.3 Steep/Unstable Slopes

Steep and unstable slopes are a concern for areas on the east side of Highway 101. Steep slopes can have the potential for either mass movement or slope erosion. Mass movement results from shifting of rock or soil material in response to gravity, such as landslides and rock slides. These mass movements are often precipitated or aggravated by excessive groundwater. Slope erosion is the removal of soils or rock that occurs as a result of sheet flow, resulting in surface erosion or gully erosion. This is primarily caused by private land use practices (mainly land clearing and road construction) that can exacerbate slope erosion. At the present time, none of the existing wastewater infrastructure has been significantly impacted by unstable slopes.

2.4.4.4 Tsunamis

Tsunamis are a substantial concern to the City. Undersea earthquakes can cause destructive tsunamis that strike the coast after the earthquake. The configuration of the Oregon and Washington continental shelf can produce tsunami waves that may appear to rise slowly but can build up to 30 feet or more in height as water surges shoreward. Tsunamis rarely come as single waves but arrive as multiple crests that may be hours apart. Often the first tsunami is not the largest or most destructive.

Oregon is vulnerable to two types of tsunamis (distant and local). Local tsunamis are most generally associated with Cascadia subduction zone earthquakes. Tsunamis from distant undersea earthquakes can take place anywhere in the Pacific Rim and will take several hours to reach the Oregon coast. Because the Cascadia Subduction Zone is so close to the Oregon coast, tsunamis caused by earthquakes along this rift can strike the northern Oregon coast within 20-30 minutes of the earthquake. In many cases, the only tsunami warning will be the earthquake itself.

Since 1995, Oregon has placed restrictions on the construction of certain types of critical and essential facilities within tsunami inundation zones along the coast. In 2013, the Oregon Department of Geology and Mineral Industries completed a study to define Tsunami hazard and inundation zones along the Oregon coast. Maps showing the inundation zones are available online. Based on these map and the accompanying report, the maximum Tsunami run-up associated with a Cascadia subduction zone earth quake is 75 to 100 feet above the ocean level at the time of the Tsunami. Similar to 100 year flood elevations, the Tsunami run-up elevations are based on assumed worst case seismic events. The actual wave run-up will depend on the magnitude of the seismic event and any mitigating circumstances, such as concurrent submarine landslides. However, it is not economically feasible to design for higher magnitude events.

Virtually all of the areas west of Highway 101 and some of the areas east of Highway 101 are within the Tsunami inundation zone. This includes most of the commercial and residential areas of the City and virtually all of the wastewater infrastructure. A plan to address the needs of these facilities in the event of a tsunami is beyond the scope of this plan and may be addressed by other studies if the City deems it necessary.

2.4.5 Public Health Hazards

There are no known public health hazards within the City of Yachats. The vast majority of the developed properties within the study area are connected to the public sanitary sewer system. There area likely to be a few septic systems in the study area, but there are no known or ongoing problems with onsite systems in the City.

2.4.6 Energy Production and Consumption

Electricity is provided to the community by the Central Lincoln PUD. Natural gas service is not available in the City. There are no known power generation facilities with the City. The major energy demand in a wastewater treatment and collection system is from the electric motors that drive pumps and other equipment. It is recommended that these components be specified as having high efficiency motors and variable speed controls, which will reduce the energy costs over the life of the project. Depending on the current programs in place with the electric utility, there may be rebates available if high efficiency electrical motors and variable speed controls are specified, which will tend to offset the slightly higher capital construction cost.

2.4.7 Water Resources

Water resources within the study area include freshwater streams and the Pacific Ocean. Groundwater resources in the area are poor and not typically used as water supplies.

The City of Yachats utilizes an outfall to the Pacific Ocean for the wastewater treatment plant. The City holds an NDPES permit for the discharge of treated effluent to this Pacific Ocean.

The City's municipal water supply comes from Salmon and Reedy Creeks. The City also holds water rights for the Yachats River and Cape Creek which is located south of the study area.

2.4.8 Flora and Fauna

The vegetation in the Yachats area is typical of the Oregon coast. Forestlands lie east of the City; the Pacific Ocean lies to the west. Forestlands consist of Douglas Fir, western Hemlock, Sitka

Spruce, Red Alder, and Western Red Cedar. Other plants common to the area include Pacific Rhododendron, Vine and Big Leaf Maple, Red Elderberry, Hairy Manzanita, Kinnikinnick, Salal, Salmonberry, and Sword and Bracken Fern.

The tidal zone along the Pacific Coast and the Yachats River estuary are the habitat of marine bass, rockfish, and ocean perch. Other types of marine life include clams, mussels, chitons, limpets, crab, shrimp, starfish, sea anemone, and urchins. Sea mammals living off the coast of Yachats include harbor seal and sea lions. Other mammals that are native to the region include shrew, mole, raccoon, river otter, muskrat, beaver, skunk, squirrel, and blacktail deer.

Of particular environmental interest in the area are the Steelhead, Coho, and Chinook Salmon, and other anadromous fish that can be found at various times of the year in the Yachats River. As with other coastal streams, impacts due to low water levels, over fishing, and numerous other environmental issues have resulted in dwindling salmon and steelhead populations.

Fieldwork to identify the presence of threatened and endangered species habitat in the study area is beyond the scope of this study. However, several threatened and endangered species may inhabit the study area. Therefore, detailed investigations to determine if a particular project impacts threatened and endangered species should be performed early in the design phase for each project. The one exception to this is for locations of utilities that have previously been developed.

2.4.9 Environmentally Sensitive Areas

The Yachats River, the estuary, the tidal areas, and the riparian areas along these waterways are considered to be environmentally sensitive. There are also likely to be other wetland areas located throughout the study area. The City has completed a local wetland inventory that identifies several wetland areas around the study area. Other wetland areas are likely to exist that are not shown on the City's wetland inventory. Several of the projects recommended in this plan will require some sort of wetland and environmental investigations as part of the early design work.

2.4.10 Air Quality and Noise

The existing air quality in the study area is very good. There are no known air quality monitoring stations located within the study area.

Significant non-natural noise sources within the study area are limited to traffic on local streets and the highway. The predominant natural noise source is the surf from the adjacent coastal areas.

2.4.11 Historic and Archeological Sites

There are no known archaeological sites that will be disturbed or impacted by the recommended projects. However, since the mouths of rivers, coastlines, protected coves, and estuary areas are well known to have been the center of coastal aboriginal life. It should be noted that archaeological or cultural deposits including shell middens, burial sites, village sites, etc. could be located within the project boundaries. As such, a detailed archaeological assessment may need to be performed prior to implementation of some of the recommended projects.

2.4.12 Threatened or Endangered Species

A comprehensive inventory for threatened or endangered species under the Endangered Species Act (ESA) within the study area has not been completed. However, the Oregon Department of Fish and Wildlife maintains an inventory of both state and federally-listed threatened and endangered species. Project specific biological assessments may be required for those capital improvements that include work in existing undeveloped areas.

2.5 SOCIOECONOMIC ENVIRONMENT

Growth within the study area will depend on socioeconomic conditions. The following section contains a general discussion of economic conditions, trends, population, land use, and public facilities relating to the both the study area and the City.

2.5.1 Economic Conditions and Trends

Population growth and the resultant wastewater flows within the study area are linked to the economic conditions and trends of the City.

Yachats does not have large commercial or industrial activities that would support large numbers of employees. Yachats is mainly a residential community with small or medium size commercial/industrial enterprises that mainly serve the local and tourist populations. Some of the attributes that make the City an attractive place to live are location, environmental and air quality, City services, recreational activities, and small-town atmosphere. One of the more active areas of commerce in the City is the recreation industry. By virtue of the coastal location and proximity to popular areas of the central Oregon coast, Yachats offers good recreational opportunities. Many homes in area are vacation rentals or second homes. The City also has a high number of hotel rooms relative to the overall population. The City hosts a large number of part time residents as well as a significant tourist population during the peak tourist season. These economic conditions and trends are expected to continue through the planning period.

2.5.2 Population and Growth Projections

The population in Yachats in 2020 is about 760¹. Based on United States census data, the population was 533 in 1990, 617 in 2000, and 690 in 2010. Therefore, the historic data shows a steady population increase over the last 30 years. This trend is expected to continue during the planning period. In June of 2017, population projections for Lincoln County were prepared by the Portland State University Population Research Center². These projections estimate the 2040 population of Yachats to be 1,061 and are based on an average annual growth rate of 1.4% from 2020-2035 and 0.9% from 2035-2067. These projections will be used for planning purposes in order to conform to state-wide planning goals. As noted elsewhere in this document, the study period ends in 2041. Therefore, the 2040 population was extrapolated for one additional year for the preparation of this document. Adding an additional year of growth at a rate of 0.9% to the 2040 population of 1,061 results in a 2041 population of 1,070.

2.5.3 Land Use

The City's Comprehensive Plan was adopted in 2008 and most recently updated in 2019. The plan established an urban growth boundary (UGB) encompassing approximately 600 acres. The current City Limits and the UGB are the same.

A majority of land use zoning in the City is comprised of residential uses with some areas designated for commercial uses. The location of the UGB and City limits are shown in Figure 2-3. This figure also shows the land use zoning designations within the City. The total areas contained under each zoning designation are listed in Table 2-1 and illustrated in Figure 2-1.

Table 2-1 Yachats Land Uses by Area

Zoning Designation	(Acres)	(%)
Single Family Residential (R-1)	282.9	58.2%
Single Family & Duplex (R-2)	31.2	6.4%
Single, Duplex, Multi-family (R-3)	60.5	12.4%
Single, Duplex, Multi-family, & Motel (R-4)	51.2	10.5%
Commercial (C-1)	20.6	4.2%
Public Facilities (PF)	9.4	1.9%
State Parks (S-P)	23.3	4.8%
Estuary Natural (EN)	7.3	1.5%
Total (Acres)	486.4 (1)	100

Notes:

(1) Total does not include road right of ways and other similar non-

¹ Portland State University, Population Research Center

² Portland State University, Population Research Center, Coordinated Population Forecast Benton County Oregon 2017-2067

zoned areas.

Figure 2-1 Ranked Land Uses

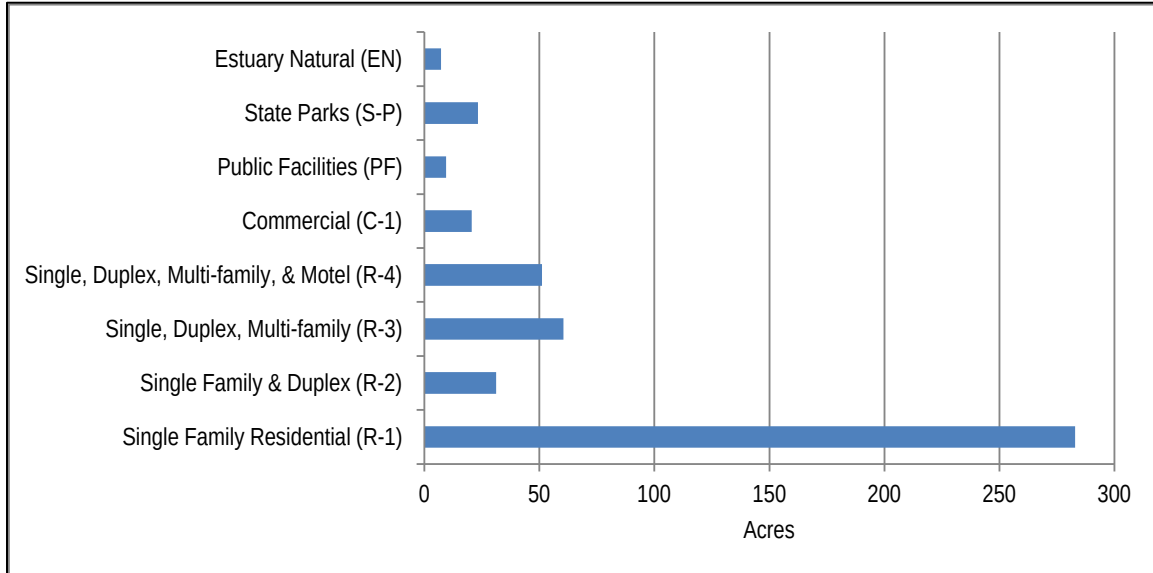
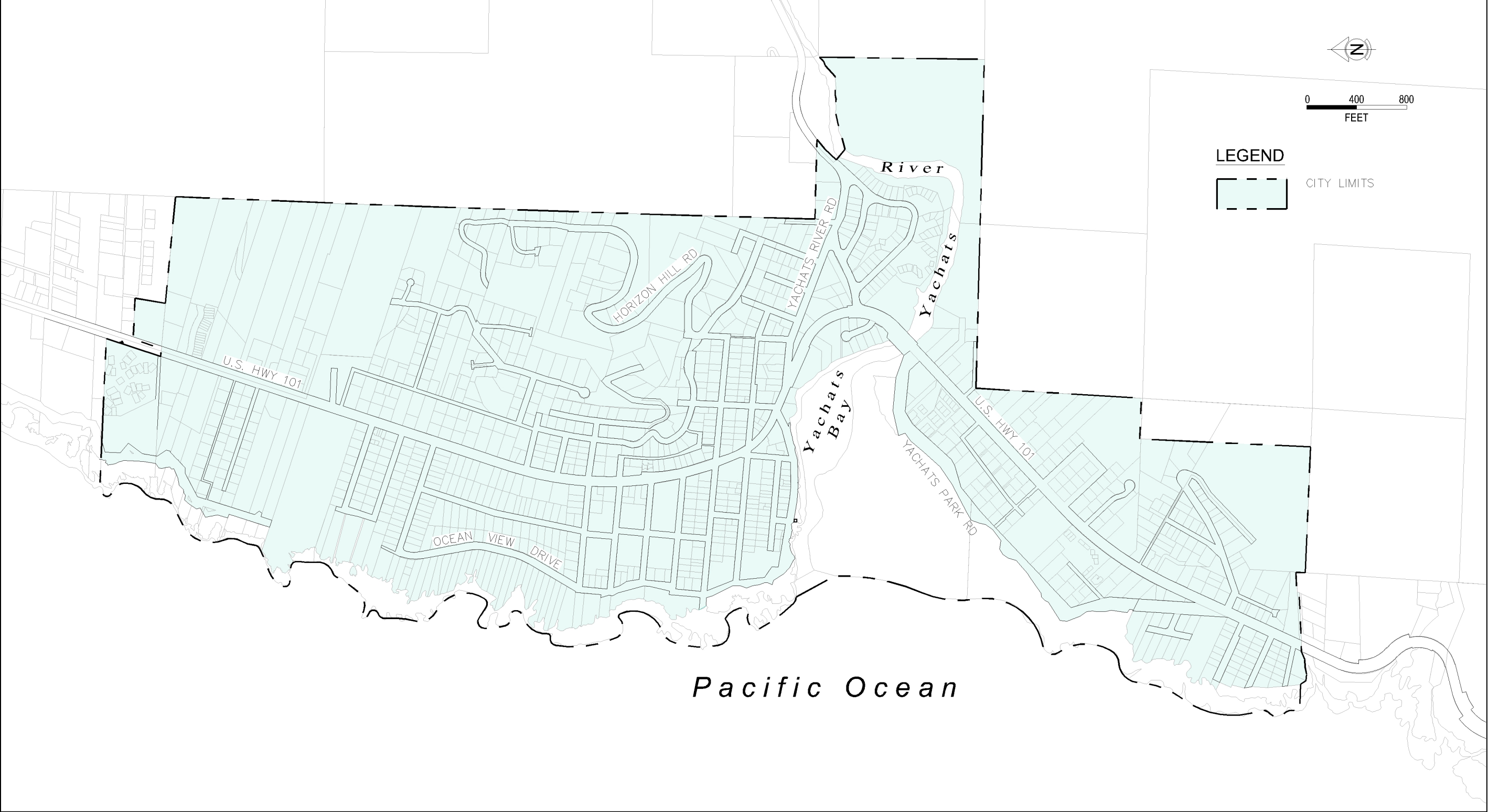


Figure 2-2 Study Area and Vicinity Map



LEGEND

R-1	SINGLE FAMILY RESIDENTIAL
R-2	SINGLE FAMILY & DUPLEX
R-3	SINGLE, DUPLEX, MULTI-FAMILY
R-4	SINGLE, DUPLEX, MULTI-FAMILY & MOTEL
C-1	COMMERCIAL
PF	PUBLIC FACILITIES
S-P	STATE PARKS
EN	ESTUARY NATURAL

FIGURE 2-3

Westech Engineering, Inc.

CHAPTER 3

REGULATORY REQUIREMENTS

Chapter Outline

- 3.1 Introduction
- 3.2 Regulating Agencies
- 3.3 Existing Permit Requirements
- 3.4 Sludge Stabilization Requirements
 - 3.4.1 Biosolids Quality
 - 3.4.2 Pathogen Requirements
 - 3.4.3 Vector Attraction Requirements
 - 3.4.4 Trace Elements
 - 3.4.5 Biosolids Use
 - 3.4.6 Biosolids Land Application Site Criteria
- 3.5 Reliability and Redundancy Requirements
- 3.6 Collection System Design Criteria
- 3.7 Pump Station and Forcemain Design Criteria

3.1 INTRODUCTION

The purpose of this chapter is to present an overview of the regulatory requirements as well as the basic design criteria used to develop and evaluate the various alternatives. This chapter presents the common baseline used to evaluate each of the recommended improvements. All of the recommended improvements must meet all applicable regulatory requirements and provide reliable service for a reasonable cost.

3.2 REGULATING AGENCIES

The U.S. Environmental Protection Agency (EPA) regulates disposal and/or reuse of sewage sludge and septage, as well as the discharge of wastewater effluent to surface waters. Subsurface disposal of treated effluent is regulated by the Oregon Department of Environmental Quality (DEQ). The basis of the regulations imposed or overseen by the EPA is the Federal Water Pollution Control Act of 1972 (Public Law 92-500) often referred to as the Clean Water Act (CWA). The scope of the Clean Water Act has been revised and expanded over the subsequent years. The EPA promulgates regulations to implement the requirements of the CWA and subsequent legislation, and is required to coordinate its requirements with other federal agencies such as the National Oceanic and Atmospheric Administration, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and with state agencies such as the Department of Environmental Quality (DEQ), the Oregon Department of Fish and Wildlife, and the Department of Health.

In Oregon, the Oregon Department of Environmental Quality (DEQ) is the EPA's delegated agency to implement the Clean Water Act.

3.3 EXISTING PERMIT REQUIREMENTS

The City's existing treatment plant is regulated under a National Pollutant Discharge Elimination System (NPDES) permit issued by DEQ (Appendix A). The existing permit was issued on October 28, 2018 and expires on September 30, 2023.

The permit sets forth effluent BOD and TSS limits that vary seasonally (Table 3-1 and Table 3-2). In addition to seasonal limitations, the NPDES permit includes several other limitations with respect to effluent quality and quantity (Table 3-3).

The NPDES permit also establishes a mixing zone at the outfall location. The mixing zone is defined as that portion of the Pacific Ocean within 100 feet of the outfall diffuser. At the present time, the City is able to comply with all requirements of the NPDES permit.

Table 3-1 NPDES Permit Discharge Limitations on BOD₅ and TSS (May 1 - October 31)

NPDES Permit Schedule A, Treated Effluent, Outfall 001(Pacific Ocean)					
Constituent	Max. Concentration (mg/L)		Max. Mass Load (lb/day)		
	Avg. Monthly	Avg. Weekly	Avg. Monthly	Avg. Weekly	Daily
BOD ₅	20	30	25	37	50
TSS	20	30	25	37	50

Table 3-2 NPDES Permit Discharge Limitations on BOD₅ and TSS (November 1 - April 30)

NPDES Permit Schedule A, Treated Effluent, Outfall 001(Pacific Ocean)					
Constituent	Max. Concentration (mg/L)		Max. Mass Load (lb/day)		
	Avg. Monthly	Avg. Weekly	Avg. Monthly	Avg. Weekly	Daily
BOD ₅	30	45	37	56	75
TSS	30	45	37	56	75

Table 3-3 Current NPDES Permit Discharge Limitations on Other Parameters Year Around

NPDES Permit Schedule A, Treated Effluent, Outfall 001(Pacific Ocean)		
pH	Range	6.0 - 9.0
Fecal coliform	Monthly Median	14 cfu/ 100 ml
	Maximum for 10% or less of samples	43 cfu/ 100 ml
	Enterococcus Bacteria	
	Monthly Geometric Mean	35 cfu/ 100 ml
	Maximum single sample	104 cfu/ 100 ml
BOD ₅ Removal Efficiency	Min. Monthly Average Removal	85%
TSS Removal Efficiency	Min. Monthly Average Removal	85%

3.4 SLUDGE STABILIZATION REQUIREMENTS

The term “sludge” refers to the solids that settle and are removed when a liquid with suspended solids passes through a settling basin or tank. Sludge may originate from several sources in a wastewater treatment plant, but can typically be classified as either raw or primary sludge (primary settling of untreated sewage) or secondary sludge (excess biological sludge from secondary treatment processes). With the exception of sludge hauled to a landfill, all sludge must be stabilized prior to reuse or disposal. Stabilized sludge is a mixture of solids and liquids that is one of the end products of the wastewater treatment process. Adequately processed sludge is classified in regulations as “biosolids.” It is commonly disposed of by applying it to agricultural or forest land after adequate processing.

3.4.1 Biosolids Quality

Wastewater biosolids are subject to differing regulations and restrictions based on quality. The Code of Federal Regulations (40 CFR 503) defines standards for three measures of biosolids quality:

- Pathogens
- Vector attraction (the tendency of the sludge to attract rodents, insects and other organisms that can spread disease)
- Trace elements

Biosolids that meet the higher of two standards for all three of these measures are designated exceptional quality (EQ) biosolids. EQ biosolids have fewer reporting and monitoring requirements and virtually no restrictions on use. Use is restricted for biosolids that do not meet the higher standard by any of these three measures. The following is a short discussion of each of these measurements of biosolids quality.

3.4.2 Pathogen Requirements

Pathogen requirements define two classes of biosolids - Class A and Class B. Class A is the higher standard and requires complete destruction of pathogens before disposal. Class B requirements call for reducing pathogens before disposal and applying the biosolids to land in such a way that pathogens are further reduced.

To be classified as Class A, biosolids must be treated using one of the EPA's Processes to Further Reduce Pathogens (PFRP), or an equivalent process. These processes include composting, heat drying, heat treatment, thermophilic aerobic digestion, beta ray irradiation, gamma ray irradiation, and pasteurization. Regardless of the process used, Class A biosolids must not exceed maximum allowable fecal coliform density or Salmonella bacteria density.

Class B biosolids must be treated using one of the EPA's Processes to Significantly Reduce Pathogens (PSRP), or an equivalent process. These processes include aerobic digestion, air drying, anaerobic digestion, composting, and lime stabilization.

3.4.3 Vector Attraction Requirements

Class A Biosolids must meet one of the following requirements for reducing vector attraction if they are to be applied to land without restrictions. It should be noted that the City of Yachats currently produces Class B biosolids. So, these requirements do not currently apply to the City.

- Volatile solids in the sludge shall be reduced by a minimum of 38 percent.
- The specific oxygen uptake rate for sludge treated by aerobic digestion shall be less than or equal to 1.5 mg oxygen per hour per gram of total solids at a temperature of 20°C.
- Aerobic processes shall treat the sludge for a minimum of 14 days with an average temperature of at least 45°C and a minimum temperature of 40°C.
- Alkali addition shall raise the pH of the sludge to a minimum of 12 for two hours and maintain the pH at a minimum of 11.5 for an additional 22 hours without additional alkali.

The use of the land where the biosolids is applied is restricted if vector attraction reduction is achieved by measures, such as injecting the biosolids below the surface of the land or disposing of them on the surface and incorporating them into the soil within six hours.

3.4.4 Trace Elements

Ten elements typically found in biosolids have been identified as critical. Two limits have been set for each of these trace elements: Exceptional Quality (EQ) and a ceiling limit. If all the trace elements are below the EQ limit, then no restrictions are placed on loading rates. If any of the trace elements are over the ceiling limit, then the biosolids are not suitable for land application. If the trace elements fall between these two limits, restrictions are placed on loading rates.

3.4.5 Biosolids Use

Table 3-4 outlines some of the general restrictions on the use of biosolids depending on the quality of the biosolids.

Table 3-4 Biosolids Use Restrictions Based on Quality Rating

Biosolids Quality Rating by Category			Use Restrictions
Pathogens	Vector Attraction	Trace Elements	
EQ	EQ	EQ	No restrictions are imposed on application or use with regard to pathogens, vector attraction, or trace elements.
Class B	EQ	EQ	Application is subject to EPA defined waiting periods for crops, grazing, and public access. Biosolids cannot be distributed for home use, in bags, or in containers.
EQ	-	EQ	Biosolids must be injected or tilled into the soil. Biosolids cannot be distributed for home use, in bags, or in containers.
EQ	EQ	-	Bulk application must not exceed EPA defined cumulative loading rates. Biosolids distributed in bags or containers are subject to annual loading rate restrictions.
All Other Biosolids Qualities			Application is subject to trace loading requirements and pathogen waiting periods. Biosolids must be injected or tilled into the soil and cannot be distributed for home use, in bags, or in containers.

EQ - Exceptional Quality Biosolids

3.4.6 Biosolids Land Application Site Criteria

Site criteria for land applying class B biosolids includes geological formation, flood plain proximity, groundwater and surface water proximity, topography, and soils, as well as method of application. Table 3-5 contains an overview of some of the general criteria contained in OAR 340-050.

Land application of Class B biosolids at sites used for agricultural purposes requires special management considerations. These relate to access to the site, types of crops grown, plant nutrient-uptake rates, timing and duration of biosolids application (i.e., site life and seasonal constraints), and grazing restrictions. A brief discussion of each of these issues follows.

- Access. Controlled access must be provided for municipal class B biosolids application sites for 12 months following surface application of biosolids. Controlled access is defined as public entry or traffic being unlikely. Privately owned rural land is typically assumed to have controlled access, while public lands such as parks may require fencing to ensure access control.
- Crops. Class B Biosolids are not to be used directly on fruits or vegetables which may be eaten raw. As a general rule, crops grown for human consumption should not be planted within 14 months of application of class B biosolids. If the edible parts will not be in contact with the biosolid amended soil, or if the crop will be processed or treated prior to marketing in such a manner to ensure that pathogen contamination is not a concern, this requirement may be waived by DEQ. There are no restrictions on planting times for crops not grown for direct human consumption.
- Nutrient Loading. The application of Class B biosolids to agricultural land should not exceed the annual nitrogen loading required for maximum crop yield. Biosolids are, therefore, typically managed according to their fertilizer value. Biosolids may be applied above agronomic rates on a onetime basis or less than once per year so long as runoff, nuisance conditions, and groundwater concerns are adequately addressed. In cases of higher than agronomic application rates, the acceptable loading rate and application frequency is typically based on nitrogen accumulation and annual nitrogen use.
- Site Life. Class B biosolids disposal sites generally have a limited application life, which may be determined by the chemistry of the soil and the metals loading from the biosolids. Site life is determined by dividing lifetime biosolids loading limits (based on the most limiting constituent) by the annual application rate.
- Seasonal Constraints. The main consideration in land applying class B Biosolids on sloping ground is to avoid surface runoff and soil erosion. Additionally, class B biosolids application should be restricted to the dry season to prevent soil damage that may occur from equipment traffic during the wet season.
- Grazing Restrictions. Grazing animals should not be allowed on pasture or forage for 30 days after application of class B Biosolids.
- Site Monitoring and Reporting. As previously noted, site monitoring is typically not required where "EQ" biosolids are applied at or below agronomic rates based on crop nitrogen requirements. However, if class B biosolids contain high concentrations of heavy metals or other toxic elements, or if crop nitrogen requirements are exceeded on a regular basis, soil monitoring and special management practices may be required. At the discretion of DEQ, monitoring wells and groundwater background characterization and/or monitoring may be required on any site on a case by case basis.

Table 3-5 Site Criteria for Class B Biosolids Application

Parameter	Criteria
Geology	Must have a stable formation
Within Flood Plain	Restricted period of application and incorporation of biosolids
Groundwater	At time of application; 4-foot minimum depth to permanent groundwater; 1-foot minimum depth to temporary groundwater
Topography	Must have appropriate management to eliminate surface runoff
Slope less than or equal to 12%	• Surface application of liquid dewatered or dried biosolids
Slope greater than 12% but less than 20%	• Direct incorporation of liquid biosolids into the soil, surface application of dewatered or dried biosolids
Soils	• Minimum rooting depth of 24 inches • No rapid leaching • Avoid saline or alkali soil • pH of 6.5 to 8.2 for heavy metal accumulator crops, or pH can be raised by adding lime to the soil.
Method of Application & Proximity to Water Bodies	Buffer strips may be required to protect water bodies. Size depends on method of application and proximity to sensitive area (determined at discretion of DEQ), generally as follows: • Direct injection: no limit required • Truck spreading: less than 50 foot buffer strip • Spray irrigation: 300 to 500 foot buffer strip • Near ditch, pond, channel, or waterway: greater than 50 foot buffer strip • Near domestic water source or well; greater than 200 foot buffer strip

3.5 RELIABILITY AND REDUNDANCY REQUIREMENTS

The EPA has established minimum standards for mechanical, electrical, fluid systems, and component reliability for all new or expanding sewerage facilities, including treatment plants. These reliability standards establish minimum levels of reliability for three classes of sewerage facilities. Pump stations associated with, but physically removed from the actual treatment works may have a different classification than the treatment works itself.

The purpose of these reliability standards is to ensure that the treatment facilities will operate effectively on a day-to-day basis and that provisions are made for operation during power failures, flooding, peak loads, equipment failures, and maintenance shutdowns. These reliability

and redundancy standards are designed to ensure that unacceptable degradation of the receiving water will not occur due to the interrupted operation of specific treatment process or unit operation.

The reliability classification will be based on the water quality and public health consequences of a component or system failure. Specific requirements pertaining to treatment plant unit processes for each reliability class are described in EPA's technical bulletin, Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability, EPA 430-99-74-001. EPA and DEQ guidelines for classifying sewerage works are summarized as follows:

- Reliability Class I. These are works whose discharge, or potential discharge, (1) is into public water supply, shellfish, or primary contact recreation waters, or (2) as a result of its volume and/or character, could permanently or unacceptably damage or affect the receiving waters or public health if normal operations were interrupted. Examples of Reliability Class I works are those with a discharge or potential discharge near drinking water intakes, into shellfish waters, near areas used for water contact sports, or in dense residential areas.
- Reliability Class II. These are works whose discharge, or potential discharge, as a result of its volume and/or character, would not permanently or unacceptably damage or affect the receiving waters or public health during periods of short-term operations interruptions, but could be damaging if continued interruption of normal operations were to occur (on the order of several days). Examples of a Reliability Class II works are works with a discharge or potential discharge moderately distant from shellfish areas, drinking water intakes, areas used for water contact sports, and residential areas.
- Reliability Class III. These are works not otherwise classified as Reliability Class I or Class II.

Table 3-6 contains the typical redundancy requirements for treatment plant and pump station components that are designed in accordance with the EPA Reliability Class I standards. DEQ requires all pump stations be designed to reliability Class I standards. For treatment plants, DEQ typically requires Class I reliability standards during the low flow season and Class II standards during the high flow season. One of the goals of treatment plant redundancy is for the treatment plant to have the ability to meet effluent permit limits with any unit removed from service. Major maintenance activities should be scheduled for the low flow season. Therefore, in practice, treatment facilities must be designed to treat the maximum month dry weather flow with any unit removed from service. During wet weather conditions, the DEQ typically allows treatment facilities to be designed such that all treatment units are required to treat the peak wet weather flow.

Table 3-6 EPA Reliability Class I Requirements

System Component	Capacity/Redundancy Requirements
Raw Sewage Pumps	Handle peak flow with largest unit out of service. As a minimum, the Peak flow is defined as the flow associated with a 5-year, 24-hour storm.
Mechanical Bar Screens	Provide one backup with either manual or mechanical cleaning (manual cleaning acceptable if only two screens)
Grit Removal	Provide a minimum of two units.
Primary Sedimentation	Handle 50% of design flow capacity with largest unit out of service. Design flow is defined as the flow used as the design basis of the component.
Activated Sludge Process	A minimum of two equal size basins. No backup basin required.
Aeration Blowers	Supply the design air capacity with the largest unit out of service. Provide a minimum of two units.
Air Diffusers	Allow for the isolation of largest section of diffusers (within a basin) without measurably impairing oxygen transfer.
Secondary Sedimentation	Handle 75% of design flow capacity with largest unit out of service. Design flow is defined as the flow used as the design basis of the component.
Disinfection Contact Basin	Handle 50% of the design flow with largest unit out of service. Design flow is defined as the flow used as the design basis of the component.
Effluent Pumps	Handle peak flow with largest unit out of service. Peak flow is defined as the maximum wastewater flow expected during the design period of the treatment works.
Electrical Power	Two separate and independent sources of electrical power shall be provided, either from two separate utility substations or from a single substation and a plant based generator. Designated backup source shall have sufficient capacity to operate all vital components, critical lighting, and ventilation during peak flow conditions, except that components used to support the secondary processes need not be included as long as treatment equivalent to sedimentation and disinfection is provided.

3.6 COLLECTION SYSTEM DESIGN CRITERIA

The requirements and regulations covering the design and sizing of the collection piping portion of the wastewater conveyance system are set forth in guidelines published by the DEQ. Table 3-7 includes a list of the minimum allowable gravity sewer pipe slopes as contained in OAR 340-052, Appendix A and DEQ design guidelines.

Table 3-7 Minimum Mainline Pipe Slopes

Inside Pipe Diameter (inches)	% Slope (ft/100 ft)
8	0.40
10	0.28
12	0.22
15	0.15
18	0.12
21	0.10
24	0.09
27	0.08

The City does not currently have any design standards that would build on the requirements set forth by DEQ. The DEQ guidelines are fairly general and lack the specificity with which most City's prefer to have with respect to new collection system improvements. Furthermore, there are many other advantages for a City to have these standards. As such, this plan recommends that the City prepare and adopt design standards for future sanitary sewer extensions. This work is discussed in greater detail in Chapter 6.

3.7 PUMP STATION AND FORCEMAIN DESIGN CRITERIA

DEQ has extensive design guidelines for public pump stations. Under the authority granted by OAR 340-052, DEQ has established requirements and guidelines for the design of public sewage pump stations. These design guidelines include OAR 340-052 Appendix B and various design memoranda issued by DEQ. DEQ has established 20-years as being the proper planning period for pump stations. Table 3-8 below summarizes design criteria assumed for new pump stations or the upgrades of the existing pump stations.

Table 3-8 Recommended Minimum Pump Station Design Criteria

Category	Minimum Design Criteria
Design Flows	• 20-year peak instantaneous flow
Pump Station Structure	
• Wetwell Type • Operational Storage • Valve Vault • Overflow	• Precast concrete, hatches with integral hatches/fall protection • Based on pump starts or overflow storage as appropriate • Precast concrete vault adjacent to wetwell • Provide bypass in accordance with DEQ historical design requests.
Pumps	
• Pump Station Capacity • Type • Number • Motor Size • Min. Pump Cycle Time • Pump Retrieval	• Convey design flow with largest single unit out of service • Submersible pumps • 2 minimum • HP as required, 480 volt, 3 phase power preferred • 6 minutes (10 starts per hour total) • Jib or davit crane installed on or adjacent to wetwell
Force Mains	
• Minimum Size & Material • Min Velocity / Max Velocity	• 4-inch, C-900 PVC, Class 52 Ductile Iron or fused HDPE • 3.5 fps / ±8 fps
Instrumentation & Control System	
• Location • Control Building • Pump Speed Control • Flow Measurement	• Building adjacent to pump station • CMU block • Soft starters or VFDs if required by City or utility company • Mag meter in vault downstream of valve.
Auxiliary Power	
• Type • Location • Fuel Supply • Silencer	• Diesel generator with Transfer Switch • Control building adjacent to P.S. • Sub-base tank, 24 hour minimum or as required by City • Critical grade, insulated
Telemetry	
• Type • Alarms	• Match City system, programmed per City direction • Remote alarms as required by City

CHAPTER 4

EXISTING WASTEWATER FACILITIES

Chapter Outline

- 4.1 Introduction
- 4.2 General Overview of Existing Wastewater Facilities
- 4.3 History and Development of the Wastewater System
- 4.4 Wastewater Collection System
 - 4.4.1 Service Area and User Connections
 - 4.4.2 Drainage Basins
 - 4.4.3 Gravity Collection System
 - 4.4.4 Known Gravity Collection System Problems
 - 4.4.5 Pump Stations
 - 4.4.6 Inflow and Infiltration
 - 4.4.7 Known Collection System Non-Compliance Issues
 - 4.4.8 Collection System Deficiencies
- 4.5 Existing Wastewater Treatment and Disposal System
 - 4.5.1 Plant Performance
 - 4.5.2 Description of Existing Treatment Plant Components
 - 4.5.3 Summary of Treatment and Disposal System Deficiencies
- 4.6 Wastewater System Operator Licensing
- 4.7 Wastewater System Funding Mechanisms
 - 4.7.1 Wastewater User Fees
 - 4.7.2 Food and Beverage Taxes
 - 4.7.3 System Development Charges
 - 4.7.4 Urban Renewal District
 - 4.7.5 Annual Sewer System Costs
 - 4.7.6 Debt Service
 - 4.7.7 Wastewater Capital Reserve Fund

4.1 INTRODUCTION

This chapter provides an inventory of the existing wastewater system components that serve the study area. This inventory includes a description of funding mechanisms and operation and maintenance budgets. The evaluation of these specific systems and the development of improvement alternatives are performed in other chapters of this study.

4.2 GENERAL OVERVIEW OF EXISTING WASTEWATER FACILITIES

The wastewater system that serves the study area consists of a conventional gravity collection system that conveys wastewater to the treatment plant. The collection system includes five pump stations. One of these is the Main Pump Station that is located near the intersection of Ocean View and Marine Drive. All of the wastewater from the community eventually flows to the Main Pump Station where it is pumped to the treatment plant headworks. The City's treatment facility is located on 7th Street near the intersection with Driftwood Lane. The treatment plant includes a headworks with screening, grit removal and flow measurement. The treatment plant utilizes an active sludge process operated in a sequencing batch reactor (SBR) configuration. The plant includes two SBR basins. Waste sludge from the SBR's is routed to a series of aerobic digesters. After digestion, the solids are dewatered for final disposal using a screw press. Dewatered solids are disposed either at a regional solids handling facility (Heard Farms Inc.) or at a landfill. Discharge from the SBR basins is routed to an equalization basin where the flow is equalized prior to being routed through an ultraviolet light (UV) disinfection facility. After UV disinfection, plant effluent is routed to an outfall pipeline for discharge into the Pacific Ocean. The plant also includes a public works building that houses the aeration blowers, office space, a laboratory room, and electrical control room, shop space, and vehicle storage. A separate operations building houses the blowers for the aerobic digesters, a locker room, and a meeting room. The plant is equipped with a diesel backup power generator.

Detailed maps of the collection system are included in Appendix B. An overall schematic of the wastewater system is shown in Figure 4-1. Detailed descriptions of the major components of the wastewater system are included below.

4.3 HISTORY AND DEVELOPMENT OF THE WASTEWATER SYSTEM

The original sewer system was installed in 1974 and included a conventional gravity collection system, four pump stations, a secondary wastewater treatment plant, and an ocean outfall. The treatment plant was a donut-style activated sludge plant that included aeration basins, an aerobic digester and clarifier in a single tank. This tank remains in service, but is now used as an aerobic

digester. Three of the four pump stations and treatment plant remain in their existing location, but have been improved since originally constructed. The Pontiac Pump Station wet well has been relocated, but the station remains in the same general area as originally constructed. The vast majority of the gravity collection piping installed in 1974 remains in service.

In 1980, the Quiet Water development was constructed and included new gravity sewers with a new pump station. In the mid-1980s, the treatment plant was improved. A new clarifier with an integral chlorine contact chamber was constructed and the existing clarifier was converted into a second aerobic digester. The new clarifier/chlorine contact chamber tank remains in service and is currently used as a sludge storage tank.

In 1991, the collection system was expanded to provide service to new homes built on the east side of the City. In 2003, an inflow and infiltration (I/I) project was completed and included upsizing sewers along Yachats Ocean Road and lining about 750 feet of piping. In 2008, the City completed a major upgrade to the sewer system. The 2008 project included the construction of the new sequencing batch reactor plant, and upgrades to four pump stations that were constructed in 1974. No major improvements to the treatment plant or pump stations have been made since 2008. In the late 2000s and early 2010s, the sewer system was extended to provide service to the Blackstone Development on the east side of the City. Several other sanitary sewer extension projects have been completed over the years to expand sewer service to nearly all residents living in the City.

4.4 WASTEWATER COLLECTION SYSTEM

This subsection provides an overview of the existing wastewater collection system within the study area with an emphasis on flow routing as well as known and reported problems.

4.4.1 Service Area and User Connections

The City's system currently serves approximately 900 user connections. A breakdown of the connections user type is presented below (Table 4-1). The vast majority of the connections are single family residential. There are no large industrial or commercial users that currently discharge to the sewer system. Several of the Commercial users are hotels that have several rooms and therefore are relatively large users in Yachats.

Table 4-1 Sewer User Summary

User Classification	Number of Connections
Residential	828
Commercial	52
Miscellaneous	9
Total	898

Figure 4-1 Overall Wastewater System Schematic

4.4.2 Drainage Basins

To aid in the analysis of the collection system, it is convenient to divide the collection system into separate drainage basins. The basin boundaries are based on a combination of factors including topography, urban growth boundaries, as well as the existing drainage patterns and trunk sewer locations. The collection system is divided into nine basins as shown in Figure 4-2. The approximate area within each of the major sewer drainage basins is listed in Table 4-2. The routing of the existing system is shown schematically in Figure 4-1.

Table 4-2 Sewer Drainage Basin Areas

Basin	Total Area (Acres)	Undeveloped Area Suitable for Future Development ⁽¹⁾ (Acres)
A	138	54
B	56	8
C	36	0
D	80	21
E	16	0
F	33	0
G	29	0
H	93	30
I	57	17
Totals	598	130

Notes

- (1) Does not include vacant lots or properties within areas that are already sewered.

Figure 4-2 Sewer Drainage Basin Map

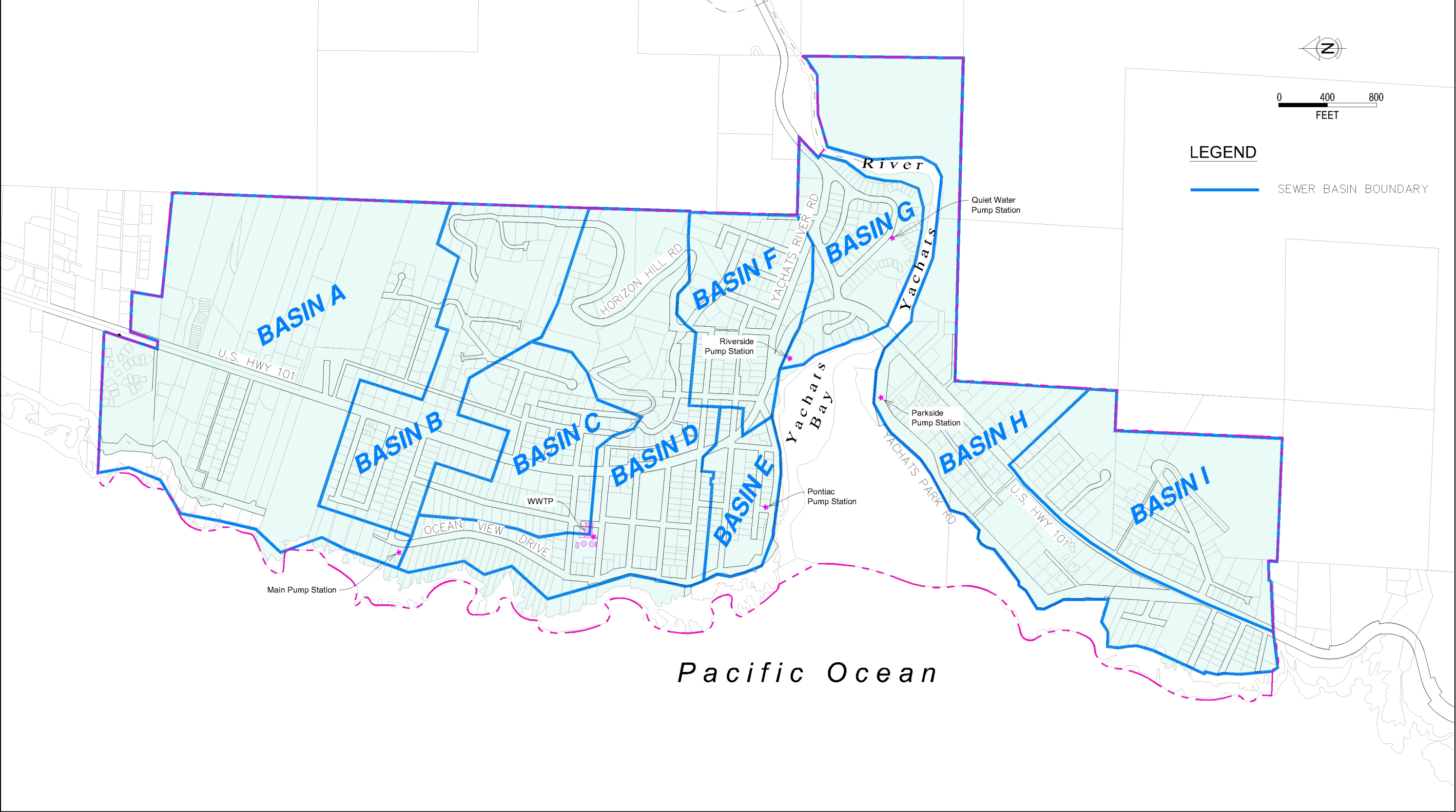


FIGURE 4-2

4.4.3 Gravity Collection System

The collection system serving the City includes approximately 65,000 feet of mainline pipe, 335 manholes and mainline cleanouts, and about 900 service laterals. Pipe sizes range from 6-inch to 15-inch diameter (Figure 4-3). The majority of the piping is 8-inch diameter asbestos concrete (AC) pipe. The collection system includes five pump stations, and approximately 5,500 feet of pressure forcemain piping. The pump stations and forcemain piping are described in greater detail below. The original collection system was built in the early 1970s using AC pipe. Most of the original piping remains in service. The original collection system has been extended over the years and most new extensions have been with PVC pipe. All of the concrete pipe was installed in the early 1970s is approaching 50 years of age. The PVC piping varies in age from 5-30 years old.

Figure 4-3 Pipe Inventory by Diameter

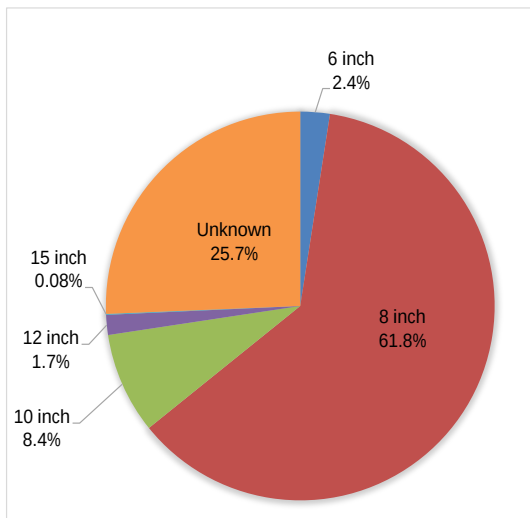
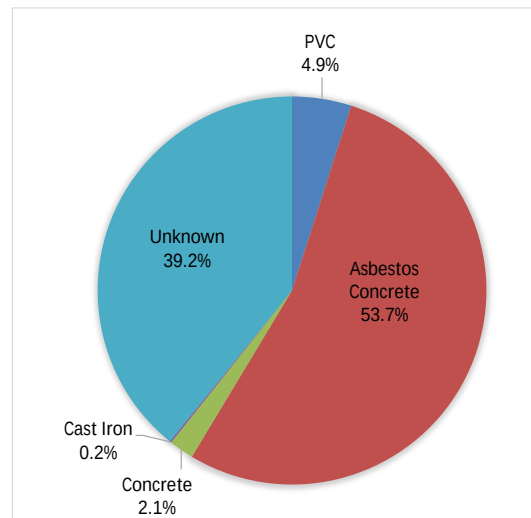


Figure 4-4 Pipe Inventory by Material



4.4.4 Known Gravity Collection System Problems

The following bullet points list major collection system problem that are known at the present time.

- Sewer Line from King Street to East 3rd Street (Manhole D-220 to Manhole D-270). This piping is old concrete piping with poor joint integrity. I/I and root intrusion are known problems on this section of piping.
- Mainline A Manhole A-040 to Manhole A-050. There is a belly on this section of line which is downstream of the Adobe Resort. The belly causes surcharging, debris accumulation, and maintenance problems.
- Hanley Drive Sewer Upstream of Manhole C-150. This mainline pipe was constructed without manholes at the termina end and at a 90-degree bend on Hanley Drive. As a result, it is not possible to clean or inspect these pipelines.

4.4.5 Pump Stations

The existing wastewater collection system serving the City includes five pump stations. Table 4-3 contains a summary of some of the important characteristics of each of the pump stations. A more detailed description of each of the stations is presented in the following sections. The Main Pump Station, the Parkside Pump Station, the Riverside Pump Station, and the Pontiac Pump Station were all constructed as part of the 2008 wastewater system improvement project. Therefore, they are relatively similar and in good condition. The Quiet Water Pump Station was constructed in the 1980s and is older type of station.

Table 4-3 Summary of Existing Pump Stations

Category	Main Pump Station	Parkside Pump Station	Riverside Pump Station
General			
▪ Basins served	All	H, I	G,H,I,F
▪ Construction date(s)	2009	2009	2009
▪ Type	Submersible	Submersible	Submersible
Firm Capacity ⁽¹⁾	1,600 gpm @ 84 ft TDH	400 gpm @ 25 ft TDH	590 gpm @ 65 ft TDH
Wetwell			
▪ Type	Concrete	Fiberglass/Packaged	Fiberglass/Packaged
▪ Size	8' diameter	6' diameter	6' diameter
▪ Rim Elevation	24.0 ft.	21.55 ft.	19.15 ft.
▪ Influent Invert Elev.	15.06 ft. 6.0 ft.	12.95 ft. 7.5 ft.	9.00 ft. 2.0 ft.
▪ Bottom Elev.	18 ft.	14.05 ft.	17.15 ft.
▪ Depth (Rim to Bottom)			
Pumps			
▪ Type	Submersible	Submersible	Submersible
▪ Number	3	2	2
▪ Manufacturer & Model	ABS AFPK 1547ME210/4D	ABS AFPK 1041M46/4D	ABS AFPK 1047ME130/4
▪ Motor Size & Speed	30 HP 1750 RPM 480-Volt 3-Phase	6.2 HP 1750 RPM 240-Volt 3-Phase	17.4 HP 1750 RPM 240-Volt 3-Phase
▪ Power Supply			
Force Main			
▪ Size & Type	6" & 10" AC	6" PVC	6" AC & HDPE
▪ Length	1,850 ft	1,035	1,173 ft.
▪ FM Discharge	WWTP Headworks	MH G-2	MH D-18
▪ FM Discharge Elev.	± 62.5 ft.	± 13.6 ft. with intermediate high point elev. = ± 30 ft.	± 48 ft.
Hydrogen Sulfide Control	none	none	none
Auxiliary Power			
▪ Type & Location	80 KW Fixed Gen	20 KW Fixed Gen	30 KW Portable Gen
▪ Fuel Supply	Diesel	Diesel	Diesel
▪ Transfer Switch	Automatic	Automatic	Manual
Telemetry	Autodialer	Autodialer	Autodialer
Overflow	Manholes A-010 and A-	Top of pump station,	Manhole G-010

Table 4-3 Summary of Existing Pump Stations

Category	Main Pump Station 040	Parkside Pump Station then overland to Pacific Ocean Elevation = 21.55 ft.	Riverside Pump Station
----------	--------------------------	---	------------------------

(1) Firm capacities based on the largest single out of service at each station.

Table 4-4 Summary of Existing Pump Stations (continued)

Category	Pontiac Pump Station	Quiet Water Pump Station
General		
▪ Basins served	E	G
▪ Construction date(s)	2009	1980
▪ Type	Submersible	Vacuum Prime/Packaged
Firm Capacity ⁽¹⁾	150 gpm @ 21.5 ft TDH	150 gpm @ 50 ft TDH
Wetwell		
▪ Type	Fiberglass/Packaged	Concrete
▪ Size	5' diameter	5' diameter
▪ Rim Elevation	27.20 ft.	11.7 ft.
▪ Influent Invert Elev.	20.0 ft.	3.69 ft.
▪ Bottom Elev.	15.0 ft.	-2.31 ft.
▪ Depth (Rim to Bottom)	12.20 ft.	14 ft.
Pumps		
▪ Type	Submersible	Vacuum Prime
▪ Number	2	2
▪ Manufacturer & Model	ABS AFPK0841M22/4D	Hydronix 40 MPC w/7.75 inch impeller
▪ Motor Size & Speed	3 HP 1750 RPM 230-Volt 3-Phase	7.5 HP 1800 RPM 230-Volt 3-Phase
▪ Power Supply		
Force Main		
▪ Size & Type	4" AC	4"
▪ Length	573 ft	825 ft
▪ FM Discharge	MH D-17	MH G-2
▪ FM Discharge Elev.	± 37 ft	± 12.2
Hydrogen Sulfide Control	none	none
Auxiliary Power		
▪ Type & Location	30 KW Portable Gen	30 KW Portable Gen
▪ Fuel Supply	Diesel	Diesel
▪ Transfer Switch	Manual	Manual
Telemetry	Autodialer	Autodialer
Overflow	MH E-013 Elevation = 24.8 ft.	Manhole G-030 Elevation = ± 11.2

(1) Firm capacities based on the largest single out of service at each station.

4.4.5.1 Main Pump Station

The Main Pump Station is located on the west side of Ocean View Drive near the intersection with Marine Drive. The entire collection system eventually drains to the Main Pump Station (Figure 4-1) where it is pumped to the treatment plant site. The station was reconstructed in 2008 and is relatively new and in good condition. The design criteria for the station are outlined above (Table 4-3).



Figure 4-5 Main Pump Station

The station consists of a packaged fiberglass wet well, a valve vault, and a control building. Three submersible wastewater pumps are located in the wet well. Pump isolation and check valves are located in the valve vault. The electrical distribution and control gear are located in the control building along with a backup power generator. The pump power cables are not equipped with an easy way to disconnect the cables from the power supply. In order to remove the pumps, the operators must disconnect the power wires at the pump. This requires an electrician which is awkward and costly. A better system includes disconnect plugs at some intermediate location between the pumps and the control panel (usually near the wet well hatch) that can be used to remove the pumps and a portion of the power cables without the need for an electrician. The City may want to consider installing a similar disconnect system during the planning period.

The station includes no provisions for hydrogen sulfide control. The station conveys water to the treatment plant headworks. The headworks concrete and associated structures do not show excessive signs of hydrogen sulfide corrosion. Therefore, hydrogen sulfide corrosion does not seem to be a major problem.

The Main Pump Station is equipped with an automatic transfer switch and an onsite diesel generator to provide backup power. The primary level control element is an ultrasonic transducer mounted in the wetwell. The pump speeds are controlled using variable frequency drives. In addition to the primary level control system, the station includes a backup level control system that consists of float switches located above the normal liquid levels. If liquid level rises above normal operating ranges and lifts the float switches, the pumps will start. The station is equipped with an autodialer for calling out alarm conditions. The station does not include a dedicated overflow pipe. This is a shortcoming that should consider addressing by installing a dedicated overflow pipe from the wet well to the storm drainage system.

The pump station discharges into 12-inch ductile iron forcemain that runs for about 64 feet from the valve vault to a manifold connecting the 12-inch pipe to 6-inch diameter and 10-inch diameter forcemain pipes. The 6- and 10-inch pipes are approximately 1,850 feet long and run in parallel to

the treatment plant. The 6-inch diameter pipe is believed to be asbestos concrete and was constructed as part of the original collection system in 1974. The 10-inch pipe is PVC and was installed later in 1993.

The Main Pump Station was constructed in 2008 and should serve the City well throughout the planning period with normal maintenance activities. As noted above, a new dedicated overflow pipe should be installed. Over the 20 year planning period, the electrical control system will likely require upgrades due to the overall age of the equipment. The remaining work at the station should consist of typical maintenance activities including building maintenance, normal pump maintenance, generator maintenance, periodic upgrades to the telemetry equipment, etc. These activities should be funded under normal operation and maintenance budgets and are not included as capital improvement projects in this document.

4.4.5.2 Parkside Pump Station

The Parkside Pump Station is located south of the Yachats River on the north side of Yachats Ocean Road. All of the collection system piping located south of the Yachats River drains to this station. The station pumps water through a 6-inch forcemain to a manhole on the north side of the Yachats River Bridge that drains to the Riverside Pump Station. The Parkside Pump Station and forcemain were constructed in 2009 and are relatively new and in good condition. The design criteria for the station is outlined above (Table 4-3).



Figure 4-6 Parkside Pump Station

The station is a packaged fiberglass station that includes a 6-foot diameter fiberglass wet well with an integral valve vault. Two submersible wastewater pumps are located in the wet well. The pumps discharge into 4-inch piping in the wet well. The pump discharge piping passes through the fiberglass valve vault where an isolation and check valve are installed on each discharge pipe. Outside the valve vault, the two 4-inch pipes connect to the 6-inch forcemain pipe. The 6-inch forcemain is mostly PVC with a section of ductile iron mounted to the Yachats River Bridge. The total length of the forcemain is approximately 1,035 feet

The station includes no provisions for hydrogen sulfide control. Based on recent inspections, the manholes downstream of the forcemain discharge point do not show signs of excessive hydrogen sulfide corrosion.

The station is equipped with an automatic transfer switch and an onsite diesel generator to provide backup power. The generator is located in a small wood framed building next to the wet well. The pumps are controlled automatically using float switches and motor starters. The

station does not have variable frequency drives. The pump controls are located in stainless steel panels adjacent to the wet well. The station is equipped with an autodialer for calling out alarm conditions. The pump power cables are not equipped with an easy way to disconnect the cables from the power supply. In order to remove the pumps, the operators must disconnect the power wires at the pump. This requires an electrician which is awkward and costly. A better system includes disconnect plugs at some intermediate location between the pumps and the control panel (usually near the wet well hatch) that can be used to remove the pumps and a portion of the power cables without the need for an electrician. The City may want to consider installing a similar disconnect system during the planning period.

The station does not include a dedicated overflow pipe. Therefore, in the event of a prolonged pump failure, sewage will flow out the top of the wet well hatch. This has not traditionally been a problem for the City, but is not standard and is something the City may want to consider addressing during the planning period.

The Parkside Pump Station was constructed in 2008 and should serve the City well throughout the planning period with normal maintenance activities. Over the 20-year planning period, the electrical control system will likely require upgrades due to the overall age of the equipment. The remaining work at the station should consist of typical maintenance activities including building maintenance, normal pump maintenance, generator maintenance, periodic upgrades to the telemetry equipment, etc. These activities should be funded under normal operation and maintenance budgets and are not included as capital improvement projects in this document.

4.4.5.3 Riverside Pump Station

The Riverside Pump Station is located north of the Yachats River on the west side of Highway 101 south of the intersection with Yachats River Road. The station receives flow from the Parkside Pump Station as well as from the areas of the City that are generally north of the Yachats River, east of Highway 101 and south of King Street. The station pumps water through a 6-inch forcemain to a manhole near the intersection of



Figure 4-7 Riverside Pump Station

Highway 101 and Third Street. From this location the wastewater flows by gravity to the Main Pump Station. The Riverside Pump Station was constructed in 2008, but the original forcemain constructed in 1974 was not replaced and remains in service. The design criteria for the station is outlined above (Table 4-3).

The station is a packaged fiberglass station that includes a 6-foot diameter fiberglass wet well with an integral valve vault. Two submersible wastewater pumps are located in the wet well. The pumps discharge into 4-inch piping in the wet well. The pump discharge piping passes through the fiberglass valve vault where an isolation and check valve are installed on each discharge pipe. Outside the valve vault, the two 4-inch pipes connect to the 6-inch forcemain pipe. The original 6-inch forcemain was constructed in 1974 and is believed to be asbestos concrete pipe that is about 1,200 feet long. In 2017, the City replaced about 270 feet of the forcemain between East 2nd Street and East 3rd Street with 6-inch HDPE pipe. Since HDPE pipe is dimensioned to the outside of the pipe rather than the inside like asbestos concrete pipe, the actual diameter of the HDPE section is slightly less than 6 inches.

The station includes no provisions for hydrogen sulfide control. Based on recent inspections, the manholes downstream of the forcemain discharge point do not show signs of excessive hydrogen sulfide corrosion.

The station is equipped with a manual transfer switch and a receptacle for a portable backup generator. The City currently has two portable generators that are stored at the public works shop building. During power outages, the City moves the generators to the pump stations. The City only has two portable generators that must be rotated among the three pump stations that are not equipped with permanent generators (i.e., Riverside, Pontiac, and Quiet Water). This is time consuming and somewhat risky. Therefore, the City may want to consider purchasing a third portable generator for the system.

The pumps are controlled automatically using float switches and motor starters. The station does not have variable frequency drives. The pump controls are located in stainless steel panels adjacent to the wet well. The station is equipped with an autodialer for calling out alarm conditions. The pump power cables are not equipped with an easy way to disconnect the cables from the power supply. In order to remove the pumps, the operators must disconnect the power wires at the pump. This requires an electrician which is awkward and costly. A better system includes disconnect plugs at some intermediate location between the pumps and the control panel (usually near the wet well hatch) that can be used to remove the pumps and a portion of the power cables without the need for an electrician. The City may want to consider installing a similar disconnect system during the planning period.

The station does not include a dedicated overflow pipe. Therefore, in the event of a prolonged pump failure, sewage will flow out the top of Manhole G-010. This has not traditionally been a problem for the City, but is not standard and is something the City may want to consider addressing during the planning period.

The Riverside Pump Station was constructed in 2008 and should serve the City well throughout the planning period with normal maintenance activities. Over the 20-year planning period, the electrical control system will likely require upgrades due to the overall age of the equipment. The remaining work at the station should consist of typical maintenance activities including building maintenance, normal pump maintenance, periodic upgrades to the telemetry equipment, etc. These activities should be funded under normal operation and maintenance budgets and are not included as capital improvement projects in this document.

4.4.5.4 Pontiac Pump Station

The Pontiac Pump Station is located on the east side of Pontiac Street north of the intersection with Ocean View Drive. The station receives flow from the properties west of Highway 101 between Ocean View Drive and Second Street. The station pumps water through a 4-inch forcemain to a manhole at the intersection of Pontiac Street and Third Street. From this location the wastewater flows by gravity to the Main Pump Station. The Pontiac



Figure 4-8 Pontiac Pump Station

Pump Station was constructed in 2008, but the original forcemain constructed in 1974 was not replaced and remains in service. The design criteria for the station is outlined above (Table 4-3).

The station is a packaged fiberglass station that includes a 5-foot diameter fiberglass wet well with an integral valve vault. Two submersible wastewater pumps are located in the wet well. The pumps discharge into 4-inch piping in the wet well. The pump discharge piping passes through the fiberglass valve vault where an isolation and check valve are installed on each discharge pipe. Outside the valve vault, the two 4-inch pipes connect to the 4-inch forcemain pipe. The 4-inch forcemain is believed to be asbestos concrete pipe and is about 575 feet long.

The station includes no provisions for hydrogen sulfide control. Based on recent inspections, the manholes downstream of the forcemain discharge point do not show signs of excessive hydrogen sulfide corrosion.

The station is equipped with a manual transfer switch and a receptacle for a portable backup generator. The City currently has two portable generators that are stored at the public works shop building. During power outages, the City moves the generators to the pump stations. The City only has two portable generators that must be rotated among the three pump stations that are not equipped with permanent generators (i.e., Riverside, Pontiac, and Quiet Water). This is time consuming and somewhat risky. Therefore, the City may want to consider purchasing a third portable generator for the system.

The pumps are controlled automatically using float switches and motor starters. The station does not have variable frequency drives. The pump controls are located in stainless steel panels located about 45 feet north of the wet well. The station is equipped with an autodialer for calling out alarm conditions. The pump power cables are not equipped with an easy way to disconnect the cables from the power supply. In order to remove the pumps, the operators must disconnect the power wires at the pump. This requires an electrician which is awkward and costly. A better system includes disconnect plugs at some intermediate location between the pumps and the control panel (usually near the wet well hatch) that can be used to remove the pumps and a portion of the power cables without the need for an electrician. The City may want to consider installing a similar disconnect system during the planning period.

The station does not include a dedicated overflow pipe. Therefore, in the event of a prolonged pump failure, sewage will back up into the collection system and flow out the lid of Manhole E-013.

The Pontiac Pump Station was constructed in 2008 and should serve the City well throughout the planning period with normal maintenance activities. Over the 20-year planning period, the electrical control system will likely require upgrades due to the overall age of the equipment. The remaining work at the station should consist of typical maintenance activities including building maintenance, normal pump maintenance, periodic upgrades to the telemetry equipment, etc. These activities should be funded under normal operation and maintenance budgets and are not included as capital improvement projects in this document.

4.4.5.5 Quiet Water Pump Station

The Quiet Water Pump Station is located on the south side of Combs Circle in the Quiet Water Subdivision. The station receives wastewater from the Quiet Water Subdivision and pumps through a 4-inch forcemain to a manhole on Highway 101 that drains to the Riverside Pump Station. The Quiet Water station and forcemain were constructed as part of the Quiet Water Subdivision in 1980. The design criteria for the station is outlined above (Table 4-3).



Figure 4-9 Quiet Water Pump Station

The station is a vacuum primed package type station consisting of a concrete wet well with a packaged pumping unit mounted over the wet well. The packaged pumping unit includes the two vacuum primed pumps, discharge piping, and controls located in a fiberglass shelter. The mechanical and electrical equipment is 40 years old and will likely reach the end of its useful life

during the planning period. The pumps discharge into a 4-inch forcemain that is approximately 820 feet long. The piping material is unknown.

The station includes no provisions for hydrogen sulfide control. Based on recent inspections, the manholes downstream of the forcemain discharge point do not show signs of excessive hydrogen sulfide corrosion.

The station is equipped with a manual transfer switch and a receptacle for a portable backup generator. The City currently has two portable generators that are stored at the public works shop building. During power outages, the City moves the generators to the pump stations. The City only has two portable generators that must be rotated among the three pump stations that are not equipped with permanent generators (i.e., Riverside, Pontiac, and Quiet Water). This is time consuming and somewhat risky. Therefore, the City may want to consider purchasing a third portable generator for the system.

The pumps are controlled automatically using float switches and motor starters. The station does not have variable frequency drives. The pump controls are located adjacent to the pumps in the fiberglass enclosure over the wet well. The station is equipped with an autodialer for calling out alarm conditions.

The station does not include a dedicated overflow pipe. Therefore, in the event of a prolonged pump failure, sewage will back up into the collection system and flow out the lid of Manhole G-030.

4.4.6 Inflow and Infiltration

The City's collection system is typical of many western Oregon sewer systems in that it experiences higher flows during the winter months because of ground water infiltration and storm water inflow (I/I). The average dry weather flow measured at the WWTP during the months of May through and October is approximately 0.134 MGD. The average flow during the wet weather months (November through April) is approximately 0.236 MGD. The highest daily flows measured most years are over 1.0 MGD. The ratio between average dry weather flow and the peak day flow is approximately 9. This ratio is common for similar municipal collection systems in Western Oregon. The City routinely inspects key manholes in the collection system during large winter storm events and does not observe any significant surcharging. However, since these are spot checks, it is possible that some surcharging occurs in the older portions of the City during very large storm events. During very large storm events, some surcharging is normal and not necessarily considered a significant shortcoming due to the relatively infrequent occurrence of these events.

No known raw sewage overflows from the collection system have ever been documented in the last several years. This fact along with a review of pump station run times and a general lack of surcharging in the system suggests that the collection piping is generally large enough to convey high flows. Nonetheless, I/I control measures are something that the City should continue to implement for the foreseeable future.

The City currently allocates approximately \$30,000 per year for I/I corrective work. These funds have traditionally been used to rehabilitate manholes and perform spot repairs. As the City's collection system continues to age and deteriorate, groundwater infiltration rates are likely to

increase. As such, the City must continue to implement I/I corrective improvements in order to keep infiltration rates at their current levels.

4.4.7 Known Collection System Non-Compliance Issues

The City has not received any warning letters from DEQ over the past few years regarding problems in the collection system. There are also no known areas that are likely to cause any compliance issues in the coming years. That said, continued I/I control efforts are needed in the collection system to maintain I/I amounts at current levels and to prevent any future non-compliance issues. The specific recommendations for the collection system are discussed in more detail in Chapter 6.

4.4.8 Collection System Deficiencies

Problems with the Collection System were identified from meetings and discussions with City staff and from field investigations. These are discussed in greater detail above and summarized in Table 4-5.

Table 4-5 Known Collection System Deficiencies

Location	Problem Category
Sewer Line from King Street to 3 rd Street (Manhole D-220 to Manhole D-270)	This piping is old concrete piping with poor joint integrity. I/I and root intrusion are known problems on this section of piping.
Mainline A Manhole A-040 to Manhole A-050	There is a belly on this section of line which is downstream of the Adobe Resort. The belly causes surcharging, debris accumulation, and maintenance problems.
Hanley Drive Sewer Upstream of Manhole C-150	This mainline pipe was constructed without manholes at the terminus end and at a 90-degree bend on Hanley Drive. As a result, it is not possible to clean or inspect these pipelines.
Main Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Main Pump Station	Lacks a dedicated overflow pipe.
Main Pump Station - Automatic Control System	May reach end of useful life during planning period
Parkside Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Parkside Pump Station - Automatic Control System	May reach end of useful life during planning period.
Riverside Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Riverside Pump Station - Automatic Control System	May reach end of useful life during planning period.
Pontiac Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Quiet Water Pump Station	Will likely reach the end of its useful life during the planning period.
Riverside, Pontiac, and Quiet Water Pump Stations	The City only has two portable backup generators that are used for these three stations. The City may want to consider purchasing a third generator for the system.

4.5 EXISTING WASTEWATER TREATMENT AND DISPOSAL SYSTEM

The City owns, operates and maintains the wastewater treatment plant (WWTP) serving the study area. The WWTP is located on 7th Street west of Highway 101. Vehicular access to the WWTP is from 7th Street. The WWTP consists of a headworks, a two-basin sequencing batch reactor activated sludge treatment facility, an equalization basin, an ultraviolet light disinfection facility, an aerobic digester, a sludge storage tank, a screw press for biosolids dewatering, a plant pump

station, a public works building, and an operations building. Treated wastewater is discharged to the Pacific Ocean on a year-around basis.

The City's first wastewater treatment plant was constructed in 1974 at the current site treatment plant site. The 1974 plant was a donut style activated sludge system installed in a circular tank. The tank was divided into different cells that were used as aeration basins, clarifiers, and an aerobic digester. In 1994, the plant was expanded by installing a second circular tank that was used as a clarifier and chlorine contact chamber. The old clarifier was converted into a second aerobic digester. In 2008, a major upgrade was completed. The 2008 improvements included the construction of a new headworks, sequencing batch reactors, equalization basin, UV disinfection facilities, and the dewatering screw press. The old treatment aeration basin was converted to the aerobic digester and the old clarifier was converted to a sludge storage tank. The outfall pipeline from 1974 also remains in service.

The wastewater facilities are schematically presented in Figure 4-10. The layout of the treatment facilities are shown in Figure 4-11. A summary of the design data for the facilities is presented in Table 4-6. The following subsections provide an evaluation of the performance of the existing plant as well as a brief description of each of the individual unit processes that comprise the treatment facility.

Table 4-6 Existing Treatment Plant Design Data

Design Flows			
MMDWF	• 0.33 MGD		
MMWWF	• 0.51 MGD		
PDF	• 1.96 MGD		
PHF	• 2.64 MGD		
Design Loadings			
BOD		TSS	
Average Annual	• 600 PPD	Average Annual	• 500 PPD
Maximum Month	• 995 PPD	Maximum Month	• 936 PPD
Anticipated Effluent Quality			
BOD Concentration	• 10 mg/L		
TSS	• 10 mg/L		
Nitrate	• 4 mg/L		

Table 4-6 Existing Treatment Plant Design Data

Headworks

Screening

- | | |
|--|---|
| <ul style="list-style-type: none"> • Type • Screen Opening Size • Number of Screens • Capacity | <ul style="list-style-type: none"> • Shaftless spiral fine screen • ¼ Inch • 1, plus bypass channel with 3/4" manual screen • 2.6 MGD |
|--|---|

Grit Chamber

- | | |
|---|---|
| <ul style="list-style-type: none"> • Type • Volume • Detention Time • Grit Removal System | <ul style="list-style-type: none"> • Aerated Grit Basin • 10,900 gallons • 6 minutes @ 2.6 MGD • 4 inch air lift pump |
|---|---|

Grit Chamber Air System

- | | |
|---|---|
| <ul style="list-style-type: none"> • Number of Blowers • Blower Size/Type | <ul style="list-style-type: none"> • 1 • 5 HP |
|---|---|

Grit Washer

- | | |
|---|---|
| <ul style="list-style-type: none"> • Type • Incoming Flow • Capacity | <ul style="list-style-type: none"> • Helical Screw classifier • 70 - 100 gpm • 1,100 pounds per hour |
|---|---|

Influent Flow Measurement

- | | |
|---|---|
| <ul style="list-style-type: none"> • Primary Device • Number • Measurement Range • Flow Meter | <ul style="list-style-type: none"> • 9-inch Parshall Flume • 3 (one for each SBR influent pipe, and one for future SBR tank) • 0.059 to 5.73 MGD, each flume • Ultrasonic |
|---|---|
-

Table 4-6 Existing Treatment Plant Design Data

Secondary Treatment	
Type	Extended Aeration / ICEAS SBR
Number of Basins	2
Basin Size (L x W x H)	77 ft. x 30.5 ft. x 20 ft. (top water level = 18 ft., bottom water level = 12.2 ft)
Volume at High Level	316,000 gallons each (includes pre-react basin)
Volume of Pre-React Chamber at High Level	51,000 gallons
Hydraulic Retention Time	
MMDWF	46 hours
MMWWF	30 hours
F/M Ratio	0.055 pounds BOD per pounds MLSS (at max month load)
Solids Retention Time (SRT)	24 days (at max month load)
Waste Sludge Production	752 pounds per day (at max month load)
Decanter	
Length	17.5 feet
Average Decant Rate	2,038 gpm
Peak Decant Rate	3,037 gpm
Aeration System	
Number of Blowers	2 (one for each basin).
Blower Size/Type	40-hp, rotary positive displacement with variable frequency drives
Blower Capacity	520 SCFM @ 8.0 psi
Aeration Type	Fine Bubble Diffused Aeration
Waste Sludge Pumps	
Type	Submersible solids handling
Number	2, one for each basin
Size	2.4 HP
Capacity	74 gpm
Waste Sludge Flow Meter	
Type	2 inch magnetic
Number	2, one for each basin
Flow Equalization Basin	
Basins	1
Basin Size	63.5 ft. x 30 ft. x 13.8 ft.
Maximum Water Depth	8.4 ft
Flow Control	Modulating sluice gate
Flow Control Meter	Effluent flow meter

Table 4-6 Existing Treatment Plant Design Data

Effluent Disinfection	
Type	• UV radiation, open channel
Design Flow (Peak)	• 1.96 MGD
Transmission	• 65% minimum
Channels	• 1
Banks Per Channel	• 2
Lamps Per Bank	• 18
Total Lamps	• 36
Minimum Dosage	• 50 MJ/CM²
Effluent Flow Meter	• 12 inch magnetic
Effluent Flow Meter	
Type	• 12 inch magnetic
Location	• In vault between EQ basin and UV channel
Outfall Pipeline	
Nominal Size	• 10 inch
Material	• Concrete
Length	• ± 700 ft.
Diffuser	• none
Auxiliary Power	
Type	• Permanent Diesel Generator
Rating	• 250 KW, 480 V, 3.-phase
Location	• Under Headworks
Fuel Supply	• Subbase Tans
Transfer Switch	• Automatic transfer switch in electrical room
Exerciser	• Automatic, weekly
Aerobic Digester	
Number of Cells	• 4
Total Volume	• 164,000 gallons
SRT	• 60 days at average BOD loading and 2% solids
Aeration System	• Number of Blowers • 3 • Blower Size/Type • 20 HP, rotary positive displacement • Blower Capacity • 320 SCFM @ 7.9 psi • Aeration Type • Fine bubble
Sludge Transfer Basin	• Volume • 8,400 gallons • Pump Capacity • 200 gpm @ 26 ft TDH • Pump Size/Type • 3 HP Submersible

Table 4-6 Existing Treatment Plant Design Data

Digested Sludge Storage Tank	
Number of Cells	• 1
Total Volume	• 110,000 gallons
SRT	• 50 days at average BOD loading and 2% solids
Aeration System	
• Number of Blowers	• 1
• Blower Size/Type	• 20 HP, rotary positive displacement
• Blower Capacity	• 320 SCFM @ 7.9 psi
• Aeration Type	• Fine bubble
Sludge Transfer Pump	
• Pump Capacity	• 200 gpm @ 26 ft TDH
• Pump Size/Type	• 3 HP Submersible
Digested Sludge Dewatering System	
Type	• Packaged polymer feed/screw press system
Capacity	• ± 900 dry pounds per day
Feed Solids Content	• 1% - 2%
Dewatered Solids Content	• 10% - 20%
Polymer Feed	
• Carrier Water Source	• City potable water or non-potable water
• Carrier Water Usage	• ± 80 gallons per hour
• Polymer Feed Pump	• LMI Diaphragm Metering Pump
• Polymer Usage	• ± 1 pound per hour
Screw Press	
• Manufacturer	• FKC Press
• Motor Size	• 7.5 HP
Loading Conveyor	
• Manufacturer	• FKC Press
• Motor Size	• 3 HP
Compliance Sampling	
Type	• Automatic, refrigerated, composite
Number	• 2
Influent Sampler Location	• Headworks
Effluent Sampler Location	• UV Channel
Plant Pump Station	
Type	• Submersible
Wet Well	• 5 ft. diameter, precast
Wet Well Depth	• 15 ft.
Pump Number & Size	• 1 @ 7.5 HP
Capacity	• 350 gpm @ 45 ft. TDH (1 pump)
Force Main Pipe Type	• 3-inch ductile iron
Flow Measurement	• Magnetic Flow Meter
Force Main Discharge Point	• Headworks after screen

Table 4-6 Existing Treatment Plant Design Data

Non Potable Water Supply System	
Source	• Treated effluent stored in annular tank around sludge storage basin
Storage Volume	• 16,700 gallons (estimated)
Pump Type	• Submersible, multistage well pump
Pump Number	• 2
Pump Size	• 2 HP
Pump Capacity	• 60 gpm @ 80 psi
Pressure Tank Size	• 500 gallon
Flow Measurement	• Magnetic flow meter

Figure 4-10 Existing Wastewater Treatment Plant Schematic

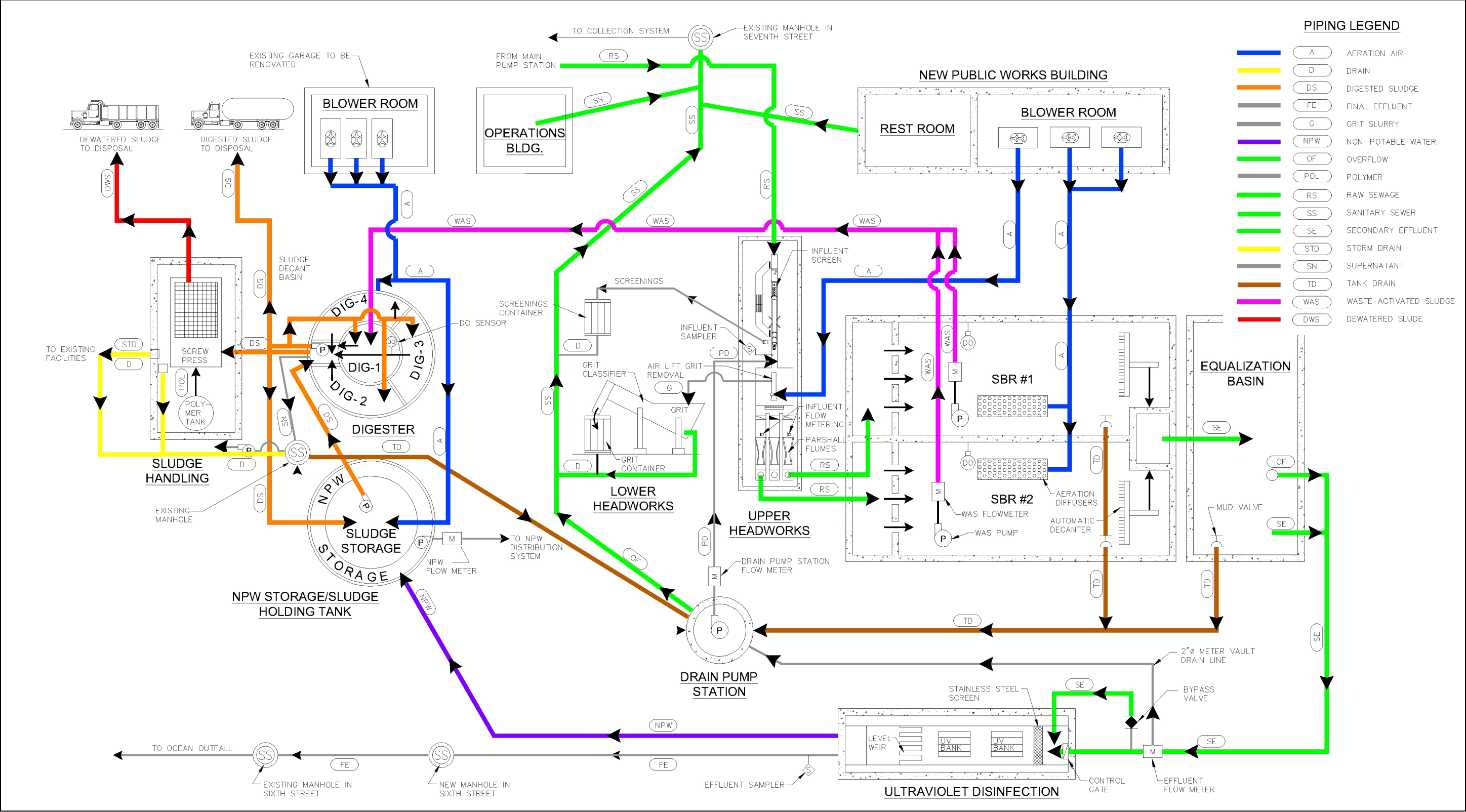
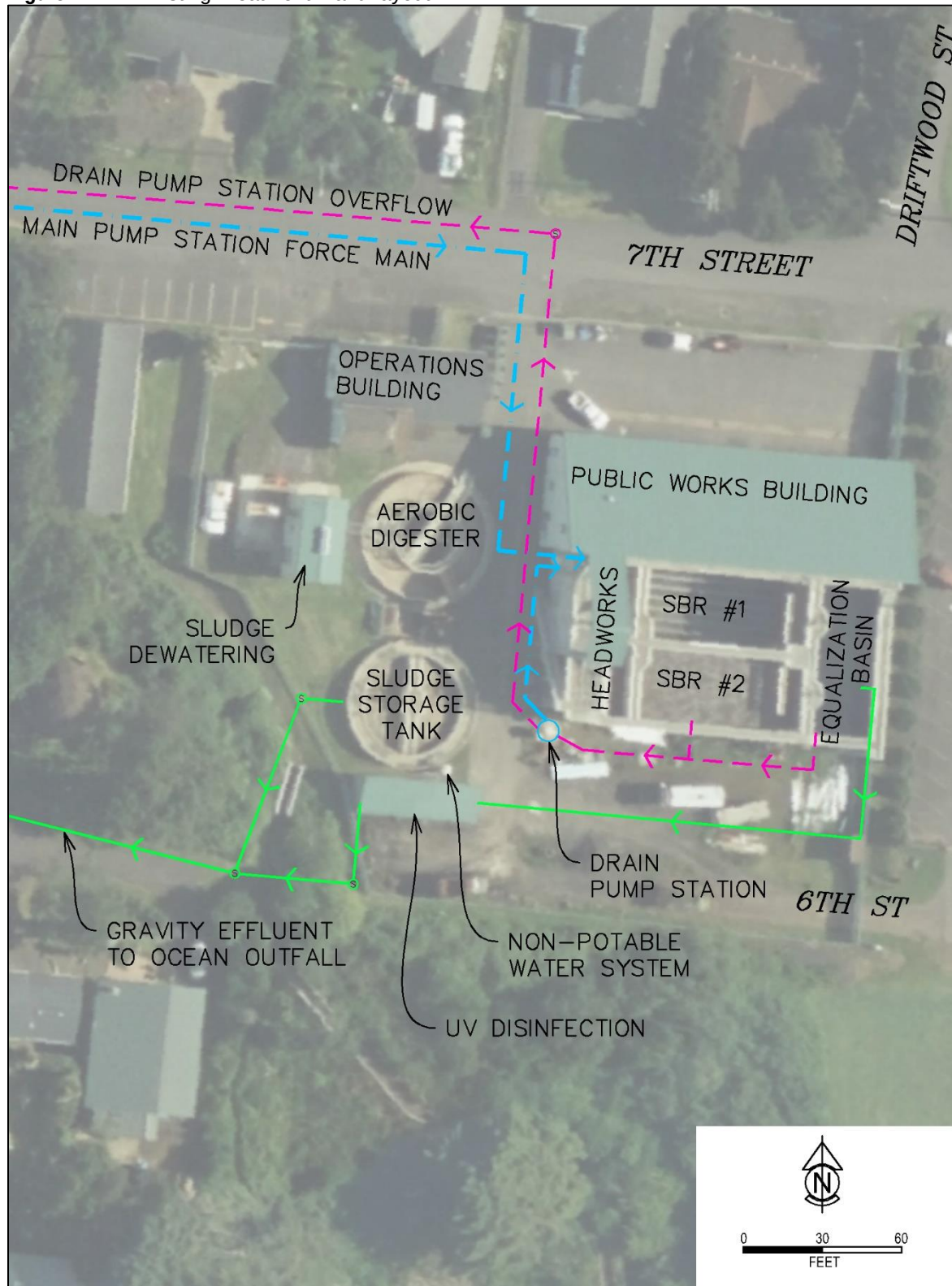


FIGURE 4-10

Figure 4-11 Existing Treatment Plant Layout



4.5.1 Plant Performance

The City's existing effluent permit requires the production of effluent BOD and TSS concentrations below 20 mg/L on an average monthly basis from May 1 – October 31 and below 30 mg/L on an average monthly basis from November 1 – April 30. Average monthly effluent BOD and TSS concentrations are listed in Table 4-7 for the 2016 through 2019 calendar years. As demonstrated in Table 4-7, the existing plant is capable of reliably meeting the effluent BOD and TSS concentration limits under existing flow and loading conditions.

Table 4-7 Existing Average Monthly Effluent BOD and TSS Concentrations (mg/L)

Year	2016		2017		2018		2019		Average	
Month	BO D	TS S	BO D	TS S	BO D	TS S	BO D	TS S	BO D	TS S
January	3.3	3.5	3.3	3.0	6.2	6.3	3.5	3.5	4.1	4.1
February	4.2	4.1	3.6	2.3	6.0	4.9	3.6	2.0	4.4	3.3
March	4.4	5.9	3.0	2.1	5.3	3.4	2.7	1.6	3.9	3.3
April	5.9	14. 0	3.6	3.4	4.7	3.4	3.0	2.0	4.3	5.7
May	5.7	12. 8	3.3	4.9	7.0	2.4	2.4	1.5	4.6	5.4
June	5.0	6.1	3.7	4.8	6.4	3.2	4.1	5.5	4.8	4.9
July	7.2	10. 4	4.5	5.5	6.6	4.1	5.2	3.1	5.9	5.8
August	4.7	4.4	6.1	6.1	6.9	3.2	6.1	4.9	6.0	4.7
September			4.8	7.1	3.2	4.5	11. 8	9.3	6.6	7.0
October	3.5	3.2	4.5	5.4	3.1	4.5	6.2	2.6	4.3	3.9
November	3.3	3.2	4.9	5.7	4.7	2.3	4.0	1.7	4.2	3.2
December	2.6	2.1	4.1	4.6	3.4	1.3	2.7	2.0	3.2	2.5
Average	4.5	6.3	4.1	4.6	5.3	3.6	4.6	3.3	4.7	4.5

Note: Existing effluent BOD and TSS permit limit is 20 mg/L from May through October and 30 mg/L from November through April.

In addition to the effluent concentration limits, the City's discharge permit also limits the total amount of pollutant that may be discharged by setting mass load limits. Mass load limits are determined by multiplying the effluent concentration of a pollutant by the effluent flow rate. Mass load limits are usually expressed in pounds of pollutant per day. Since flow and concentration are multiplied, increases in the flow rate must be offset by decreases in the pollutant concentration in order to maintain a constant effluent mass load. The existing permit allows for the discharge of 25 pounds per day of BOD and TSS on a monthly average basis from May through October and 37 pounds per day from November through April. Average monthly effluent BOD and TSS mass loads are listed in Table 4-8 for the 2016 through 2019 calendar years. As demonstrated in Table 4-8, the existing plant is capable of reliably meeting the effluent BOD and TSS mass load limits under existing flow and loading conditions.

Table 4-8 Existing Average Monthly Effluent BOD and TSS mass loads (pounds per day)

Year	2013		2014		2015		2016		Average	
Month	BO D	TS S	BO D	TS S	BO D	TS S	BO D	TS S	BO D	TSS
January	6.5	5.9	7.1	6.4	10. 9	10. 9	5.0	4.8	7.4	7.0
February	6.4	6.3	10. 7	7.5	10. 0	9.3	7.3	4.4	8.6	6.9
March	8.7	12. 0	9.5	6.4	7.9	5.8	2.6	1.5	7.2	6.4
April	5.1	12. 1	7.7	7.1	7.2	5.4	3.9	2.6	6.0	6.8
May	3.8	8.5	4.4	6.3	6.1	7.0	2.4	1.5	4.2	5.8
June	1.7	3.1	3.7	4.7	6.3	3.2	3.9	5.2	3.9	4.1
July	7.6	11. 1	5.2	6.2	6.2	3.9	5.0	3.0	6.0	6.1
August	4.3	4.0	5.9	5.9	6.5	3.1	9.2	6.4	6.5	4.9
September			4.5	6.0	2.8	3.9	11. 4	9.9	6.2	6.6
October	5.0	4.6	3.6	4.3	2.5	3.6	6.1	2.7	4.3	3.8
November	5.6	6.7	8.8	11. 1	4.8	2.3	3.7	1.3	5.7	5.4
December	5.4	4.4	4.4	5.0	5.7	2.2	2.8	2.1	4.6	3.4
Average	5.5	7.2	6.3	6.4	6.4	5.1	5.3	3.8	5.9	5.6

Note: Existing effluent BOD and TSS mass load limits are 25 pounds per day from May through October and 37 pounds per day from November through April.

4.5.2 Description of Existing Treatment Plant Components

4.5.2.1 Headworks



Figure 4-12 Headworks Fine Screen with Grit Removal Chamber

Wastewater from the City is pumped from the Main Pump Station to the Headworks. The headworks provides screening of the incoming raw wastewater, grit removal, measurement of influent flow, monitoring of influent temperature and pH, and sampling of the influent.

The wastewater from the Main Pump Station force main discharges into a small chamber upstream of the fine screen. A refrigerated composite wastewater sampler draws samples from this chamber. The sampler is Hach automatic wastewater sampler. The sampler is used to obtain influent

samples for BOD and TSS. Slide gates are used to direct flow to either a mechanical fine screen or a manually-cleaned bar screen. Under normal operating conditions all wastewater is routed through the fine screen. The fine screen is a Parkson Hycor Helisieve unit with a capacity of 2.6 MGD. The screen opening size is $\frac{1}{4}$ - inch diameter. Screened material is removed from the channel by a shaftless auger. The screenings are washed, compacted, and dried before being discharged into a dumpster for final disposal at a landfill. The manually-cleaned bar screen is designed to be used on a temporary basis when the mechanical screen is out of service.

Behind



Figure 4-13 Headworks Grit Dewatering Equipment

Downstream of the screen, the wastewater flows to a grit removal chamber. The grit removal chamber is a small aerated concrete tank that provides about 6 minutes of detention time at a peak flow of 2.6 MGD. Grit falls to the bottom of the tank and is removed by an air lift pump. The air lift pump discharges into a grit concentrator located below the headworks. Dewatered grit is transported from the concentrator by a dewatering screw into a dumpster next to the headworks. Dewatered grit is hauled to a landfill for disposal. The water runoff from the concentrator is routed to the plant pump station which discharges back to the headworks.



Figure 4-14 Headworks Shelter Corrosion

Downstream of the grit removal system, weirs are used to split the flow between the two SBR basins. Water flows over the weirs into an SBR inlet channel fitted with a Parshall flume for flow measurement. There is a dedicated flume for each SBR inlet channel as well as a third inlet channel and flume for a future SBR basin. An ultrasonic flow meter is mounted over each flume to track influent flow. The fine screen and grit removal system are also monitored for various alarm conditions.

Overall, the headworks is in good condition and should serve the City well for the remainder of the planning period. One notable exception is the metal awning that covers the headworks. The structure has corrosion issues (Figure 4-14) that are likely to get worse in the coming years and the City should plan to address the corrosion during the planning period. Other improvements that should be considered include installing baggers on the screening and grit chutes. This will improve overall sanitation and reduce problems from insects and other pests.

4.5.2.2 Sequencing Batch Reactors

The plant has two sequencing batch reactor (SBR) basins. The incoming flow is split between the two basins at the headworks. The SBR basins provide secondary treatment of the wastewater. The SBR process is an activated sludge process that is performed in a batch sequence. The sequence consists of a two-hour aerated phase, followed by a one-hour settle phase, followed by a one-hour decant phase. All three



Figure 4-15 SBR Basin

phases are performed in a single basin. Several variations of the SBR process exist. The variation at the City's plant is the intermittent cycle extended aeration system (ICEAS) process manufactured by Xylem. This process is a modification of a conventional SBR that allows continuous inflow of wastewater to the SBR basins during all phases of the treatment cycle: Therefore, the City can operate on a single basis as well as both basins depending on the influent flow and loading conditions.

The SBR process is automatically controlled by a programmable logic controller (PLC) located in the SBR control panel. The control panel is located in the electrical room inside the public works building. System settings are adjusted using a human-machine interface mounted on the door of the control panel. The control panel also includes local control switches to manually operate the equipment when the PLC is unavailable. The PLC monitors the status of the SBR process as well as various alarm conditions.

Two 40-hp, positive displacement, blowers are housed in public works building. They deliver air to the bottom of the SBR basins via membrane diffusers during the aeration phase. Two actuated air valves are used to control the flow of air to each aeration grid depending on the number of basins in service. Air is fed to an aeration grid mounted on the bottom of each aeration basin. The grid consists of a main header pipe with several lateral pipes. Air diffusers are mounted along each lateral pipe. The air diffusers are Xylem, 9-inch fine bubble membrane disc diffusers.

A dissolved-oxygen (DO) probe is located near the middle of each SBR basin. The probe is suspended from the hand railing. The probe is monitored by an analyzer located in the electrical room inside the Public Works Building. Signals from the probe and analyzer are transmitted to the SBR PLC to control the speed of the blowers when desired by the plant operators. The PLC can be used to regulate the DO concentration in the basins by controlling blower speed and operation time during the aeration phase. The variable frequency drives for each blower are located in the electrical room inside the public works building.

Each SBR basin has a decanter assembly at the east end. The decanter lowers during the decant phase, drawing off the clarified supernatant in the basin. A variable-frequency drive keeps the decanter speed relatively constant. At the end of the decant phase, the decanter will return to the park position. A selector switch for each decanter is located near the decanter operator at the east end of the SBR basins. The switch can be set to lower, off, auto, or raise. In auto mode, the PLC will control the decanter. The other switch positions are used to manually raise, lower, or stop the decanter from operating. Treated effluent from the SBR tanks flows through the decanters, into the decanter discharge boxes, then to the equalization basin.

Each SBR basin has a submersible pump used to waste sludge. The pump discharge line is fitted with a magnetic flow meter to track the volume of sludge that is wasted. Waste sludge is pumped directly to the aerobic digesters.

Under normal conditions, the waste sludge pumps are automatically controlled by the PLC. The operator is able to adjust set points to control sludge wasting. Once the set points are in place, the pumps are started and stopped automatically. Sludge wasting typically occurs near the end of the decant phase of the SBR cycle.



Figure 4-16 SBR Aeration Grid

Overall, the sequencing batch reactors are in good condition and should serve the City well for the remainder of the planning period. The only exception to this is some of the mechanical and electrical equipment will reach the end of its useful life during the planning period. Mechanical equipment such as valve actuators, waste pumps, etc. do tend to wear out and must be rebuilt or replaced from time to time. Electrical gear like variable frequency drives also must occasionally be replaced. In addition to electrical and mechanical equipment, the rubber membranes on aeration grid in each basin eventually wear out and must be replaced. These black rubber membranes can be seen in Figure 4-16 above. Each basin has a few hundred of these membranes and replacing them is a significant work effort.

4.5.2.3 Equalization Basin

The purpose of the equalization basin is to provide short-term storage of effluent decanted from the SBRs, resulting in a smaller peak flow to the effluent disinfection system. The equalization basin is 62.5 feet long and 30 feet wide, with a water depth varying from 0 to 10.8 feet. The equalization basin accepts decanted effluent from the SBRs through openings at the bottom of the decanter discharge boxes.



Figure 4-17 Equalization Basin

The discharge rate from the equalization basin flows through a 12-inch pipe to the UV disinfection channel. The end of the pipe is fitted with an actuated gate that is used to control the discharge rate from the equalization basin. The gate is located in the UV channel. Under normal operating conditions, the PLC located in the main plant control panel adjusts the position of the actuated valve to set the discharge from the EQ basin equal to a value that is set by the operations staff. This control scheme requires daily attention from the operators. It is possible to increase the automation of the control programming. The City may want to consider installing a level transducer in the basin and modifying the control programming. The costs for these improvements would probably be in the \$10,000 to \$15,000 dollar range and would decrease the amount of labor require to monitor the system.

The equalization basin is a relatively straight-forward element of the treatment plant. It is in good condition and should serve the City well for the reminder of the planning period. The actuated control gate will require maintenance during the planning period as well as some of the other mechanical components. However, work of this nature is generally considered maintenance rather than a capital improvement and should be included in the City's normal operation and maintenance budget.

4.5.2.4 UV Disinfection

Discharge from the equalization basin is routed to the ultraviolet light (UV) disinfection system. The purpose of the UV disinfection system is to reduce the number of pathogens in the wastewater effluent to acceptable limits prior to discharge.

The UV system is model UV 3000+ manufactured by Trojan UV. The system consists of the inlet baffle, UV banks, UV junction box for each bank of lamps, UV



Figure 4-18 UV Disinfection System

system controller, an automatic lamp wiping system, and outlet finger weir. The UV lamps are mounted in an open channel downstream of the EQ basin. The channel is enclosed in a wood framed enclosure. There are two banks of lamps with 18 lamps per bank. All other UV equipment is located adjacent to the UV channel except the main control panel which is located in the electrical room inside the public works building. The system was furnished with a portable Davit crane for removing the lamp banks for maintenance purposes. The crane is heavy and awkward to use. The City may want to consider purchasing a gantry crane on casters with an electric hoist to reduce the amount of labor required to service the lamps.

Effluent from the equalization basin is discharged to the upstream end of the UV channel, where it proceeds through an inlet baffle that creates uniform flow conditions through the two bulb banks. A constant flow depth is maintained by the finger weir at the downstream end of the channel. As the effluent flows by the lamps, microorganisms are exposed to UV radiation, which causes rearrangements of their genetic material, effectively killing them.

The UV disinfection system is controlled by a PLC within the UV system controller. Under normal operation, the UV lamp intensity level is controlled by the UV system PLC. The lamp power is adjusted based inputs from the effluent flow meter and UV intensity sensors. As the flowrate through the system increases, or the turbidity of the water increases, the lamp power is increased to maintain a minimum UV dose.

The UV system controller control panel has a display screen and keypad for monitoring the system and setting the cleaning system wiping frequency and strokes per wiping cycle. The control panel has the ability to display all alarm conditions, UV levels, and all control functions.

The UV system was installed in 2008 and should serve the City for the remainder of the planning period. Some of the electrical control elements of the system will likely reach the end of their useful life during the planning period due to normal aging. Therefore, the City should anticipate

upgrading the control system during the planning period. The recommended improvements are discussed in Chapter 7.

4.5.2.5 Effluent Monitoring

Effluent monitoring equipment is generally located near the UV channel. A magnetic flow meter is located in a vault on the 12-inch pipe between the equalization basin and the UV channel. This flow meter is used to track effluent flows from the plant.

A refrigerated composite wastewater sampler draws samples from the upstream side of the finger weir in the UV channel. The sampler is an Hach automatic wastewater sampler. The sampler is used to obtain effluent samples for BOD, TSS, e.coli and fecal coliform testing. Grab samples are collected from the downstream side of the UV lamps to monitor pH.

4.5.2.6 Ocean Outfall

The effluent from the UV channel flows to the outfall pipeline that discharges to the Ocean. The first 60 feet of pipe downstream of the UV channel is 12 inch pipe that was installed in 2008. This pipe connects to a manhole at the southwest corner of the treatment plant site. The remaining pipeline from this manhole to the end is 10 inch diameter and is the original pipe that was installed in 1974. The pipeline generally runs west from the plant along the 6th Street right of way for approximately 670 feet. The end of the pipe is approximately 350 feet west of a manhole on Ocean View Drive. From the manhole on Ocean View Drive west, the pipe is cast iron and was backfilled with concrete. The end of the pipe is exposed during minus tides and can be inspected. The City inspects the pipe using a push camera and from the surface on an annual basis. The pipeline condition appears to be satisfactory. There are no known offset joints, collapsed sections, or cracks in the pipe. The pipe was installed using open cut construction techniques and the end of the trench was backfilled with concrete. Some of this concrete has eroded in recent years, so the City should plan to replace the concrete pipe cover as soon as possible.

4.5.2.7 Drain Pump Station

The purpose of the Drain Pump Station is to convey plant building wastes and drain flows to the plant headworks. Drainage from the headworks, the sludge dewatering system, and other miscellaneous sanitary drains are directed to the drain pump station wet well. Tank drains from the SBR basins, and the equalization basin are also routed to the drain pump station wet well.

The Drain Pump Station consists of a wet well and a valve vault. The station is equipped with a single 7.5 HP submersible solids handling pumps. The wet well is equipped with guiderails for pump removal and installation. The pump discharge pipe is fitted with a check valve and an isolation valve located in the valve vault. The flow from the station is tracked using a magnetic flow meter mounted on an exposed portion of the force main that is under the headworks structure near the backup power generator.

The pump is controlled automatically using float switches. The pump control panel is located in the electrical room inside the public works building. The control panel includes a Hand/Off/Auto switch to manually start the pump if desired. The station does not have a backup level control system. The station utilizes standard motor starters to start pump. Therefore, the pump operates at a single speed.

Power for this pump station is provided from the treatment plant power distribution system, which is equipped with an automatic transfer switch for operation with the auxiliary generator located at the WWTP site. If, despite these precautions, the station were to overflow, the overflow will discharge through an overflow pipe to the gravity collection system that ultimately drains to the Main Pump Station.



Figure 4-19 Drain Pump Station Wet Well

4.5.2.8 Aerobic Digester

The existing aerobic digester tank was originally constructed in 1974. Prior to the 2008 wastewater treatment plant improvement project, the City's treatment plant consisted of a donut style aeration basin that was part of an activated sludge wastewater treatment process. The basin included four cells. Two were used as aeration basins and two were used as aerobic digesters. As part of the 2008 project, all four cells were converted into aerobic digesters. New aeration grids were installed



Figure 4-20 Aerobic Digester

along with transfer and decant piping. The waste sludge from the SBR's can be piped to any of the four digester cells. The four cells can be isolated from one another to control sludge digestion. Each cell is aerated using a fine bubble aeration grid mounted at the bottom of each cell. Three positive displacement blowers are used to provide aeration air. The blowers are located in the Operations Building.

The air supply from each cell can be turned off which enables the operator to settle the solids and decant the supernatant in order to thicken the sludge. Each digester cell is fitted with a floating pipe on swivel joint for decanting supernatant. The decant lines are piped to the sludge transfer pump station.

A portion of the tank is isolated from the four digester cells and fitted with a transfer pump. This section of the tank is referred to as the "sludge transfer pump station." The digester is piped so that mixed sludge and decanted clear water can be routed to the sludge transfer pump station. The sludge transfer pump discharge piping has valves and piping that allows sludge to be pumped to either of the four digester cells in order to transfer sludge from one cell to another. The pump discharge piping also allows the operators to pump from the sludge transfer pump station to the Drain Pump Station, a liquid sludge disposal port, and the sludge storage tank. The pump that is used to feed the dewatering screw press also draws suction from the sludge transfer pump station.

The aerobic digesters are sized to provide a solids residence time of at least 60 days thereby meeting the Federal Pathogen reduction requirements of CFR 40 503.32(b) (3) PSRP (1).

The aerobic digester is in relatively good condition and should serve the City well for the remainder of the planning period. There is some corrosion of the concrete walls. Due to the slightly acidic environment in the digester, some of the concrete has corroded exposing the aggregate. The City should consider coating the digester walls during the planning period to halt

the corrosion. The mechanical components such as the blowers and the sludge transfer pump will need to be periodically rebuilt or replaced due to age. This type of work is typically considered normal maintenance that is funded from the City's operation and maintenance budget rather than a capital improvement project. Therefore, the replacement costs for this equipment are not included in any of the recommended projects described in this document. In addition to the miscellaneous mechanical components, the diffuser membranes will need to be replaced due to normal aging during the planning period. One of the projects listed in Chapter 7 includes replacement of the diffuser membranes.

The most significant problem with the aerobic digester involves the air delivery system. The aerobic digester and sludge storage tank share the same blower system. This system consists of three blowers that are operated manually. There is a timer system that can be used to automatically turn the blowers on and off, but there is no way to automatically adjust the amount of air that is supplied to the individual tanks. The air is either on for all of the tanks or off for all of the tanks. There is no way to automatically deliver air to each tank individually. This creates several operational problems. This system makes achieving adequate digestion more difficult, leads to over-aerating the older sludge, excessive foam buildup, and excessive power consumption. Between the aerobic digester and the sludge storage tank, there are five smaller sub-tanks and the sludge is typically processed through the tanks in series. Therefore, the sludge age in each of these tanks can be very different and the aeration needs in each tank can be very different. For the first tank in the series, the air demands are relatively high. For the last tank in the series, the air demands are relatively low. With the current system, the first tank in the series controls the amount of time that the blowers must be operated. In order to meet the aeration demands of the first tank (i.e., the tank with the youngest sludge), an excess amount of air must be supplied to the tanks with the older sludge. This creates foaming problems and wastes energy. Maintaining an adequate dissolved oxygen concentration in the first tank in the series requires over-aerating the tanks with the older sludge. In the tanks with older sludge, it is not uncommon for the dissolved oxygen levels to be greater than 10 mg/L, which is much higher than needed. If the City had the means to automatically adjust the air supply to each of the five tanks individually, this would enable operators to better manage the digestion process, control foaming, and reduce power consumption costs. For this reason, this plan recommends improving the air delivery system for the aerobic digester and the sludge storage tank. The recommended improvements are discussed in Chapter 7.

4.5.2.9 Sludge Storage Tank

The sludge storage tank was originally constructed in 1992. The tank was used as a clarifier and a chlorine contact chamber. A circular clarifier is located in the middle of the tank and an annular ring around the outside of the clarifier was used for chlorine contact time. As part of the 2008 improvement project, the clarifier was converted into a sludge storage tank and the contact chamber was converted into a final effluent storage tank for the non-potable water system.



Figure 4-21 Sludge Storage Tank

As noted in the previous subsection, the sludge transfer pump station is used to pump water from the aerobic digester to the sludge storage tank. Air is supplied to the sludge storage tank from the same blowers used to supply air to the aerobic digester. The sludge storage tank is fitted with a submersible pump that is used to pump sludge to the Sludge Transfer Pump Station. Where it is typically fed into the dewatering screw press.

The sludge storage tank is in good condition and should serve the City well for the remainder of the planning period. There is some corrosion of the concrete walls. Due to the slightly acidic environment in the tank, the concrete has corroded exposing the aggregate. The City should consider coating the tank walls during the planning period to halt the corrosion. The mechanical components such as the blowers and the sludge transfer pump will need to be periodically rebuilt or replaced due to age. This type of work is typically considered normal maintenance that is funded from the City's operation and maintenance budget rather than a capital improvement project. Therefore, the replacement costs for this equipment are not included in any of the recommended projects described in this document. In addition to the miscellaneous mechanical components, the diffuser membranes are wear items that will need to be replaced due to normal aging during the planning period. One of the projects listed in Chapter 7 includes replacement of the diffuser membranes. As described in the previous subsection (Section 4.5.2.8), the air supply system for the aerobic digester and the sludge storage tank is a shared system that lacks automatic control functionality. This leads to operational problems and excess power consumption. The recommended improvements for the air supply system are discussed in Chapter 7.

4.5.2.10 Sludge Dewatering System

The treatment plant is equipped with a sludge dewatering system that consists of a sludge pump, a polymer feed system, a screw press, and a screw conveyor. All of this equipment is located in the sludge handling building. The sludge dewatering system is used to dewater sludge prior to hauling and disposal. Sludge is typically pumped from the sludge storage tank to the sludge transfer pump station. The sludge pump is located in the solids handling building and draws suction from the sludge transfer pump station. Polymer is added to the sludge on the discharge side of the sludge pump as a coagulant to aid the dewatering process. Sludge is fed into the screw press for dewatering. The water removed from the sludge drains to the Drain Pump Station. The dewatered sludge is fed into a dump truck or dumpsters using the screw conveyor.



Figure 4-22 Solids Handling Building

The sludge dewatering system is a packaged, skid-mounted, system manufactured by FKC Screw Press Inc.. The sludge pump, polymer feed system, screw press, control panel, and screw conveyor are mounted on a skid that is located inside the solids handling building. The polymer feed system consists of a diaphragm metering pump, piping and valves, to blend the polymer with mixing water prior to adding it to the sludge. The sludge is then fed into a small flocculation tank that is mounted upstream of the screw press. The flocculation tank is fitted with a motorized mixer that gently mixes the polymer with the sludge to facilitate flocculation. The flocculated sludge is then fed into the screw press. The screw press includes an auger shaft that presses the sludge against a screen. The diameter of the auger shaft increases from the intake to discharge end of the press which increases the pressing force across the machine. The auger is powered by a motor on the discharge side of the press. Dewatered solids discharge into a screw conveyor that is used to feed the material into a dump truck or dumpster for disposal.

The screw press is rated for about 900 dry pounds per day and typically produces dewatered sludge with solids concentrations of 10-20% by weight. The City typically dewateres sludge in batches by operating the system about 45 days each year. The dewatered solids are either fed into a dumpster that is picked up by the local solid waste disposal company or loaded into a City-owned dump truck and then hauled to a treatment plant owned by Heard Farms, Inc. near Roseburg. The City owns a small tractor that is used to load biosolids into the dump truck.

Overall, the sludge dewatering equipment is in good condition and should serve the City well for the remainder of the planning period with proper maintenance. The system includes several mechanical components (e.g., metering pumps, sludge pump, screw press bearings and motor, etc.) that will eventually wear out due to normal usage and require replacement. This type of work is typically considered normal maintenance that is funded from the City's operation and maintenance budget rather than a capital improvement project. Therefore, the replacement costs for this equipment are not included in any of the recommended projects described in this document.

The main issue with the sludge dewatering system is corrosion of the metal building components. There are some corrosion issues with some of the metal framing. These are relatively minor however. The larger issue is with the metal siding panels, the roof, and the doors. These components are showing early signs of corrosion issues which will continue to worsen during the planning period. At some point, improvements to the building will be needed. This will likely occur during the planning period. Therefore, the recommended improvements discussed in Chapter 7 include a building upgrade to address the corrosion issues.

Another issue with the sludge handling facilities is the overall age and condition of the tractor used to load biosolids into the City's dump trucks. This tractor is fairly old and will likely reach the end of its useful life during the planning period. Therefore, the City should plan to replace the tractor at some point.

4.5.2.11 Sludge Disposal

City of Yachats has the ability to produce Class B biosolids, but often doesn't. The City has found that it more economical to have the biosolids landfilled or hauled to another treatment facility in Douglas County. Neither of these disposal options requires the production of Class B biosolids.

The City's most recent biosolids management plan was prepared in 2014. The plan identifies three different disposal options. These include landfilling, hauling to the treatment plant owned by Heard Farms in Douglas County, and land application at a 16 acre site that has been authorized for biosolids disposal. The City has not utilized the land application site for many years and the current owner is not overly interested in receiving biosolids. The City owns a tanker truck that can be used to haul wet solids to the site, but does not have the equipment needed to distribute dewatered solids at the site. Hauling wet solids is time consuming and operator intensive. For all of these reasons, the City has not used the land application site in recent years. For many years, the City either had the local solid waste company pick up dewatered solids for landfilling or hauled dewatered solids to Heard Farms. Recently, the City stopped having the local solids waste company pick up the solids and all solids are currently sent to Heard Farms. This approach is currently sufficient. However, as the City grows and the quantity of biosolids increases, disposal will become more challenging. Also, if there are any policy changes at Heard Farms, the City may be forced to find new disposal methods. In order to ensure that the City always has reliable disposal options, this plan recommends several improvements to the biosolids handling equipment and disposal program. These are discussed in Chapter 7.

4.5.2.12 Non-Potable Water System

The treatment plant includes a non-potable water system. This system is used to deliver treated wastewater effluent at pressure to various locations though the plant. The purpose of the system is to use recycled water for various uses to offset the use of potable water. An example is the wash water used to clean the solid material removed by the headworks screen.

Treated effluent is diverted from the downstream end of the UV chamber into the old



Figure 4-23 Non-Potable Water Pump Skid and Pressure Tank

chlorine contact chamber that is located around the sludge storage tank. The old chlorine contact chamber acts as a storage tank for non-potable water. As part of the 2008 project, two submersible pumps were installed in the tank. The pump discharge piping is fitted with a pressure tank. A pressure switch is used to start and stop the pumps. The system feeds washdown stations around the treatment plant, the headworks screen, the grit removal system, and the sludge dewatering system.

The pumps were supplied as packaged system and are suspended from a skid. The skid is mounted to the top of the old chlorine contact chamber. The skid includes the pump discharge piping, isolation valves, the pressure switch and an electrical junction box. The pressure tank is mounted adjacent to the pump skid. Downstream of the pressure tank, the supply piping is fitted with a magnetic flow meter that is used to track non-potable water usage.

All of the equipment is mounted outside. The pump skid, pressure tank, and exposed electrical conduits are painted steel and corrosion is a problem. The City typically repaints the mild steel components on an annual basis. This requires a fair amount of labor and the City may want to consider moving some of the equipment inside the adjacent UV shelter to provide some protection from the weather.

4.5.2.13 Operations Building

The operations building was constructed in 1974 and remains in service. The building originally included the blowers, a backup power generator, a restroom, office space, a chlorine storage room, and a chemical feed room. The building was reconfigured as part of the 2008 improvements. These improvements included converting the office space into a meeting room, converting the generator room into an equipment storage room, and converting the chlorine storage and chemical feed rooms into a locker room for the public works staff. The old blowers were removed and replaced with the blowers used for the aerobic digester and sludge storage tank.



Figure 4-24 Operations Building

The building is a wood framed structure with a composite roof. The building is in good condition and should serve the City for many years provided that needed routine maintenance activities (i.e., painting, roof maintenance, etc.) occur.

4.5.2.14 Public Works Building

The Public Works Building was constructed in 2008 as part of the treatment plant upgrades. The building houses a vehicle and equipment storage garage, a workshop, a blower room for the SBR and grit chamber blowers, office space, a restroom, a laboratory, and the main electrical control room for the plant. The building also has a mezzanine for equipment and records storage.



Figure 4-25 Public Works Building

The SBR tank wall serves as the back wall of the building. The remaining structure is a metal framed building with metal siding and roofing. Several components of the building are showing corrosion issues. Some of the door frames and the entire metal roof are in poor condition and some of the metal siding panels are also corroding. These problems will continue to worsen during the planning period. As some point, improvements to the building will be needed. This will likely occur during the planning period. Therefore, the recommended improvements discussed in Chapter 7 include a building upgrade to address the corrosion issues.

4.5.2.15 Telemetry System

The treatment plant is equipped with an autodialer for alerting operations staff of the various alarm conditions that are automatically monitored. The plant does not include an overall SCADA system.

4.5.3 Summary of Treatment and Disposal System Deficiencies

Overall, the treatment facilities are functioning well. The facilities are relatively new and in good condition and should continue to serve the City for the remainder of the planning period with normal maintenance activities. There are some shortcomings the City should plan to address during the planning period. These are summarized below.

- The shelter over the headworks structure has corrosion problems that will get worse during the planning period and will likely need to be addressed.
- The City may want to consider installing baggers to contain the screenings and grit that is removed at the headworks. This will improve overall sanitation and reduce problems from insects and other pests.

- The tractor used to load biosolids into the City's dump trucks will likely reach the end of its useful life during the planning period. Therefore, the City should plan to purchase a new tractor during the planning period.
- Several components (e.g., metal siding panels, doors, and metal roof) of the public works building are corroding. This problem will worsen in the coming years and the City should plan to make upgrades during the planning period.
- Some of the mechanical and electrical equipment used throughout the plant (e.g., valve, actuators, variable frequency drives, etc.) will likely reach the end of their useful life during the planning period due to normal wear and age.
- The SBR diffuser membranes will likely reach the end of their useful life during the planning period due to normal wear and age.
- The automatic control system for the UV disinfection equipment will likely reach the end of its useful life during the planning period.
- The diffuser membranes in the aerobic digester and sludge storage tank will likely reach the end of their useful life during the planning period due to normal wear and age.
- The concrete surfaces of the aerobic digester and sludge storage tank are corroding and the City should consider coating the walls of the tanks during the planning period.
- The air supply system for the aerobic digester and the sludge storage tank lacks automatic control functionality which makes it more difficult to control the digestion process, leads to operational problems like foaming, and leads to excess power consumption.

4.6 WASTEWATER SYSTEM OPERATOR LICENSING

The City's wastewater collection system currently requires a level 2 certification for operation. The treatment system requires a level 3 certification. It is unlikely that these will change during the planning period.

4.7 WASTEWATER SYSTEM FUNDING MECHANISMS

Funding for the City's existing wastewater system comes from several sources including user fees, a food and beverage tax, system development charges (SDCs), and an urban renewal district.

4.7.1 Wastewater User Fees

User fees are monthly charges to all residences, businesses, and other users that are connected to the wastewater system. User fees are established by the city council and are typically the sole source of revenue to finance wastewater system operation and maintenance. The City's wastewater user fee system is established by Resolution 2015-12-01. For most residential and commercial connections (i.e., $\frac{5}{8}$ and $\frac{3}{4}$ inch meters), the City currently charges a flat fee of \$47.94 that includes up to 200 cubic feet of water per month. An additional charge of \$6.00 is assessed for each 100 cubic foot above the initial amount that is included in the base charge. The City does have some users with larger meters. These users are charged a special rate that is based on usage.

The anticipated revenue from sewer billings for the fiscal year 2020/2021 is budgeted to be approximately \$565,000. Including other various charges and interest earnings, the total sewer fund revenues, for the 2020/2021 fiscal year are budgeted to be approximately \$567,500. It should be noted that these budget amounts are less than the historic revenue from user rates. In the previous two fiscal years, the revenue from user rates was about \$750,000 and \$620,000. Due to the Covid 19 pandemic, the City anticipated less revenue for the 2020/2021 fiscal year.

The City's sewer fund must provide sufficient revenues to properly operate and maintain the wastewater system and provide reserves for normally anticipated replacement of key system components such as pumps, motors, pump station control equipment, chemical feed equipment, manholes and sewer collection piping. Although the City relies exclusively on sewer fees for operation and maintenance costs, the sewer fund is typically not adequate to finance major capital improvements without outside funding sources.

4.7.2 Food and Beverage Taxes

The City currently collects a 5% tax on food and non-alcoholic beverages sold at restaurants. These funds are used to pay for improvements to the City's utility systems. The anticipated revenue from this tax is listed as \$175,000 in the 2020/2021 fiscal year budget. These funds are typically used to repay loans for the wastewater system improvements that were completed in 2008. As with user rates, the anticipated revenue from the food and beverage tax for the 2020/2021 fiscal year is significantly less than has historically been collected. For the last two fiscal years, revenue from the food and beverage tax has been about \$370,000. The City anticipated less revenue from this source for the 2020/2021 fiscal year due to the Covid 19 pandemic.

4.7.3 System Development Charges

A system development charge (SDC) is a fee collected by the City as each piece of property is developed. SDCs are used to finance necessary capital improvements and municipal services required by the development. SDCs can be used to recover the capital costs of infrastructure required as a result of the development, but cannot be used to finance either operation and maintenance, or replacement costs.

The SDC fee system was most recently revised by Resolution Number 2007-01-01. The City charges different SDC fees based on the size of the water meter installed at each property. The current fee structure is listed in Table 4-9. Over the last three fiscal years, the City has collected and average of about \$70,000 in wastewater system development charges. A portion of these funds are typically used to retire the debt associated with the 2007 wastewater system improvement project and a portion is reserved for capital improvements.

Table 4-9 Current Wastewater SDC Fees

Meter Size	SDC Charge
$\frac{3}{4}$ by $\frac{5}{8}$ - Inch	\$4,851
$\frac{3}{4}$ - Inch	\$7,277
1- Inch	\$12,128
1 $\frac{1}{2}$ - Inch	\$24,255
2 - Inch	\$38,808
3- Inch	\$77,616
4- Inch	\$121,275
6- Inch	\$242,550

4.7.4 Urban Renewal District

The City collects revenues from an urban renewal district. Some of these funds are used to retire the debt associated with the 2007 wastewater system improvement project. For the 2020/2021 fiscal year, the City planned to use approximately \$95,000 of urban renewal funds to service this debt.

4.7.5 Annual Sewer System Costs

Annual operations and maintenance costs are recurring costs typically funded through user rates. The City's budget for 2020/2021 fiscal year includes various expenditures as listed below (Table 4-10). The total expenditures for the fiscal year are approximately \$793,240.

Table 4-10 Sewer Utility Fund Expenditures
2020/2021 Fiscal Year

Item	Budget
Personnel Services	\$ 345,000
Materials and Services	\$ 288,460
Capital Outlays	\$ 99,780
Debt Service	\$ 60,000
TOTAL EXPENDITURES	\$ 793,240

4.7.6 Debt Service

The City currently has two outstanding loans (Table 4-11). As of the fall of 2021, the total outstanding principal owed is approximately \$3,363,000 and the minimum debt service payments total approximately \$505,500 per year.

Table 4-11 Sewer Utility Fund Existing Debt

Loan Description	Loan Amount	Term (years)	Payoff Date	Interest Rate	Annual Payment	Outstanding Principal (10/2021)
Wastewater Treatment Plant - Clean Water State Revolving Loan Fund	\$6,671,721	20	4/2029	2.9%	±\$469,000	\$3,016,073
Wastewater Treatment Plant - OECDD Loan	\$528,000	25	12/2033	Varies 2-5%	\$36,915	\$346,740

4.7.7 Wastewater Capital Reserve Fund

The City maintains a capital reserve fund used to make improvements to the wastewater system. In recent years, the City has typically contributed an average of about \$80,000 from user fees to this fund. At the end of the 2020/2021 fiscal year, the ending balance in this fund is anticipated to be about \$220,000.

CHAPTER 5

WASTEWATER FLOWS AND LOADS

Chapter Outline

- 5.1 Introduction
- 5.2 Population
 - 5.2.1 Historic and Future Population
- 5.3 Occupancy Rates
- 5.4 Wastewater Flows
 - 5.4.1 Wastewater Treatment Plant Flow Records
 - 5.4.2 Wastewater System Existing Flow Estimates
 - 5.4.3 Wastewater Flow Projections
 - 5.4.4 Drainage Basin Service Area Flows
- 5.5 Wastewater Loads
 - 5.5.1 Wastewater Treatment Plant Load Records
 - 5.5.2 Load Projections

5.1 INTRODUCTION

In order to select and size both collection and treatment facilities for the planning period, projected wastewater flows and organic loadings must be determined. The projected flows and organic loadings were determined based on a number of variables including the following:

- Rate of projected population increase
- Land use zoning within the UGB
- Projected per capita and per acre flowrates and organic loadings.

This chapter develops wastewater flow and loading projections which are used for sizing the collection system components as well as the treatment plant components. The projected design flowrates were determined based on a number of variables including zoning of land within the service area, anticipated development density at buildout and within a 20-year planning period, and projected per capita and per acre flowrates.

5.2 POPULATION

Population projections serve as the basis for future wastewater flow and load projections. Much of the challenge in projecting system growth relates to the difficulty in accurately tracking or projecting actual populations. This is especially challenging in Yachats. As a tourist destination, The population in Yachats fluctuates on a seasonal basis and on a weekly basis. The population generally increases during the summer season with peaks occurring during weekends and holidays. As noted in the following subsection, the current population of Yachats is estimated to be about 760 residents. During peak holidays, the population is believed to be greater than 2,000 residents. This fluctuation is significantly greater than a typical City. Therefore, traditional population estimates are of limited use and other means must be developed to track the service population in Yachats.

The population of Yachats consists of permanent residents, part time residents, and tourists. Permanent residents generally own homes in the City and reside in the City on a full-time basis. Part time residents own homes, but the homes are not occupied on a full-time basis. Tourists visit the City for short periods of time and occupy hotel rooms and vacation rentals.

5.2.1 Historic and Future Population

As described previously (Section 2.5.2) the population in Yachats has steadily increased from about 533 residents in 1990 to about 760 in 2020. This trend is expected to continue during the planning period. In June of 2017, population projections for Lincoln County were prepared by

the Portland State University Population Research Center³. Based on these projections, the estimated population in 2041 is 1,070 (see Section 2.5.2). These projections are based on an average annual growth rate of 1.4% from 2020-2035 and 0.9% from 2035-2041. These population values are generally considered to be the full-time residents, but do not include part time residents or tourists. Therefore, these projections are of limited use for projecting wastewater flows.

In order to account for flows from part time residents and tourists. The total number of connections to the sewer system and the number of multifamily units such as apartment buildings, condominium complexes, and hotel rooms were tracked separately. The City currently has about 959 user connections. Of these, 11 are multi-family connections that include about 70 units. There are also eight hotel connections that include about 311 rooms. The total number of what can be considered “standard” connections is about 940. These connections mostly consist of single-family homes and businesses.

In order to project future populations in the City, the annual average growth rates used for the projections prepared by the Portland State Population Research Center were applied to the number of “standard” connections, the number of multi-family units, and the number of hotel rooms (Table 5-1). Therefore, this approach is based on the assumption that the ratio of single-family homes, to multi-family units and hotel rooms will remain constant during the planning period. This is likely to be an oversimplification, but seems like a reasonable assumption given all of the other uncertainties involved in estimating future wastewater flows.

Table 5-1 Yachats Sewer Service Category Projections

Year	Number of “Standard” Connections	Number of Multi- Family Units	Number of Hotel Rooms
2020	940	70	311
2025	1008	75	334
2030	1081	81	358
2035	1160	86	384
2040	1213	93	411
2041	1224	94	417

Note: Annual Average growth rates based on projections prepared by the Portland State Population Research Center which equal 1.4% from 2020-2035 and 0.9% from 2035-2041

5.3 OCCUPANCY RATES

In the previous section, projections of the total number of connections and non-standard living units (i.e., multi-family units and hotel rooms) are presented. If Yachats didn’t have a large number of part time residents and tourists, then these values could be used to estimate the total

³ Portland State University, Population Research Center, Coordinated Population Forecast Benton County Oregon 2017-2067

population using reasonable estimates of population densities. For example, a reasonable population density for single family homes and multi-family units is about 1.8 people per unit. A reasonable population density for hotel rooms is about 1.2 people per unit. Using these values, it is possible to estimate the total population of Yachats at full occupancy (Table 5-2).

Table 5-2 Yachats Sewer Service Population at Full Occupancy

Year	Estimated Population at Full Occupancy
2020	2191
2025	2350
2030	2520
2035	2703
2040	2844
2041	2873

Note: Population at full occupancy estimated by assuming 1.8 people per standard connection and multi-family unit and 1.2 people per hotel room.

As show in Table 5-2, the 2020 population of Yachats at full occupancy is estimated to be about 2,200 residents. This is the population that would correspond to peak holidays like Independence Day. In communities like Yachats, wastewater production tends to be about 90 gallons per person per day. Therefore, the peak wastewater flow at full occupancy should be about 200,000 gallons per day. Since peak occupancy occurs during the summer months, when groundwater infiltration and stormwater inflow into the collection system are minimal, drinking water production rates can be used as a way to check this estimate. The City does not measure drinking water production on a daily basis. But, based on discussions with City staff, the peak water usage during summer months is believed to be about 225,000 gallons per day. If we assume some of this water is used for lawn watering and other consumptive uses, 200,000 gallons per day of wastewater seems like a reasonable estimate and supports the methodology used to estimate population.

Drinking water production may also be used as a means to estimate the average occupancy rate during the year. This should be less than the occupancy rate during peak weekends and holidays. On an average annual basis, the City currently produces about 136,000 gallons per day of drinking water. Per capita drinking water production rates are typically about 90 gallons per person per day in a City like Yachats. Therefore, the average annual population should be about 1,500 people, which corresponds to an occupancy rate of 70%. This value agrees well with the BOD loading at the wastewater treatment plant. As shown below (Table 5-8), the average annual BOD loading measured at the treatment plant is about 314 pounds per day. Typical per-capital BOD loading rates tend to be about 0.22 pounds per person per day. At this rate, 315 pounds of BOD corresponds to a population of about 1,430. Again, this is roughly equal to an occupancy rate of 70%. Therefore, throughout the remainder of this document, a 70% occupancy rate will be used to estimate average annual flows and organic and solids loading.

A similar analysis of drinking water production and BOD loading, shows that the occupancy rate during the peak month is about 90%. Therefore, this value will be used to estimate peak monthly wastewater flows and loads.

5.4 WASTEWATER FLOWS

Wastewater facility evaluation and design typically account for the following standard flow rates:

- Average dry-weather flow (ADWF) - Average daily wastewater flow during the dry-weather months of May through October
- Average wet-weather flow (AWWF) - Average daily wastewater flow during the wet weather months of November through April
- Average annual flow (AAF) - Daily wastewater flow averaged over the entire year
- Maximum-month dry-weather flow (MMDWF) - Maximum monthly flow during the dry weather months
- Maximum-month wet-weather flow (MMWWF) - Maximum monthly flow during the wet weather months
- Peak-day flow (PDF) - Maximum one-day flow during the weather months
- Peak-hour flow (PHF) - Maximum flow over a short duration (peak hour).

5.4.1 Wastewater Treatment Plant Flow Records

The City's treatment plant Discharge Monitoring Reports (DMRs) filed with the DEQ for the period from November 2015 through October 2020 were evaluated to identify flow patterns and evaluate current flows to the plant.

Wastewater flows in Yachats are strongly influenced by precipitation (Figure 5-1). This is common for wastewater collection systems in Western Oregon. Winter rains cause groundwater levels to rise. The groundwater enters the collection system through faults and cracks in the collection piping and manholes (infiltration) and through direct connections to storm drainage collection facilities (inflow). Infiltration and inflow (I/I) results in increased flows measured at the treatment plant. As shown in Figure 5-1, plant inflows during the winter months are significantly higher than flows during the dry summer months. This can also be seen in Table 5-3 where the various flow components are tabulated for the last four years in millions of gallons per day (MGD).

Table 5-3 Summary of Treatment Plant Flow Data November 2015 through October 2020

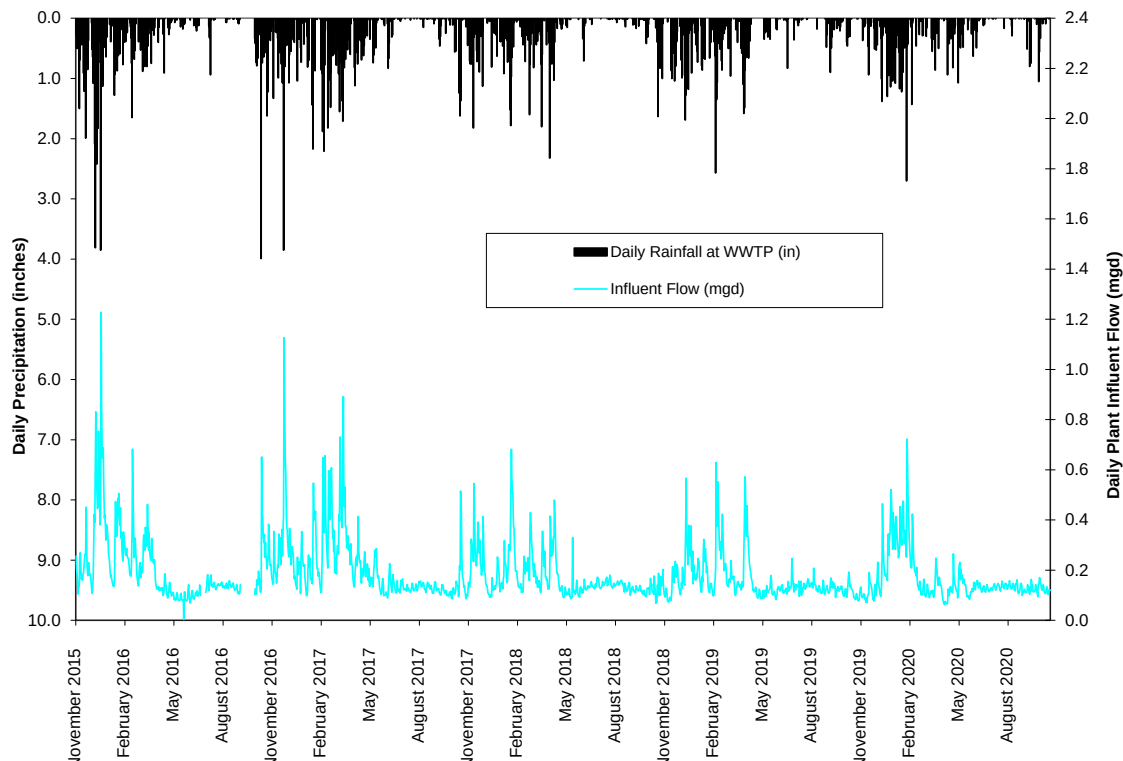
Water Year ⁽¹⁾	ADWF (MGD)	AAF (MGD)	AWWF (MGD)	MMDWF (MGD)	MMWWF (MGD)	PDF (MGD)
2016	0.144	0.216	0.275	0.240	0.491	1.23
2017	0.141	0.218	0.296	0.171	0.381	1.13
2018	0.130	0.172	0.216	0.150	0.270	0.682

2019	0.126	0.163	0.200	0.139	0.267	0.629
2020	0.132	0.161	0.191	0.147	0.363	0.723
Average	0.134	0.186	0.236	0.169	0.354	0.879
Maximum	0.144	0.218	0.296	0.240	0.491	1.23

Notes

1. Water year is November through October starting in November prior to the year listed.

Figure 5-1 Precipitation Effects on Plant Influent Flow



5.4.2 Wastewater System Existing Flow Estimates

The DEQ has published guidelines for the estimation of wet weather flows in Western Oregon. The purpose of these guidelines is to identify a methodology that can be used to estimate wastewater flows if no surcharging in the collection system were to occur. In most municipal systems, large amounts of I/I enter the collection piping and manholes. As a result, portions of the system surcharge during high flow conditions associated with wet weather. This surcharging tends to decrease the amount of I/I that could occur if the surcharging were not present. For most municipal systems, the existing wet weather flows are influenced by this phenomenon and the wet weather flows to the wastewater treatment plant would actually be higher if no surcharging were to occur. It is important to consider the flowrates in the absence of surcharging because as the improvements to the collection system are made, the bottlenecks that cause the surcharging will be removed and the wet weather flows to the treatment plant may increase beyond the flows currently measured today.

In order to estimate the wet weather flow components that would occur in the absence of bottlenecks, the DEQ has published guidelines that describe a methodology to correlate wastewater flows to rainfall during moderate rainfall events when surcharging is believed to be absent. This mathematical correlation is used to extrapolate flows at higher rainfall events associated with peak wet weather flow conditions. This methodology is useful for most City's where surcharging is common. However, the City's system does not experience any surcharging even during the largest winter storms. Therefore, the DEQ flow projection methodology is overly conservative for Yachats and is not used for this plan. The City routinely inspects the collection system during large winter storms and has never observed any surcharging. The collection system was inspected as part of this facilities planning effort and there was no evidence of surcharging such as debris accumulation on the manhole shelves and grease rings on the manhole walls above the flow channel. There is no evidence to support using the DEQ flow projections methodology for Yachats and doing so would result in overly conservative flow estimates. Therefore, the DEQ wet weather flow projection methodology was not used and the existing flows as measured at the treatment plant (Table 5-4) are considered to be representative of the actual peak flows in the system.

The City does not record flows to the treatment plant on an hourly basis. Therefore, the existing peak hourly flow must be estimated. For this planning document, the peak hourly flow is assumed to be 10 times the average dry weather flow. This value fairly common in municipal systems in Western Oregon and is likely to be slightly conservative (i.e., slightly over-estimates the actual peak flow), but is considered a reasonable estimate for the purposes of this planning document. Table 5-4 includes a summary of existing flow estimates that will be used throughout the remainder of this planning document.

Table 5-4 Summary of Existing Flow Estimates

Flow	Value (MGD)
AAF	0.186
ADWF	0.134
AWWF	0.236
MMDWF	0.240
MMWWF	0.491
PDF	1.23
PHF	1.34

5.4.3 Wastewater Flow Projections

This section builds on the discussions of population projections and occupancy rates in Sections 5.2 and 5.3 and the existing flow estimates listed in Table 5-4. Projections of future wastewater flows through the planning period were based on the existing flows combined with flow from the anticipated population growth. Increases in wet weather flows were estimated by making assumptions about the total area of land developed in the future and the amount of I/I per acre of newly developed land. It is important to note that the flow projections listed below include the existing peak flow estimates listed in Table 5-4. These flow estimates are theoretical estimates of

wastewater flow that might occur in the absence of surcharging (Section 5.4.2). These flows are significantly higher than the measured flows (Table 5-4). Therefore, a comment on the applicability of the following flow projections is appropriate. These flow estimates are generally considered useful for sizing new facilities, but not useful for determining when certain components of the wastewater system (e.g., pump stations and trunk sewers) should be upgraded to increase capacity. In the case of existing pump stations, other information such as pump run times should also be evaluated to determine if the flows to the station are exceeding pump capacity.

The projected wastewater flowrates were based on the following assumptions.

- Population growth will occur in accordance with the projections in Sections 5.2 and 5.3.
- Flow rates will increase in proportion to population increase.
- Occupancy rate of 70% will be used estimates of AAF, ADWF, and AWWF.
- Occupancy rate of 90% will be used for estimates of MMDWF and MMWWF.
- Occupancy rate of 100% will be used for estimates of PDF and PHF.
- The per capita average dry weather flow rate associated with the population increase will remain constant during the planning period at a value of 90 gallons per capita per day.
- There will be no contribution from “wet” industries during the planning period. Commercial and industrial development will be “dry” with flows comparable to residential developments.
- The ratio of industrial and commercial development to municipal population will remain constant over the planning period.
- The City will continue to implement infiltration and inflow reduction measures that will prevent any increase in infiltration and inflow into the existing collection system. In other words, existing I/I contributions will remain constant.
- A peaking factor of 2 will be applied to the sanitary flow component of the PHF.
- The increase in the AWWF over the planning period is equal to twice the increase in the ADWF.
- The increase in the MMDWF over the planning period is equal to twice the increase in the ADWF.
- The increase in the MMWWF over the planning period is equal to three times the increase in the ADWF.
- The increase in the PDF over the planning period is equal to four times the increase in the ADWF.
- The increase in the PHF over the planning period is equal to five times the increase in the ADWF.

Based on these assumptions, the future estimates of wastewater flow listed in Table 5-5 were prepared.

Table 5-5 Future Wastewater Flow Projections

Year	Population at Full Occupancy	Projected Wastewater Flows (MGD)						
		ADWF	AAF	AWWF	MMDW F	MMWW F	PDF	PHF
2025	2350	0.148	0.206	0.264	0.266	0.530	1.288	1.413
2030	2520	0.159	0.222	0.286	0.294	0.572	1.349	1.489
2035	2703	0.170	0.239	0.309	0.323	0.616	1.415	1.571
2040	2844	0.179	0.252	0.326	0.346	0.650	1.466	1.635
2041	2873	0.181	0.255	0.330	0.351	0.657	1.476	1.648

5.4.4 Drainage Basin Service Area Flows

The peak discharge from each basin was estimated to evaluate the capacity of the trunk sewers. Estimates of existing peak flows as well as projected peak flows associated with buildout were developed. In Chapter 6, the existing peak flows are used to determine existing deficiencies and the projected peak flows associated with buildout are used for sizing the recommended improvements. Flows associated with buildout conditions are used for sizing trunk sewers because gravity sewer piping is not suited for incremental expansion. In small Cities like Yachats it is generally more cost effective to install a sewer line sized for complete development of the upstream service area. This is due to the fact that the pipe sizes are relatively small (i.e., less than 24 inches in diameter). Over the life of a particular pipeline it is generally not cost effective to install a smaller diameter pipe (e.g., an 8-inch diameter pipe), then later replace this pipe with a larger pipe (e.g., 12-inch diameter pipe) before the smaller diameter pipe has reached the end of its useful life. Due to the relatively long life cycle of modern pipeline materials (i.e., 70+ years), it is usually more cost effective to install a larger pipe sized for buildout of the upstream basin. For this reason, peak flows associated with complete buildout of the UGB are used in this plan to size the trunk sewers in the City.

The peak flow from each basin at buildout conditions was determined by summing the following quantities.

- Existing average dry weather flow multiplied by a peaking factor of 2
- Existing I/I contribution
- Additional base sewage flow from growth multiplied by a peaking factor of 2
- I/I from future development

The existing ADWF from each basin was estimated by using a ratio of the sewerage area in each basin to total sewerage area of the City, then multiplying this ratio by the total ADWF for the City. The existing I/I contribution from each basin was estimated based on the age and total length of piping within each basin, pump station run times, and field measurements during wet weather conditions.

For undeveloped areas in the City, the additional ADWF associated with growth in the basin was determined by multiplying estimates of sewage flow per acre (Table 5-6) by the area of undeveloped land for each land use within each basin. For areas of the City that are already developed to residential densities, but are not served by the public wastewater system, the ADWF was estimated by assuming a typical occupancy of 2.25 people per residence and a flow of 90 gallons per minute per person. A peaking factor of two was applied to these values to estimate PHF from new development. The additional I/I from future development was determined by multiplying 1,200 gallons per acre per day by the total undeveloped area within each basin. This allowance for I/I in currently undeveloped areas is used only to size the collection system piping serving those areas.

Table 5-6 Flow Rates Per Acre Used for Estimates of Flow from Undeveloped Areas

Land use	Flow (gallons/acre/day)
Regular Density Residential Areas	810
High Density Residential Areas	2,430

The existing peak flows and the projected peak flows at buildout are listed for each collection system basin in Table 5-7. It is important to note that the peak flows listed in Table 5-7 are for complete buildout of the land within the study area. For this reason, these peak flows are greater than the flows listed in the previous subsection (Table 5-5). The flows in Table 5-7 are generally useful for sizing the gravity collection system piping while the flows listed in Table 5-5 are useful for evaluating the treatment plant and pump stations.

Table 5-7 Projected Drainage Basin Service Area Flows at Buildout of the System

Basin	Total Area (Acres)	Existing Sanitary Flow (MGD)	Existing I/I (MGD)	Existing PHF (MGD)	Future Sanitary Flow (MGD)	Future I/I (MGD)	Buildout PHF (MGD)
A	138	0.028	0.217	0.272	0.108	0.065	0.552
B	56	0.016	0.122	0.154	0.017	0.010	0.197
C	36	0.012	0.076	0.100	0.001	0.000	0.102
D	80	0.019	0.133	0.172	0.019	0.025	0.235
E	16	0.005	0.043	0.054	0.000	0.000	0.055
F	33	0.011	0.129	0.151	0.002	0.000	0.155
G	29	0.010	0.057	0.076	0.002	0.000	0.080
H	93	0.021	0.201	0.242	0.029	0.036	0.336
I	57	0.013	0.093	0.120	0.020	0.020	0.180
Totals	598	0.134	1.072	1.34	0.198	0.156	1.892

5.5 WASTEWATER LOADS

In addition to the expected wastewater flow, evaluation and design of wastewater facilities requires estimates of the expected loads of various pollutants in the wastewater. Treatment facilities must be designed with operating capacity to treat the highest expected loads of pollutants over the planning period. Pollutants used as design parameters for this study were biochemical oxygen demand (BOD; sometimes referred to as a five-day oxygen demand expressed as BOD₅), and total suspended solids (TSS). The following classifications of wastewater pollutant loads were used.

- Average Load – Average daily wastewater load.
- Maximum Month Load – Daily wastewater load during the maximum month.

5.5.1 Wastewater Treatment Plant Load Records

The City's treatment plant Discharge Monitoring Reports (DMRs) filed with the DEQ for the period from November 2015 through October 2020 were evaluated to identify loading patterns and evaluate current loads to the plant. This data set includes BOD and TSS measurements once per week from 24 hour composite samples taken from the wastewater treatment plant influent flow stream.

Pollutant loads in pounds per day were calculated for BOD and TSS using the data sets described above. Pollutant load calculations were based on the concentration for each pollutant multiplied by the influent flow on the day the sample was collected.

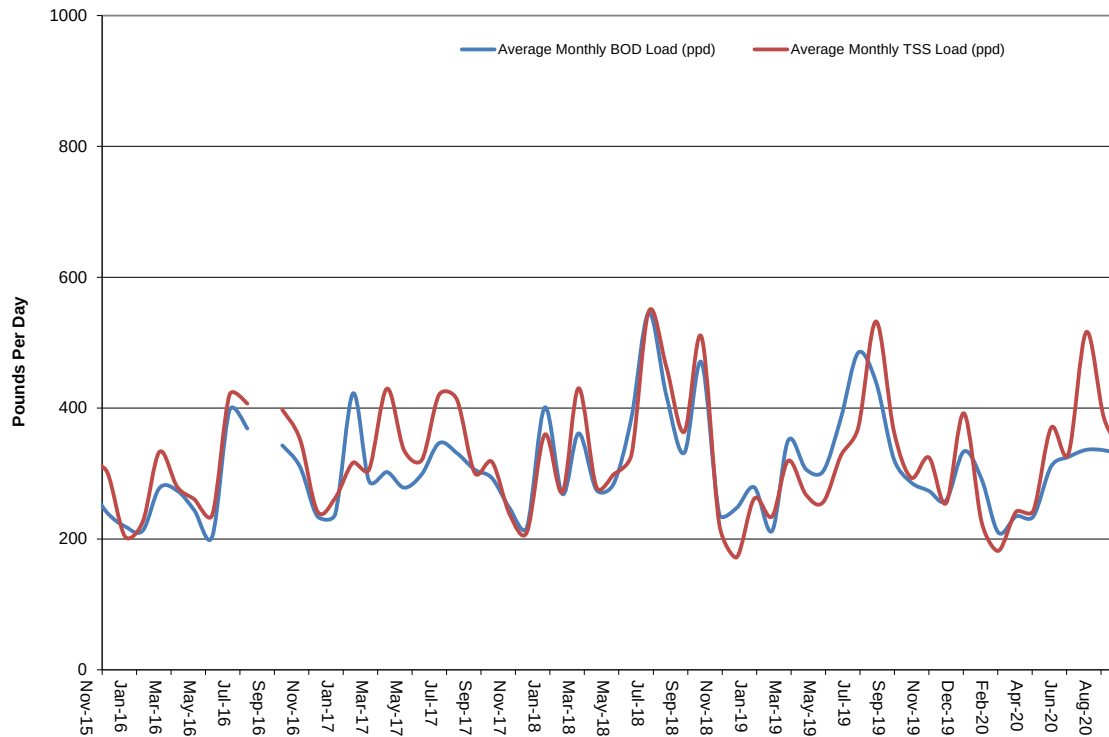
The average monthly influent BOD and TSS loads measured at the treatment plant from November 2015 through October 2020 are plotted in Table 5-8. The annual average influent loading and the maximum month loading are listed in Table 5-8 for BOD and TSS. As expected for a community with a large portion of vacation homes, the influent BOD and TSS loading rates generally increase over the summer months as vacation visitation increases. As described above (section 5.3) annual average flow and load values correspond to an annual average service population of approximately 1,575 residents. This equates to an occupancy rate of about 70% assuming the maximum occupancy of 1.8 people per residence and 1.2 people per hotel room.

Table 5-8 Summary of Plant BOD and TSS Loading Data 2015 through 2020.

Time Period	BOD Load (pounds per day)		TSS Load (pounds per day)	
	Average Annual	Maximum Month	Average Annual	Maximum Month
November 2015 - October 2016	282	396	310	420
November 2016 - October 2017	302	422	332	429
November 2017 - October 2018	350	545	359	547
November 2018 - October 2019	320	484	303	532

2019				
November 2019 - October 2020	291	336	317	516
Average	309	436	324	489

Figure 5-2 BOD and TSS Loading History at Wastewater Treatment Plant



5.5.2 Load Projections

This section builds on the discussions of population projections in Section 5.2 and 5.3 and the existing load data listed in section 5.5.1. Projections of future wastewater loads through the planning period were based on the following assumptions.

- Population growth will occur in accordance with the projections in Section 5.2 and 5.3.
- BOD and TSS loading rates will increase in proportion to population increase.
- A unit loading rate of 0.22 pounds per person per day will be used for estimates of average annual and maximum monthly BOD and TSS loading rates.
- Occupancy rate of 70% will be used estimates of average annual loading rates.
- Occupancy rate of 90% will be used for estimates of the maximum month loading rates.

Based on these assumptions, the future estimates of influent wastewater loads listed in Table 5-9 were prepared.

Table 5-9 Future Wastewater Load Projections

Year	Population at Full Occupancy	BOD (ppd)		TSS (ppd)	
		Average Annual	Peak Month	Average Annual	Peak Month
2020	2,191	337	434	337	434
2025	2,350	362	465	362	465
2030	2,520	388	499	388	499
2035	2,703	416	535	416	535
2040	2,844	438	563	438	563
2041	2,873	442	569	442	569

CHAPTER 6

COLLECTION SYSTEM EVALUATION

Chapter Outline

- 6.1 Introduction
- 6.2 Collection System Operation, Maintenance, & Rehabilitation
 - 6.2.1 Need for System-Wide Preventative Maintenance
 - 6.2.2 Present Maintenance Practices
 - 6.2.3 Recommended Collection System Maintenance Program (Program – 1)
- 6.3 Collection System Deficiencies
 - 6.3.1 Gravity Main Capacity Analysis
 - 6.3.1 Collection System Improvements to Serve Currently Undeveloped Areas
 - 6.3.2 Pump Station Capacity Analysis
 - 6.3.3 Force Main Capacity Analysis
 - 6.3.4 Summary of Collection System Deficiencies
- 6.4 Collection System Alternatives
 - 6.4.1 No Action
 - 6.4.2 Reroute Sewage
 - 6.4.3 Upgrade Existing Facilities
 - 6.4.4 Infiltration/Inflow Reduction
- 6.5 Recommended Gravity Collection System Improvements
 - 6.5.1 Improvements to the Gravity Collection System
- 6.6 Recommended Pump Station and Forcemain Improvements
- 6.7 Summary of Recommendations

6.1 INTRODUCTION

This chapter includes an analysis of the collection system. The first subsection focuses on operation, maintenance, and rehabilitation of the collection system. This is followed by the development of alternatives for potential improvements to the wastewater collection system.

This chapter addresses the following key questions:

- What are the current collection system operation and maintenance practices and how can they be improved?
- What are the existing collection system deficiencies?
- What collection system components are likely to become deficient during the planning period or prior to complete buildout of the system?
- What are the alternatives for correcting existing and projected deficiencies?

The existing and projected collection system deficiencies are presented. Where appropriate, different alternatives for addressing each of the deficiencies are presented and discussed. The alternatives are evaluated against each of the collection system deficiencies to generate complete collection system recommendation. In Chapter 7, the treatment system is evaluated and alternatives for correcting treatment system deficiencies are identified and evaluated.

6.2 COLLECTION SYSTEM OPERATION , MAINTENANCE , & REHABILITATION

This section discusses the need for maintenance of the gravity sewer collection piping and provides recommendations for the basic elements necessary for a maintenance program. The need for system-wide preventive maintenance is addressed first, and then the general recommended approaches to collection system maintenance are outlined.

6.2.1 Need for System-Wide Preventative Maintenance

Maintenance of sewerage systems is necessary to ensure the proper operation of the facilities and to obtain the full useful life of those facilities. Sanitary sewer systems represent significant investment of public capital. If a sewer system is allowed to fall into disrepair because of the lack of maintenance, it will not operate efficiently or as designed. Health problems and property damage may result from sanitary sewer backups, surcharging and/or overflows. Without proper maintenance, a system's capacity can be reduced by debris clogging, root intrusion growth, structural damage, infiltration and inflow (I/I), and other factors that eventually lead to failures throughout the system. Repair of failed sections of a sanitary sewer system are costly, quite often exceeding the original cost of construction. In spite of this, many jurisdictions do not adequately

fund the level of maintenance necessary to protect their investment in the sewerage system. Collection system maintenance can be separated into two types: preventive and corrective.

Preventive maintenance involves scheduled inspection of the system and data gathering to identify problem areas and analysis of this data so that scheduled maintenance can be targeted at specific problems. As a general rule, as preventative maintenance increases, the amount of corrective maintenance required decreases.

Corrective maintenance, often referred to as emergency maintenance, is typically performed when the sewer system fails to convey sewage. Causes for initiating corrective maintenance may include blockages, solids buildup, excessive I/I, flooding and sewer breaks. Corrective maintenance requires immediate action, and the jurisdiction will typically pay a premium to have this work performed.

6.2.2 Present Maintenance Practices

At the present time, the City has a good collection system maintenance program. The City owns sewer cleaning and television inspection equipment. The City cleans about 2,600 feet of mainline every year. This work is usually performed in the areas of the system that are known problem areas. The City currently owns a push camera and has traditionally inspected about 2,100 feet of mainline piping each year. To increase this rate, the City plans to purchase more sophisticated television inspection equipment in 2021 or early. With this equipment, the City anticipates being able to inspect about 14,000 feet per year. At this rate, the City should be able to inspect all mainline pipes about once every 5 years. In the 2021/2022 fiscal year, the City budgeted approximately \$30,000 per year for I/I correction. The City plans to use these funds to purchase the television inspection equipment. The costs of this equipment will consume the annual \$30,000 budget for the next few years. Once the television inspection equipment purchase is completed, these funds should be used for other I/I corrective measures. Since 2015, the City has smoke tested about 15% of the collection system.

6.2.3 Recommended Collection System Maintenance Program (Program - 1)

The City's original collection system was constructed in 1974 and is in relatively good condition. In the last six years, the City has performed television inspections of about 20% of the gravity collection system piping. The City plans to acquire a self-propelled television inspection camera in the 2021-2022 fiscal year which should increase the amount of mainline the City can inspect each year. The City should consider inspecting about 20% of the system each year. At this rate, the City can inspect the entire system about once every 5 years. Based on the City's recent experience, most problems in the collection system can be addressed by manhole rehabilitation and spot repairs of mainlines and service laterals. Over the planning period, the collection system will continue to age and deteriorate and it will become increasingly important for the City to make annual repairs in order to keep the system in good condition. Therefore, the City should formalize the annual maintenance program at a funding rate of \$30,000 per year and not divert these funds for other needs. This funding rate should be sufficient for the immediate future, but the City should evaluate this funding rate at 5 year intervals along with the list of problems

observed through television inspections to ensure that the program is able to adequately address the needs of the system. Initial maintenance activities should be focused on rehabilitating leaking manholes, making spot repairs in the mainline piping, and working with customers to repair service laterals with high rates of infiltration. The City should also consider smoke testing the collection system to identify illicit connections to the sewer system.

6.3 COLLECTION SYSTEM DEFICIENCIES

The purpose of this section is to determine the components of the existing collection system that are or will become deficient. This includes components that lack capacity to convey existing peak flows or will lack capacity as flows increase due to growth. Some collection system deficiencies were identified in Chapter 4. This section is intended to supplement those discussions. Together with the deficiencies listed in Chapter 4, the intent of this section is to present an overall list of deficiencies that must be addressed by the City.

6.3.1 Gravity Main Capacity Analysis

The peak design flows developed in Chapter 5 were used as the basis for an evaluation of the existing sanitary sewer trunk lines. Pipe sizes, lengths, slopes, and locations were determined from City records. The evaluation was limited to the main trunk lines conveying sewage through the basins. This approach was taken since most of the pipes within a basin will actually encounter only a fraction of the capacity of the pipe. Typical practice is to construct sewer lines with pipe no smaller than 8-inches in diameter. This facilitates solids conveyance, cleaning, and maintenance. In the upper ends of the drainage basins, flows do not approach the capacity of the 8-inch diameter pipes. Therefore, it is not necessary to model all of the smaller diameter pipes in the collection system.

The capacity of each mainline segment was estimated using Manning's equation. The adequacy of the main trunk sewers can be determined by comparing the capacity calculated using Manning's equation against the peak flow estimates for each basin (Table 5-7). This analysis was used to identify the following problem.

- Mainline D from Manhole D-010 to Manhole D-030 – This section of 10-inch trunk sewer is located on Ocean View Drive just south of the Main Pump Station. This section of piping lacks the capacity to convey existing peak flows and peak flows at buildout of the collection system.

6.3.2 Collection System Improvements to Serve Currently Undeveloped Areas

In addition to the sewers lacking capacity, there are a number of areas within the City that are currently undeveloped and/or areas that lack gravity sewer service. New gravity mainlines will need to be installed to serve underdeveloped or underserved areas as they develop. In some cases pump stations may be needed to convey wastewater to the existing system. Most municipalities require that mainlines serving these areas are to be installed at the expense of the developer. These lines should be sized as required to serve all upstream areas. In Yachats, drainage patterns and locations for new sewers is relatively obvious. Therefore, this plan does not show all future

extensions. In general, the integrity of the sewer basin boundaries shown in Figure 4-2 should be maintained. As sewer service is extended into undeveloped areas of the City, some minor adjustments to the sewer basin boundaries may be needed. These are acceptable as long as they are relatively minor. Any major changes to the sewer basin boundaries that change the basin area by more than about 10% should only be approved if adequate downstream capacity is available.

6.3.3 Pump Station Capacity Analysis

There are a total of five wastewater pump stations in the collection system. The City collects run time data for each pump station. This data consists of the number of hours each day that each pump at each station was running. This data showed that all of the pump stations were able to convey the peak flows without the need to run the redundant pump. With the exception of the Main Pump Station, all of the City's stations are equipped with two pumps. The run time data showed that the second pump was not needed to convey peak flows to each station. Therefore, there was always a backup pump available which is needed to satisfy redundancy requirements. The Main Pump station has three pumps and the run time data never showed a time when all three pumps were running. Therefore, there was always a redundant pump available at the Main Pump Station as well. The run time data demonstrates that the pumps are adequately sized to convey existing peak flows.

The firm capacity of each station (Table 4-3) was compared against the peak flow from each sewer basin (Table 5-7) with the flows routed through the system as shown in Figure 4-1. This analysis showed that none of the pump stations lack the capacity to convey the existing peak flows or the peak flows anticipated at complete buildout of the collection system. Therefore, the capacity of the pump stations is adequate for the planning period and there is no need to improve the stations from a capacity standpoint. However, improvements to the pump stations will be needed during the planning period to address other issues that are mainly related to the age of the equipment. The recommended improvements are discussed below.

6.3.4 Force Main Capacity Analysis

Each of the five pump stations convey water through pressure force main pipes to the discharge locations. Each of these pipelines was analyzed with respect to their ability to convey peak flows at buildout of the upstream basin, as well as their overall age and ability to reliably serve the City for the remainder of the planning period. Pipe friction losses become problematic for pump station design when pipe velocities exceed about seven feet per second. At these pipe velocities, the power requirements to overcome the friction losses drive operating costs above acceptable levels. These pipe velocities also cause mechanical problems due to hydraulic pressure transients and excessive wear on valves and other similar pipe appurtenances. As such, the flow in each pipe segment that corresponds to a velocity of seven feet per second was considered to be the maximum capacity of each pipe segment.

All of the force main pipelines are adequately sized to convey the existing peak flows and the peak flows associated with complete buildout of the collection system. Therefore, improvements to address capacity issues are not needed.

The forcemain pipe for the Pontiac Pump Station and most the pipe for the Riverside Pump Station are the original AC pipes that were installed in 1974. About 270 feet of the Riverside Pump Station Forcemain was replaced in 2018 with HDPE pipe. The remaining 930 feet of the Riverside Pump Station Forcemain is the original 1974 pipe. The 1974 pipelines will be almost 70 years old at the end of the planning period. Of all of the City's forcemain pipes, these two pipelines are the oldest and will likely reach the end of their useful life the soonest. It is likely that the existing pipes will be sufficient for the remainder of the planning period. However, in an effort to be conservative, this plan does recommend replacing these two pipelines. However, these projects are assigned a relatively low priority ranking and the City may be able to delay these projects until the next planning period if no issues are observed. The recommended forcemain improvements are discussed in greater detail below.

6.3.5 Summary of Collection System Deficiencies

The known deficiencies described in Chapter 4 have been combined with the deficiencies described above to develop a complete list of collection system deficiencies. These are listed below (Table 6-1).

Table 6-1 Summary of Collection System Deficiencies

Location (note 1)	Problem Category
Sewer Line from King Street to 3 rd Street (Manhole D-220 to Manhole D-270)	This piping is old concrete piping with poor joint integrity. I/I and root intrusion are known problems on this section of piping.
Mainline A Manhole A-040 to Manhole A-050	There is a belly on this section of line which is downstream of the Adobe Resort. The belly causes surcharging, debris accumulation, and maintenance problems.
Hanley Drive Sewer Upstream of Manhole C-150	This mainline pipe was constructed without manholes at the terminal end and at a 90-degree bend on Hanley Drive. As a result, it is not possible to clean or inspect these pipelines.
Mainline D Manhole D-010 to D-030	Lacks capacity to convey peak flows
Main Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Main Pump Station	Lacks a dedicated overflow pipe.
Main Pump Station - Automatic Control System	May reach end of useful life during planning period
Parkside Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Parkside Pump Station - Automatic Control System	May reach end of useful life during planning period.
Riverside Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Riverside Pump Station - Automatic Control System	May reach end of useful life during planning period.
Riverside Pump Station Forcemain	The segment installed in 1974 may reach end of useful life during planning period.
Pontiac Pump Station	Pump power cables do not include any disconnect plugs and an electrician is needed to remove the wiring from the pumps when service is required.
Pontiac Pump Station Forcemain	May reach end of useful life during planning period
Quiet Water Pump Station	Will likely reach the end of its useful life during the planning period.
Riverside, Pontiac, and Quiet Water Pump Stations	The City only has two portable backup generators that are used for these three stations. The City may want to consider purchasing a third generator for the system.

Note 1: See collection system maps in Appendix B for manhole numbering.

6.4 COLLECTION SYSTEM ALTERNATIVES

Facilities planning requires the examination of a broad range of alternatives for each portion of the wastewater system. This section examines the alternatives for collecting wastewater within the study area and conveying it to the point of treatment. This section develops and screens wastewater collection alternatives using criteria such as land requirements, topographic constraints, reliability, operational flexibility, construction and long-term O&M costs, and regulatory restrictions. The alternatives listed in this section represent the tools used in the

facilities planning effort to address the previously listed deficiencies in order to provide a comprehensive long-term solution for the City's collection system.

6.4.1 No Action

The no action approach implies that no improvements will be made to the existing collection system (excluding maintenance or repairs). Obviously, this approach is recommended for those areas of the system which have sufficient capacity to convey the design flows and are in acceptable condition. Although this approach may be justified in isolated areas within the system on a case-by-case basis where there is insufficient capacity to convey peak design flows (i.e., minor surcharging for short periods of time), this approach is effectively eliminated by DEQ guidelines and regulations.

Although it is always an option to not improve the system, the result will be health risks, damage to existing facilities, sanitary sewer overflows, environmental pollution, compliance issues, and inconveniences where sewage collection and facilities are inadequate. Furthermore, delaying required improvements almost inevitably leads to a greater future problem. However, to ensure that system improvements are justified, it is necessary to consider the costs and advantages of proposed improvements against the risks entailed by the no action alternative. It should be noted that since resources are limited and the sewer system cannot be upgraded all at one time, the phasing plan adopted by the City for the improvements will in effect require that the no action alternative be adopted on a temporary basis for all but the first phase improvements.

6.4.2 Reroute Sewage

Under this scenario, sewage would be diverted or rerouted from one sewer basin or system to another. This approach is practical in cases where an existing sewer has capacity in excess of that needed to convey design flows from that basin, and where flow diversion is practical from a construction and topographic standpoint.

6.4.3 Upgrade Existing Facilities

This approach involves constructing replacement pipes or pump stations to provide adequate capacity for the design flows. This is the most obvious alternative since it provides assurance that the sewage collection system can convey the design flows through the City and that overflows will be kept to a minimum, which in turn limits the City's liability and health risks to residents.

6.4.4 Infiltration/Inflow Reduction

As stated previously, the collection system collects moderate amounts of I/I during the winter months. While reduction of the existing I/I flows and minimization of future I/I flows is important, experience in Western Oregon has shown that the goal of complete elimination of I/I is unreasonable and largely unattainable. For the purposes of this study, it was assumed that the recommended sewer collection system maintenance program (i.e., Program-1) will prevent increases in the amount of I/I that enters the existing collection system. In other words, no reduction in flows is assumed. This assumption is based on the idea that I/I reduction should be an ongoing work effort included in the City's maintenance budget indefinitely. This approach is recommended because as the I/I corrective work is performed, other areas in the collection

system will continue to age and deteriorate and new I/I sources will appear over time. These new I/I sources will replace the I/I sources that were removed as a result of the corrective work. This assumption may turn out to be somewhat conservative. If so, future flow projections during the next planning cycle can be adjusted accordingly.

6.5 RECOMMENDED GRAVITY COLLECTION SYSTEM IMPROVEMENTS

The remainder of this section describes the recommended improvements to the collection system. Written descriptions are provided for each improvement project. The locations of the projects are shown in Figure 6-1 through Figure 6-3. These figures are included at the end of this section for formatting purposes. The recommended project budgets for each project are listed in Table 6-2. A detailed breakdown of the construction costs, contingency, design, and administration costs are included in Appendix C.

As noted previously, the recommended pipe sizes and capacities are based on complete buildout of the UGB in its current configuration. The decision to size pipelines to convey peak flows associated with buildout conditions is based on the fact that buried pipelines are not well suited for incremental expansion. In other words, it is more cost effective in the long-run to install pipelines sized for complete buildout of the upstream basin rather than for 20-year flow projections.

To address the I/I problems in the collection system, the I/I reduction plan (i.e., Program-1) is recommended. This program is discussed in greater detail above.

6.5.1 Improvements to the Gravity Collection System

This section includes a description of the recommended improvements to the gravity collection piping. As described above, most of the existing collection system piping is adequately sized to convey the peak flows at buildout of the study area. However, some of the main trunk lines are undersized and will need to be upsized. Some of the pipelines have known problems that are not related to capacity, but other problems such as grade issues, root intrusion, etc. The recommended improvements are discussed below.

- *Sewer Line from King Street to 3rd Street (Manhole D-220 to Manhole D-270) - Project G-1*
This project is recommended to replace old concrete pipe with poor joint integrity that is susceptible to root intrusion and I/I. Rather than replacing the pipeline using open cut construction methods, the recommended improvements include lining the pipe with a cured in place fiberglass liner. This approach does not require open cut construction and will require much less disturbance than traditional open cut construction methods. The location of the pipeline is challenging because it is located in undeveloped side and back yards. The pipes are located in public right of ways or easements, but there are no roadways in the right of ways. The adjacent property owners tend to use the easements and right of way as extensions of their yards. Open cut construction would result in significant disturbance to the adjacent properties and would require the removal of three large spruce trees. The cured in place pipe avoids this disturbance. There are some pipe joints that are slightly offset in this section and the cured in place liner will

not repair these. However, the offsets are fairly minor and not likely to result in clogging. The cured in place liner will stop the I/I that is entering through the joints and will stop future root intrusion. Since it eliminates the need for trenching, cured in place liners for these three pipe lengths is the recommended approach. The total recommended budget for this project is \$140,000. A detailed breakdown of this budget is included in Appendix C.

- *Mainline A Manhole A-040 to Manhole A-050 - Project G-2*

This pipeline is located north of Marine Drive outside of any public right of way. The existing 12-inch diameter pipeline is known to have a large belly that collects debris and is a maintenance issue for the City. The recommended improvements include replacing the existing pipeline with a new 12-inch PVC pipeline in the same alignment but constructed with positive grade by open cut construction. The total length of this segment is approximately 475 feet. The project also includes the replacement of the manholes and reinstating the service laterals. The pipeline is located in the backyards of four homes. Therefore, the construction activities will be fairly disruptive to these properties and close coordination with the property owners is required. The project will require the removal and replacement of fences, and rehabilitation of landscaping. The total recommended budget for this project is \$141,000. A detailed breakdown of this budget is included in Appendix C.

- *Mainline D Manhole D-010 to D-030, Ocean View Drive - Project G-3*

This pipeline segment is located on Ocean View Drive south of the Main Pump Station. The existing 10-inch diameter pipeline lacks the capacity to convey peak flows. The recommended improvements include replacing the existing pipeline with approximately 670 feet of new 15-inch diameter pipe. Ideally, it would be best to install this pipe in the same alignment as the existing pipe. However, the existing pipe may be too close to the existing 6-inch forcemain for the Main Pump Station. If these two pipelines were constructed in a common trench, then it is probably not possible to replace the gravity sewer in the same alignment. It is assumed that another corridor for the new gravity sewer can be found along this section of Ocean View Drive. However, this may be a challenge depending on the specific location of the waterlines and the 10-inch forcemain from the Main Pump Station. Very early in the design process, it would be wise to perform some utility potholing to verify the exact locations of all of the pipelines in the area. With this information it will be possible to verify the feasibility of open-cut installation of the new 15-inch gravity sewer. The total recommended budget for this project is \$263,000. A detailed breakdown of this budget is included in Appendix C.

- *Hanley Drive Sewer Manholes - Project G-4*

This project is relatively straight-forward and includes installing manholes at the terminal end of the line in Hanley Street south of the 10th Street intersection as well as at the location where the mainline pipe makes a 90 degree turn west. This mainline pipe was constructed without manholes. As a result, it is not possible to clean or inspect this pipeline section. Should the line plug, the City will be forced to excavate and cut into the pipe to remove the plug. This would be time consuming and beyond a typical sewer cleaning process that is commonly performed by public works staff. The proposed manholes correct this problem and essentially bring the pipe up to current standards. The total recommended budget for this project is \$25,000. A detailed breakdown of the budget is included in Appendix C.

- *Wastewater Collection System Design Standards - Project G-5*

Over the years, the City's collection system has been extended using a wide range of piping materials and sizes. Some pipelines have been installed at substandard grades and without manholes at appropriate locations. To prevent these types of problems, most cities publish design standards that can be provided to developers and other relevant parties. These standards not only clarify pipe sizing requirements, they also document the City's standards with respect to materials, service connections, manholes, etc. The lack of such standards in Yachats is a shortcoming the City can easily address. We recommend the City budget approximately \$5,000 to retain an engineering firm to develop standards for future development of the wastewater collection system.

6.6 RECOMMENDED PUMP STATION AND FORCEMAIN IMPROVEMENTS

This subsection includes a description of the recommended improvements to the City's existing pump stations and force main piping. Where appropriate the various improvement alternatives that were considered are discussed along with the reasons for the selection of the preferred alternative.

▪ *Pump Station Disconnect Panel Improvements (Project P-1)*

None of the City's existing pump stations are equipped with disconnect plugs for the pumps. The pump power cables are hard-wired to the power supply equipment. The problem with this arrangement is that the City must hire an electrician to disconnect the pump power cables anytime a pump must be removed for service. Most modern pump stations have disconnect plugs at some location on the pump cables that enable utility workers to legally disconnect the power cables from the power supply system without the need for an electrician. To make the stations more operator friendly, new disconnect panels with plugs are recommended at all of the stations except for the Quiet Water Pump Station. As described below, the Quiet Water Pump Station should be upgraded early in the planning period. The disconnect panel for the Quiet Water Pump Station should be installed as part of the upgrade project (i.e., Project P-3). Therefore, Project P-1 includes the installation of disconnect panels at the other four pump stations. In general, the improvement should consist of a disconnect panel mounted near each pump station wet well. Plugs for the pump cables should be located on the bottom of the panel. The pump cables should be located in a secured, screened, raceway between the disconnect panel and the wet well. Given the limitations of public procurement rules, the most economical approach for the City will be to install disconnect panels at each station as a single project rather than doing the work one station at a time. A single package of design documents suitable for public bidding can be prepared and the installation work can be performed under a single construction contract. This will create an economy of scale and the overall cost should be lower than performing the work one station at a time. The total recommended budget for this project is \$265,000. A detailed breakdown of this budget is included in Appendix C.

▪ *New Portable Generator (Project P-2)*

The Riverside, Pontiac, and Quiet Water Pump Stations are not equipped with permanent inside generators. The City currently has two portable generators that are used to power these three stations during a prolonged power outage. Operations staff is required to move the generators from station to station in order to prevent overflows. This is awkward and time consuming and

the City should consider purchasing a third portable generator to make the system more user friendly. This generator can be located at the shops building and should be size to power all three pump stations to provide some redundancy. The total cost of the generator is estimated to be about \$40,000.

▪ *Quiet Water Pump Station Improvements (Project P-3)*

The Quiet Water Pump Station was installed in the early 1980s, and while it has been well-maintained, it will likely reach the end of its useful life during the planning period due to age. Therefore, the City should plan to upgrade the station early in the planning period. The recommended improvements include a new wet well with a top slab and hatch, two new submersible pumps with discharge piping, a new valve vault, a new pump disconnect panel, and a new pump control panel with a manual transfer switch for a portable generator. Once the new station is operational, the old station can be decommissioned and demolished. The improvements should be designed with a firm capacity of 150 gallons per minute to match the capacity of the existing station. The new wet well should be installed next to the existing pump station. The existing station is relatively shallow. Therefore, it makes sense to replace the wet well rather than salvaging the existing wet well. This approach has the advantage of utilizing modern materials for the wet well structure and avoiding the need for bypass pumping. It is possible that the City will need to obtain a new easement for the new station, but it is assumed that the property owners will be willing to grant the easement at no cost to the City. The City could even offer the vacate the existing easement if it is no longer needed after the improvements are completed. In this way, the overall impact to the property owners can be minimized. The total recommended budget for this project is \$493,000. A detailed breakdown of this budget is included in Appendix C.

▪ *Main Pump Station Improvements (Project P-4)*

The Main Pump Station was constructed in 2008. Therefore, the station is relatively new and in good condition. Most of the infrastructure will serve the City for the remainder of the planning period with the exception of the automatic control equipment and the pumps. By the end of the planning period, this equipment will be 30 years old which is beyond the typical lifespan of this equipment. Therefore, the City should plan to replace the pumps and the control system during the planning period. The recommended improvements include new pumps and a new control panel. The new pumps should be sized to match the capacity of the existing pumps. This station also lacks an overflow pipe. Therefore, this should be added as part of the improvement project. There is an existing 30 inch storm drainage pipe immediately south of the wet well. Is it envisioned that a new overflow pipe will be installed between the wet well and the 30 inch storm drainage pipe. In order to install the new control panel, the old control panel must be removed. Once the new control panel is removed, bypass pumping will be required since there will be no way to start and stop the pumps. Therefore, this project includes some budget for bypass pumping and the installation of a bypass pumping port in the existing valve vault. The total recommended budget for this project is \$382,000. A detailed breakdown of this budget is included in Appendix C.

▪ *Parkside Pump Station Improvements (Project P-5)*

The Parkside Pump Station was installed in 2008. Most of the infrastructure should serve the City well for the remainder of the planning period with the exception of the pumps and the automatic control system. The pumps and automatic control system will be more than 30 years old at the end of the planning period. This is far beyond the typical design life for these facilities.

Therefore, the City should plan to upgrade the station during the planning period. The proposed scope of the improvements is very similar to that proposed for the Main Pump Station and includes new pumps and a new control panel. The total recommended budget for this project is \$218,000. A detailed breakdown of this budget is included in Appendix C.

▪ *Riverside Pump Station Control System Improvements (Project P-6)*

The Riverside Pump Station was installed in 2008. Most of the infrastructure should serve the City well for the remainder of the planning period with the exception of the pumps and the automatic control system. The pumps and automatic control system will be more than 30 years old at the end of the planning period. This is far beyond the typical design life for these facilities. Therefore, the City should plan to upgrade the station during the planning period. The proposed scope of the improvements is very similar to that proposed for the Main Pump Station and includes new pumps and a new control panel. The total recommended budget for this project is \$218,000. A detailed breakdown of this budget is included in Appendix C.

▪ *Pontiac Pump Station Improvements (Project P-7)*

The Pontiac Pump Station was installed in 2008. Most of the infrastructure should serve the City well for the remainder of the planning period with the exception of the pumps and the automatic control system. The pumps and automatic control system will be more than 30 years old at the end of the planning period. This is far beyond the typical design life for these facilities. Therefore, the City should plan to upgrade the station during the planning period. The proposed scope of the improvements is very similar to that proposed for the Main Pump Station and includes new pumps and a new control panel. The total recommended budget for this project is \$218,000. A detailed breakdown of this budget is included in Appendix C.

▪ *Pontiac Pump Station Forcemain Improvements (Project F-1)*

The Pontiac Pump Station Forcemain is the original pipeline that was installed in 1974. By the end of the planning period, this pipeline will be almost 70 years old. It is possible that this pipeline will reach the end of its useful life toward the end of the planning period. If not, this project can be delayed to the next planning period. This project is relatively straight-forward and includes the installation of a new 4-inch forcemain adjacent to the existing forcemain. Once the new pipe is installed, the old forcemain pipe can be abandoned in place. The total length of the pipeline is about 575 feet. The total recommended budget for this project is \$80,500. A detailed breakdown of this budget is included in Appendix C.

▪ *Riverside Pump Station Forcemain Improvements (Project F-2)*

Most of the Riverside Pump Station Forcemain is the original pipeline that was installed in 1974. Approximately 270 feet of the line on Highway 101 between East 2nd Street and East 3rd Street was replaced with HDPE pipe in 2018. The remaining 930 feet of this pipeline is the original pipe that was installed in 1974. By the end of the planning period, this pipeline will be almost 70 years old. It is possible that this pipeline will reach the end of its useful life toward the end of the planning period. If not, this project can be delayed to the next planning period. This project includes the installation of a new 8-inch forcemain adjacent to the existing forcemain. The existing forcemain is 6-inches in diameter. The larger 8-inch diameter forcemain is recommend to provide the City with some flexibility should the flow projections included herein turn out to be low. Most of the pipeline will need to be installed in the Highway 101 right of way. Due to the traffic control requirements and other requirements that will be imposed by ODOT, this project

will be much more expensive than a typical pipeline project in a City right of way. The cost difference between a 6-inch pipe and an 8-inch pipe is fairly minor compared to the trenching, traffic control, and surface restoration costs required for this particular project. As such, the benefits of installing a slightly larger pipe seem worth the minor additional cost. The total length of the pipeline is about 930 feet. The total recommended budget for this project is \$326,000. A detailed breakdown of this budget is included in Appendix C.

6.7 SUMMARY OF RECOMMENDATIONS

The recommended improvements described above are summarized in Table 6-2 below and are shown in the figures below. These improvements will result in a sewage collection system with the capacity needed to convey flows from within the planning area assuming development to current zoning densities.

The improvements address existing deficiencies, as well as potential deficiencies may potentially arise during the planning period. Only the improvements that address the existing deficiencies are required at this time. The remaining deficiencies are largely related to aging infrastructure. If some of these facilities are able to be maintained effectively, some of the age-related improvements may be deferred to the next planning period. The improvements are prioritized in Chapter 8.

The improvements recommended in this chapter are based on the existing land use zoning and UGB. If the service area limits or community growth boundaries are to be expanded in the future, the sewer system should be re-examined to determine where additions are needed and if alternate projects are justified.

Table 6-2 Recommended Collection System Improvements

Project Code	Project Description	Recommended Diam./Capacity	Length	Project Cost
Gravity Collection System Improvements				
G-1	Sewer Line from King Street to 3rd Street (Manhole D-220 to Manhole D-270)	8	360	\$140,000
G-2	Mainline A Manhole A-040 to Manhole A-050	12	475	\$141,000
G-3	Mainline D Manhole D-010 to D-030, Ocean View Drive	12	670	\$263,000
G-4	Hanley Drive Sewer Manholes	N/A	N/A	\$25,000
G-5	Wastewater Collection System Design Standards	N/A	N/A	\$5,000
Pump Station and Forcemain Improvements				
P-1	Pump Station Disconnect Panel Improvements	N/A	N/A	\$265,000
P-2	New Portable Generator	N/A	N/A	\$40,000
P-3	Quiet Water Pump Station Improvements	N/A	N/A	\$493,000
P-4	Main Pump Station Improvements	2.3 MGD	N/A	\$382,000
P-5	Parkside Pump Station Improvements	0.6 MGD	N/A	\$218,000
P-6	Riverside Pump Station Improvements	0.85 MGD	N/A	\$218,000
P-7	Pontiac Pump Station Improvements	0.22 MGD	N/A	\$218,000
F-1	Pontiac Pump Station Forcemain Improvements	4 inch	575	\$121,000
F-2	Riverside Pump Station Forcemain Improvements	8 inch	1200	\$326,000
General Collection System				
Pgm-1	Annual Sewer Collection System Rehabilitation Program (Program - 1)	-	-	\$30,000 per year

Figure 6-1 Recommended Improvements to the City's Collection System - North

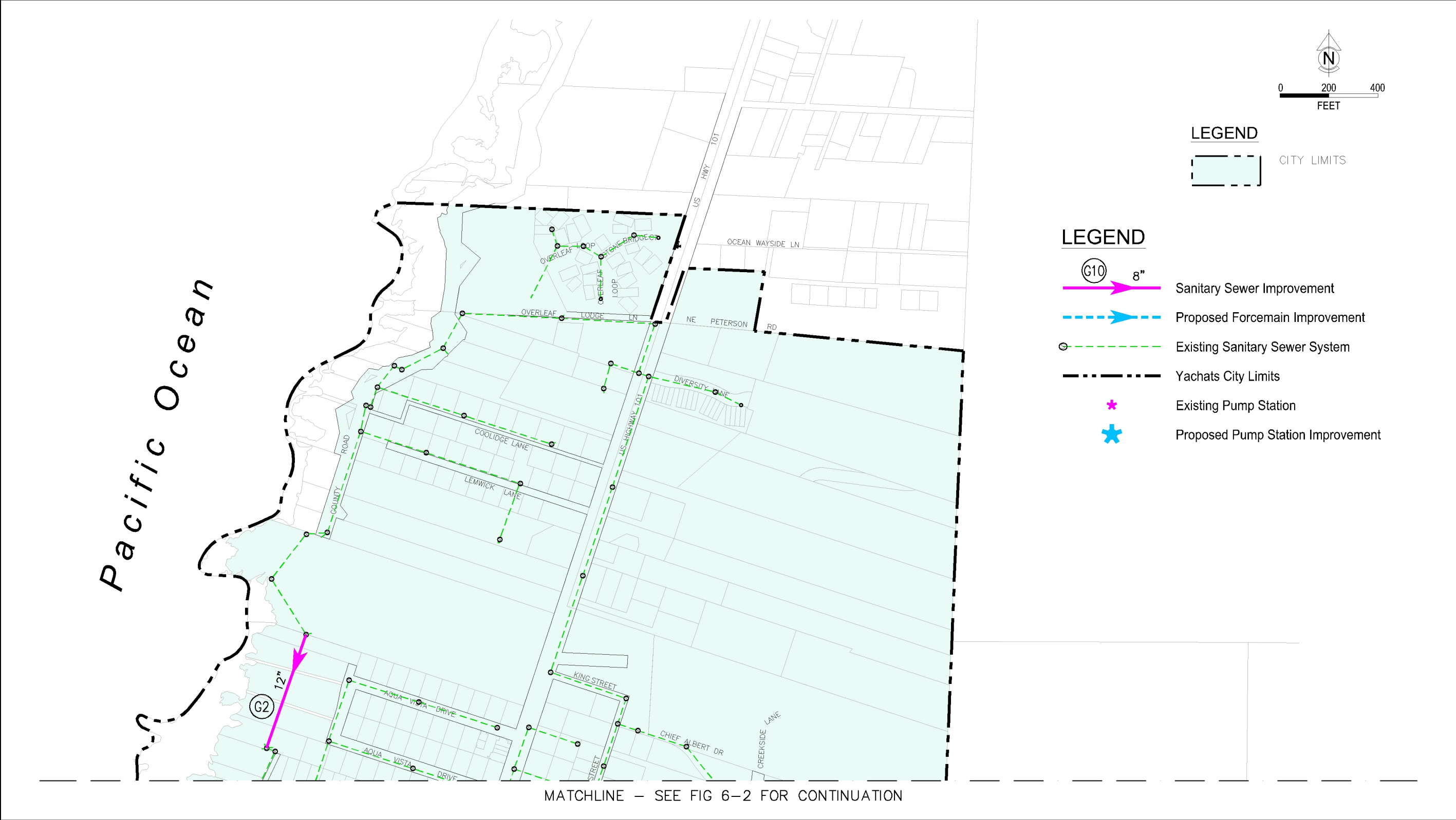


FIGURE 6-1

MATCHLINE — SEE FIG 6-1 FOR CONTINUATION



Figure 6-3 Recommended Improvements to the City's Existing Collection System - South Central

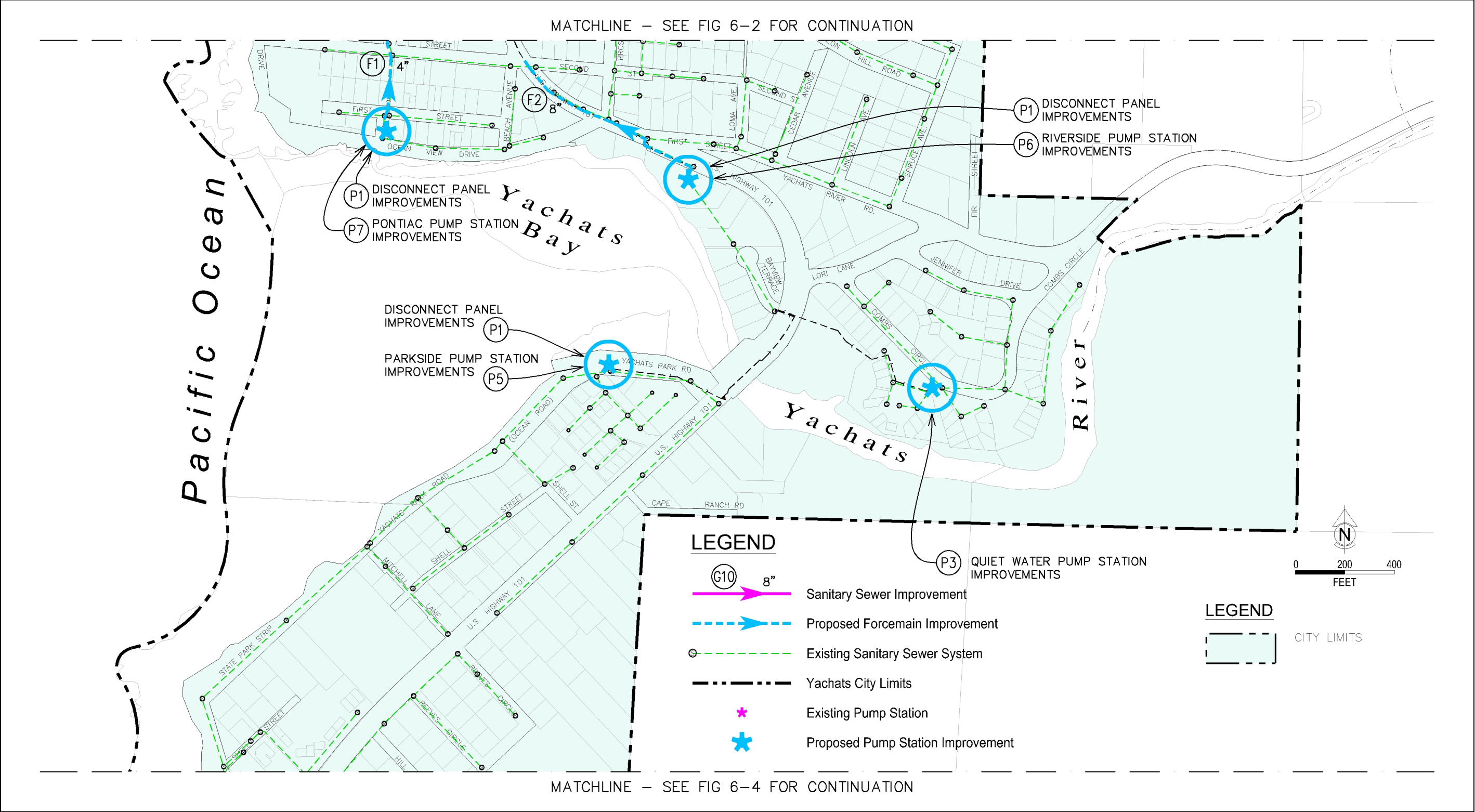


FIGURE 6-3

CHAPTER 7

TREATMENT SYSTEM EVALUATION

Chapter Outline

- 7.1 Introduction
- 7.2 Existing Treatment System Deficiencies
- 7.3 Treatment System Evaluation
 - 7.3.1 Headworks
 - 7.3.2 Secondary Treatment Process
 - 7.3.3 Equalization Basin and UV Disinfection
 - 7.3.4 Outfall Pipe
 - 7.3.5 Aerobic Digester and Sludge Storage Tank
 - 7.3.6 Sludge Dewatering System
 - 7.3.7 Sludge Disposal Practices
- 7.4 Summary of Treatment System Deficiencies
- 7.5 Treatment Plant Improvement Alternatives Analysis
- 7.6 Recommended Treatment Plant Improvements

7.1 INTRODUCTION

Chapter 4 includes a listing of existing treatment system deficiencies (Section 4.5.3). This chapter builds on the information from Chapter 4 by evaluating the existing treatment system with respect to future flows and loads. The deficiencies identified in Chapter 4 are first summarized. This is followed by an analysis of the existing treatment and disposal system with respect to future flows and loads. The purpose of this analysis is to identify treatment system components that are likely to become deficient during the planning period as a result of increased flows and loads due to growth. A comprehensive list of existing and projected shortcomings is then presented.

The second portion of this chapter includes a listing of the recommended improvements to address each deficiency.

7.2 EXISTING TREATMENT SYSTEM DEFICIENCIES

For completeness, the treatment system shortcomings identified in Chapter 4 are listed in this subsection. These shortcomings include the following items.

- The shelter over the headworks structure has corrosion problems that will get worse during the planning period and will need to be addressed.
- The City may want to consider installing baggers to contain the screenings and grit that is removed at the headworks. This will improve overall sanitation and reduce problems from insects and other pests.
- The tractor used to load biosolids into the City's dump trucks will likely reach the end of its useful life during the planning period. Therefore, the City should plan to purchase a new tractor during the planning period.
- Several components (e.g., metal siding panels, doors, and metal roof) of the solids handling building are corroding. This problem will worsen in the coming years and the City should plan to make upgrades during the planning period.
- Several components (e.g., metal siding panels, doors, and metal roof) of the public works building are corroding. This problem will worsen in the coming years and the City should plan to make upgrades during the planning period.
- Some of the mechanical and electrical equipment used throughout the plant (e.g., valve, actuators, variable frequency drives, etc.) will likely reach the end of their useful life during the planning period due to normal wear and age.
- The SBR diffuser membranes will likely reach the end of their useful life during the planning period due to normal wear and age.

- The automatic control system for the UV disinfection equipment will likely reach the end of its useful life during the planning period.
- The diffuser membranes in the aerobic digester and sludge storage tank will likely reach the end of their useful life during the planning period due to normal wear and age.
- The concrete surfaces of the aerobic digester are corroding and the City should consider coating the walls of the tank during the planning period.
- The air supply system for the aerobic digester and the sludge storage tank lacks automatic control functionality which makes it more difficult to control the digestion process, leads to operational problems like foaming, and leads to excess power consumption.

7.3 TREATMENT SYSTEM EVALUATION

This section includes a quantitative evaluation of the treatment plant with respect to the projected wastewater flows and loadings. The purpose of this analysis is to identify treatment system components that are likely to become deficient during the planning period as a result of increased flows and loads due to population growth.

7.3.1 Headworks

The headworks consists of the fine screen, the grit removal system, two influent flow measurement flumes, the flow meter, and the automatic sampler. These facilities were constructed in 2008 and are relatively new and in good condition. These facilities are designed for a peak flow of about 2.6 MGD. The projected peak flow at the end of the planning period is about 2.7 MGD. While this number is slightly greater than the design capacity of the existing facility, it is unlikely to be a problem during the planning period. The projected flow is only 4% greater than the design capacity of the facilities. This is not enough to cause any problems. Also, the flow projection methodology used in Chapter 5 is fairly conservative and tends to overestimate the actual flows. Therefore, it is very unlikely that improvements to address capacity issues will be needed during the planning period. During the 20-year planning period, some of the mechanical equipment such as the motors that operate the screen and the grit removal equipment may need to be replaced due to age. However, this type of work is generally considered to be maintenance and should be included in the City's current O&M budget rather than listed as a capital improvement project.

7.3.2 Secondary Treatment Process

Sequencing batch reactors (SBRs) are used to provide secondary treatment at the plant. The SBR tankage and piping were constructed in 2008, are in good condition, and should serve the City well for the remainder of the planning period. As noted above, some of the mechanical and electrical systems will likely reach the end of their useful life due to age and need to be replaced. But, the major structural and mechanical elements should serve the City well for the remainder of the planning period.

The design capacity of the secondary treatment process is listed below (Table 7-1) along with the projected design criteria at the end of the planning period. A comparison of the projected flows to the existing flows shows that the plant may be operating near its hydraulic capacity at the end

of the planning period. From a practical perspective, the plant will likely be able to provide adequate treatment for the entire planning period. This is because the projected flows are simply not much greater than the design capacity of the plant. However, from a planning perspective, the City should plan for a plant expansion near the end of the planning period. It is better to be prepared for a plant expansion and not need it rather than need it and not be prepared. It is very likely that this project will not be needed and can be delayed into the next planning period (i.e., beyond 2041). For this reason, the plant expansion will be given a relatively low priority ranking in Chapter 8. The City should be able to monitor flows over the course of the planning period and can increase the priority ranking of the expansion project if needed. The recommended improvements are described later in this section.

Table 7-1 Existing Treatment Plant Capacity Evaluation

Wastewater Flow	Existing Capacity	2041
MMDWF	• 0.33 MGD	• 0.37 MGD
MMWWF	• 0.51 MGD	• 0.52 MGD
PDF	• 1.96 MGD	• 1.64 MGD
PHF	• 2.64 MGD	• 2.71 MGD
BOD Loading	Existing Capacity	2038
Average Annual	• 600 PPD	• 442 PPD
Maximum Month	• 995 PPD	• 569 PPD

7.3.3 Equalization Basin and UV Disinfection

The equalization basin and the UV disinfection system are designed to convey and disinfect about 2.0 MGD. The peak day flow and the peak hour flow at the end of the planning period are about 1.6 MGD and 2.7 MGD respectively. Therefore, the capacity of the equalization basin and the UV disinfection system is slightly less than the projected peak hour flow to the plant. However, since the SBR treatment cycles are longer than one hour, the peak hour flow will be attenuated through the SBRs and the EQ basin. The volume of the equalization basin is greater than the volume decanted from the SBRs under peak flow conditions and the basin has the storage volume needed to reduce the peak flows below 2.0 MGD. As such, the existing system should be sufficient to convey and treat the flows at the end of the planning period. Therefore, these systems should serve the City for the remainder of the planning period with proper maintenance and periodic replacement of bulbs and other wear items. The costs for this maintenance should be included in the City's normal O&M budget. As noted above (Section 7.2), the automatic control system for the UV equipment will likely reach the end of its useful life during the planning period. Therefore, the City should plan to replace this equipment at some point. The recommended improvements are discussed below.

7.3.4 Outfall Pipe

An analysis of the hydraulic capacity of the outfall pipeline from the UV channel to the ocean was performed. Based on this analysis, the pipeline has the capacity to convey about 1.75 MGD without flooding the UV chamber. As described in the previous paragraph, the peak discharge rate from the plant at the end of the planning period will be about 2 MGD. Since the pipeline

cannot convey this amount, upgrades are needed during the planning period. Fortunately, the segment of pipe that is west of Ocean View Drive does have sufficient capacity. The problem is with the 10-inch pipe segment between the treatment plant site and Ocean View Drive. The recommended improvements are discussed below.

7.3.5 Aerobic Digester and Sludge Storage Tank

The aerobic digester and sludge storage tank were designed to provide about 110 days of solids storage at a solids content of 2% and a plant BOD loading rate of 600 pounds per day (Table 4-6). The projected BOD loading rate at the end of the planning period is estimated to be about 440 pounds per day (Table 5-9). Since the projected BOD loading rate at the end of the planning period is significantly less than the design BOD loading rate, the aerobic digester and sludge storage tank should be sufficiently sized for the remainder of the planning period and no improvements should be needed to increase the capacity of the two tanks.

7.3.6 Sludge Dewatering System

The City currently uses a screw press to dewater the digested sludge prior to disposal. The dewatered sludge is either sent to a landfill or hauled to another treatment facility (Heard Farms, Inc.) for disposal. In recent years, the City has operated the screw press about 50 days each year. Over the planning period, the solids and organic loading rates are expected to increase by a factor of about 1.3. Therefore, the screw press will need to operate about 65 days each year at the end of the planning period. This amount of use is considered reasonable and there is no reason from a capacity standpoint to replace the screw press.

7.3.7 Sludge Disposal Practices

The City currently disposes of dewatered biosolids by hauling it to another treatment facility (Heard Farms, Inc.) located in Douglas County. The City currently disposes about 30 dry tons of biosolids per year. This value is expected to increase by 30% over the planning period. As the amount of biosolids increases, it will become more challenging for the City to adequately dispose of it. Therefore, the City should plan to develop additional disposal strategies during the planning period. The recommendations for accomplishing this are discussed below.

7.4 SUMMARY OF TREATMENT SYSTEM DEFICIENCIES

Having been constructed in 2008, the treatment facilities are relatively new and in good condition. The previous subsection (Section 7.3) includes a brief analysis of the plant with respect to its ability to treat and dispose of the future flows and loadings anticipated during the planning period. As expected, most of the facilities are sufficient to meet the City's needs for the duration of the planning period. The flow and loading projections show that additional secondary treatment capacity may be needed toward the end of the planning period. This makes sense since the treatment plant was designed in 2008 for 20 year flow projections (i.e., 2028 flows). The planning period for this facilities plan ends in 2041. Therefore, it makes sense that the secondary treatment capacity may need to be expanded because the end of the planning period is several years beyond the original design year for the plant. In addition the potential need for increased secondary treatment capacity, a number of existing shortcomings were also identified in Chapter

4 (see section 7.2). For the sake of completeness, all of the existing and projected deficiencies are summarized in Table 7-2.

Table 7-2 Summary of Treatment System Deficiencies

Deficiency Number	Description
D-1	The shelter over the headworks structure has corrosion problems that will get worse during the planning period and will need to be addressed.
D-2	The solids handling building has corrosion problems that will get worse during the planning period and will need to be addressed.
D-3	The public works building has corrosion problems that will get worse during the planning period and will need to be addressed.
D-4	The City should consider installing baggers for the fine screen and grit removal system at the headworks to improve sanitation and simplify operations.
D-5	Some of the mechanical and electrical equipment used throughout the plant (e.g., valve, actuators, variable frequency drives, etc.) will likely reach the end of their useful life during the planning period due to normal wear and age.
D-6	The automatic control system for the UV disinfection equipment will likely reach the end of its useful life during the planning period.
D-7	The SBR diffuser membranes will likely reach the end of their useful life during the planning period due to normal wear and age
D-8	The diffuser membranes in the aerobic digester and sludge storage tank will likely reach the end of their useful life during the planning period due to normal wear and age.
D-9	The tractor used to load biosolids into the City's dump trucks will likely reach the end of its useful life during the planning period.
D-10	The City should develop additional strategies for sludge disposal to deal with the anticipated quantity increases during the planning period
D-11	The 10 inch segment of the outfall pipeline between the treatment plant and Ocean View Drive lacks the capacity to convey peak flows at the end of the planning period.
D-12	The sequencing batch reactors may lack the capacity to treat the projected flows at the end of the planning period
D-13	The air supply system for the aerobic digester and the sludge storage tank lacks automatic control functionality which makes it more difficult to control the digestion process, leads to operational problems like foaming, and leads to excess power consumption.
D-14	The concrete surfaces of the aerobic digester and sludge storage tank are corroding and the City should consider coating the walls of the tank during the planning period.

7.5 TREATMENT PLANT IMPROVEMENT ALTERNATIVES ANALYSIS

As described in the following sections, the recommended treatment system improvements are relatively straight-forward and obvious. As such, detailed alternatives analyses are not needed for this planning effort. The treatment plant was constructed in 2008 and is relatively new and in good condition. As such, the recommended improvements are needed to maintain, and make minor modifications to the existing treatment operation. Detailed alternatives analyses are typically performed for major treatment plant upgrades like constructing a new treatment plant in a new location or changing from one treatment technology to another (e.g., wastewater lagoons versus activated sludge). In the case of Yachats, the existing treatment facilities are fairly new and functional and there are no compliance issues or reasons to perform major upgrades that would necessitate a detailed alternatives analysis.

7.6 RECOMMENDED TREATMENT PLANT IMPROVEMENTS

This subsection includes a description of the recommended improvements to the City's wastewater treatment plant. These improvements are needed to address the deficiencies listed above in Table 7-2. Cost estimates for these improvements are listed in Table 7-3. The recommended improvements are based on the flow and loading projections presented in Chapter 5. These projections are fairly conservative. As such, some of the improvements may not be required during the planning period. Only the improvements that address the existing deficiencies are required at this time. The need for the additional SBR basin is growth dependent. As such, it may not be needed during the planning period. The improvements are prioritized in Chapter 8.

- *Headworks and Grit Removal Baggers (Project T-1)*

This project is relatively small and straight-forward and includes the installation of new baggers for the headworks screenings and grit. This project addressed deficiency D-4 in Table 7-2. At the present time, these materials drop into trash cans and are not contained within the cans. The screenings and grit create odors and attract nuisance pests. Baggers keep these materials contained in bags thereby reducing odors, improving sanitation, and improving overall worker safety. The baggers can be purchased from the original equipment manufacturers. Operations staff should be able to purchase the baggers and install them without needing assistance from a contractor. The total recommended budget for this project is \$10,000.

- *SBR and Digester Diffuser Membrane Replacement (Project T-2)*

This project is recommended to address deficiencies D-7 and D-8 in Table 7-2. The aeration system in the SBR and digester tanks consists of rubber membranes that wear over time. The typical life of these membranes is about 10 years. The existing membranes are older than this and are reaching the end of their useful life. Therefore, the City should plan to replace the membranes early in the planning period. As the membranes age, the air bubbles tend to get larger and less evenly distributed in the tanks. This reduces the oxygen transfer efficiency which ultimately drives up power costs. Therefore, replacing the membranes will have the benefit of reducing power consumption costs. The membranes are typically purchased from the original equipment manufacturers and installed by public works staff without assistance from a contractor. The installation process requires draining and cleaning the tanks. Therefore, the membranes in

each tank can only be replaced one tank at a time and the process may need to span multiple years. Based on discussions with the diffuser manufacturer, the current purchase price of the membranes is \$12.00 each. In the two SBR tanks, the aerobic digesters, and the sludge storage tank, there are a total of 1,022 membranes that need to be replaced. Therefore, the total purchase price is about \$12,300. As the work proceeds, it is likely that miscellaneous repairs of the aeration piping and other similar mechanical repairs will be required. Therefore, some additional budget should be allocated for this project. A total recommended budget of \$15,000 is reasonable for planning purposes.

- *New Tractor for the Treatment Plant (Project T-3)*

This project addresses deficiency D-9 in Table 7-2. A small tractor is used at the treatment plant to manage biosolids and perform other chores. The tractor is old, in poor condition, and will likely reach the end of its useful life during the planning period. As such, the City should budget to replace the tractor in the coming years. The total recommended budget for this item is \$35,000.

- *Public Works Building, Headworks Shelter, and Solids Building Rehab. (Project T-4)*

This project addresses deficiencies D-1, D-2, and D-3 in Table 7-2. Corrosion of these structures is a problem that the City will need to address during the planning period. The entire headworks shelter is in poor condition including the roofing and the structural framing members. Most treatment facilities do not have similar shelters over the headworks area. Shelters are convenient, but not needed. The exterior coastal environment is hard on metal building materials, and replacing the headworks structure with long-lasting materials would be expensive. Since the shelter is not necessarily needed, the recommended improvements include removing the shelter altogether without replacement. With a few minor exceptions, the metal frames of the public works and solids handling buildings are in good condition and should serve the City for the remainder of the planning period. The metal roofing on the public works and solids handling buildings is failing and will need to be replaced during the planning period. The overhead doors on the public works and solids handling buildings are failing and will need to be replaced during the planning period. The metal siding panels and exterior metal trim elements on both buildings are also showing signs of corrosion and the City should consider replacing all of the panels during the planning period. These panels consist of an interior and exterior metal skin over a foam insulation board. On several of the panels, the metal skin is separating from the foam board which allows water penetration that increases corrosion rates. As such, it is likely that all of these panels will eventually fail and need to be replaced. Replacing these panels will be a major construction effort that will basically require removing and replacing the exterior walls of both buildings. This will be disruptive to the operations staff and it will likely be necessary to temporarily move out of the public works building while the work is occurring. All new materials will need to be carefully selected by qualified professionals to ensure that high quality materials and coating systems are used that can withstand the harsh coastal environment. Several manufactures offer metal roofing, doors, and siding that are manufactured from materials and coating systems that are suitable for a coastal environment. Therefore, it should be possible to rehabilitate the metal buildings rather than replacing them. That said, building material costs are fairly dynamic and the City may discover that the costs to replace the wall panels with new metal panels is comparable to the cost of installing masonry walls. If this proves to be the case, masonry walls would be the better choice for corrosion resistance. This project is presented as a

single project in this plan because it will be more cost effective to perform this work as a single project. However, the City may need to break the project into smaller sub-projects for cash flow purposes. For example, the overhead doors and metal roofing can be replaced as individual sub-projects prior to replacing the metal siding panels. A detailed cost estimate for this work is presented in Appendix C. The costs for each of the project elements is listed in the estimate should the City choose to implement this project as separate sub-projects. The total recommended budget for this work is \$700,000.

▪ *Outfall Pipeline Improvements (Project T-5)*

The existing 10-inch diameter outfall pipe from the treatment plant to Ocean View Drive lacks the capacity to convey projected peak flows that are expected during the planning period (deficiency D-11, Table 7-2). The recommended improvements include replacing the existing pipeline with a new 12-inch PVC pipeline in the same alignment as the existing pipe. The total length of this segment is approximately 260 feet. It is envisioned that this section of pipe can be replaced using conventional open-cut construction methods. The total recommended budget for this work is \$96,000. A detailed breakdown is included in Appendix C.

▪ *Biosolids Drying Beds (Project T-6)*

This project is recommended to improve the biosolids disposal options for the City (deficiency D-10, Table 7-2). Biosolids disposal is an ongoing effort for operations staff that can be time consuming and challenging. At the present time, the City disposes of dewatered biosolids by hauling it to another treatment plant in Douglas County. This method is currently sufficient. However, as the City grows and the quantities of biosolids increase, disposal will become more challenging. Likewise, if there are policy changes with management of the treatment plant in Douglas County, the City may someday be forced to find other options. Therefore, the City should plan to develop other biosolids disposal strategies during the planning period. During the summer months, it is possible to further dry the dewatered solids in drying beds prior to disposal. This decreases the volume of solids that must be hauled and thereby reduces disposal costs. The City currently has a makeshift drying bed at the treatment plant that is used for this purpose. Biosolids are currently dried by placing on the asphalt surface between the digester tank and the headworks. Unfortunately, this area is too small to accommodate the solids from an entire digester dewatering run and the asphalt surface is somewhat challenging to clean after the drying is complete. To increase the amount of biosolids that can be dried, this project includes the construction of a dedicated drying bed located on the south side of the UV shelter. With these improvements, the City should be able to dry the solids from an entire digester run which will improve the overall disposal capabilities. The total recommended budget for this work is \$158,000. A detailed breakdown is included in Appendix C.

▪ *New Biosolids Disposal Site Acquisition (Project T-7)*

As described in Section 4.5.2.11, the City's existing biosolids disposal practices are currently sufficient. However, as the City grows and the quantity of biosolids increases, finding adequate disposal methods will become more challenging. Also, if there are any policy changes with the management of the treatment plant in Douglas County, the City might be forced to find other disposal options. The City currently has an approved land application site about 8 miles from the treatment plant on Yachats River Road. However, the current property owner is not particularly interested in receiving biosolids at this time. Therefore, the site is not a reliable disposal option and the City should consider finding alternative sites. The City may want to start by having

discussions with the owner of the Yachats River Road Site to see if there are some improvements the City could make to the property in order to make biosolids disposal more attractive to the owner. The goal of these discussions should be to establish a long-term written agreement with the property owner. If an agreement with the owner of the Yachats River Road Site cannot be reached, the City should then consider locating another site. The process of obtaining authorization for new biosolids disposal sites includes first reaching an agreement with the local property owner, then preparing a biosolids management plan in accordance with DEQ guidelines that has the proper site authorization request paperwork. In most cases, land owners are willing to accept the biosolids for their value as fertilizer and cities do not typically compensate the land owners. The fertilizer benefit is usually sufficient compensation. The process of preparing a biosolids management plan and obtaining the needed site authorizations can be time consuming and somewhat costly, but is something that should only need to be performed once during the planning period. There are some other fields along Yachats River Road that would be good options. However, based on discussion with City staff, none of the property owners have traditionally been receptive to receiving biosolids. As such, the City may need to look at fields that are further from the City. There are several fields in the Florence area and along Highway 34 that are potential options if a receptive property owner can be found. For planning purposes, the recommended budget to find a new disposal site is \$50,000. This includes some budget for consulting costs and labor to develop new agreements with other land owners, and prepare a new biosolids management plan. At this time, it is difficult to accurately estimate the work effort involved to find a new site. So, to some degree, the budget for this project is a “placeholder.” The actual costs are likely to vary.

▪ *Biosolids Manure Spreader (Project T-8)*

As described above for Project T-7, the City will likely need to locate a new site for the disposal of biosolids by land application during the planning period. Once the site is located and permitted, the City will need the equipment to haul and spread biosolids at the site. At the present time, the City does not have this equipment. Manure spreaders are typically used to distribute dewatered biosolids on fields. Manure spreaders can either be towed behind a tractor or can be truck-mounted. The costs for a small tow-behind spreader are about \$40,000 while the costs for a small truck-mounted unit are about \$100,000. With the tow behind option, the City would need transport the spreader to the site, use a dump truck to haul biosolids to the site, transfer the biosolid from the dump truck into the spreader, and use a tractor to move and operate the spreader. A medium to large size tractor would be required. The PTO power for even the smallest tow-behind spreaders is at least 60 horsepower. This tractor size is quite a bit larger than the tractor needed at the treatment plant (See Project T-3). Therefore, the City would need to acquire another larger tractor in order to use a tow-behind spreader. A more cost-effective option may be to purchase a truck-mounted spreader. These are more costly than the tow-behind units. However, the dewatered biosolids can be directly loaded into the spreader at the treatment plant and the truck-mounted unit can be driven to the site and used directly to distribute the biosolids. The truck-mounted unit significantly decreases the labor, handling requirements, and the equipment needed for the task. Just considering biosolids disposal, the truck mounted unit is the most efficient option. However, considering other needs of the public works department, a larger tractor for road maintenance or similar public works activities may make sense for the City. In which case, a tow-behind spreader may be a better choice. For planning purposes, this plan

recommends the acquisition of a truck-mounted spreader. However, it may make sense for the City to use these funds to purchase a tow-behind unit and a larger tractor. This decision can be made after the land application site is located and a more thorough evaluation can be performed to determine the best long-term option for the City. For now, a budget of \$100,000 is recommended for the acquisition of a truck-mounted spreader.

▪ *Aerobic Digester and Sludge Storage Air Supply System Improvements (Project T-9)*

As described in Section 4.5.2.8, the air supply system for the aerobic digester and the sludge storage tank is a shared system that lacks the ability to automatically control the air supply to the individual tanks. Between the aerobic digester and the sludge storage tank, there are a total of five sub-tanks that are used to digest the sludge in a sequential manner. Since the sludge age in each tank is very different, the air demands in each tank are also different. With the current air supply system, the air can be automatically turned on or off for all of the tanks at once. There is no way to automatically turn the air on and off for each of the five tanks. This creates operational problems described in Section 4.5.2.8. Air is supplied to the five tanks from three blowers that are connected to a single pipe that feeds all five tanks. A more ideal system would be to have a dedicated blower for each of the five tanks. While ideal, this would be costly and other options are available. The recommended improvements include modifying the air piping in the blower room, and the underground air piping immediately outside the blower room, so that one of the three blowers can be dedicated to the sludge storage tank and two blowers can be dedicated to the aerobic digester. This requires the installation of an isolation valve and a new tee in the manifold piping inside the blower room. A new discharge pipe will also need to be installed from the new tee and connect to the underground air piping that supplies air to the aerobic digester. The piping improvements should be designed so that all three blowers remain connected by a manifold so that a valve can be opened to supply air to the sludge storage tank from the digester blowers (and vice versa) in the event of a blower failure. This will provide the required redundancy in the air delivery system. When the piping modifications are completed, the plant control system can then be re-programmed to start and stop the sludge storage tank blower based on timer settings that are selected by the operations staff. In order to provide control for the air supply to the individual digester tanks, new motor-actuated air control valves need to be installed on the aeration pipes feeding each tank. A total of seven 4-inch actuated valves are required. The plant control system, can then be re-programmed to open and close these valves based on timer settings selected by the operations staff. The plant control system can also be programmed to increase or decrease the digester blower speeds depending on the number of digester valves that are open. The total recommended budget for this work is \$223,000. A detailed breakdown is included in Appendix C.

▪ *Aerobic Digester and Sludge Storage Tank Coating & Piping Improvements (Project T-10)*

The Aerobic Digester tank was constructed in 1974 and the Sludge Storage tank was constructed in the mid 1980s. Overall, the tanks are in good condition and should serve the City well for remainder of the planning period. There is some corrosion of the concrete surfaces inside the tanks exposing some of the aggregate (Deficiency D-14, Table 7-2). At the present time, the corrosion is not advanced to the point of causing any structural concerns. But, the corrosion will continue and eventually the City will need to address it in order to preserve the structural integrity of the tanks. The typical approach is to rehabilitate the concrete surface by applying a protective coating. Several coating systems are available from various coating manufacturers. The most

robust system that is typically used is an epoxy liner applied over the concrete surface. Prior to application of the epoxy liner, specialized mortar mixes are used to smooth the rougher portions of the walls to create a surface suitable for the epoxy liner. These coating systems are expensive but long-lasting and will extend the life of the tanks well beyond the current planning period. Therefore, they are a long-term investment. In order to apply the coating system, each tank will need to be isolated, drained, cleaned, and the concrete surfaces will need to be prepared in accordance with the coating manufacturer's specifications. Any seepage cracks will need to be repaired in order to provide a suitably dry surface for the coating process. Overall, the project will be somewhat risky from a cost-control standpoint because the work will need to be performed while the adjacent digester cells are full of water. A number of previously unknown problems (e.g., concrete cracks, spot repairs, etc.) can arise during the recoating process that will require other repair methods. Some contingency for these unknowns is built into the recommended budget for this project. But until the tanks are drained, cleaned, and inspected, the risk cannot entirely be quantified. Nonetheless, the work needs to be performed, and the City simply needs to be prepared for the potential cost-escalation risk. In addition to the recoating work, the City should also perform any miscellaneous improvements while the tanks are drained and cleaned. For example, there is no gravity piping between digester cells 3 and 4. The addition of a gravity piping connection would simplify the transfer of sludge between these two cells. Also, the old launder in the sludge storage tank collects debris and is a maintenance nuisance. While the tank is drained for recoating the launder can be filled with concrete to address this problem. Other similar improvements should be carefully considered prior to recoating. The recommended budget for this project includes some cost for these types of miscellaneous improvements. But, they are just approximate estimates. Finally, the total recommended budget for this project includes recoating all of the digester tanks and the sludge storage tank as a single project. However, the rehabilitation work can be done on a tank-by-tank basis in order to spread the costs out over multiple years for cash flow purposes. The total recommended budget for this project is \$330,000. A detailed breakdown is provided in Appendix C.

▪ *SBR & Digester Control System Upgrades (Project T-11)*

The mechanical equipment (i.e., blowers, decanters, air valves, WAS pumps, etc.) that is used for the treatment process is controlled by a centralized control system. The control system consists of a control panel, variable frequency drives, blower motors, decanter motors, valve actuators, WAS pumps, and instruments. These electrical and mechanical systems were installed in 2008 and will be more than 30 years old by the end of the planning period. This is beyond the design life for certain elements of the system including the primary control equipment in the main control panel, the variable frequency drives, and some of the equipment motors and instruments. The City has already replaced two of the variable frequency drives and it is reasonable to assume that the rest will eventually need to be replaced. As a preventative measure, the City should plan to upgrade some of the mechanical and electrical equipment during the planning period before failures require emergency measures. It is envisioned that this work will be performed near the midpoint of the planning period when the existing systems are 20-25 years old. The proposed improvements will address deficiencies D-5 in Table 7-2. The specific improvements are envisioned to include the following items: a new control panel to replace the existing plant control panel, new variable frequency drives, new decanter actuators, new actuators on the air control valves, new WAS pumps, a new sludge pump, new dissolved oxygen probes, new water

level sensors, and a SCADA control computer with software. The total recommended budget for this project is \$972,000. A detailed breakdown of this estimate is included in Appendix C.

▪ *UV Disinfection Control System Upgrades (Project T-12)*

The electrical system that controls the UV disinfection equipment is a PLC based system that will be more than 30 years old by the end of the planning period (Deficiency D-6, Table 7-2). This is beyond the expected reliable service life of this type of electrical control equipment and the City should plan to upgrade the system during the planning period. As part of this planning effort, the original UV equipment manufacturer was consulted about replacement costs to develop the proposed budget for this project. This approach is adequate for planning purposes, but a more thorough inspection should be performed prior to upgrading the system. Therefore, the City should plan to pay for a site visit from the manufacturer's service technicians to inspect the system to develop a thorough replacement/upgrade scope of service. This inspection should be performed about 5-10 years after the adoption of this plan or sooner if problems with the system arise. The total recommended budget for the inspection and upgrades is \$40,000.

▪ *SBR Basin #3 (Project T-13)*

This project may be needed to increase the secondary treatment capacity of the plant (Deficiency D-12, Table 7-2). The secondary process is a two-basin SBR. The process was designed to be easily expanded by adding a third basin. As the City grows, or if more residents live in Yachats on a full-time basis, the flows to the plant may exceed the capacity of the two existing SBR basins and a third basin may be needed. If this happens, it will be late the planning period at the soonest and it is very possible that this project may be able to be deferred to the next planning period (i.e., beyond 2041). Therefore, this project should be assigned a relatively low priority ranking. The existing plant was designed to accommodate the addition of a third SBR basin. The headworks includes a flow measurement flume and outlet pipe for a third SBR basin and the aeration air system was designed for the addition of the new blower to provide additional air for the third basin. The new SBR basin will be constructed on the south side of the existing basins and will share a common wall with basin #2. The project will require the construction of the new SBR tank, installation of air piping and aeration grid, the installation of inlet piping, a decanter, WAS piping, WAS pump, handrails stairs and walkways. The total recommended budget for this project is \$1,236,000. A detailed cost estimate is also included in Appendix C.

Table 7-3 Recommended Treatment Plant Improvements

Project Code	Project Description	Recommended Project Budget
T-1	Headworks and Grit Removal Baggers	\$10,000
T-2	SBR and Digester Diffuser Membrane Replacement	\$15,000
T-3	New Tractor for the Treatment Plant	\$35,000
T-4	Public Works Building, Headworks Shelter, and Solids Handling Building Rehab	\$700,000
T-5	Outfall Pipeline Improvements	\$96,000
T-6	Biosolids Drying Beds	\$158,000
T-7	New Biosolids Disposal Site Acquisition	\$50,000
T-8	Biosolids Manure Spreader	\$100,000
T-9	Aerobic Digester and Sludge Storage Tank Air Supply System Imps.	\$223,000
T-10	Aerobic Digester Tank Coating and Piping Improvements	\$330,000
T-11	SBR, EQ Basin, & Digester Control System Upgrades	\$972,000
T-12	UV Disinfection Control System Upgrades	\$40,000
T-13	SBR Basin #3	\$1,236,000

CHAPTER 8

CAPITAL IMPROVEMENT PLAN

Chapter Outline

- 8.1 Introduction
- 8.2 Prioritized Improvements
 - 8.2.1 Prioritization Criteria
 - 8.2.2 Prioritized Groups
 - 8.2.3 Prioritized Capital Improvement Projects
 - 8.2.4 Environmental Impact
- 8.3 Basis of Costs
 - 8.3.1 Accuracy of Cost Estimates
 - 8.3.2 Adjustment of Cost Estimates over Time
 - 8.3.3 Engineering and Administrative Costs and Contingencies
- 8.4 Construction Cost Estimates
 - 8.4.1 Gravity Collection System Improvement Costs
 - 8.4.2 Pump Station Improvement Costs
 - 8.4.3 Wastewater Treatment Improvement Costs
- 8.5 Funding Sources
 - 8.5.1 Local Funding Sources
 - 8.5.2 State and Federal Grant and Loan Programs
 - 8.5.3 Funding Recommendations

8.1 INTRODUCTION

As documented in the previous sections, there is a need for wastewater system improvements within the study area to correct existing and projected deficiencies. Some of these deficiencies are more critical than others. Some deficiencies exist under current conditions, while other deficiencies will manifest as the City grows and/or the existing systems continue to age.

Recommended improvements for specific components of the City's wastewater system have been described in previous chapters. This chapter builds on that work by assigning a priority to each of the improvement recommendations. The cost estimates have been developed to a conceptual level, for planning and budgeting purposes. More detailed cost estimates will be necessary as the projects are implemented.

8.2 PRIORITIZED IMPROVEMENTS

A prioritizing process is required since the scope of the proposed improvements is large. Projects that resolve immediate deficiencies should naturally have a higher priority than long-term, growth-related improvements. The following approach is designed to provide a basis for evaluating and ranking the improvement projects.

8.2.1 Prioritization Criteria

The assignment of a particular project or capital improvement program to a priority level was made after an evaluation using the following criteria:

- Public Health/Environmental Concerns—Projects targeted to resolve existing or near-term regulatory compliance issues were assigned the highest priority.
- Capacity or Size Deficiencies—The severity of the deficiency was considered and compared with the service improvements provided by the replacement components. The projected 'yield' or cost-benefit ratio of a project was used to assign a priority of high, medium or low.
- Consumed Infrastructure—Projects to replace damaged or deteriorated infrastructure, particularly those facilities that have reached the end of their useful life and no longer function as designed were assigned a higher priority.
- City Priority—Projects identified by City operations and maintenance personnel to be high priority due to operational or maintenance problems.

8.2.2 Prioritized Groups

In order to assist the City with their planning, scheduling and construction efforts each improvement project was assigned to one of two priority levels. The priority levels are:

- Priority 1—Near Term Improvements

These projects are targeted to problem areas needing immediate attention. They have been developed to resolve existing or near-term system deficiencies. It is recommended that Priority 1 improvements are undertaken as soon as practical.

- **Priority 2—Intermediate Improvements**

These projects will be needed beyond the near term of the Priority 1 projects to address problems with existing infrastructure that is likely to become deficient during the planning period. Although not critical at this time, Priority 2 improvements should be considered as improvement projects that will be upgraded to Priority 1 at some point during the planning period.

8.2.3 Prioritized Capital Improvement Projects

To aid in the development of a wastewater system capital improvement program (CIP), each improvement project was examined and assigned to one of the priority classes described above. Table 8-1 is a comprehensive listing of these projects. The locations of the various projects are shown in Figure 8-1 Through Figure 8-3 below. The reader is referred to previous chapters of this report for more detailed descriptions of the individual projects.

At a minimum, all of the Priority 1 and Priority 2 improvements should be included in the CIP. Work on the Priority 1 improvements should begin immediately after agency approval and adoption of this plan by the City. A key early first step is the procurement of a funding plan for the Priority 1 improvements. This work effort may include meeting with the various funding agencies to evaluate funding assistance alternatives. The funding plan should also include preparation of a financial analysis of the wastewater utility that includes recommendations for utility rate and SDC fee increases if needed.

8.2.4 Environmental Impact

It should be noted that while the improvements recommended in this report are not anticipated to have significant adverse impacts on the environment, each CIP project will need to undergo project-specific environmental review (as applicable) as part of the preliminary and final design process. The scope of the environmental review and permitting requirements will vary from project to project. Should the City choose to pursue State or Federal funding assistance for a particular project, the funding agency will have specific environmental review requirements that must be completed prior to the award of a funding package.

Table 8-1 Recommended Capital Improvement Priorities

Project Code ¹	Project	Priorit y	Total Estimated Project Cost ²
G-1	Sewer Line from King Street to 3rd Street (Manhole D-220 to Manhole D-270)	1	\$140,000
G-2	Mainline A Manhole A-040 to Manhole A-050	1	\$141,000
G-3	Mainline D Manhole D-010 to D-030, Ocean View Drive	1	\$263,000
G-4	Hanley Drive Sewer Manholes	1	\$25,000
G-5	Wastewater Collection System Design Standards	1	\$5,000
P-1	Pump Station Disconnect Panel Improvements	1	\$265,000
P-2	New Portable Generator	1	\$40,000
P-3	Quiet Water Pump Station Improvements	1	\$493,000
T-1	Headworks and Grit Removal Baggers	1	\$10,000
T-2	SBR and Digester Diffuser Membrane Replacement	1	\$15,000
T-3	New Tractor for the Treatment Plant	1	\$35,000
T-4	Public Works Building, Headworks Shelter, and Solids Handling Building Rehab	1	\$700,000
T-5	Outfall Pipeline Improvements	1	\$96,000
Subtotal Priority 1			\$ 2,223,000
P-4	Main Pump Station Improvements	2	\$382,000
P-5	Parkside Pump Station Improvements	2	\$218,000
P-6	Riverside Pump Station Improvements	2	\$218,000
P-7	Pontiac Pump Station Improvements	2	\$218,000
F-1	Pontiac Pump Station Forcemain Improvements	2	\$121,000
F-2	Riverside Pump Station Forcemain Improvements	2	\$326,000
T-6	Biosolids Drying Beds	2	\$158,000
T-7	New Biosolids Disposal Site Acquisition	2	\$50,000
T-8	Biosolids Manure Spreader	2	\$100,000
T-9	Aerobic Digester and Sludge Storage Tank Air Supply System Imps.	2	\$223,000
T-10	Aerobic Digester Tank Coating and Piping Improvements	2	\$330,000
T-11	SBR, EQ Basin, & Digester Control System Upgrades	2	\$972,000
T-12	UV Disinfection Control System Upgrades	2	\$40,000
T-13	SBR Basin #3	2	\$1,236,000
Subtotal Priority 2			\$ 4,592,000
TOTAL....			\$ 6,820,000
Recurring Annual Programs			
Pgm-1	Annual Sewer Collection System Rehabilitation Program (Program - 1)		\$30,000
Subtotal Recurring Annual Programs			\$30,000

Table 8-1 Recommended Capital Improvement Priorities

Project Code ¹	Project	Priorit y	Total Estimated Project Cost ²
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¹ Project Code Legend:

G = Gravity Sewer T = Treatment P = Pump Station F= Forcemain Pgm =
Improvement Program

² See Section 8.3 for basis of project cost estimates. Costs are in June 2021 dollars (ENR Cost Index = 12,112).

The map displays the sanitary sewer system for Yachats, Oregon. The Pacific Ocean is to the west. The city limits are outlined with a dashed line. The map shows existing sanitary sewer lines (dashed green lines with circles) and proposed improvements (solid magenta lines with circles). A proposed pump station improvement is indicated by a magenta star in a circle. The map includes a legend, a north arrow, and a scale bar (0 to 400 feet). The map is labeled with street names: OCEAN WAYSIDE LN, NE PETERSON RD, DIVERSITY AVE, US HWY 101, CREEKSIDE LANE, CHIEF ALBERT DR, KING STREET, AQUA VISTA DRIVE, LEMWICK LANE, COOLIDGE LANE, OVERLEAF LN, and OVERLEAF LOOP. A matchline at the bottom indicates the map continues in FIG 8-2.

LEGEND

- 8" G10 Pipe Size, Project Code
- Priority 1
- Priority 2
- Existing Sanitary Sewer Line
- Proposed Pump Station Improvement
- Yachats City Limits

Pacific Ocean

MATCHLINE — SEE FIG 8-2 FOR CONTINUATION

Westech Engineering, Inc.

Figure 8-2 Recommended Capital Improvement Priorities - North Central

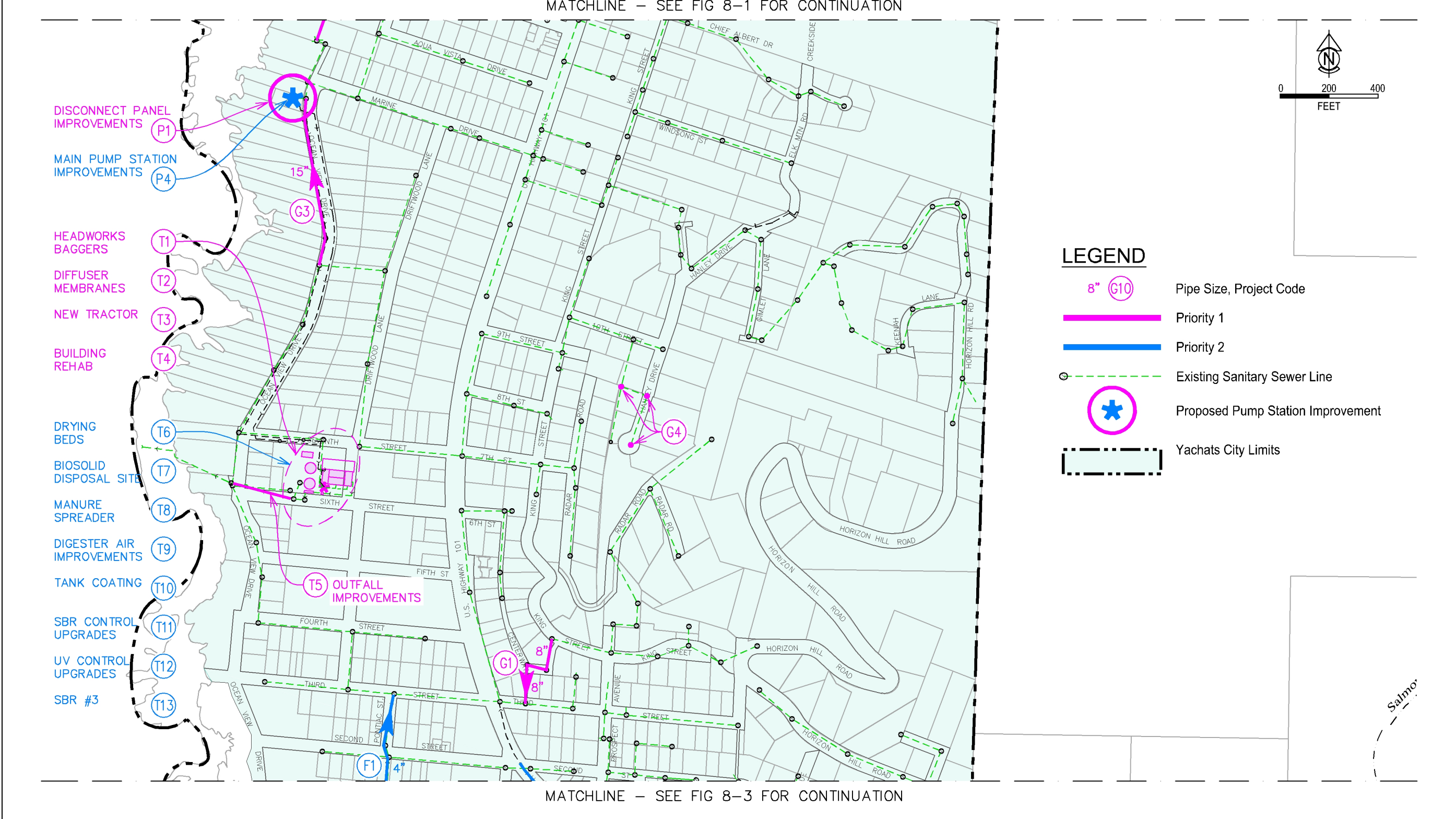


FIGURE 8-2

Figure 8-3 Recommended Capital Improvement Priorities - South Central

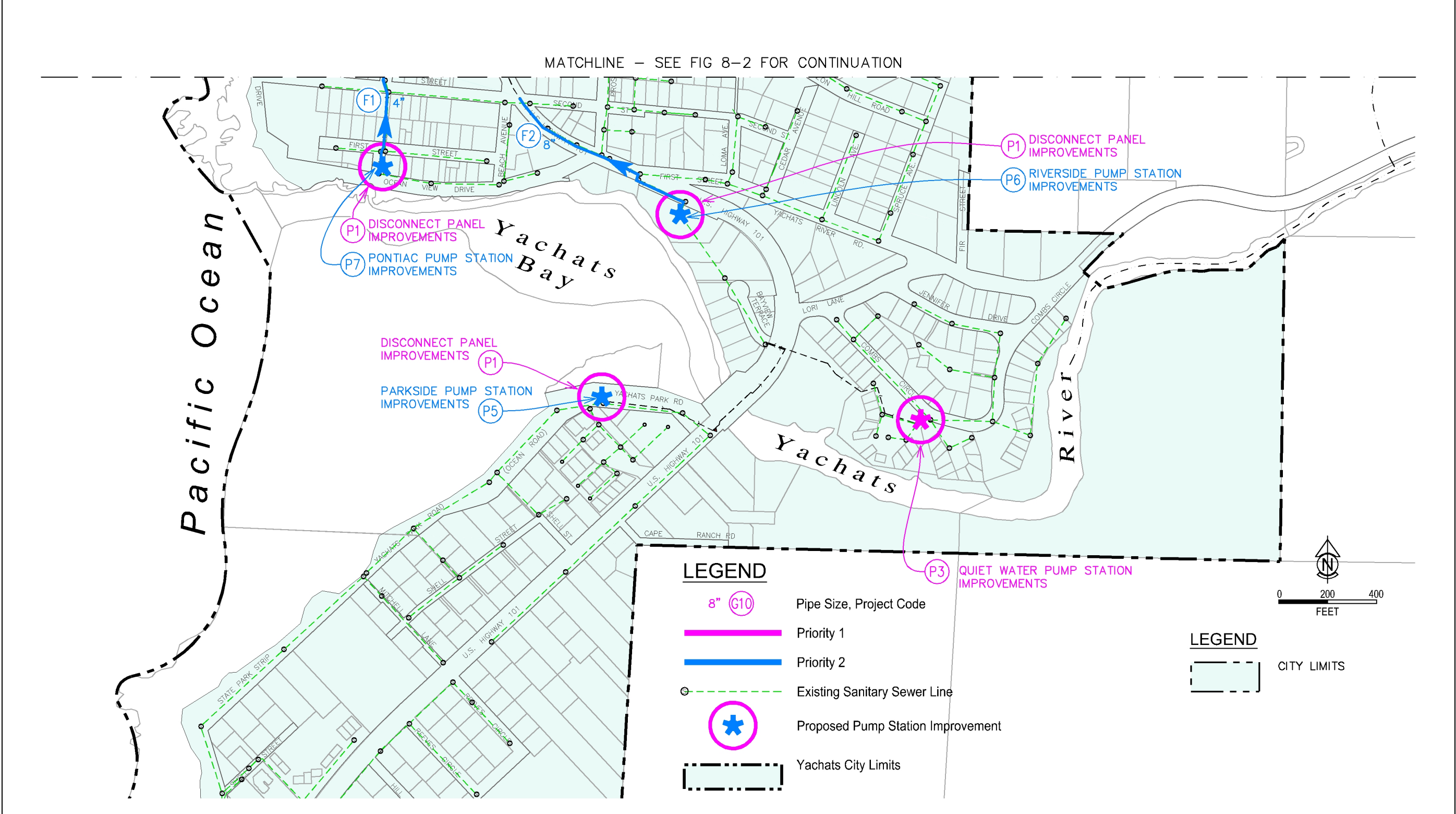


FIGURE 8-3

8.3 BASIS OF COSTS

In order to forecast municipal capital expenditures, cost estimates have been prepared for each improvement project. The preparation methodology and intended use of these cost estimates are summarized below.

8.3.1 Accuracy of Cost Estimates

The accuracy and precision of cost estimates is a function of the level to which improvement alternatives are developed (i.e., detail and design) and the techniques used in preparing the actual estimate. Estimates are typically divided into three basic categories as follows:

- **Planning Level Estimate.** These are order-of-magnitude estimates made without detailed engineering design data. They are often performed at the zero to 2 percent stage of project completion and typically range from 35 percent over, to 25 percent below the final project cost. A relatively large contingency is typically included to reduce the risk of underestimating. This is particularly important since many times the project financing must be secured before the detailed design can proceed.
- **Budgetary Estimates.** This level of estimate is prepared during the preliminary design phase using process flow sheets, preliminary layouts and equipment details. This type of estimate is typically accurate to +30 and –15 percent of the final project cost.
- **Engineer’s Estimate.** This estimate is prepared on the basis of well-defined engineering data, typically when the construction plans and specifications are completed. The estimating process at this level relies on piping and instrument diagrams, electrical diagrams, equipment data sheets, structural drawings, geotechnical data and a complete set of specifications. This estimate is sometimes called a definite estimate. The engineer’s estimate is expected to be accurate within +15 percent to –5 percent of the pricing secured during the bidding process.

The project costs prepared as part of this study are planning level estimates. Actual project costs will depend on the final project scope, labor and material costs, market conditions, construction schedule, and other variables at the time the project is built. These variables are typically uncertain at the time planning level estimates are prepared. Prior to the implementation of each of the recommended projects, the City should update the cost estimates during the preliminary design phase. As more detailed information becomes available, more accurate cost estimates can be prepared.

8.3.2 Adjustment of Cost Estimates over Time

A commonly used indicator to evaluate the change of construction costs over time is the Engineering News-Record (ENR) construction cost index. The index is computed from the prices for structural steel, Portland cement, lumber, and common labor, and is based on a value of 100 in the year 1913. The construction costs developed in this analysis are based on June 2021 ENR 20 City Construction Cost Index of 12,112. As the planning period elapses, the costs presented in

this study can be updated to the present, by applying the ratio of the current cost index to the index used during the preparation of the estimate.

8.3.3 Engineering and Administrative Costs and Contingencies

The cost of engineering services for major projects typically covers special investigations, pre-design reports, topographic surveying, geotechnical investigations, contract drawings and specifications, construction administration, inspection, project start-up, the preparation of O&M manuals, and performance certifications. Depending on the size and type of the project, engineering costs may range from 16 to 25 percent of the contract cost when all of the above services are provided. The lower percentage applies to large projects without complex mechanical systems. The higher percentage applies to smaller, more complex projects that require the integration of a complex design into an existing facility and where full-time inspection is required by the funding agencies or desired by the Owner.

The City will have administrative costs associated with any construction project. These include internal planning and budgeting costs, administration of engineering and construction contracts, legal services, and coordination with regulatory and funding agencies.

8.4 CONSTRUCTION COST ESTIMATES

The planning level estimates for the improvements recommended in this study are based on a number of assumptions as follows. The cost estimates reflect projects bid in late winter or early spring for summer construction. The estimates are based on construction costs of similar historical projects and on current estimates solicited from material and equipment vendors. The estimates are expected to have accuracies of +35 percent and -25 percent of the actual project cost. The following sections describe the cost estimating process for the various categories of projects.

8.4.1 Gravity Collection System Improvement Costs

The cost estimates for the proposed gravity pipeline improvements were based on the following assumptions.

- Normal depth sewer pipeline construction
- 4 inch forcemain piping in City right of way (materials, installation, surface restoration, etc.) - \$150 per foot
- 8 inch forcemain piping in ODOT right of way (materials, installation, surface restoration, etc.) - \$250 per foot
- 8 inch gravity pipeline construction cost (materials, installation, surface restoration, etc.) - \$150 per foot
- 10 inch gravity pipeline construction cost (materials, installation, surface restoration, etc.) - \$160 per foot

- 12 inch gravity pipeline construction cost (materials, installation, surface restoration, etc.) - \$170 per foot
- 15 inch gravity pipeline construction cost (materials, installation, surface restoration, etc.) - \$200 per foot
- New Manholes (materials, installation, and surface restoration) - \$6,000 each
- Service Laterals (materials, installation, and surface restoration) - \$2,000 each
- Construction Contingencies - 10% of estimated construction cost
- Engineering Costs (surveying, engineering design, and construction administration) - 20% of estimated construction cost
- Legal, Permits & Administrative Costs (permitting, administration, legal, easement acquisition and financing) - 10% of estimated construction cost

8.4.2 Pump Station Improvement Costs

Construction costs for new pump stations include site preparation, foundation, wetwell construction, building, pumps, mechanical piping, emergency power generation, and electrical and instrumentation. Project costs have been based on historical construction cost information for similarly sized projects and discussions with equipment manufacturers. A construction contingency of 10%, an engineering design cost of 20% and an administrative, legal and permitting cost of 10% was assumed for these projects.

8.4.3 Wastewater Treatment Improvement Costs

Construction costs for the wastewater treatment plant improvements include all materials and treatment equipment for each project as well as associated mechanical piping, and electrical and instrumentation.

A construction contingency of 10% of the estimated construction cost was used for the treatment plant estimates. Engineering, legal, and administration costs were assumed to be 20% of the estimated construction cost. Legal and permitting cost of 10% was assumed for these projects.

8.5 FUNDING SOURCES

As a general rule, small communities are not able to finance major wastewater system improvements without some form of government funding such as low interest loans or grants. It is anticipated that the funding for the recommended capital improvement plan outlined in this report will be secured from multiple sources depending on the particular project. These funding sources might include system development charges (SDCs), monthly user fees, as well as state and federal grant and loan programs. The following section outlines the major local and State/Federal funding programs that may be available for these projects.

8.5.1 Local Funding Sources

To a large degree, the type and amount of local funding used for the improvements will depend on the amount of grant funding obtained and the requirements of any loan funding. Local revenue sources for capital improvements include ad valorem taxes (property taxes), various types of bonds, user fees, connection fees and SDCs. Local revenue sources for operating costs include ad valorem taxes and user fees. The following sections discuss local funding sources and financing mechanisms that are most commonly used for the type of capital improvements presented in this study.

8.5.1.1 User Fees

User fees are monthly charges to all residences, businesses, and other users that are connected to the system. User fees are established by the City Council and are typically the sole source of revenue to finance operation and maintenance. These fees are periodically modified to account for changes in operation and maintenance costs, and the need for new improvements. Although user fees are not always sufficient to finance major capital construction projects, they can be used to repay long term financing. The reader is referred to Section 4.7.1 for a description of the City's current user fee structure.

8.5.1.2 System Development Charge Revenues

A system development charge (SDC) is a fee collected by the City as each piece of property is developed. SDCs are used to finance necessary capital improvements and municipal services required by the development. SDCs can be used to recover the capital costs of infrastructure required as a result of the development, but cannot be used to finance either operation and maintenance, or replacement costs. The reader is referred to Section 4.7.3 for information on the City's current SDC charges.

As established in ORS 223, a SDC can have two principal elements, the reimbursement fee and the improvement fee. Fees are collected at issuance of building permits. The reimbursement portion of the SDC is the fee for buying into either existing capital facilities or those that are under construction. The reimbursement fee represents a charge for utilizing excess capacity in an existing facility that was paid for by other parties. The revenue from this fee is typically used to repay existing improvement loans. The improvement portion of the SDC is the fee designed to cover the costs of capital improvements that must be constructed to provide an increase in capacity.

8.5.1.3 Connection Fees

Many communities charge connection fees to cover the cost of connecting a new development to the municipal sewer system. There are two types of connection fees. The first is for newly constructed connections and is designed to cover the cost of the City's inspections at the time of connection to the collection system. The second type of fee is designed to defray the City's administrative cost of setting up a new account and is charged against newly constructed connections, as well as transfers of an existing service to a new owner.

8.5.1.4 Capital Construction Fund

Capital construction funds, or sinking funds, are often established as a budget line item to set aside money for a particular construction purpose. A set amount from each annual budget is deposited in a sinking fund until sufficient reserves are available to complete the project. Such funds can also be developed from user fee revenues or from SDCs. The City currently maintains a capital improvement. The status of this fund is discussed in Chapter 4.

8.5.1.5 General Obligation Bonds

The sale of municipal general obligation bonds is a traditional method of funding municipal improvement projects. General obligation bonds utilize a municipality's basic taxing authority and are retired with property taxes based on an equitable distribution of the bonded obligation across the community's assessed valuation. General obligation bonds are normally associated with the financing of facilities that benefit an entire community and must be approved by a majority vote of the residents.

General obligation bonds are backed by the municipality's full faith and credit, as the municipality must pledge to assess property taxes sufficient to pay the annual debt service. This portion of the property tax is outside the State constitutional limits that restrict property taxes to a fixed percentage of the assessed value. The municipality may use other sources of revenue, including user fee revenues, to repay the bonds. If it uses other funding sources to repay the bonds, the amount collected as taxes is reduced commensurately.

The general procedure followed when financing improvements with general obligation bonds is typically as follows:

- Determination of the capital costs required for the improvement
- An election by the voters to authorize the sale of bonds
- The bonds are offered for sale
- The revenue from the bond sale is used to pay the capital cost of the project(s)

General obligation bonds can be "revenue supported", wherein a portion of the user fee is pledged toward repayment of the bond debt. The advantage of this method is that the need to collect additional property taxes to retire the bonds is reduced or eliminated. Such revenue supported general obligation bonds have most of the advantages of revenue bonds in addition to a lower interest rate and ready marketability.

The primary disadvantage with the use of general obligation bonds is that the debt incurred by this method is often added to the debt ratios of the municipality. This has the potential to limit flexibility of the municipality to issue debt for other purposes.

8.5.1.6 Revenue Bonds

Revenue bonds are similar to general obligation bonds, except they rely on revenue from the sales of the utility (i.e., user fees) to retire the bonded indebtedness. The primary security for the bonds is the municipality's pledge to charge user fees sufficient to pay all operating costs and debt service. Because the reliability of the source of revenue is relatively more speculative than for general obligation bonds, revenue bonds typically have slightly higher interest rates.

The general shift away from ad valorem property taxes makes revenue bonds a frequently used option for payment of long-term debt. Many communities prefer revenue bonding, because it ensures that no additional taxes are levied. In addition, repayment of the debt obligation is limited to system users since repayment is based on user fees.

One advantage with revenue bonds is that they do not count against a municipality's direct debt. This feature can be a crucial advantage for a municipality near its debt limit. Rating agencies closely evaluate the amount of direct debt when assigning credit ratings. There are normally no legal limitations on the amount of revenue bonds that can be issued; however, excessive issue amounts are generally unattractive to bond buyers because they represent high investment risks.

Under ORS 288.805-288.945, municipalities may elect to issue revenue bonds for revenue producing facilities without a vote of the electorate. Certain notice and posting requirements must be met and a sixty (60) day waiting period is mandatory.

The bond lender typically requires the municipality to provide two additional securities for revenue bonds that are not required for general obligation bonds. First, the municipality must set user fees such that the net projected cash flow from user fees plus interest will be at least 125% of the annual debt service (a 1.25 debt coverage ratio). Secondly, the municipality must establish a bond reserve fund equal to maximum annual debt service or 10% of the bond amount, whichever is less.

8.5.1.7 Improvement Bonds

Improvement (Bancroft) bonds are an intermediate form of financing that are less than full-fledged general obligation or revenue bonds. This form of bonding is typically used for Local Improvement Districts.

Improvement bonds are payable from the proceeds of special benefit assessments, not from general tax revenues or user fees. Such bonds are issued only where certain properties are recipients of special benefits not occurring to other properties. For a specific improvement, all property within the designated improvement district is assessed on the same basis, regardless of whether the property is developed or undeveloped. The assessment is designed to divide the cost of the improvements among the benefited property owners. The manner in which it is divided is in proportion to the direct or indirect benefits to each property. The assessment becomes a direct lien against the property, and owners have the option of either paying the assessment in cash, or applying for improvement bonds. If the improvement bond option is taken, the municipality sells Bancroft Improvement Bonds to finance the construction, and the assessment is paid over 20 years in 40 semiannual installments plus interest.

The assessments against the properties are usually not levied until the actual cost of the project is determined. Since the determination of actual costs cannot normally be determined until the project is completed, funds are not available from assessments for the purpose of paying costs at the time of construction. Therefore, some method of interim financing must be arranged.

The primary disadvantage to this source of revenue is that the development of an assessment district is very cumbersome and expensive when facilities for an entire community are

contemplated. Therefore, this method of financing should only be considered for discrete improvements to the collection system where the benefits are localized and easily quantified.

8.5.1.8 Certificates of Participation

Certificates of Participation are a form of bond financing that is distinct from revenue bonds. While it is more complex, and typically has a higher interest rate than revenue bonds, it is a process controlled by the City Council, and it does not have to be referred to the voters. This can result in significant time savings.

8.5.1.9 Ad Valorem Property Taxes

Ad valorem property taxes were often used in the past as a revenue source for public utility improvements. These taxes were the traditional means of obtaining revenue to support all local governmental functions. Ad valorem taxation is a financing method that applies to all property owners that benefit, or could potentially benefit from an improvement, whether the property is developed or not. The construction costs for the improvement project are shared proportionally among all property owners based on the assessed value of each property. Ad valorem taxation, however, is less likely to result in individual users paying their proportionate share of the costs as compared to their benefits.

8.5.2 State and Federal Grant and Loan Programs

Several state and federal grant and loan programs are available to provide financial assistance for municipal wastewater system improvements. The primary sources of funding available for wastewater system financing are Rural Utilities Service (RUS), Special Public Works Fund (SPWF), the Water/Wastewater (W/W) Financing Program, the Community Development Block Grant (CDBG) program, and the Clean Water State Revolving Fund (CWSRF).

8.5.2.1 USDA Rural Development

USDA Rural Development (RD) provides federal loans and grants to rural municipalities, counties, special districts, Indian tribes, and not-for-profit organizations to construct, enlarge, or modify water treatment and distribution systems and wastewater collection and treatment systems. Preference is given to projects in low-income communities with populations below 10,000.

Borrowers of RD loans must be able to demonstrate the following:

- Monthly user rates must be at or above the local area-wide average.
- They have the legal authority to borrow and repay loans, to pledge security for loans, and to operate and maintain the facilities and services.
- They are financially sound and able to manage the facility effectively.
- They have a financially sound facility based on taxes, assessments, revenues, fees, or other satisfactory sources of income to pay for all facility costs including O&M and to retire indebtedness and maintain a reserve.

The maximum RD loan term is 40 years, but the finance term may not exceed statutory limitations on the agency borrowing the money or the expected useful life of the improvements.

The reserve can typically be funded at 10 percent per year over a ten-year period. Interest rates for RD loans vary based on median household income, but tend to be lower than those obtained in the open market.

8.5.2.2 Oregon Infrastructure Finance Authority

The Oregon Infrastructure Finance Authority (IFA) manages a number of grant and low interest loan programs as described in the following sections.

Special Public Works Fund

The IFA administers the Special Public Works Fund (SPWF) program. The SPWF is a lottery-funded loan and grant program that provides funding to municipalities, counties, special districts, and public ports for infrastructure improvements to support industrial/manufacturing and eligible commercial economic development. Eligible commercial economic development is defined as commercial activity that is marketed nationally, or internationally, and attracts business from outside Oregon. Funded projects are usually linked to a specific private sector development and the resulting direct job creation (i.e., firm business commitment), of which 30% of the created jobs must be "family wage" jobs. The program also funds projects that build infrastructure capacity to support industrial/manufacturing development where recent interest by eligible business(s) can be documented.

The SPWF is primarily a loan program, although grant funds are available based on economic need of the community. Although the maximum loan term is 25 years, loans are generally made for 20-year terms. The maximum loan amount for projects funded with direct SPWF money is \$1 million, while the maximum for projects financed with bond funds is \$10 million.

Water/Wastewater Financing Program

The IFA also administers the W/W Financing Program, which gives priority to projects that provide system-wide benefits and helps communities meet the Clean Water Act or the Safe Drinking Water Act standards. It is intended to assist local governments that have been hard hit with state and federal mandates for public drinking water systems and wastewater systems. In order to be eligible for this program, the system must be out of compliance with federal or state rules, regulations or permits, as evidenced by issuance of Notice of Non-Compliance by the appropriate regulatory agency. The funded project must be needed to meet state or federal regulations. Priority is given to communities under economic distress.

Similar to the SPWF, the W/W Financing Program is primarily a loan program, although grant funds are available in certain cases, based on economic need of the community. Although the maximum loan term is 25 years, loans are generally made for 20-year terms. The maximum loan amount for projects funded with direct W/W money is \$500,000, while the maximum for projects financed with bond funds is \$10 million.

Economic and Community Development Block Grant

The IFA administers the CDBG, but the funds are from the U.S. Department of Housing and Urban Development (HUD), so all federal grant management rules apply to the program. The federal eligibility standards are strict. There are two subcategories of Public Works projects

eligible for funding, "Public Water and Wastewater," and "Public Works for New Housing." Only the former is considered in this discussion.

Grants are available for critically needed construction, improvement, or expansion of publicly owned water and wastewater systems for the benefit of current residents. Generally, projects must be necessary to resolve regulatory compliance problems identified by state and/or federal agencies and the project must serve a community that is comprised of more than 51% of low and moderate income persons.

The program separates projects into three parts. Grants are available for:

- Preliminary Engineering and Planning Projects

Generally, these grants fund preparation or update of Water System Master Plans and Wastewater Facility Plans, as required by the Oregon Department of Environmental Quality or Oregon Health Division. In addition, funds for grant administration and preparation of a final design funding application can be included in the project budget. All plans produced with grant funds must be approved by the appropriate regulatory agency. Grants of up to \$20,000 can also be made for problem identification studies to delineate problems and corrective measures, as required by a regulatory agency.

- Final Design and Engineering Projects

Final design and engineering, bid specifications, environmental review, financial feasibility, rate analysis, grant administration, and preparing a construction funding application are all eligible project activities. The final design, plans and specifications must be approved by the appropriate regulatory agency before a grant will be awarded.

- Construction Projects

These grants fund construction and related activities, grant administration, and land/permanent easement acquisition.

IFA has established an evaluation system that gives priority to projects that provide system-wide benefits. The overall maximum grant amount per water or wastewater project is \$3,000,000 (including all planning, final engineering, and construction). The project cannot be divided locally into phases with the expectation of receiving more than one \$3,000,000 grant. In order to qualify for grant funding under this program, the water user rates must be at or above statewide averages.

Based on the 2021 guidelines for the Community Development Block Grant Program, approximately 33% of the families in Yachats are classified as having low or moderate incomes. This is below the 51% threshold to be eligible for a Community Development Block Grant. As such, it does not appear that the City qualifies for a Block Grant. However, the requirements for these funding programs do change periodically, so it is worth verifying with the IFA.

8.5.2.3 Clean Water State Revolving Fund (CWSRF)

The Clean Water State Revolving Fund loan program provides low-cost loans to public agencies for the planning, design or construction of various projects that prevent or mitigate water pollution. The Oregon Department of Environmental Quality administers the program. Eligible

agencies include federally recognized Indian tribal governments, cities, counties, sanitary districts, soil and water conservation districts, irrigation districts, various special districts and certain intergovernmental entities.

Four different types of loans are available within the program including loans for planning, design, construction, and local community projects. A portion of the fund is reserved for small communities, planning and green projects. All loans, except for planning loans, include an annual loan fee on the outstanding balance. Interest rates for the loan program change quarterly based on a percentage of the national municipal bond rate. Those percentages vary from 25 percent to 55 percent of the bond rate. For example, with a quarterly bond rate of 3.75 percent, CWSRF interest rates range from 0.94 percent to 2.06 percent depending on the length of the loan repayment period. Interest rates are found on DEQ's website. The low-interest rates and terms inherent with these loans make this program an attractive alternative to the municipal bond market. For example, a \$4 million, 20-year loan with a CWSRF interest rate one-percentage point lower than a bond would reduce the interest cost by about \$500,000 over the life of the loan.

DEQ accepts new applications year-round. Applicants must provide information on the project's water quality benefits, environmental impact and estimated cost. Applications are available by contacting DEQ's regional project officers as listed on DEQ's website.

8.5.3 Funding Recommendations

Based on the infrastructure improvements and cost projections presented in this plan, the existing user fee and SDC fee structures may not be sufficient to meet the planning period goals. This plan accordingly recommends that the City complete a full review of its user fee and SDC rate structure and update these fees accordingly. Should the City choose to pursue funding assistance from one of the state and federal agencies for any of the projects listed in this plan, an important early step is to schedule a "one stop meeting" with Oregon Infrastructure Finance Authority (IFA). These meetings are designed to gather staff from the various federal and state funding agencies to evaluate the applicability of the various funding sources to a particular municipal project.

Consolidated Revenue and Expense Statement

Governmental Fund (100, 150, 155, 160)

For Period Ended September 30, 2021

Printed: 10/22/2021 7:46:19 AM

Period 03 - 03

Fiscal Year 2022

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
300101	Beginning Fund Balance	\$ 3,375,835.00	\$ 4,025,281.90	\$ -	\$ 4,025,281.90	119.24%	Beginning Balances - Unaudited
300105	Beginning Balance-Hall Bequest	\$ 150,000.00	\$ 150,000.00	\$ -	\$ 150,000.00	100.00%	
304492	804 Trail Mitigation	\$ 125,000.00	\$ -	\$ -	\$ -	0.00%	
304221	Franchise Cable	\$ 20,000.00	\$ 5,630.28	\$ -	\$ 5,630.28	28.15%	Received Quarterly
304223	Franchise Disposal Services	\$ 13,000.00	\$ 4,331.35	\$ -	\$ 4,331.35	33.32%	Received Quarterly
304224	Franchise Electricity	\$ 52,000.00	\$ 6,983.48	\$ 3,353.24	\$ 10,336.72	19.88%	Received Monthly
304222	Franchise Telephone	\$ 4,000.00	\$ -	\$ -	\$ -	0.00%	Received Annually
304480	Gifts/Donations	\$ 1,000.00	\$ 220.00	\$ 129.00	\$ 349.00	34.90%	
304481	Grants	\$ 162,500.00	\$ 87,020.10	\$ -	\$ 87,020.10	53.55%	
301500	Interest Earned	\$ 29,542.00	\$ 2,508.09	\$ 1,208.43	\$ 3,716.52	12.58%	Reserve Acct & LGIP Interest
304210	License Business	\$ 11,000.00	\$ 20.00	\$ 40.00	\$ 60.00	0.55%	
304211	License Vacation Rental	\$ 28,000.00	\$ -	\$ -	\$ -	0.00%	
304435	LID Assessments	\$ 7,700.00	\$ 40,611.00	\$ -	\$ 40,611.00	527.42%	
304484	Misc Revenue	\$ 1,000.00	\$ 4.00	\$ 115,726.94	\$ 115,730.94	11573.09%	Sale of YRFPD \$115,430.00
304491	Other Local Resources	\$ 4,000.00	\$ 1,372.38	\$ 682.65	\$ 2,055.03	51.38%	
304690	Other State Sources	\$ 1,000.00	\$ -	\$ -	\$ -	0.00%	
304230	Permits/Filing Fee	\$ 2,000.00	\$ 300.00	\$ 825.00	\$ 1,125.00	56.25%	
304461	Rental Income	\$ 5,000.00	\$ -	\$ -	\$ -	0.00%	
304335	Rents or Fees	\$ 9,000.00	\$ 1,381.00	\$ 400.00	\$ 1,781.00	19.79%	
304344	SDC Storm Drain Improvement	\$ 15,000.00	\$ 2,642.12	\$ 1,321.06	\$ 3,963.18	26.42%	
304343	SDC Wastewater Reimbursement	\$ 40,000.00	\$ 13,575.34	\$ 6,787.67	\$ 20,363.01	50.91%	
304341	SDC Water Improvements	\$ 25,791.00	\$ 5,412.62	\$ 2,706.31	\$ 8,118.93	31.48%	

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
304342	SDC Water Reimbursements	\$ 13,000.00	\$ 3,354.42	\$ 1,677.21	\$ 5,031.63	38.70%	
304630	State Revenue Share	\$ 11,000.00	\$ 5,026.92	\$ -	\$ 5,026.92	45.70%	
304245	Tax - Food & Beverage Tax	\$ 350,000.00	\$ -	\$ 102.69	\$ 102.69	0.03%	
304622	Tax - Marijuana	\$ 27,500.00	\$ -	\$ 7,721.96	\$ 7,721.96	28.08%	
304110	Tax - Property Current	\$ 89,746.00	\$ 230.30	\$ 133.11	\$ 363.41	0.40%	
304120	Tax - Property Past Due	\$ 2,000.00	\$ 250.42	\$ 120.12	\$ 370.54	18.53%	
304650	Tax - State Highway	\$ 50,000.00	\$ 4,309.99	\$ 5,706.76	\$ 10,016.75	20.03%	
304620	Tax - State OLCC	\$ 16,500.00	\$ 1,217.84	\$ 1,450.65	\$ 2,668.49	16.17%	
304610	Tax - State Tobacco	\$ 600.00	\$ 58.33	\$ 67.82	\$ 126.15	21.03%	
304240	Tax - Transient Lodging	\$ 1,147,541.00	\$ -	\$ 531.21	\$ 531.21	0.05%	
304864	Transfer from Streets Oper.	\$ 3,000.00	\$ -	\$ 750.00	\$ 750.00	25.00%	
314869	Transfer in Commons Operations	\$ -	\$ -	\$ 2,500.00	\$ 2,500.00	0.00%	
314861	Transfer in General Fund	\$ 416,850.00	\$ -	\$ 104,212.50	\$ 104,212.50	25.00%	
314872	Transfer in Street Reserves	\$ 525,000.00	\$ -	\$ 131,250.00	\$ 131,250.00	25.00%	
314883	Transfer in Urban Renewal	\$ 319,000.00	\$ -	\$ 56,000.00	\$ 56,000.00	17.55%	
304810	Transfer in URD Admin Reimb	\$ 15,000.00	\$ -	\$ 3,750.00	\$ 3,750.00	25.00%	
314863	Transfer in Visitor Amenity	\$ 104,250.00	\$ -	\$ 26,062.50	\$ 26,062.50	25.00%	
314890	Transfer in Water System	\$ 43,000.00	\$ -	\$ 10,750.00	\$ 10,750.00	25.00%	
304501	Transfer In-South Tnk Debt Svc	\$ 60,000.00	\$ -	\$ 38,750.00	\$ 38,750.00	64.58%	
314866	Urban Renewal Contribution	\$ 200,000.00	\$ -	\$ 50,000.00	\$ 50,000.00	25.00%	
	REVENUE	\$ 7,476,355.00	\$ 4,361,741.88	\$ 574,716.83	\$ 4,936,458.71	66.03%	
105101	City Manager	\$ 42,000.00	\$ 10,849.49	\$ 3,500.00	\$ 14,349.49	34.17%	
105102	Deputy Recorder	\$ 33,000.00	\$ 9,140.88	\$ 4,248.27	\$ 13,389.15	40.57%	
105104	City Clerk 2	\$ 22,500.00	\$ 1,399.97	\$ -	\$ 1,399.97	6.22%	
105105	Community Services Coordinator	\$ 25,000.00	\$ -	\$ -	\$ -	0.00%	
105106	City Accountant	\$ 37,500.00	\$ -	\$ -	\$ -	0.00%	
105107	Temp Accounting/Office Help	\$ 40,000.00	\$ -	\$ -	\$ -	0.00%	
105110	Water Lead	\$ 26,300.00	\$ 3,454.37	\$ 1,629.68	\$ 5,084.05	19.33%	
105111	Wastewater Lead	\$ 11,000.00	\$ 1,021.08	\$ 533.90	\$ 1,554.98	14.14%	
105112	Field Utility 2	\$ 10,000.00	\$ 1,807.21	\$ 391.61	\$ 2,198.82	21.99%	
105113	Field Utility 1	\$ 8,000.00	\$ 1,282.34	\$ 364.09	\$ 1,646.43	20.58%	

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
105114	Field Utility	\$ 2,700.00	\$ 656.32	\$ 406.27	\$ 1,062.59	39.36%	
105140	Fringe Benefits	\$ 29,000.00	\$ 3,139.12	\$ 1,164.73	\$ 4,303.85	14.84%	
105141	Insurance Benefits	\$ 55,900.00	\$ 5,409.07	\$ 2,308.33	\$ 7,717.40	13.81%	
105142	Regular PERS System	\$ 39,400.00	\$ 2,978.10	\$ 1,283.95	\$ 4,262.05	10.82%	
105150	Capitalized Labor	\$ 20,800.00	\$ -	\$ -	\$ -	0.00%	
	PERSONNEL	\$ 403,100.00	\$ 41,137.95	\$ 15,830.83	\$ 56,968.78	14.13%	
205202	Visitor Center Operations	\$ 65,000.00	\$ 16,250.00	\$ -	\$ 16,250.00	25.00%	
205209	Emergency Prep & Public Safety	\$ 7,000.00	\$ 154.65	\$ 75.96	\$ 230.61	3.29%	
205210	Dues & Memberships	\$ 6,000.00	\$ 2,503.88	\$ -	\$ 2,503.88	41.73%	
205213	Board/Comm/Meeting Education, Travel, & Expense	\$ 5,000.00	\$ -	\$ -	\$ -	0.00%	
205214	Marketing (Grants/Prgm/Events)	\$ 22,000.00	\$ 555.00	\$ 2,174.50	\$ 2,729.50	12.41%	
205220	Marketing/Road Sign	\$ 200.00	\$ -	\$ -	\$ -	0.00%	
205222	Insurance	\$ 24,300.00	\$ 22,401.87	\$ -	\$ 22,401.87	92.19%	
205224	Trails Maintenance/Supplies/Services	\$ 6,500.00	\$ 897.54	\$ 91.65	\$ 989.19	15.22%	
205230	Printing (Maps & Signs)	\$ 1,800.00	\$ -	\$ 42.99	\$ 42.99	2.39%	
205240	Office Materials & Supplies	\$ 12,000.00	\$ 3,671.37	\$ 757.72	\$ 4,429.09	36.91%	
205241	Computer Equipment and Maintenance	\$ 6,000.00	\$ -	\$ -	\$ -	0.00%	
205251	Telephones/Cell Phones/DSL	\$ 8,250.00	\$ 913.41	\$ 586.98	\$ 1,500.39	18.19%	
205252	Utilities	\$ 13,450.00	\$ 1,695.61	\$ 779.05	\$ 2,474.66	18.40%	
205253	Postage	\$ 1,000.00	\$ 79.98	\$ -	\$ 79.98	8.00%	
205255	Education and Training	\$ 5,000.00	\$ -	\$ -	\$ -	0.00%	
205260	Contract Expense (all Professional, IGA & Personal Svcs)	\$ 87,000.00	\$ 11,693.44	\$ 2,121.64	\$ 13,815.08	15.88%	
205261	Auditor	\$ 7,000.00	\$ -	\$ -	\$ -	0.00%	
205262	Legal	\$ 15,200.00	\$ 20.00	\$ 660.00	\$ 680.00	4.47%	
205263	Bank Charges/Credit Card Fees	\$ 2,000.00	\$ 535.67	\$ 488.97	\$ 1,024.64	51.23%	
205270	Travel	\$ 2,000.00	\$ -	\$ -	\$ -	0.00%	
205282	Software	\$ 13,500.00	\$ -	\$ -	\$ -	0.00%	
205311	Equipment Lease and Rental	\$ 4,750.00	\$ 572.16	\$ -	\$ 572.16	12.05%	
205312	Equipment Fuel/Tires/Parts	\$ 2,900.00	\$ 338.00	\$ 540.30	\$ 878.30	30.29%	
205313	Equipment Repair	\$ 5,000.00	\$ -	\$ -	\$ -	0.00%	

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
205317	Tools and Small Equipment	\$ 3,700.00	\$ -	\$ -	\$ -	0.00%	
205320	Fireworks	\$ 3,000.00	\$ -	\$ -	\$ -	0.00%	
205325	Yard Debris Dumpster	\$ 6,000.00	\$ 1,485.57	\$ 876.46	\$ 2,362.03	39.37%	
205330	Building and Land Maintenance	\$ 68,000.00	\$ 1,516.38	\$ 6,495.45	\$ 8,011.83	11.78%	
205335	Custodial Support/Supplies	\$ 26,000.00	\$ 2,358.99	\$ 2,954.24	\$ 5,313.23	20.44%	
205345	Books and Periodicals\Children's Books/Programs	\$ 12,500.00	\$ 1,159.46	\$ -	\$ 1,159.46	9.28%	
205361	Parts	\$ 5,000.00	\$ 435.51	\$ -	\$ 435.51	8.71%	
205362	Consumables	\$ 700.00	\$ 238.10	\$ 386.64	\$ 624.74	89.25%	
205363	Outside Services	\$ 4,000.00	\$ 210.33	\$ -	\$ 210.33	5.26%	
205367	Storm Drain Parts	\$ 6,000.00	\$ -	\$ -	\$ -	0.00%	
205368	Storm Drain Consumables	\$ 500.00	\$ -	\$ -	\$ -	0.00%	
205369	Storm Drain Outside Services	\$ 2,500.00	\$ -	\$ -	\$ -	0.00%	
205411	Street Lighting	\$ 20,000.00	\$ 3,209.25	\$ 1,592.68	\$ 4,801.93	24.01%	
205421	Parks/Grounds Maintenance	\$ 1,600.00	\$ 2,406.78	\$ 1,031.74	\$ 3,438.52	214.91%	
205422	Advertising\Legal Notice	\$ 2,000.00	\$ 1,040.00	\$ 76.00	\$ 1,116.00	55.80%	
205439	Comm Support/Beautification	\$ 68,000.00	\$ 11,803.72	\$ 75.00	\$ 11,878.72	17.47%	
205440	Equipment & Furniture	\$ 1,500.00	\$ 359.97	\$ -	\$ 359.97	24.00%	
205445	Rent	\$ 5,000.00	\$ -	\$ -	\$ -	0.00%	
205474	Mowing	\$ 23,600.00	\$ 4,758.00	\$ 3,102.00	\$ 7,860.00	33.31%	
205475	Tree Removal/Trimming	\$ 23,300.00	\$ -	\$ -	\$ -	0.00%	
205490	Material and Services	\$ 13,100.00	\$ 864.29	\$ 893.92	\$ 1,758.21	13.42%	
208000	Operating Contingency	\$ 57,900.00	\$ -	\$ -	\$ -	0.00%	
	MATERIALS AND SERVICES	\$ 676,750.00	\$ 94,128.93	\$ 25,803.89	\$ 119,932.82	17.72%	
207120	Transfer out City Hall	\$ 200,000.00	\$ -	\$ 50,000.00	\$ 50,000.00	25.00%	
217121	Transfer out Streets OP	\$ 61,000.00	\$ -	\$ 15,250.00	\$ 15,250.00	25.00%	
217122	Transfer out Library Op/Proj	\$ 33,100.00	\$ -	\$ 8,275.00	\$ 8,275.00	25.00%	
217123	Transfer out LLCM	\$ 35,000.00	\$ -	\$ 8,750.00	\$ 8,750.00	25.00%	
217124	Transfer out Commons	\$ 152,000.00	\$ -	\$ 38,000.00	\$ 38,000.00	25.00%	
217125	Transfer out Visitor Amenities	\$ 325,000.00	\$ -	\$ 81,250.00	\$ 81,250.00	25.00%	
217126	Transfer out Cap Res	\$ 13,000.00	\$ -	\$ 3,250.00	\$ 3,250.00	25.00%	

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
217127	OP Transfer - Parks & Trails Operations	\$ 90,000.00	\$ -	\$ 22,500.00	\$ 22,500.00	25.00%	
217128	Transfer to Parks & Trails	\$ 50,000.00	\$ -	\$ 12,500.00	\$ 12,500.00	25.00%	
217129	Transfer to WW Plant Loan	\$ 60,000.00	\$ -	\$ 15,000.00	\$ 15,000.00	25.00%	
217131	Interfund Transfer Street Proj	\$ 100,000.00	\$ -	\$ 25,000.00	\$ 25,000.00	25.00%	
217134	Transfer to Water	\$ 500,000.00	\$ -	\$ 125,000.00	\$ 125,000.00	25.00%	
	TRANSFERS	\$ 1,619,100.00	\$ -	\$ 404,775.00	\$ 404,775.00	25.00%	
407922	Capital Outlay - Improvement	\$ 60,000.00	\$ -	\$ -	\$ -	0.00%	
407941	Capital Outlay - Equipment	\$ 20,000.00	\$ -	\$ -	\$ -	0.00%	
407942	Capital Outlay-Infrastructure	\$ 125,000.00	\$ -	\$ -	\$ -	0.00%	
407947	Capital Outlay-Street Projects	\$ 128,000.00	\$ -	\$ -	\$ -	0.00%	
	CAPITAL OUTLAY	\$ 333,000.00	\$ -	\$ -	\$ -	0.00%	
205720	Interest Expense - South Tank	\$ 33,603.00	\$ -	\$ 6,100.99	\$ 6,100.99	18.16%	
205721	Interest Expense - DEQ	\$ 90,059.00	\$ -	\$ -	\$ -	0.00%	
205722	Loan Fee - DEQ	\$ 15,080.00	\$ -	\$ -	\$ -	0.00%	
207630	Principal Payment - South Tank	\$ 93,038.00	\$ -	\$ 15,324.20	\$ 15,324.20	16.47%	
207631	Principal Payments - DEQ	\$ 360,301.00	\$ -	\$ -	\$ -	0.00%	
	DEBT SERVICES	\$ 592,081.00	\$ -	\$ 21,425.19	\$ 21,425.19	3.62%	
	TOTAL EXPENSE	\$ 3,624,031.00	\$ 135,266.88	\$ 467,834.91	\$ 603,101.79	16.64%	
	NET GAIN/(LOSS)	\$ 3,852,324.00	\$ 4,226,475.00	\$ 106,881.92	\$ 4,333,356.92	112.49%	

Consolidated Revenue and Expense Statement

Enterprise Fund (660 and 670)

For Period Ended September 30, 2021

Printed: 10/22/2021 7:46:05 AM

Period 03 - 03

Fiscal Year 2022

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
300101	Beginning Balance	\$ 2,348,643.00	\$ 2,411,598.55	\$ -	\$ 2,411,598.55	102.68%	Beginning Balances - Unaudited
301500	Interest Earned	\$ 4,000.00	\$ 1,624.55	\$ 754.65	\$ 2,379.20	59.48%	
304310	Water/Wastewater Services	\$ 1,435,000.00	\$ 291,027.65	\$ 136,351.29	\$ 427,378.94	29.78%	
304312	Capital Reserve Fee	\$ -	\$ 15.60	\$ 5.59	\$ 21.19	0.00%	
304320	Installation Charges	\$ 12,000.00	\$ 2,450.00	\$ -	\$ 2,450.00	20.42%	
304335	Rents or Fees	\$ 1,000.00	\$ 90.00	\$ 70.00	\$ 160.00	16.00%	
314874	Wastewater Reserve	\$ 200,000.00	\$ -	\$ 50,000.00	\$ 50,000.00	25.00%	
314861	Transfer in General Reserve	\$ 500,000.00	\$ -	\$ 125,000.00	\$ 125,000.00	25.00%	
314866	Urban Renewal Contribution	\$ 62,000.00	\$ -	\$ 15,500.00	\$ 15,500.00	25.00%	
314875	Transfer in Water Operations	\$ 200,000.00	\$ -	\$ 50,000.00	\$ 50,000.00	25.00%	
	REVENUE	\$ 4,762,643.00	\$ 2,706,806.35	\$ 377,681.53	\$ 3,084,487.88	64.76%	
105101	City Manager	\$ 42,000.00	\$ 1,750.00	\$ 3,500.00	\$ 5,250.00	12.50%	
105102	Deputy Recorder	\$ 22,000.00	\$ 3,723.11	\$ 2,832.20	\$ 6,555.31	29.80%	Sale of YRFPD \$115,430.00
105105	Community Services Coordinator	\$ 25,000.00	\$ -	\$ -	\$ -	0.00%	
105106	City Accountant	\$ 9,400.00	\$ -	\$ -	\$ -	0.00%	
105107	Temp Accounting/Office Help	\$ 40,000.00	\$ -	\$ -	\$ -	0.00%	
105110	Water Lead	\$ 44,800.00	\$ 10,387.46	\$ 5,291.27	\$ 15,678.73	35.00%	
105111	Wastewater Lead	\$ 63,000.00	\$ 12,370.72	\$ 6,407.54	\$ 18,778.26	29.81%	
105112	Field Utility 2	\$ 51,000.00	\$ 11,053.46	\$ 5,616.81	\$ 16,670.27	32.69%	
105113	Field Utility 1	\$ 46,000.00	\$ 8,610.87	\$ 4,640.62	\$ 13,251.49	28.81%	

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
105114	Field Utility	\$ 49,000.00	\$ 9,298.50	\$ 4,360.12	\$ 13,658.62	27.87%	
105140	Fringe Benefits	\$ 40,500.00	\$ 5,852.94	\$ 3,365.39	\$ 9,218.33	22.76%	
105141	Insurance Benefits	\$ 103,200.00	\$ 20,373.08	\$ 10,922.56	\$ 31,295.64	30.33%	
105142	Regular PERS System	\$ 63,000.00	\$ 9,766.32	\$ 5,114.38	\$ 14,880.70	23.62%	
105150	Capitalized Labor	\$ 68,400.00	\$ -	\$ -	\$ -	0.00%	Labor for CIP
	PERSONNEL	\$ 667,300.00	\$ 93,186.46	\$ 52,050.89	\$ 145,237.35	21.76%	
205210	Dues & Memberships	\$ 3,650.00	\$ 765.00	\$ 905.67	\$ 1,670.67	45.77%	
205211	DEQ Fees	\$ 4,500.00	\$ -	\$ -	\$ -	0.00%	
205212	Fee Expense	\$ 10,250.00	\$ 2,576.30	\$ 1,111.99	\$ 3,688.29	35.98%	
205222	Insurance	\$ 34,000.00	\$ 31,344.19	\$ -	\$ 31,344.19	92.19%	
205240	Office Materials & Supplies	\$ 17,200.00	\$ 6,860.40	\$ 1,094.70	\$ 7,955.10	46.25%	
205251	Telephones/Cell Phones/DSL	\$ 17,100.00	\$ 1,635.21	\$ 2,271.56	\$ 3,906.77	22.85%	
205253	Postage	\$ 12,000.00	\$ 60.00	\$ -	\$ 60.00	0.50%	
205255	Education and Training	\$ 3,500.00	\$ -	\$ -	\$ -	0.00%	
205260	Contract Expense (all Professional, IGA & Personal Svcs)	\$ 13,750.00	\$ 10,839.80	\$ 4,243.28	\$ 15,083.08	109.70%	
205261	Auditor	\$ 9,500.00	\$ -	\$ -	\$ -	0.00%	
205262	Legal	\$ 2,000.00	\$ -	\$ -	\$ -	0.00%	
205270	Travel	\$ 2,000.00	\$ -	\$ -	\$ -	0.00%	
205282	Software	\$ 28,500.00	\$ -	\$ -	\$ -	0.00%	
205311	Equipment Lease and Rental	\$ 5,100.00	\$ 1,144.84	\$ -	\$ 1,144.84	22.45%	
205312	Equipment Fuel/Tires/Parts	\$ 10,500.00	\$ 1,199.13	\$ 1,080.58	\$ 2,279.71	21.71%	
205313	Equipment Repair	\$ 8,500.00	\$ 16.68	\$ 710.93	\$ 727.61	8.56%	
205317	Tools and Small Equipment	\$ 5,000.00	\$ 260.89	\$ 33.67	\$ 294.56	5.89%	
205330	Building and Land Maintenance	\$ 11,500.00	\$ -	\$ -	\$ -	0.00%	
205335	Custodial Support/Supplies	\$ 2,500.00	\$ 1,380.21	\$ 1,520.10	\$ 2,900.31	116.01%	
205342	Plant Utilities	\$ 57,000.00	\$ 8,050.55	\$ 3,909.97	\$ 11,960.52	20.98%	
205351	Main Plant Parts	\$ 15,500.00	\$ 7,129.04	\$ 466.94	\$ 7,595.98	49.01%	
205352	Main Plant Consumables	\$ 25,000.00	\$ 7,582.10	\$ 567.89	\$ 8,149.99	32.60%	
205353	Main Plant Outside Services	\$ 28,000.00	\$ 16,946.78	\$ 2,431.90	\$ 19,378.68	69.21%	

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
205361	Parts	\$ 36,000.00	\$ 10,603.58	\$ 107.26	\$ 10,710.84	29.75%	
205362	Consumables	\$ 3,500.00	\$ 200.00	\$ -	\$ 200.00	5.71%	
205363	Outside Services	\$ 15,000.00	\$ 3,409.50	\$ 2,148.00	\$ 5,557.50	37.05%	
205364	Collection I & I	\$ 5,000.00	\$ -	\$ -	\$ -	0.00%	
205440	Equipment & Furniture	\$ -	\$ 239.98	\$ -	\$ 239.98	0.00%	
205470	Equipment Repair/Maintenance	\$ 2,000.00	\$ -	\$ -	\$ -	0.00%	
205474	Mowing	\$ 11,500.00	\$ 1,509.00	\$ 1,760.00	\$ 3,269.00	28.43%	
205475	Tree Removal/Trimming	\$ 30,000.00	\$ -	\$ -	\$ -	0.00%	
208000	Operating Contingency	\$ 50,000.00	\$ -	\$ -	\$ -	0.00%	
	MATERIALS AND SERVICES	\$ 479,550.00	\$ 113,753.18	\$ 24,364.44	\$ 138,117.62	28.80%	
217126	Transfer out Cap Res	\$ 400,000.00	\$ -	\$ 100,000.00	\$ 100,000.00	25.00%	
217136	Transfer Out Debt Services	\$ 43,000.00	\$ -	\$ 10,750.00	\$ 10,750.00	25.00%	
	TRANSFERS	\$ 443,000.00	\$ -	\$ 110,750.00	\$ 110,750.00	25.00%	
407921	Capital Outlay - Infrastructure Systems	\$ 208,000.00	\$ 24,519.36	\$ 33,569.55	\$ 58,088.91	27.93%	
407941	Capital Outlay - Equipment	\$ 235,000.00	\$ -	\$ -	\$ -	0.00%	
407948	Capital Outlay - Water systems	\$ 241,000.00	\$ 3,735.00	\$ 1,232.00	\$ 4,967.00	2.06%	
	CAPITAL OUTLAY	\$ 684,000.00	\$ 28,254.36	\$ 34,801.55	\$ 63,055.91	9.22%	
	TOTAL EXPENSE	\$ 2,273,850.00	\$ 235,194.00	\$ 221,966.88	\$ 457,160.88	20.11%	
	NET GAIN/(LOSS)	\$ 2,488,793.00	\$ 2,471,612.35	\$ 155,714.65	\$ 2,627,327.00	105.57%	

Consolidated Revenue and Expense Statement

Debt Services Fund (155)

For Period Ended September 30, 2021

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Period 03 - 03

Fiscal Year 2022

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	Notes
300101	Beginning Balance	\$ 662,132.00	\$ 1,026,229.84	\$ -	\$ 1,026,229.84	154.99%	Beginning Balances - Unaudited
301500	Interest Earned	\$ 4,522.00	\$ 590.40	\$ 274.40	\$ 864.80	19.12%	
304110	Tax - Property Current	\$ 44,746.00	\$ 116.30	\$ 67.22	\$ 183.52	0.41%	
304120	Tax - Property Past Due	\$ 1,000.00	\$ 126.46	\$ 60.66	\$ 187.12	18.71%	
304245	Tax - Food & Beverage Tax	\$ 350,000.00	\$ -	\$ 102.69	\$ 102.69	0.03%	
304501	Transfer In-South Tnk Debt Svc	\$ 60,000.00	\$ -	\$ 38,750.00	\$ 38,750.00	64.58%	
314883	Transfer in Urban Renewal	\$ 195,000.00	\$ -	\$ 25,000.00	\$ 25,000.00	12.82%	
314890	Transfer in Water System	\$ 43,000.00	\$ -	\$ 10,750.00	\$ 10,750.00	25.00%	
	REVENUE	\$ 1,360,400.00	\$ 1,027,063.00	\$ 75,004.97	\$ 1,102,067.97	81.01%	
217129	Transfer to WW Plant Loan	\$ 60,000.00	\$ -	\$ 15,000.00	\$ 15,000.00	25.00%	
	TRANSFERS	\$ 60,000.00	\$ -	\$ 15,000.00	\$ 15,000.00	25.00%	
205720	Interest Expense - South Tank	\$ 33,603.00	\$ -	\$ 6,100.99	\$ 6,100.99	18.16%	Sale of YRFPD \$115,430.00
205721	Interest Expense - DEQ	\$ 90,059.00	\$ -	\$ -	\$ -	0.00%	
205722	Loan Fee - DEQ	\$ 15,080.00	\$ -	\$ -	\$ -	0.00%	
207630	Principal Payment - South Tank	\$ 93,038.00	\$ -	\$ 15,324.20	\$ 15,324.20	16.47%	
207631	Principal Payments - DEQ	\$ 360,301.00	\$ -	\$ -	\$ -	0.00%	
	DEBT SERVICES	\$ 592,081.00	\$ -	\$ 21,425.19	\$ 21,425.19	3.62%	
	TOTAL EXPENSE	\$ 652,081.00	\$ -	\$ 36,425.19	\$ 36,425.19	5.59%	
	NET GAIN/(LOSS)	\$ 708,319.00	\$ 1,027,063.00	\$ 38,579.78	\$ 1,065,642.78	150.45%	

Consolidated Revenue and Expense Statement

Urban Renewal (900)

For Period Ended September 30, 2021

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Period 03 - 03

Fiscal Year 2022

Acct No	Description	Budget	Prior Period	Current Period	YTD Bal	YTD %	NOTES
300101	Beginning Balance	\$ 413,739.00	\$ 421,085.26	\$ -	\$ 421,085.26	101.78%	Beginning Balances - Unaudited
301500	Interest Earned	\$ 2,750.00	\$ 514.35	\$ 240.36	\$ 754.71	27.44%	
304110	Tax - Property Current	\$ 413,782.00	\$ 1,070.40	\$ 618.63	\$ 1,689.03	0.41%	
304120	Tax - Property Past due	\$ 15,572.00	\$ 943.78	\$ 439.65	\$ 1,383.43	8.88%	
304491	Other Local Sources	\$ 300.00	\$ 24.33	\$ -	\$ 24.33	8.11%	
	REVENUE	\$ 846,143.00	\$ 423,638.12	\$ 1,298.64	\$ 424,936.76	50.22%	
205210	Dues & Memberships	\$ 200.00	\$ -	\$ -	\$ -	0.00%	
205261	Auditor	\$ 1,770.00	\$ -	\$ -	\$ -	0.00%	
205422	Advertising/Legal Notice	\$ 300.00	\$ -	\$ -	\$ -	0.00%	
	MATERIALS AND SERVICES	\$ 2,270.00	\$ -	\$ -	\$ -	0.00%	
217126	Transfer out Cap Res	\$ 12,000.00	\$ -	\$ 3,000.00	\$ 3,000.00	25.00%	
217128	Transfer to Parks & Trails	\$ 44,000.00	\$ -	\$ 11,000.00	\$ 11,000.00	25.00%	Sale of YRFPD \$115,430.00
217129	Transfer to WW Debt Service	\$ 95,000.00	\$ -	\$ 23,750.00	\$ 23,750.00	25.00%	
217130	Interfund Transfer Wastewater	\$ 50,000.00	\$ -	\$ 12,500.00	\$ 12,500.00	25.00%	
217131	Interfund Transfer - Street Capital	\$ 230,000.00	\$ -	\$ 57,500.00	\$ 57,500.00	25.00%	
217133	Transfer out Storm Drains	\$ 50,000.00	\$ -	\$ 12,500.00	\$ 12,500.00	25.00%	
217137	Trans to South Tank Debt	\$ 100,000.00	\$ -	\$ 25,000.00	\$ 25,000.00	25.00%	
217140	Admin Fee Trans to General Fund	\$ 15,000.00	\$ -	\$ 3,750.00	\$ 3,750.00	25.00%	
	TRANSFERS	\$ 596,000.00	\$ -	\$ 149,000.00	\$ 149,000.00	25.00%	
	TOTAL EXPENSE	\$ 598,270.00	\$ -	\$ 149,000.00	\$ 149,000.00	24.91%	
	NET GAIN/(LOSS)	\$ 247,873.00	\$ 423,638.12	\$ (147,701.36)	\$ 275,936.76	111.32%	

Debt Services - Revenue Water Bond 155-1200

Monthly Financial Detail Report

SEPTEMBER 2021

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Period 03 - 03

Fiscal Year 2022

Fund	Dept	Account Number	Description	Budget for Year	Prior Mo Bal	Current Activity	Actual to Date	% of Budget	Notes
155	1200	300101	Beginning Balance	\$ 43,242.00	\$ 43,241.66	\$ -	\$ 43,241.66	100.00%	Beginning Balances - Unaudited
155	1200	301500	Interest Earned	\$ 22.00	\$ 3.64	\$ 1.73	\$ 5.37	24.41%	Water Bond Reserve Acct
155	1200	314890	Transfer in Water System	\$ 43,000.00	\$ -	\$ 10,750.00	\$ 10,750.00	25.00%	Quarterly transfer from 660-1700
			REVENUE	\$ 86,264.00	\$ 43,245.30	\$ 10,751.73	\$ 53,997.03	62.60%	
155	1200	205720	Interest Expense - Water Bond	\$ 11,967.00	\$ -	\$ 6,100.99	\$ 6,100.99	50.98%	Semi-Annually, 9/17/21 and 3/17/22
155	1200	207630	Principal Payments-Water Bond	\$ 30,884.00	\$ -	\$ 15,324.20	\$ 15,324.20	49.62%	Semi-Annually, 9/17/21 and 3/17/22
			DEBT SERVICES	\$ 42,851.00	\$ -	\$ 21,425.19	\$ 21,425.19	50.00%	
			EXPENSE	\$ 42,851.00	\$ -	\$ 21,425.19	\$ 21,425.19	50.00%	
			Revenue Total	\$ 86,264.00	\$ 43,245.30	\$ 10,751.73	\$ 53,997.03	62.60%	
			Expense Total	\$ 42,851.00	\$ -	\$ 21,425.19	\$ 21,425.19	50.00%	
			NET GAIN/(LOSS)	\$ 43,413.00	\$ 43,245.30	\$ (10,673.46)	\$ 32,571.84	75.03%	

Debt Services - Water GO Bond 155-1218

Monthly Financial Detail Report

SEPTEMBER 2021

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Period 03 - 03

Fiscal Year 2022

Fund	Dept	Account Number	Description	Budget for Year	Prior Mo Bal	Current Activity	Actual to Date	% of Budget	Notes
155	1218	300101	Beginning Balance	\$ 45,642.00	\$ 46,636.12	\$ -	\$ 46,636.12	102.18%	Beginning Balances - Unaudited
155	1218	304110	Tax - Property Current	\$ 44,746.00	\$ 116.30	\$ 67.22	\$ 183.52	0.41%	
155	1218	304120	Tax - Property Past Due	\$ 1,000.00	\$ 126.46	\$ 60.66	\$ 187.12	18.71%	
			REVENUE	\$ 91,388.00	\$ 46,878.88	\$ 127.88	\$ 47,006.76	51.44%	
155	1218	205720	Interest Expense - GO Bond	\$ 11,880.00	\$ -	\$ -	\$ -	0.00%	Semi-Annually, 12/15/21 and 6/15/22
155	1218	207630	Principal Payments - GO Bond	\$ 32,000.00	\$ -	\$ -	\$ -	0.00%	Annually, 12/15/21
			DEBT SERVICES	\$ 43,880.00	\$ -	\$ -	\$ -	0.00%	
			EXPENSE	\$ 43,880.00	\$ -	\$ -	\$ -	0.00%	
			Revenue Total	\$ 91,388.00	\$ 46,878.88	\$ 127.88	\$ 47,006.76	51.44%	
			Expense Total	\$ 43,880.00	\$ -	\$ -	\$ -	0.00%	
			NET GAIN/(LOSS)	\$ 47,508.00	\$ 46,878.88	\$ 127.88	\$ 47,006.76	98.94%	

Debt Services - South Tank 155-1268

Monthly Financial Detail Report

SEPTEMBER 2021

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Period 03 - 03

Fiscal Year 2022

Fund	Dept	Account Number	Description	Budget for Year	Prior Mo Bal	Current Activity	Actual to Date	% of Budget	Notes
155	1268	300101	Beginning Balance	\$ 120,178.00	\$ 120,178.88	\$ -	\$ 120,178.88	100.00%	Beginning Balances - Unaudited
155	1268	314883	Transfer in Urban Renewal	\$ 100,000.00	\$ -	\$ 25,000.00	\$ 25,000.00	25.00%	Quarterly transfer from 900-9000
			RESOURCES	\$ 220,178.00	\$ 120,178.88	\$ 25,000.00	\$ 145,178.88	65.94%	
155	1268	217129	Transfer to WW Plant Loan	\$ 60,000.00	\$ -	\$ 15,000.00	\$ 15,000.00	25.00%	Quarterly transfer to 155-1276
			TRANSFERS	\$ 60,000.00	\$ -	\$ 15,000.00	\$ 15,000.00	25.00%	
155	1268	205720	Interest Expense - South Tank	\$ 9,756.00	\$ -	\$ -	\$ -	0.00%	Annually, 12/1/21
155	1268	207630	Principal Payment - South Tank	\$ 30,154.00	\$ -	\$ -	\$ -	0.00%	Annually, 12/1/21
			DEBT SERVICES	\$ 39,910.00	\$ -	\$ -	\$ -	0.00%	
			EXPENSE	\$ 99,910.00	\$ -	\$ 15,000.00	\$ 15,000.00	15.01%	
			Resource Total	\$ 220,178.00	\$ 120,178.88	\$ 25,000.00	\$ 145,178.88	65.94%	
			Expense Total	\$ 99,910.00	\$ -	\$ 15,000.00	\$ 15,000.00	15.01%	
			NET GAIN/(LOSS)	\$ 120,268.00	\$ 120,178.88	\$ 10,000.00	\$ 130,178.88	108.24%	

Debt Services - Wastewater Plant 155-1276

Monthly Financial Detail Report

SEPTEMBER 2021

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Period 03 - 03

Fiscal Year 2022

Fund	Dept	Account Number	Description	Budget for Year	Prior Mo Bal	Current Activity	Actual to Date	% of Budget	Notes
155	1276	300101	Beginning Balance	\$ 453,070.00	\$ 816,173.18	\$ -	\$ 816,173.18	180.14%	Beginning Balances - Unaudited
155	1276	301500	Interest Earned	\$ 4,500.00	\$ 586.76	\$ 272.67	\$ 859.43	19.10%	
155	1276	304245	Tax - Food & Beverage Tax	\$ 350,000.00	\$ -	\$ 102.69	\$ 102.69	0.03%	
155	1276	304501	Transfer In-South Tnk Debt Svc	\$ 60,000.00	\$ -	\$ 15,000.00	\$ 15,000.00	25.00%	Quarterly transfer from 155-1268
155	1276	314883	Transfer in Urban Renewal	\$ 95,000.00	\$ -	\$ 23,750.00	\$ 23,750.00	25.00%	Quarterly transfer from 900-9000
			REVENUE	\$ 962,570.00	\$ 816,759.94	\$ 39,125.36	\$ 855,885.30	88.92%	
155	1276	205721	Interest Expense - DEQ	\$ 90,059.00	\$ -	\$ -	\$ -	0.00%	Semi-Annually, 10/1/21 and 4/1/22
155	1276	205722	Loan Fee - DEQ	\$ 15,080.00	\$ -	\$ -	\$ -	0.00%	Annually, 4/1/22
155	1276	207631	Principal Payments - DEQ	\$ 360,301.00	\$ -	\$ -	\$ -	0.00%	Semi-Annually, 10/1/21 and 4/1/22
			DEBT SERVICES	\$ 465,440.00	\$ -	\$ -	\$ -	0.00%	
			EXPENSE	\$ 465,440.00	\$ -	\$ -	\$ -	0.00%	
			Revenue Total	\$ 962,570.00	\$ 816,759.94	\$ 39,125.36	\$ 855,885.30	88.92%	
			Expense Total	\$ 465,440.00	\$ -	\$ -	\$ -	0.00%	
			NET GAIN/(LOSS)	\$ 497,130.00	\$ 816,759.94	\$ 39,125.36	\$ 855,885.30	172.17%	

Urban Renewal 900-9000

Monthly Financial Detail Report

SEPTEMBER 2021

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Period 03 - 03

Fiscal Year 2022

Fund	Dept	Account Number	Description	Budget for Year	Prior Mo Bal	Current Activity	Actual to Date	% of Budget	Notes
900	9000	300101	Beginning Balance	\$ 413,739.00	\$ 421,085.26	\$ -	\$ 421,085.26	101.78%	Beginning Balance - Unaudited
900	9000	301500	Interest Earned	\$ 2,750.00	\$ 514.35	\$ 240.36	\$ 754.71	27.44%	LGIP Interest Earned
900	9000	304110	Tax - Property Current	\$ 413,782.00	\$ 1,070.40	\$ 618.63	\$ 1,689.03	0.41%	
900	9000	304120	Tax - Property Past due	\$ 15,572.00	\$ 943.78	\$ 439.65	\$ 1,383.43	8.88%	
900	9000	304491	Other Local Sources	\$ 300.00	\$ 24.33	\$ -	\$ 24.33	8.11%	
			REVENUE	\$ 846,143.00	\$ 423,638.12	\$ 1,298.64	\$ 424,936.76	50.22%	
900	9000	205210	Dues & Memberships	\$ 200.00	\$ -	\$ -	\$ -	0.00%	
900	9000	205261	Auditor	\$ 1,770.00	\$ -	\$ -	\$ -	0.00%	
900	9000	205422	Advertising/Legal Notice	\$ 300.00	\$ -	\$ -	\$ -	0.00%	
			MATERIALS AND SERVICES	\$ 2,270.00	\$ -	\$ -	\$ -	0.00%	
900	9000	217126	Transfer out Cap Res	\$ 12,000.00	\$ -	\$ 3,000.00	\$ 3,000.00	25.00%	Quarterly Transfer to 660-1705
900	9000	217128	Transfer to Parks & Trails	\$ 44,000.00	\$ -	\$ 11,000.00	\$ 11,000.00	25.00%	Quarterly Transfer to 150-1035
900	9000	217129	Transfer to WW Debt Service	\$ 95,000.00	\$ -	\$ 23,750.00	\$ 23,750.00	25.00%	Quarterly Transfer to 155-1276
900	9000	217130	Interfund Transfer Wastewater	\$ 50,000.00	\$ -	\$ 12,500.00	\$ 12,500.00	25.00%	Quarterly Transfer to 670-1805
900	9000	217131	Interfund Transfer - Street Capital Reserve	\$ 230,000.00	\$ -	\$ 57,500.00	\$ 57,500.00	25.00%	Quarterly Transfer to 150-1040
900	9000	217133	Transfer out Storm Drains	\$ 50,000.00	\$ -	\$ 12,500.00	\$ 12,500.00	25.00%	Quarterly Transfer to 150-1050
900	9000	217137	Trans to South Tank Debt	\$ 100,000.00	\$ -	\$ 25,000.00	\$ 25,000.00	25.00%	Quarterly Transfer to 155-1268
900	9000	217140	Admin Fee Trans to General Fund	\$ 15,000.00	\$ -	\$ 3,750.00	\$ 3,750.00	25.00%	Quarterly Transfer to 100-1010
			TRANSFERS	\$ 596,000.00	\$ -	\$ 149,000.00	\$ 149,000.00	25.00%	
			EXPENSE	\$ 598,270.00	\$ -	\$ 149,000.00	\$ 149,000.00	24.91%	
			Revenue Total	\$ 846,143.00	\$ 423,638.12	\$ 1,298.64	\$ 424,936.76	50.22%	
			Expense Total	\$ 598,270.00	\$ -	\$ 149,000.00	\$ 149,000.00	24.91%	
			NET GAIN/(LOSS)	\$ 247,873.00	\$ 423,638.12	\$ (147,701.36)	\$ 275,936.76	111.32%	

City of Yachats

Fund Balance Report

		Modified Accrual Basis		Modified Cash Basis				FY2022 VS FY2021
		30-Jun-17	30-Jun-18	FY2019 30-Jun-19	FY2020 30-Jun-20	FY2021 30-Jun-21	YTD FY2022 30-Sep-21	
City Hall	100-1010	468,845	691,207	829,068	921,273	537,149	508,800	
Commons	100-1020	(15,519)	500	15,292	77,910	104,451	129,086	
LLC & Museum	100-1025			583	6,722	0	(1,362)	
Library	100-1030			0	8,122	28,700	31,557	
Parks and Trails	100-1035			14,053	16,879	0	4,504	
Visitor Amenities	100-1045	195,095	119,446	98,664	249,548	670,851	706,136	
Streets	100-1040	71,533	80,581	93,513	43,350	14,572	17,604	
Storm Drains	100-1050	80,252	86,394	110,146	88,495	68,824	67,735	
Water	600-1700			164,050	325,623	128,056	148,645	
WasteWater	670-1800			178,721	265,946	157,154	179,633	
Total Operating Funds		800,206	978,128	1,504,090	2,003,868	1,709,757	1,792,338	(82,581)
SDC's	160-1605	149,075	236,321	413,285	519,487	588,135	666,938	
General Construction (So Tank)	160-1630	211,843	40,401	213,305	213,305			
Revenue Water Bond	155-1200			0	43,071	43,242	32,572	
Water Gen Obl Bond	155-1218			0	(157)	46,636	47,007	
South Tank Loan	155-1268			100,000	160,089	120,179	130,179	
WasteWater Loans (2)	155-1276	577,777	594,019	668,616	736,214	816,173	855,885	
Urban Renewal	900-9000	68,236	207,433	297,767	432,235	421,085	275,937	
Total Restricted Funds		1,006,931	1,078,174	1,692,973	2,104,244	2,035,450	2,008,518	26,932
City Hall Reserves	150-1010			69,066	63,697	0	13,982	
Commons Reserves	150-1020			118,449	145,449	145,449	147,949	
LLC & Museum Reserves	150-1025			213,077	208,077	208,077	208,078	
Library Reserves	150-1030			242,453	306,638	291,781	291,782	
Parks and Trails Reserves	150-1035			103,486	153,486	135,156	158,262	
Streets Reserves	150-1040			437,841	316,867	315,906	264,164	
Storm Drains Capital	150-1050			0	40,000	40,000	52,500	
Water Reserves	660-1705			167,522	252,358	1,121,617	1,293,332	
WasteWater Reserves	670-1805			443,800	518,930	1,004,775	1,005,717	
Total Capital Reserves		1,838,319	1,554,067	1,795,694	2,005,502	3,262,761	3,435,765	(173,004)
Total Fund Balances		3,645,456	3,610,369	4,992,757	6,113,614	7,007,968	7,236,621	(228,653)

City of Yachats
Contract Expense Report
TYD Through September 30, 2021

DESCRIPTION/VENDOR NAME	YTD FY2022
Code Enforcer/TCB	4,160.66
Finance / Janet Cline	14,850.00
Finance / Thomas Lauritzen	7,171.00
Finance / OCWCOG	39.50
Printing-Video/Quality Code Publishing LLC	1,262.20
Printing-Video/National Photocopy Corp	1,414.80
TOTAL PAID YEAR TO DATE	\$ 28,898.16

ANNUAL BUDGET AMOUNT \$ 100,750.00

PERCENTAGE EXPENDED 28.68%