



PLANNING COMMISSION WORK SESSION AGENDA

Monday, March 26, 2018 - 6:00 PM

City Hall, Conference Room A, 169 SW Coast Hwy, Newport, OR 97365

The meeting location is accessible to persons with disabilities. A request for an interpreter for the DEAF AND HARD OF HEARING, or for other accommodations for persons with disabilities, should be made at least 48 hours in advance of the meeting to Peggy Hawker, City Recorder at 541.574.0613.

The agenda may be amended during the meeting to add or delete items, change the order of agenda items, or discuss any other business deemed necessary at the time of the meeting.

1. CALL TO ORDER

2. UNFINISHED BUSINESS

3. NEW BUSINESS

3.A Discuss Updated Wastewater Plan and Potential Policies

[Sanitary Sewer Master Plan.pdf](#)

3.B Presentation by DOGAMI Regarding "Beat the Wave" Modeling Assumptions

[DOGAMI Presentation.pdf](#)

4. ADJOURNMENT

Planning Commission Work Session Agenda Item Report

Agenda Item No. 2016-2294

Submitted by: Sherri Marineau

Submitting Department: Community Development

Meeting Date: March 26, 2018

SUBJECT

Discuss Updated Wastewater Plan and Potential Policies

Recommendation:

ATTACHMENTS

- [Sanitary Sewer Master Plan.pdf](#)

Memorandum

To: Planning Commission/Commission Advisory Committee
From: Derrick I. Tokos, AICP, Community Development Director 
Date: March 22, 2018
Re: Review of Updated Sanitary Sewer ("Wastewater") Master Plan and Existing Wastewater Comprehensive Plan Policies

Enclosed is a draft copy of the updated Sanitary Sewer Master Plan, prepared by Brown and Caldwell, dated September 2016. Please take a moment to familiarize yourself with the document. Also attached is a copy of the existing "Wastewater Facilities" section of the Comprehensive Plan that will be replaced in its entirety and the wastewater goal and policies (highlighted), which will need to be updated.

The Master Plan includes an analysis of System Development Charges (SDCs) that was factored into the recent comprehensive update that the City completed to its SDC methodology. This aspect of the document will not be a point of focus of our effort to update the wastewater elements of the Comprehensive Plan.

At this work session, you will have an opportunity to ask questions of staff and discuss policy issues that you would like to see addressed with the update. This will help me put together a draft set of amendments for your consideration at a future work session.

You might pay particular attention to the Executive Summary, Basis for Planning (Section 2) Wastewater System Policy Recommendations (Section 3), and Capital Improvement Plan (Section 6), as these portions of the document contain much of the information that we will want to incorporate, in summarized form, into the Comprehensive Plan. The information will also serve as a basis for developing policy recommendations.

Attachments

WASTEWATER FACILITIES

Wastewater facilities are provided by the City of Newport. The sewerage service area encompasses most of the major developed areas within the city limits north of the bay. The areas lying south of South Beach and outside the city limits but within the UGB are currently unserved by the city's wastewater facilities.

Existing Wastewater Facilities:

The primary components of the wastewater system are the wastewater treatment plant, gravity sanitary sewer lines, force mains, and lift stations. These components are identified in Map WW1 (CH2M HILL update) and are discussed in greater detail in the "Wastewater System Master Plan Update 1988" (hereinafter referenced as the "Wastewater Master Plan").

No systematic and detailed evaluation has been made to determine the conditions of the components of the existing system, other than to identify the sizes and flow carrying capacities. General conditions of the existing components are inferred by recommendations in the Wastewater Master Plan that address their maintenance, upgrading, or replacement: the greater their deterioration and significance to the overall function of the wastewater system component, the higher their priority for maintenance or replacement.

Several events have occurred since 1981 that improved the condition of the wastewater facilities. These events are outlined in the following.

Treatment: The city's existing treatment plant was expanded in two major stages to provide secondary treatment for an average daily flow of 3.2 million gallons per day. This treatment capacity is adequate to serve a population of around 11,000 residents. Between 1980 and 1986, the greatest sewage flows received at the city's treatment plant were approximately 2.49 million gallons per day.

Collection: Some of the existing trunk sewers, lift stations, and force mains were modified to expand their capacities. Some new sewers were added to provide sewer service to previously unsewered areas within the city limits.

Recommended Wastewater System Facility Improvement Projects:

The Wastewater Master Plan briefly describes the need for facility improvements necessary to accommodate the projected population growth in Newport, considering the following factors:

- > Existing and forecasted sewer service needs by area and type
- > Total peak flow rate of wastewater

- > Natural drainage contours, topography, site access, and sewer system construction factors
- > Oregon State Department of Environmental Quality's policies covering the design of sewer systems

The existing major facilities together with the proposed facilities shown on Map WW1 combine to make up the wastewater system facilities plan for Newport. Table 2 (page 142) lists wastewater system improvement projects identified in the Wastewater Master Plan. A brief discussion of the facility needs and means to address these needs follows.

The City of Newport and its urban growth boundary have been divided into 14 separate drainage basins that are largely based on natural gravity drainage patterns and topography, but are also functions of land use and potential for phased construction of sewer extensions. These drainage basins are indicated on Map WW1.

Treatment: A preliminary sizing of the needed wastewater treatment facilities was based on the forecasted daily base flow from the projected residential population plus an allowance for infiltration of ground water. Wastewater flow during the summer months has increased significantly since 1981. The concentrations of suspended solids and biochemical oxygen demand in the influent have continued to remain high during the summer months, indicating the increased flow during the summer is mostly domestic sewage and not an increase of ground water infiltration or stormwater inflow. It is suspected that the higher summer domestic sewage flow results from an increase in tourism, industry, and commercial activity.

By using the flow rates given for the various drainage basins shown on Map WW1, several different alternatives have been examined for transmission of wastewater to treatment facilities and disposal of treated effluent. Major development anticipated south of the bay determines many of the forecasted wastewater facility needs. The current 3.2 million gallon per day capacity of the existing treatment plant provides secondary treatment for a residential population of around 11,000 people. Assuming the population of Newport increases as projected, particularly in the South Beach area and in the Thiel Creek area, additional treatment facilities located on a separate site will be required. Either a treatment plant will need to be constructed on the south side of the bay, or additional transmission capacity will be needed to supplement the existing 8-inch force main bay undercrossing. The Wastewater Master Plan recommends that a new treatment plant, with an initial capacity of 3.5 million gallons per day, be constructed on the south side of the bay with a new ocean effluent outfall pipeline. The plant would be constructed to allow an expected inflow of 3.9 million gallons per day by the year 2010.

Collection: A combination of force mains and gravity sanitary trunk sewer lines will parallel U.S. 101, supplying effluent to the South Beach treatment plant. Generally, gravity sanitary trunk sewers will service the peripheral areas of South Beach, directing sewage to the lines paralleling the highway. Because of beneficial topography on developable properties on the north side of the bay, almost all of the proposed new sewer lines will be gravity sanitary trunk sewer lines. One exception to this pattern is an 8-inch force main serving the northeast bay area.

A detailed discussion of the proposed phased improvement plan for the wastewater system facilities is provided in the Wastewater Master Plan (pp. 3-4 through 3-11). The highest priority projects recommended for construction during the first planning period (1988-1992) include:

- Construction of new and proposed expansions to existing trunk sewers, lift stations, and force mains, totaling \$5,980,000
- Construction of three new lift stations and expansion of one existing lift station, totaling \$760,000
- Construction of new force mains, gravity trunk sewers, and gravity sewers, involving a combined total of 251,000 linear feet of new service lines, totaling \$1,405,000

During the second planning period (1993-2000), the most significant proposed addition to the wastewater system involves the construction and operation of a new South Beach Wastewater Treatment Plant to provide secondary treatment for certain drainage basins and a new effluent outfall pipeline from the facility. Much of the recommended collection system development is designed in conjunction with the proposed new South Beach treatment plant. The last planning period (through the year 2010) will be marked by the abandonment of the northside wastewater treatment plant and its replacement by an expanded South Beach Wastewater Treatment Plant, which will be capable of treating 7 million gallons per day.

Funding:

The cost estimates in Table 2 are based upon current design and construction costs for the major system components, not including laterals and service connections. The Wastewater Master Plan (pp. 3-11 through 3-15) discusses further assumptions used in calculating the cost estimates.

Most of the locally financed projected wastewater development projects are expected to be financed through a combination of general obligation bonds issued by the city and funding from the urban renewal program. General obligation bonds are primarily supported by the city's taxing power and credit. The bonds reduce the city's available debt level because local governments are limited in the amount of debt which can be secured overall. The Newport Development Commission administers the city urban renewal program, which provides monies through tax increment bonds.

Table 2
 CH2M HILL, Inc.
 Recommended Wastewater System Improvements

PHASE I, PRIORITY A--1988-1995 COMPONENTS

| | | Costs ^a | Anticipated Year of Construction | Funding Sources |
|----|---|---------------------|----------------------------------|----------------------------------|
| 1. | Trunk sewers, lift stations, and force mains within several drainage basins to provide collection service within the individual drainage basins. | \$ 5,980,000 | 1988-95 | Unknown |
| 2. | New Thiel Creek lift station. Pumping capacity 1.30 mgd. | 390,000 | 1993 | Developer |
| 3. | New 10-inch force main from Thiel Creek lift station to gravity sewer--7,800 lf; and new 12-inch gravity trunk sewer--1,600 lf; and 15-inch gravity trunk sewer--2,000 lf; from force main to South Beach lift station. | 640,000 | 1993 | Developer |
| 4. | New South Beach lift Station. Pumping capacity 0.60 mgd | 150,000 | 1993 | |
| 5. | New 6-inch force main from South Beach lift station to gravity sewer--6,000 lf; and new 8-inch gravity trunk sewer--1,800 lf; from force main to Ferry Slip lift station. | 340,000 | 1994 | Developer UR/GOB ^c |
| 6. | New Ferry Slip lift station. Pumping capacity 0.60 mgd. | 130,000 | 1990 | |
| 7. | New 6-inch force main from Ferry Slip lift station to existing gravity sewer--2,700 lf. | 105,000 | 1990 | UR/GOB UR/GOB |
| 8. | Expand OSU Marine Science Center lift station to pumping capacity of 1.00 mgd. | 90,000 | 1990 | UR/GOB |
| 9. | New 15-inch gravity sewer from existing bay crossing to existing bay front lift station--3,200 lf | 320,000 | 1993 | UR/GOB |
| | TOTAL ESTIMATED COST OF PHASE I | \$ 8,145,000 | | |

PHASE II, PRIORITY B--1996-2000 COMPONENTS

| | | Costs ^a | Anticipated Year of Construction | Funding Sources |
|----|---|---------------------|----------------------------------|-----------------|
| 1. | Trunk sewers, lift stations, and force mains within the several drainage basins to provide collection service within the individual drainage basins. | \$ 1,410,000 | | Unknown |
| 2. | Extend existing 8-inch force main to relocate outlet from gravity sewer to north end of existing 8-inch bay crossing force main--1,500 lf. | 75,000 | | Unknown |
| 3. | Construct new 24-inch force main from bay front lift station across Yaquina Bay to the OSU MSC lift station --4,000 lf (1,600 feet of which is the bay undercrossing). | 1,000,000 | | GOB |
| 4. | New OSU MSC lift station. Pumping capacity 2.00 mgd | 500,000 | | GOB |
| 5. | New 24-inch force main from OSU MSC lift station to gravity sewer--6,000 lf; and new 30-inch gravity trunk sewer--2,600 lf; and new 36-inch gravity trunk sewer--100 lf; from force main to new South Beach treatment plant site. | 1,175,000 | | GOB |
| 6. | Abandon South Beach lift station and force main and construct 27-inch gravity trunk sewer to 30-inch gravity trunk sewer 3,200 lf and connect to manhole. | 300,000 | | Unknown |
| 7. | Expand Ferry Slip lift station to pumping capacity of 0.72 mgd and relocate outlet of 6-inch force main to existing 24-inch force main--100 lf. | 130,000 | | Unknown |
| 8. | New South Beach Wastewater Treatment Plant--trickling filter process--initial treatment capacity 3.50 mgd average daily flow. | 9,500,000 | | UR/GOB |
| 9. | New 36-inch effluent outfall pipeline--4,000 lf from plant to beach; 2,500 lf from beach into ocean. | 2,000,000 | | UR/GOB |
| | TOTAL ESTIMATED COST OF PHASE II | \$16,090,000 | | |

PHASE III, PRIORITY C--THROUGH YEAR 2010 COMPONENTS

| | | |
|--|---------------------|---------|
| New lift station at site of existing Northside Wastewater Treatment Plant. Pumping capacity 5.34 mgd. Assumes using existing structure for wetwell. | \$ 1,150,000 | UR |
| New 18-inch force main from lift station at existing Northside plant site to gravity trunk sewer--1,800 lf; and new 21-inch gravity trunk sewer from force main to bay front lift station construction under Phase II--1,800 lf. | 250,000 | Unknown |
| 3. Rehabilitation and expand bay front lift station to pumping capacity of 6.50 mgd. | 1,640,000 | Unknown |
| 4. Expand OSU MSC lift station to pumping capacity of 8.00 mgd. | 1,000,000 | Unknown |
| 5. Construct 3.50 mgd expansion of proposed South Beach Wastewater Treatment Plant to bring treatment capacity to 7.00 mgd average daily flow. | 6,500,000 | Unknown |
| Abandon existing Northside Wastewater Treatment Plant. | | |
| TOTAL ESTIMATED COST OF PHASE III | \$10,540,000 | |

^a At August 1987 costs (ENR 4430).

^b The anticipated year of construction may vary depending upon the rate and direction or growth and availability of funding.

^c UR means Urban Renewal Program Funds; GOB means General Obligation Bonds.

^d Abandoning the treatment plant will involve some costs, but the amount is dependent on the City's future plans for the structures and plant site property. This estimate points out that costs for abandoning the plant are not included here at this time.

mgd = million gallons per day; lf = linear feet.

Source: "Wastewater System Master Plan Update for 1988 for the City of Newport, Oregon," CH2M HILL.

Implementation Measure 3: The city shall use data and findings from Implementation Measures 1 and 2 of this section to update the Water Supply section of the Public Facilities element of the Newport Comprehensive Plan to reflect new information as a result of the engineering and finance studies.

WASTEWATER

Goal: To provide a wastewater collection and treatment system with sufficient capacity to meet the present and future needs of the Newport urbanizable area in compliance with State and Federal regulations.

Policy 1: On-site sewer systems shall not be allowed unless the city's sanitary sewer system is greater than 250 feet away. In any case, a subsurface permit from the Lincoln County Sanitarian must be obtained prior to any development that will rely on an on-site sewer system.

Policy 2: City wastewater services may be extended to any property within the urban growth boundary. Except for the very limited circumstances allowed by state law and regulations, the city will not generally provide wastewater services outside the urban growth boundary. The city may require a consent to annexation as a condition of providing wastewater service outside the city limits. Nothing in this policy obligates the City to provide wastewater services outside of the city limits. For property outside the city limits but within the urban growth boundary, wastewater services may be provided at the City's discretion only for:

- a) residentially zoned lands as allowed by county zoning without full services, and
- b) commercial and industrial zoned lands to existing lawful uses as of the date (9/4/07) of this amendment.

Policy 3: The city will design and develop the wastewater collection and treatment system in a way that addresses the demands of the various users under normal and predictable daily and seasonal patterns of use.

TRANSPORTATION

Transportation Goals and Policies repealed by Ordinance No. 1802 (January 4, 1999).

DRAFT

Sanitary Sewer Master Plan

Prepared for
City of Newport, Oregon
September 2, 2016

This is a draft and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.



6500 SW Macadam Avenue, Suite 200
Portland, OR 97239

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List of Abbreviations

| | | | |
|-----------|--|----------------|---|
| AC | asbestos cement | NAVD88 | North American Vertical Datum of 1988 |
| BC | Brown and Caldwell | NMC | Newport Municipal Code |
| BLI | buildable lands inventory | NOAA | National Oceanic and Atmospheric Administration |
| BOD | biochemical oxygen demand | NPDES | National Pollutant Discharge Elimination System |
| CCTV | closed-circuit television | OAR | Oregon Administrative Rules |
| CIP | Capital Improvement Plan | OSU | Oregon State University |
| CIPP | cured-in-place pipe | PACP | Pipeline Assessment and Certification Program |
| City | City of Newport | PRI | Pipe Rating Index |
| CMOM | Capacity, Management, Operation, and Maintenance | PS | pump station |
| Comp Plan | Comprehensive Plan | PVC | polyvinyl chloride |
| CSP | concrete sewer pipe | Q | maximum predicted flow |
| d/D | ratio of depth to pipe diameter | Q _m | pipe capacity |
| DEQ | Department of Environmental Quality | R&R | rehabilitation and replacement |
| DI | ductile iron | RDII | rainfall-derived infiltration/inflow |
| DLCD | Oregon Department of Land Conservation and Development | RG-1 | Rain Gauge 1 |
| EPA | Environmental Protection Agency | RTK | a unit hydrograph method |
| °F | degree(s) Fahrenheit | SCADA | Supervisory Control and Data Acquisition |
| FM | force main | SDC | system development charge |
| fps | feet per second | SFE | SFE Global, Incorporated |
| GIS | geographic information system | SSMP | Sanitary Sewer Master Plan |
| gpad | gallon(s) per acre per day | SSO | sanitary sewer overflow |
| gpcd | gallon(s) per capita per day | STEP | Septic Tank Effluent Pump |
| gpm | gallon(s) per minute | SWMM | Storm Water Management Model |
| HDPE | high-density polyethylene | UGB | urban growth boundary |
| HDR | high-density residential | Utility | Sanitary Sewer Utility |
| HGL | hydraulic grade line | WU | Weather Underground |
| HMSC | Hatfield Marine Science Center | WWTP | wastewater treatment plant |
| I/I | infiltration/inflow | | |
| ID | identifier | | |
| LDR | low-density residential | | |
| LF | linear foot/feet | | |
| LID | Local Improvement District | | |
| MDR | medium-density residential | | |
| mgd | million gallons per day | | |
| NASSCO | National Association of Sewer Service Companies | | |

Executive Summary

This Executive Summary provides a brief description of each section of the Sanitary Sewer Master Plan (SSMP). Recommendations and costs for a Capital Improvement Plan (CIP) are provided at the end of the section.

Introduction

The City of Newport (City) commissioned this SSMP and retained Brown and Caldwell (BC) to evaluate and make recommendations on capital improvement projects related to the City's sanitary sewer collection system. The plan was needed to help the City in continuing to provide reliable and effective sanitary services to the community. A number of key objectives have been identified in the report with the main objective for the City being to identify improvements in its system, as required to convey current and future flows. These improvements and their respective costs are presented herein.

Basis of Planning

The City provides sanitary sewer collection system services to approximately 10,000 people spread across an area of approximately 11.2 square miles. The City oversees over 62 miles of gravity pipelines ranging in size from approximately 3 to 36 inches in diameter, 1,400 manholes, 9 major pump stations, 16 minor pump stations, and 12 miles of sanitary force mains.

Pipe within the collection system is comprised of a variety of materials that range in age from almost 100 years to 10 years or less. The City provides wastewater collection services to residents, commercial establishments, institutional customers, and a number of industries in the service area. Sewer service is provided only to customers within the city limits.

Wastewater System Policies

Policies and standards have been created to guide the City and its users in the operation and development of the City's wastewater collection system. The policies and standards are derived from the City's Comprehensive Plan, City Resolutions, and Newport Municipal Code (NMC). Suggested modifications to the NMC have been provided to facilitate the continued protection of the City's valuable assets. They include the following:

- Vegetation requirements
- Root control
- Side sewer condition education requirement
- Fees for commercial/industrial wastewater groups
- Voluntary pretreatment program
- I/I reduction

Flow Projections and Modeling

In order to understand the current conditions and predict future deficiencies, a hydrologic/hydraulic (H/H) model was constructed. The model used base wastewater flows and rainfall-derived infiltration/inflow (RDII) data. The model was calibrated against measured field information collected using flow meters installed within the City sewer system over a 4-month period.

The information provided through the modeling activities helped to complete capacity analyses and identify issues for current, 20-year, and build-out development planning scenarios. The modeling results, when compared against design parameters established by the Oregon Department of Environmental Quality, BC, and the City, formed the basis for identifying deficient areas of the system.

The model includes all major trunk lines (greater than 10 inches in diameter), major pump stations, and sewers that could be impacted by future growth.

The primary modeling parameter for flow associated with selecting and sizing gravity sewers, pump stations, and force mains is the once-per-10-year, 24-hour duration recurrence flow interval. The flow condition was selected based on guidance provided by the Oregon Administrative Rules (OAR), specifically OAR 340-041-0009 (6) and (7), which prohibits discharge of raw sewage to waters of the state with some exceptions. The most notable of these are sanitary sewer overflows (SSOs) from a pump station or sanitary structure during a winter storm event greater than the 1-in-5-year, 24-hour duration storm, or a summer storm event greater than the 1-in-10-year, 24-hour duration storm. The more conservative condition was used herein. The U.S. EPA recommends that municipalities evaluate a range of storm events (typically 5- through 20-year storms) and to select an event that provides a level of protection against SSOs that is in accordance with community values.

Additional guidance parameters were established when reviewing the data and performing the hydraulic analysis.

Hydraulic Analysis

To determine the capacity limits of the system (gravity, force mains, and pump station), a hydraulic analysis was completed. Each category was evaluated to determine if an overflow was possible, given current and future flow conditions. For the gravity sewers the guidance parameter/criteria limit was that the available freeboard between the hydraulic grade line and the lowest sewer fixture be greater than 7 feet. The pump stations were evaluated on their ability to provide firm pumping capacity for future flows. The forcemains were evaluated and/or sized to maintain a velocity between 3.5 and 8 feet per second. A number of deficiencies were identified during the exercise and included in the plan recommendations.

In general, gravity sewer replacements include areas of Avery Street and NW Nye Street. The Bayfront PS and Nye Beach PS lack the firm capacity to convey existing, 20-year and buildout conditions peak flows; the Northside PS lacks firm capacity to convey the 20-year and buildout conditions peak flows; and the SE Running Springs Drive PS lacks firm capacity to convey the buildout conditions peak flow.

The Northwest 56th Street PS is located in a geologically unstable area. Though the pump station does not exceed parameters for flow or velocity, it is recommended that it be included on the pump station upgrade list. Initial efforts should be focused on completing an alternative analysis to determine the best solution (e.g., stabilize the current infrastructure, relocate)

The velocities in most force mains are within acceptable limits with the exception of Bayfront and HMSC for future peak flows and firm pumping capacity, respectively.

Capital Improvement Plan

The CIP is based on reviewing existing conditions and applying the results of the modeling effort. The plan is intended to help the City make decisions on existing and potential expected deficiencies given growth and flow increases in the system. It also provides guidance for expanding the system to meet the City's future growth needs.

Capital improvements have been developed based on the buildout condition planning scenario. These include sewer replacements that will be required to convey future flows and sewer extensions and pump stations that will be required to provide new sewer service to areas of the city without sewer service and to areas that may be annexed by the City in the foreseeable future.

The plan was established in a manner that is consistent with other communities, and is based on “existing conditions” planning. This type of planning focuses efforts on existing deficiencies first before preparing for future conditions. Also, the plan is structured to help allocate rates and system development charges based on improvements that are focused on existing and new users, respectively.

The average yearly cost of the plan has been separated into two categories: planned activities and rehabilitation/replacement (R&R). The planned activities address known deficiencies (i.e., capacity) based on the performed H/H analysis. The R&R activities assume a schedule that targets a discrete portion of the system.

It is recommended that the City allocate a yearly budget of approximately \$1.17M for planned projects (e.g. pump station gravity sewer upgrades) and \$1.53 for annual reoccurring activities (e.g. inspections and rehabilitation of known and assumed deficient sewers). A total annual budget of \$2.70M is expected with this plan.

Because of the timing of some projects, year-to-year expenditures may fluctuate. Estimated project costs are presented in Table ES-1 below, with discrete projects and annual activities broken out by description, location, and type. A timeline for each project has been identified.

Table ES-1. Cost of Recommended CIP s and Implementation Schedule

| Project no. | Project name | Project description | Year completed | Estimated cost of improvements, 2016 dollars ^a |
|---|-----------------------------|---|----------------|---|
| Gravity Sewer Improvements | | | | |
| 1 | NE Avery Street | Upsize gravity sewer from the Bayfront FM to the Northside PS | 5-10 | 1,230,000 |
| 2 | NW Nye Street | Upsize and rehabilitate gravity sewer from the Big Creek FM to the Northside PS | 1-5 | 1,140,000 |
| Total all gravity sewer improvements | | | | 2,370,000 |
| Major Pump Station and FM Improvements | | | | |
| 3 | Nye Beach PS | Upgrade pump station firm capacity to 2.74 mgd | 1-5 | 2,828,000 |
| 4 | Bayfront PS | Upgrade pump station firm capacity to 2.59 mgd | 1-5 | 3,224,000 |
| 4 | Bayfront FM | Upgrade force main to 14-inch diameter | 1-5 | 490,000 |
| 5 | Northside PS | Upgrade pump station firm capacity to 9.2 mgd | 5-10 | 2,780,000 |
| 5 | Northside FM | A conservative cost estimate was assumed from previously chosen alternatives. | 5-10 | 1,500,000 |
| 6 | SE Running Springs Drive PS | Upgrade pump station firm capacity to 0.27 mgd | 5-10 | 1,178,000 |
| 6 | SE Running Springs Drive FM | Upgrade force main to 14-inch diameter | 5-10 | 330,000 |
| 7 | SE 3 rd St PS | Replace pump station with a gravity line extending to SE 4 th St | 10-15 | 310,000 |
| 7 | NW 56 th St PS | PS is located in a geologically unstable area; Conduct alternative analysis and implement project solution. | 10-15 | 1,347,000 |
| Total all pump station and FM improvements | | | | 13,987,000 |

Table ES-1. Cost of Recommended CIP s and Implementation Schedule

| Project no. | Project name | Project description | Year completed | Estimated cost of improvements, 2016 dollars ^a |
|---|-----------------------------------|---|----------------|---|
| Sewer Extension Improvements | | | | |
| 8 | Surfland Septic Conversion | Construct new gravity system | 15-20 | 4,620,000 |
| 8 | Surfland Septic Conversion | Construct new pump station | 15-20 | 1,000,000 |
| 8 | Surfland Septic Conversion | Construct new force main | 15-20 | 612,000 |
| Total all sewer extension improvements | | | | 6,232,000 |
| Other Improvements | | | | |
| 9 | Maintenance Program | Conduct a study to establish a cleaning schedule for sewer mains. Currently the City has 19 sewer mains identified for regular cleaning | 1-5 | 20,000 |
| 10 | Re-route building crossings | Re-route sewer mains that cross under buildings including: <ul style="list-style-type: none"> Gravity system just east of NW Nye St, north of NW 12th St. Sewer main under Washington Federal Bank, 505 N Coast Hwy (SSMH 7003 to 7002 to 7061). Sewer main under house at 1819 NW Crestview Place (SSMH 4774 to 4787). Sewer main under house at 270 SE Pentner Lane (SSMH 7531 to 7533). The sewer main under the Newport Fire Station, 245 NW 10th St (SSMH 5045 to 5518) will be addressed by the Nazarene Church Sewer Replacement project and is not included in this cost. | 10-15 | 760,000 |
| Total all other improvements | | | | 780,000 |
| Annual Rehabilitation and Repair Costs | | | | |
| 11 | Sewer R/R Program (excluding PSs) | Rehabilitate sewers and FMs based on R/R implementation plan. Target Grade 5 and 4 sewers. | Annual | 1,011,750 |
| 12 | Inspection Program | Inspect 47,000 LF of gravity pipe per year | Annual | 117,500 |
| 12 | Inspection Program | Inspect 9,300 LF of force mains per year | Annual | 186,000 |
| 12 | Inspection Program | PS inspection program | Annual | 15,000 |
| 13 | Minor PS R/R Program | A schedule should be established to conduct these improvements on an annual basis. Priority pump stations include, but are not limited to: <ul style="list-style-type: none"> Embarcadero PS SW Minnie St PS San Bay-O PS NE 10th St PS | Annual | 200,000 |
| Total all annual costs | | | | 1,530,000 |
| Total of 20-yr CIP (without annual R&R costs, no inflation) | | | | 23,369,000 |
| Total of 20-yr CIP (with annual R&R costs, no inflation) | | | | 53,969,000 |

a. Estimated costs include a 30% allowance for construction contingencies and a 20% allowance for engineering design and administration. PS costs include a 25% allowance for contractor markups. See Appendix E for unit cost tables - assumes a depth of 10' per cost condition 2 for gravity and sewer extensions.

As part of the R&R program, the City should assess goals for I/I reduction. Currently, some areas of the system contribute higher I/I flows than others, when normalized by pipe length. As an example, Basins 4B and 7 together contribute 19 percent of the peak wet weather I/I but comprise only 7 percent of the sewered area. Further analysis is warranted to determine if an I/I reduction program is cost-effective and could defer, or even eliminate, the need for some predicted future capacity increase projects.

Costs associated with project no. 11 (Sewer R/R) are based on existing inspection data which was used to generate an assumed percent of the total system that will require R/R in the future. This approach assumes that existing Grades 2-4 will become Grade 5 or that new Grade 5 will be identified in later inspections, thus needing repair within 5-years of identifying. This approach carries some risk for pipes yet to be inspected, where Grade 5 pipe may currently exist in areas that will not be targeted for inspection for many years; thus, failure could prematurely occur and require emergency repairs. An alternate approach for consideration would be to complete a comprehensive inspection of the entire system and establish a more accurate understanding of Grade 5 deficiencies so that the plan can be revised to reflect actual versus assumed conditions. This approach may require more upfront costs, but has the potential of reducing future expenditures as the planning period advances.

For long-term planning purposes, the City should consider conducting a rate study in order to prepare financially for implementing future CIP projects.

Benefits of implementing this CIP program include:

- Optimization of the life-cycle of the existing system by selecting and sizing the projects according to population projections.
- Prioritization of the projects will enable the City to plan and prepare financially for implementing improvements.
- Optimization of public support for potential future rate increases.

Because the CIP program has been developed according to the scope of the SSMP, only key portions of the system have been evaluated for capacity limitations. It is possible that smaller, upstream systems may also need to be increased for capacity in the future.

Figure ES-2 below shows the locations of the recommended improvements.

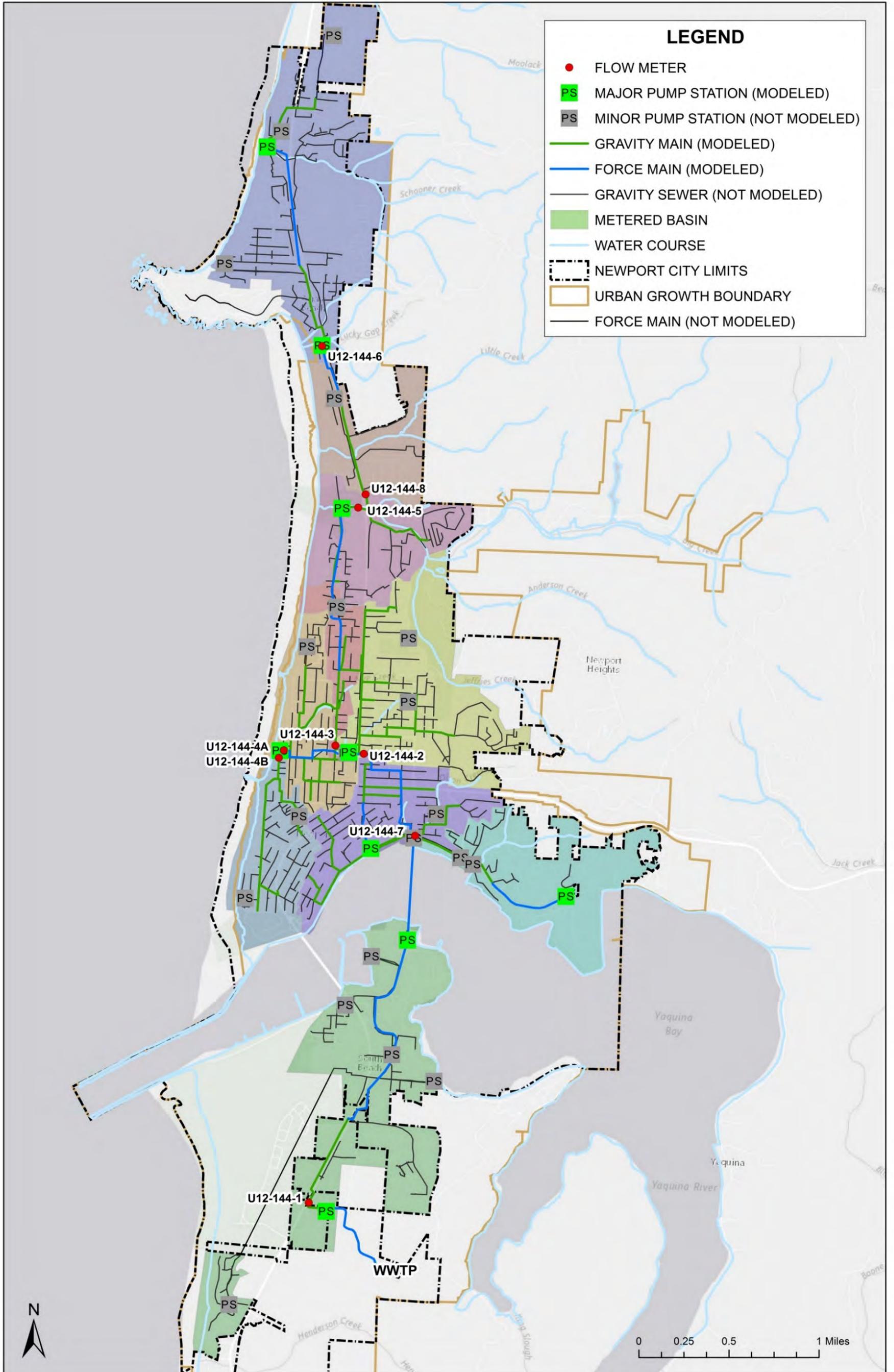


Figure ES-1. SSMP model extents and flow meter locations

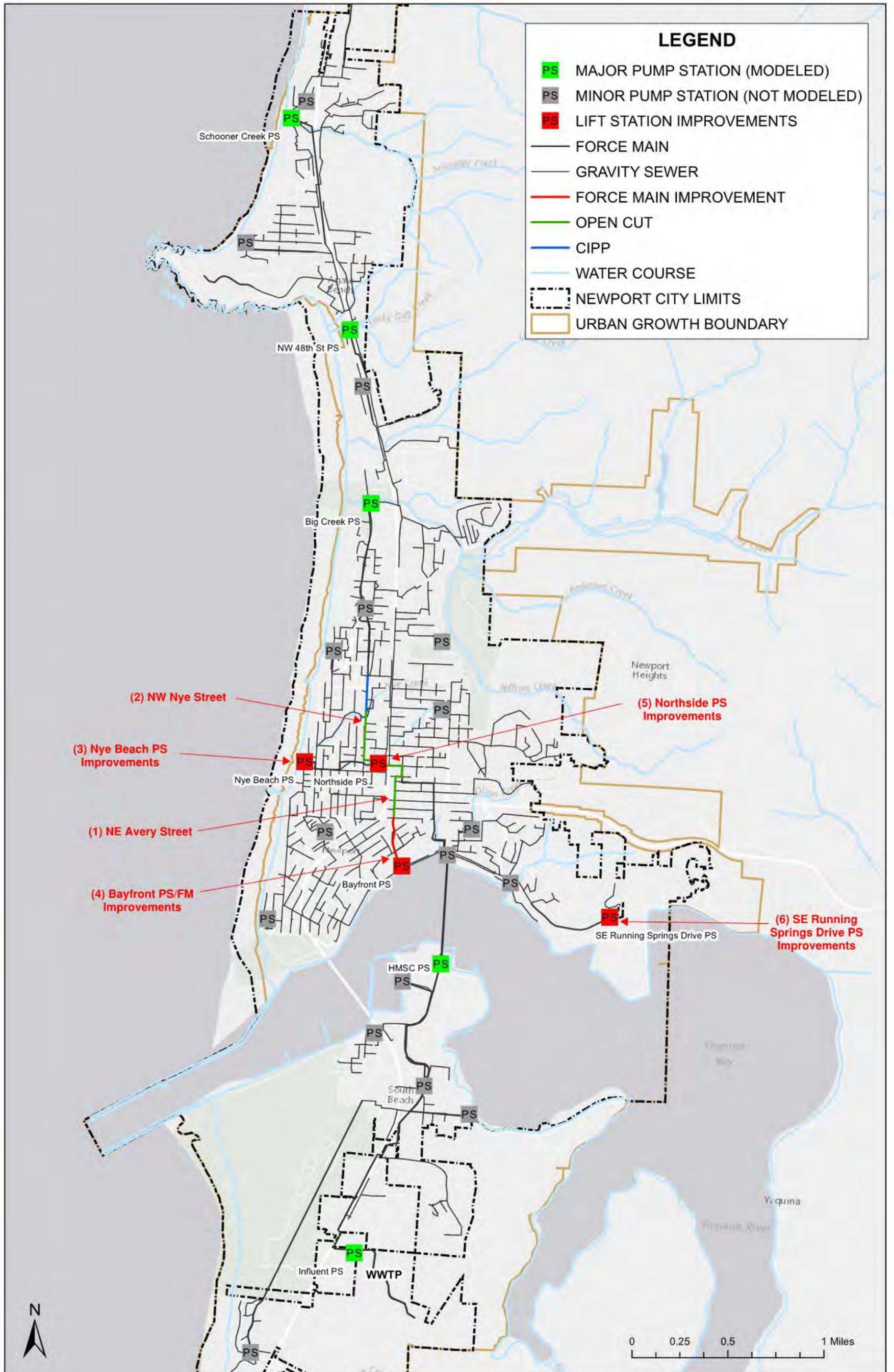


Figure ES-2. Recommended capacity-based future capital improvements

Section 1

Introduction

The City of Newport (City) provides sanitary sewer collection system services for approximately 10,000 people spread across an area of approximately 11.2 square miles. The City owns over 62.5 miles of gravity pipelines ranging in size from approximately 3 to 36 inches in diameter, 1,400 manholes, 9 major pump stations, 16 minor pump stations, and 12 miles of sanitary force mains. A majority of the sewer system was built after 1950 and is concrete, while much of the newer pipe is polyvinyl chloride (PVC).

The City commissioned this Sanitary Sewer Master Plan (SSMP) and retained Brown and Caldwell (BC) to evaluate and make recommendations on capital improvement projects related to the City's sanitary sewer collection system.

This section describes the purpose and scope of work for the master planning project.

1.1 Need for the Plan

The City recognizes that changes have occurred in the population, the area available for development, and land uses since the development of the last SSMP in 1988. A new hydrologic/hydraulic model and guidance on the capital improvement needs of the collection system are required as part of prudent planning for the future and for continued reliable and effective sanitary service to the community.

1.2 Plan Objectives

The objectives of the SSMP include the following:

- Evaluate the current and future flows and system conveyance capacity
- Identify capital improvements and their costs as required to convey current and future flows
- Identify potential additions or extensions of the collection system associated with future growth
- Identify probable future condition and serviceability of the system because of aging
- Evaluate the Newport Municipal Code (NMC) and provide recommended improvements
- Document the above activities in a new contemporary SSMP

1.3 Approach

In general, the following approach was used for the project:

- Acquisition and review of the geographic information system (GIS) data with respect to land use, zoning, and the layout of the sanitary sewer system
- Field survey or measure-downs of key manholes to determine manhole rim elevations and elevations of pipes
- Identification of data gaps and a request to the City to fill them
- Development of a hydrologic/hydraulic model
- Calibration of the model based on flow information from the previous year's wet weather flow monitoring task

- Additional calibration of the model based on the City's Supervisory Control and Data Acquisition (SCADA) information from pump stations
- Identification of existing (current) system hydraulic deficiencies and the improvements required
- Identification of future system hydraulic deficiencies and the improvements required
- Description of the major elements of a sewer rehabilitation program and why such a program is important for long-term collection system management success
- Development of the SSMP documenting all of the above

1.4 Plan Organization

The SSMP is organized as follows:

Section 1: Introduction. Defines why the SSMP was developed and its purpose.

Section 2: Basis of Planning. Documents the primary elements that formulate the basis of the planning effort.

Section 3: Wastewater System Policies. Documents the existing Comprehensive Plan (Comp Plan), Resolutions, and NMC and recommends improvements.

Section 4: Flow Projections and Modeling. Documents the flow projections used in the modeling and the modeling process.

Section 5: Hydraulic Analysis. Identifies hydraulic deficiencies for the existing and future planning scenarios.

Section 6: Capital Improvement Plan. Identifies capital improvements and costs associated with existing and future planning scenarios.

Appendices A through H provide supporting information for Sections 1 through 6.

Section 2

Basis of Planning

This section includes an overview of study area characteristics including location, topography, soils, land use, rainfall, and sanitary sewer collection system conditions.

2.1 Background and History

In 1856, Yaquina Bay was visited by the Calumet, a sailing vessel bound for a nearby military garrison. Six years later oyster beds were discovered in Yaquina Bay, turning Yaquina Bay into a profitable location. Newport was officially founded in 1866. Despite not being accessible by road until 1927, the city became a popular tourist destination. While Newport remains a popular tourist destination today, the city is also home to the National Oceanic and Atmospheric Administration (NOAA), Oregon State University's (OSU's) Hatfield Marine Science Center (HMSC), the Oregon Coast Aquarium, and Rogue Ales brewery.

In 1880, the city had a population of about 50. Newport continued to grow rapidly through 1910, reaching a population of 721 people. Growth continued but slowed during the Great Depression, with a population of 1,530 in 1930. The city saw substantial growth after World War II, reaching a population of 3,241 in 1950. Growth continued at a rapid pace, with a nearly 60 percent increase in population between 1970 and 1990. By 2000, the population was 9,532. According to the Population Research Center at Portland State University the 2015 population is estimated at 10,165.

The city's sewers convey the wastewater flows to the wastewater treatment plant (WWTP) southeast of the city where the water is treated, pumped north across Yaquina Bay, and then discharged into the Pacific Ocean.

2.2 City Location

Newport is located along the Oregon Coast in Lincoln County. Figure 2-1 below shows the city's location within the region.

2.3 Service Area Description

The City provides wastewater collection services to its residents, commercial establishments, institutional customers, and a number of industries. Sewer service is provided only to customers within the city limits. Figure 2-2 below is a general map of the collection system.

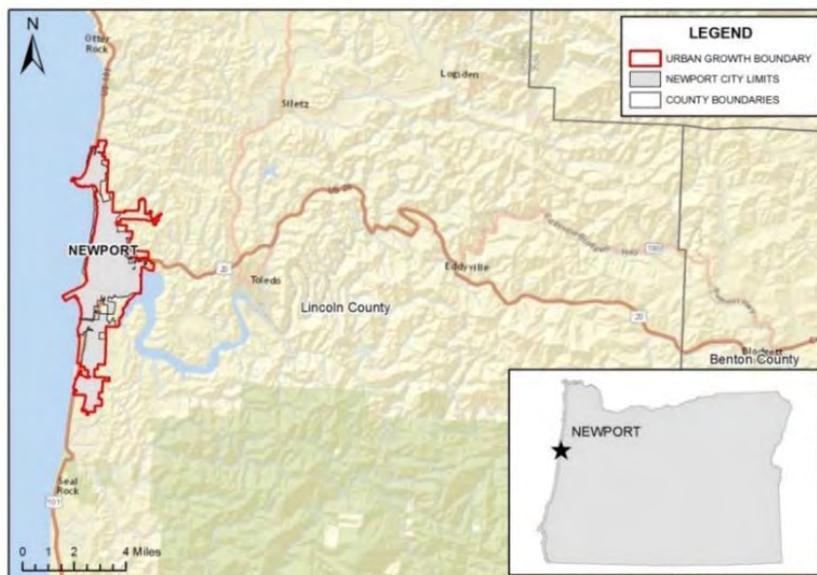


Figure 2-1. Vicinity map

2.4 Topography

The topography of Newport influenced how the sanitary sewer system was constructed. In general, the city is influenced by the Pacific Ocean and Yaquina Bay. Gravity sewers convey the flow down hills and toward the WWTP. Pump stations convey flows up hills and over divides, ultimately discharging into the gravity sewers.

2.5 Climate and Rainfall

Newport experiences relatively warm, dry summers and mild, wet winters. The majority of rainfall occurs during the months of October through April. The driest months are July and August, which typically average approximately 1 inch of monthly rainfall. The average annual precipitation for Newport is 68 inches.

Table 2-1 provides historical climate data averages for Newport.

| Table 2-1. Historical Climate Data | | | | | | | | | | | | | |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| Data | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
| Average maximum temperature, °F | 50.4 | 52.5 | 53.7 | 55.9 | 59.3 | 62.4 | 64.4 | 65.3 | 65.1 | 61.1 | 55.1 | 51.0 | 58.0 |
| Average minimum temperature, °F | 38.4 | 39.1 | 39.5 | 41.2 | 44.9 | 48.7 | 50.4 | 50.7 | 49.0 | 45.6 | 42.1 | 39.4 | 44.1 |
| Average total precipitation, " | 10.2 | 8.0 | 7.9 | 4.8 | 3.2 | 2.5 | 0.8 | 1.1 | 2.4 | 5.6 | 9.7 | 11.5 | 67.7 |
| Average total snowfall, " | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1.0 |
| Average snow depth, " | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Note: °F = degree(s) Fahrenheit.

a. The historical climate data are provided by the Western Regional Climate Center. The historical climate data are based on a period of record from 1931–2005.

2.6 Population

According to the Population Research Center at Portland State University the 2015 population is estimated at 10,165. A 2014 U.S. Census Bureau report shows the population of the city to be 10,116 (USCB 2014). The Comp Plan calculates the 2011 population to be 11,243 and predicts a population of 12,846 by 2031 (Multiple Authors, Latest Update 2012). It is expected that growth will be focused on expansion more than infill.

2.7 Land Use and Zoning

Land use and zoning provide the basis for developing future unit wastewater flows and overall wastewater flow projections for buildout conditions. Understanding the nature and distribution of the various land use classifications is important for accurate identification of future wastewater flow rates and the phasing of required improvements. This section describes both the existing and proposed future land uses for the study area.

Land use and zoning are largely governed by the local topography and by decisions made by the City, its citizens, and the Oregon Department of Land Conservation and Development (DLCD). Expansion of the urban growth boundary (UGB) must be approved by the DLCD before such actions can be adopted.

Information on current land use was obtained from GIS data provided by the City. The existing land use classifications are shown in Figure 2-3, below.

In addition, the City maintains a buildable lands inventory (BLI). The BLI was developed as part of the *Newport Economic Opportunities Analysis* to estimate land capacity in terms of dwelling units (ECON-Northwest 2012). These buildable parcels are identified as “infill development” in Figure 2-4, below.

The City’s planning department provided 20-year and buildout development conditions. Table 2-2 provides the 20-year and buildout projections for identified development in the city. The development identifier (ID) corresponds to the development area on Figure 2-4. Detailed views of the development areas are provided in Appendix B.

| Development ID | 20-year development conditions | Buildout development conditions ^c |
|----------------|---|--|
| 1 | • 30-acre light industrial development ^a | - |
| 2 | • 6-acre annexation for 48-unit assisted living facility | - |
| 3 | • 50 LDR units | • 50 LDR units |
| 4 | • 120-unit assisted living facility • 170 MDR units | - |
| 5 | • 50 LDR units | • 50 LDR units |
| 6 | • 22.5-acre HDR development ^a | • 12.5-acre HDR development ^a |
| 7 | • 38.5-acre LDR development ^a | • 38.5-acre LDR development ^a |
| 8 | • 135-acre LDR development ^b | • 135-acre LDR development ^b |
| 9 | • 9-acre log yard (light industrial) • 1.1-acre light industrial development • 1.2-acre waterfront commercial | • 12-acre waterfront heavy industrial |

| Table 2-2. 20-year and Buildout Development Conditions | | |
|--|---|--|
| Development ID | 20-year development conditions | Buildout development conditions ^c |
| 10 | <ul style="list-style-type: none"> 1.4-acre heavy industrial development 3.4-acre classroom/research facility (light industrial) 0.2-acre commercial development | - |
| 11 | <ul style="list-style-type: none"> 2.3-acre commercial development Oregon Museum of Science and Industry (OMSI) youth camp (assume 250 maximum occupancy) 60 MDR units | - |
| 12 | <ul style="list-style-type: none"> 0.2-acre commercial development 0.2-acre light industrial development | - |
| 13 | <ul style="list-style-type: none"> 4.1-acre commercial development | - |
| 14 | <ul style="list-style-type: none"> 1.1-acre light industrial development 1.1-acre commercial development | - |
| 15 | <ul style="list-style-type: none"> 1.0-acre commercial development | - |
| 16 | <ul style="list-style-type: none"> 7-acre commercial development 2.3-acre commercial development 350 LDR units 500-unit OSU student housing | <ul style="list-style-type: none"> 3-acre commercial development 650 LDR units |
| 17 | <ul style="list-style-type: none"> 1.1-acre light industrial development | <ul style="list-style-type: none"> 2.2-acre light industrial development |
| 18 | <ul style="list-style-type: none"> 0.5-acre commercial development 3 LDR units | - |
| 19 | <ul style="list-style-type: none"> 18 LDR units | - |
| 20 | <ul style="list-style-type: none"> 0.5-acre light industrial development Airport (assume 5-acre commercial development) | - |
| Infill development | <ul style="list-style-type: none"> 215 residential parcels | <ul style="list-style-type: none"> 501 residential parcels |
| Septic conversion | <ul style="list-style-type: none"> 184 LDR units | - |

Note: HDR = high-density residential, LDR = low-density residential, and MDR = medium-density residential.

Development densities specified in the NMC were used to determine the number of dwellings per acre. LDR = 5 dwellings per acre, MDR = 10 dwellings per acre, HDR = 10 dwellings per acre. An average of 2.19 people per household was assumed.

- a. Assume 80% infill to account for roads and rights-of-way.
- b. Assume 40% infill to account for steep-sloped terrain, roads, and rights-of-way.
- c. 20-year development conditions are not included in buildout conditions.

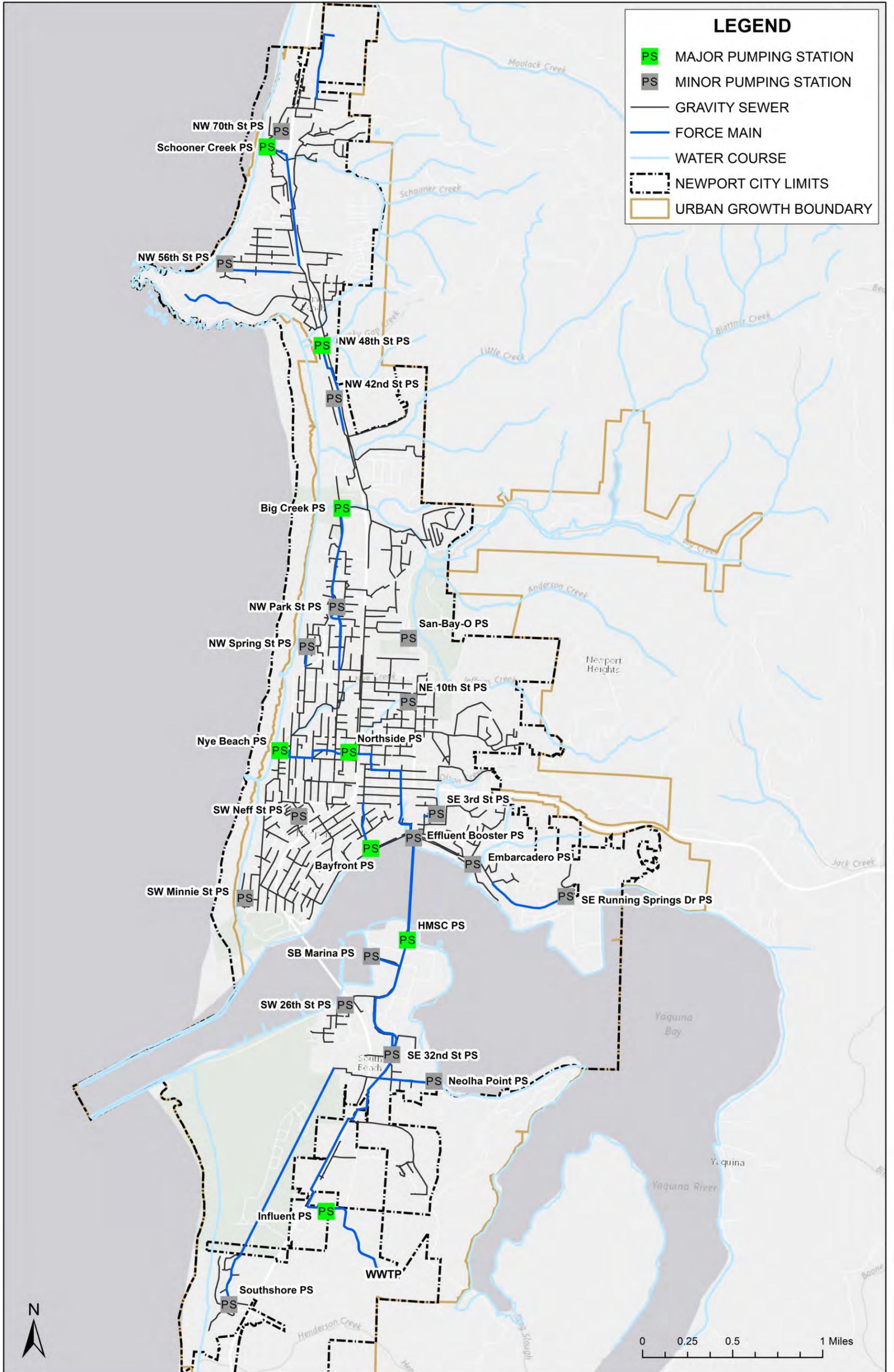


Figure 2-2. Collection system map

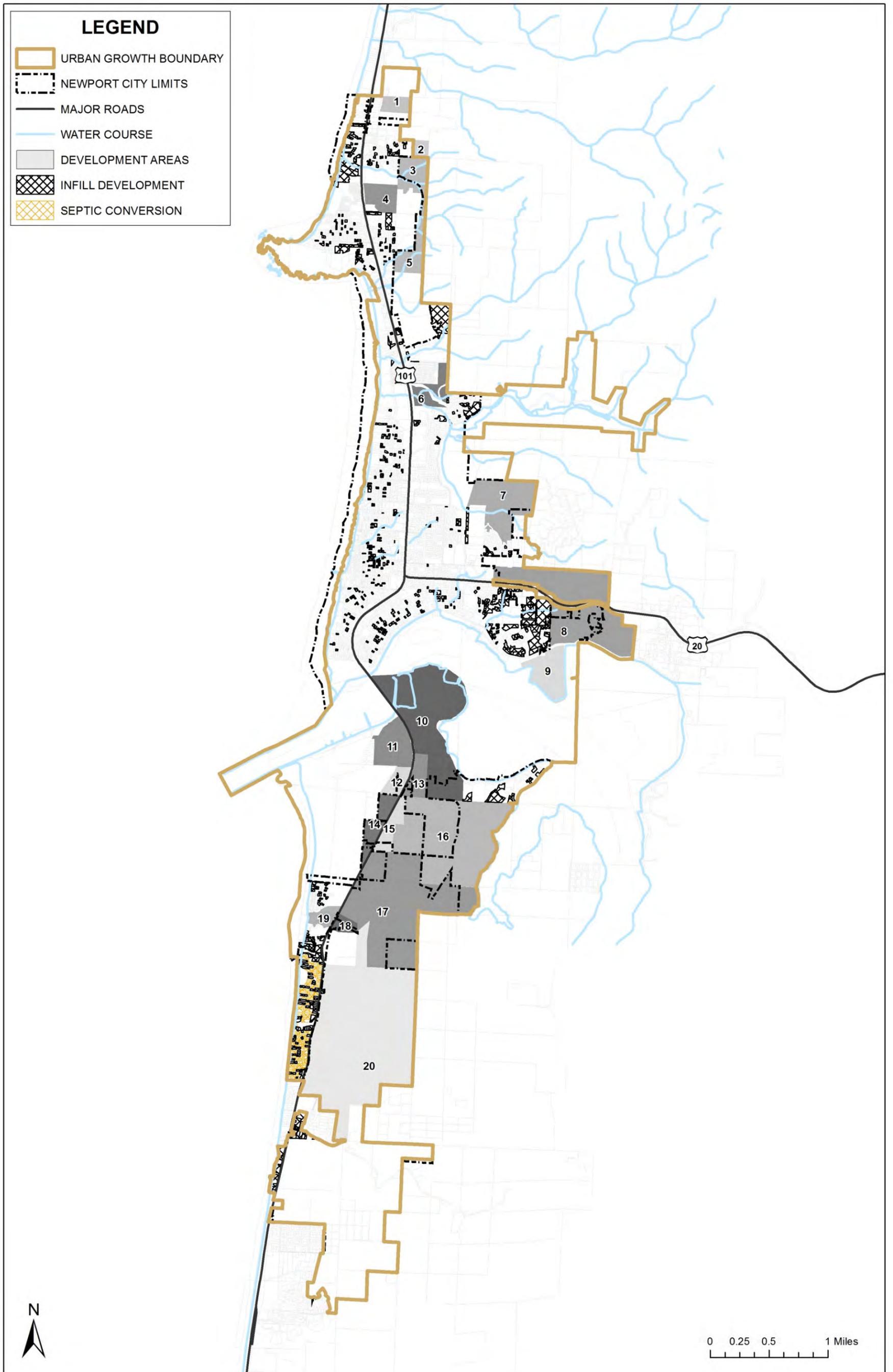


Figure 2-4. Future development for 20-year and buildout conditions

2.8 Description of Existing Collection System

According to the City’s GIS, sanitary sewer collection system services to approximately 10,000 people spread across an area of approximately 11.2 square miles. The City owns over 62.5 miles of gravity pipelines ranging in size from approximately 3 to 36 inches in diameter, 1,4 manholes, 9 major pump stations, 16 minor pump stations, and 12 miles of sanitary force mains.

According to GIS data, approximately 59 percent of the City’s sanitary sewer system was constructed since 1950, with 40 percent of the construction date unknown. As shown in Figure 2-5, growth was very strong in the 1970s through 2000s, but has slowed somewhat since 2010. Age data on the sewers constructed prior to the 1950s are not reliable. Figure 2-9 below shows the locations of sewers (gravity and forcemain) by age.

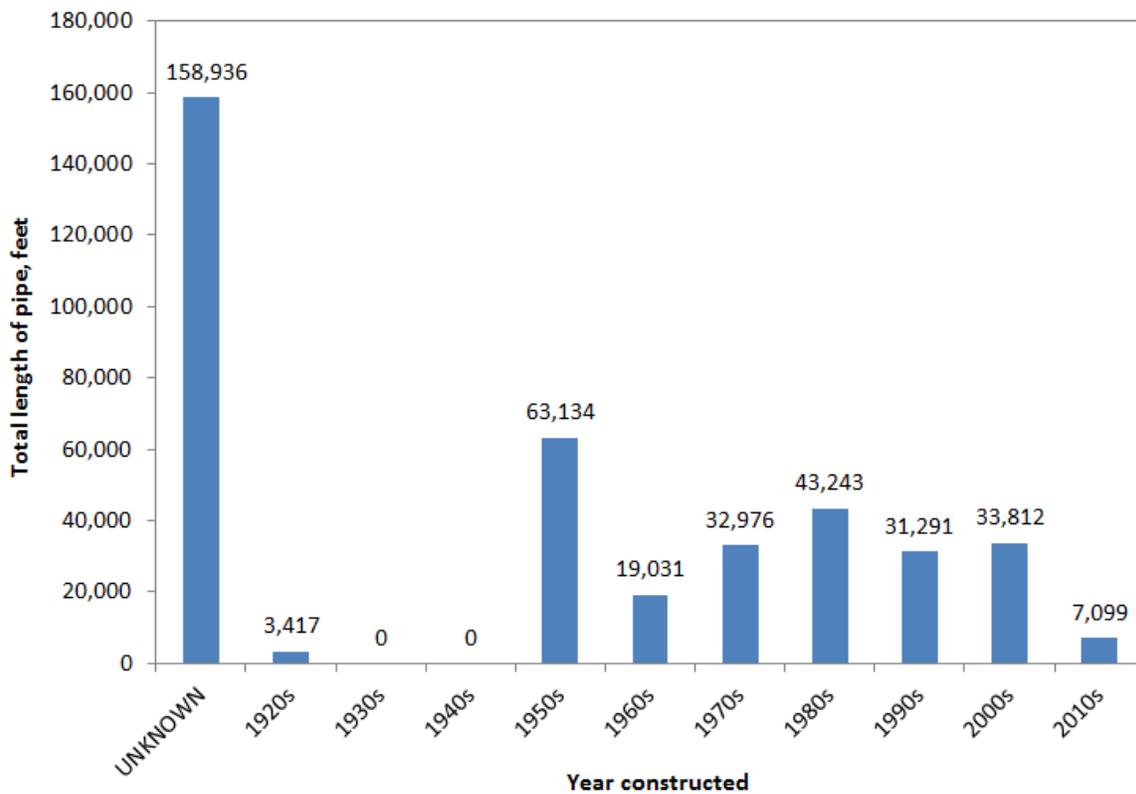


Figure 2-5. Pipe age distribution

The distribution of pipe size and material used throughout the city is based on data extracted from the City’s GIS. Approximately 25 percent of the pipes did not have an identified diameter. The size distribution of pipes within the sanitary collection system is shown in Figure 2-6, below. Approximately 53 percent of the sanitary sewer collection system consists of pipes 8 to 10 inches in diameter.

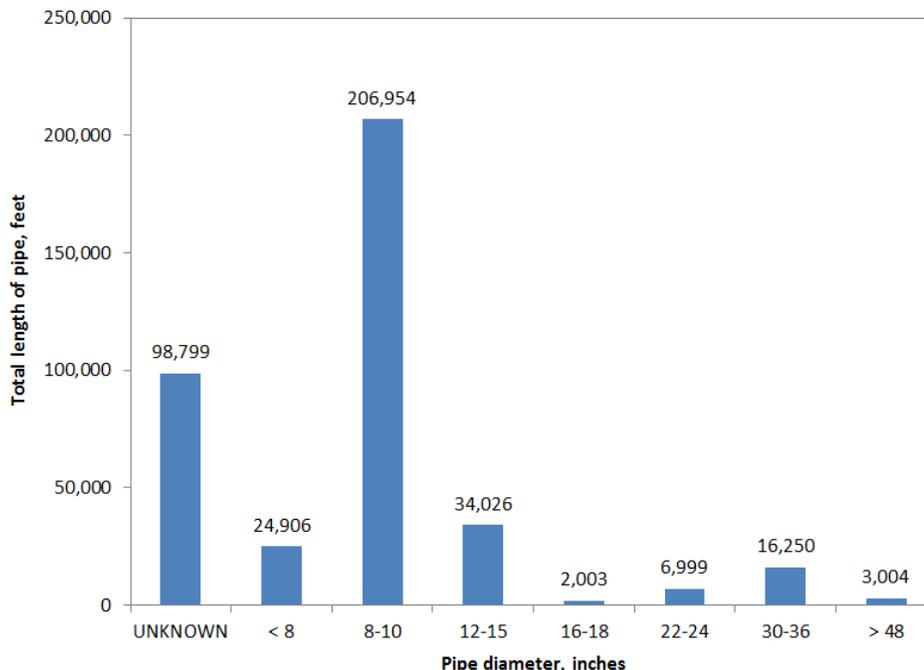


Figure 2-6. Pipe size distribution

The distribution of pipe materials used throughout the city is based on data extracted from the City’s GIS. Approximately 63 percent of the pipes did not have a material identifier. The distribution of materials shown in Figure 2-7 is based on the pipes for which the pipe material was identified. This figure includes the linear feet (LF) of force mains and gravity sewers. Figure 2-8 below shows the location of pipe materials as used throughout the collection system.

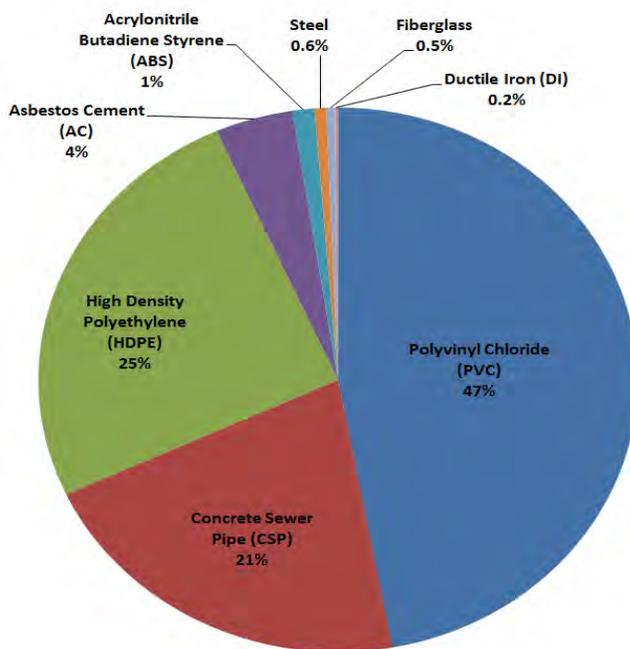


Figure 2-7. Pipe material distribution



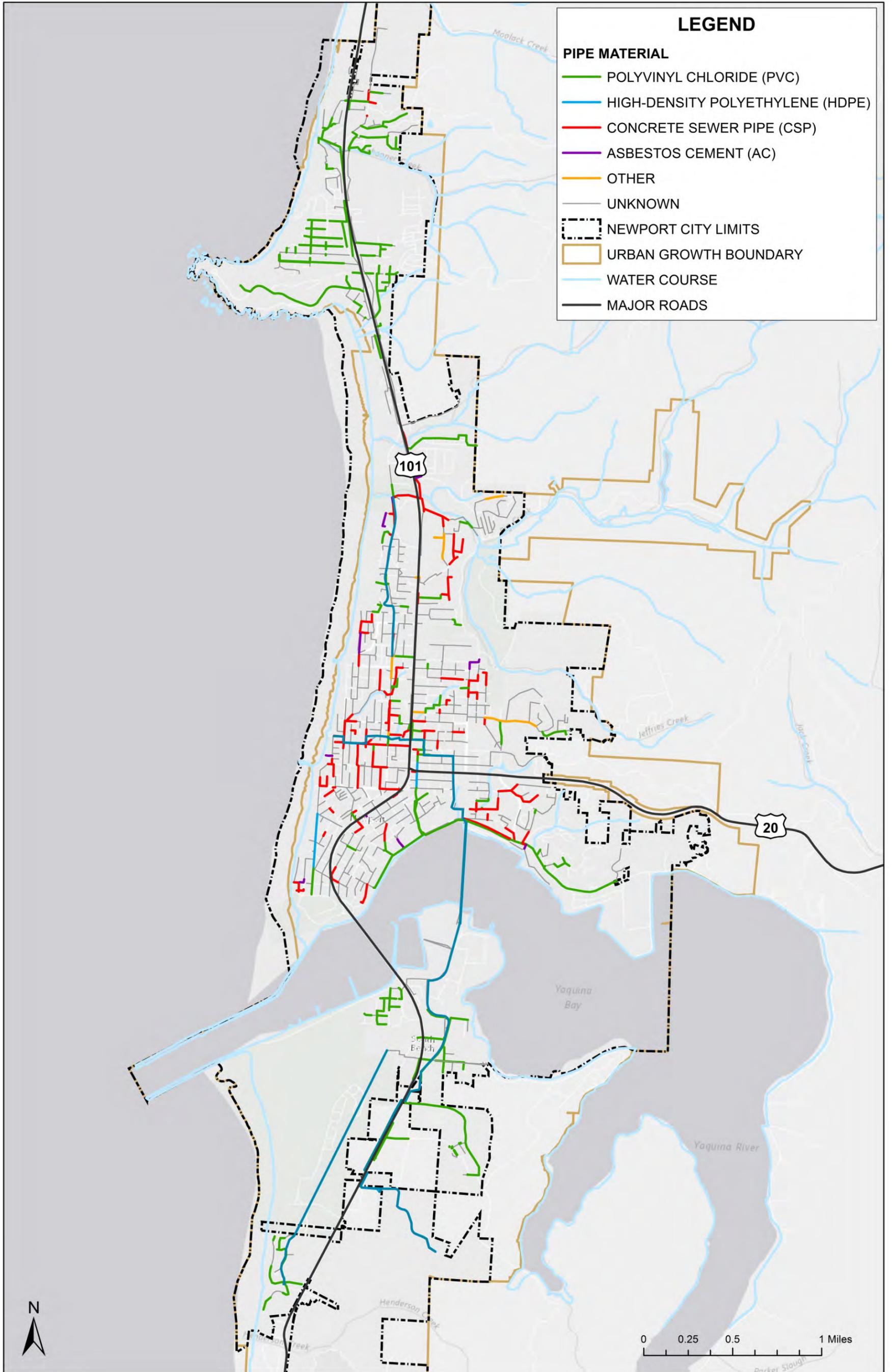


Figure 2-8. Pipe material location

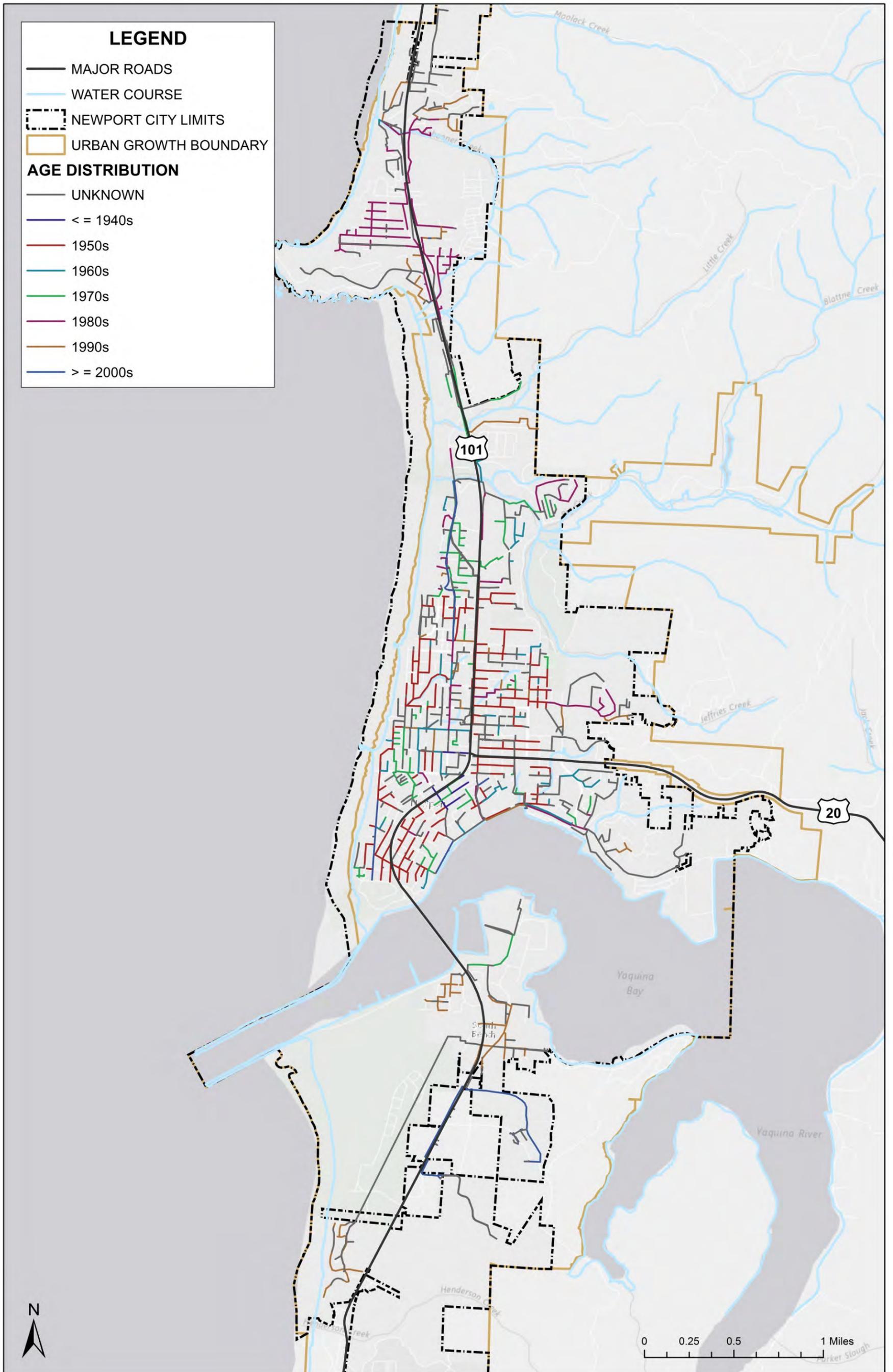


Figure 2-9. Pipe age location

The most widely represented pipe materials are PVC and concrete sewer pipe (CSP). Most new construction has used PVC pipe as the material of choice. Most of the high-density polyethylene (HDPE) pipes included in the inventory are used for force mains. Also, some of the City's force mains are constructed of PVC or ductile iron (DI), and three pump stations have force mains constructed in part, or in total, of asbestos cement (AC).

2.9 Description of Pump Stations

The topography of Newport has required that pump stations be used to serve a number of areas throughout the city. Currently, there are 9 major pump stations, 16 minor pump stations, and 12 miles of sanitary force mains within the service area owned and operated by the City.

The major pump stations are the primary focus of this SSMP because of their critical importance on the collection system. Minor pump station facilities and individual septic tank effluent pump (STEP) systems were not closely evaluated or modeled in this SSMP; however, an estimated allowance for inspection and maintenance of these pump stations is included in the sections below for planning purposes.

Table 2-3 summarizes the design data for the City's major pump stations.

| PS | Current firm pumping capacity ^a , gpm | Number of pumps | FM size, in. | FM material ^f | FM length, ft | Year constructed | Year upgraded ^b |
|-----------------------------|--|-----------------|--------------|--------------------------|---------------|------------------|----------------------------|
| Bay Front | 1,200 | 2 | 8 | PVC | 1,370 | unknown | 2001 |
| Big Creek | 2,430 | 3 | 14 | HDPE | 5,040 | unknown | 2016 |
| HMSC | 1,390 | 2 | 8 | DI | 35 | unknown | 2001 |
| Influent | 850 | 2 | 24 | HDPE | 3,000 | unknown | 2001 |
| | 3,500 | 4 | | | | | |
| Northside | 3,000 | 3 | 20-24 | Steel/DI/HDPE | 142,000 | unknown | 2001 |
| NW 48th Street ^c | 1,215 | 2 | 10 | PVC | 1,564 | 1980 | 2018 |
| Nye Beach | 1,400 | 2 | 12 | PVC/AC | 2,200 | unknown | - |
| Schooner Creek ^c | 660 | 2 | 8 | PVC | 3,779 | unknown | 2018 |
| SE Running Springs Drive | 153 | 2 | 4 | PVC | 2,505 | unknown | - |

Note: gpm = gallon(s) per minute.

- The firm pumping capacity is based on PS operation without the use of the redundant pump(s).
- Year upgraded is based on record drawings, if available. Pump configuration and sizes and FM geometries are shown for current conditions.
- The NW 48th Street PS, Schooner Creek PS, and Schooner Creek FM are currently being upgraded as part of the Agate Beach Improvement Project. These values represent their planned improvements.

Of the pump stations shown in Table 2-3, Nye Beach is the only pump station with a force main constructed in part of AC. The U.S. Environmental Protection Agency (EPA) has identified asbestos as a hazardous material requiring special precautionary handling and disposal procedures. The Oregon Department of Environmental Quality (DEQ) has developed a Fact Sheet with information about AC pipe. This Fact Sheet is provided in Appendix F.

Projects and costs identified in sections below do not account for handling and/or replacing AC pipe. Costs for AC pipe removal should be evaluated on a case-by-case basis or considered part of the contingency estimate to each project.



Section 3

Wastewater System Policies

This chapter presents policies and standards that guide the operation and development of the City's wastewater collection and conveyance system. The policies and standards are derived from the City's Comp Plan, City resolutions, and NMC (City 2011, 2015a).

3.1 Comp Plan

The City revised its Comp Plan in 2015 and included excerpts from the environmental geology of Lincoln County, Oregon. The summarized planning concerns for the City are listed below. Table 3-1 presents the Comp Plan goals and policies:

- There are large landslides on both the north and south sides of Yaquina Head. The landslide on the south side has made several buildings unusable. In Agate Beach, subsurface drainage is restricted and a public sewerage system is necessary before additional developments are made.
- Just east of Newport, in the vicinity of McClean [sic] Point, much of the slope has been affected by landslides. Development in this area should proceed with caution. The making of steep cuts, removal of toe support, the additional weight of embankments on the upper slopes, and the addition of moisture from the developments, including subsurface sewage disposal, all add to the instability of the slope. Serious problems can arise, especially following periods of extremely heavy rainfall. Developments in this area could suffer serious slope problems unless the slopes and embankments are properly constructed and a public sewerage system is installed.
- The area south of Yaquina Bay from Highway 101 eastward as far south as Henderson Creek is subject to a seasonal high water table. Before development reaches a greater density, a public sewerage system should be installed. A high water table creates problems for foundations of structures, and in some areas the water will stand at the surface after a heavy rainfall (City 2015a).

| Table 3-1. Comp Plan Goals and Policies | |
|--|--|
| Item | Policy, standard, or guideline statement |
| General Goals and Policies | |
| Goal | To assure adequate planning for public facilities to meet the changing needs of the City of Newport urbanizable area. |
| Policy 1 | The city shall develop and maintain public facilities master plans (by reference incorporated herein). These facility plans should include generalized descriptions of existing facilities operation and maintenance needs, future facilities needed to serve the urbanizable area, and rough estimates of projected costs, timing, and probable funding mechanisms. Public facilities should be designed and developed consistent with the various master plans. |
| Policy 2 | In order to assure the orderly and cost efficient extension of public facilities, the city shall use the public facilities master plans in the capital improvement planning. |
| Policy 3 | The city shall work with other providers of public facilities to facilitate coordinated development. |
| Policy 4 | <p>Essential public services should be available to a site or can be provided to a site with sufficient capacity to serve the property before it can receive development approval from the city. For purposes of this policy, essential services shall mean:</p> <ul style="list-style-type: none"> • Sanitary Sewers • Water • Storm Drainage • Streets <p>Development may be permitted for parcels without the essential services if:</p> <ul style="list-style-type: none"> • The proposed development is consistent with the Comp Plan; and • The property owner enters into an agreement, that runs with the land and is therefore binding upon future owners, that the property will connect to the essential service when it is reasonably available; and • The property owner signs an irrevocable consent to annex if outside the city limits and/or agrees to participate in a local improvement district for the essential service. |
| Policy 5 | Upon the annexation of territory to the City of Newport, the city will be the provider of water and sewer service except as specified to the contrary in an urban service agreement or other intergovernmental agreement. |
| Policy 6 | <p>Local Improvement Districts (LIDs) should be evaluated as a means of funding public facilities where the construction of such facilities is expected to enhance the value of properties that are adjacent or proximate to the planned improvements. For LIDs in developed residential areas, the aggregate assessment amount within a prospective LID should be no more than 10% of the assessed value of properties within the boundaries of the proposed district. The aggregate assessed value may be higher for other types of LIDs, such as developer initiated districts; however, in no case should it exceed 50% of the assessed value of the affected property.</p> <p>When considering a new LID, the City should proceed with preparing an engineer’s report that sets out the likely cost of constructing the improvement.</p> <p>Consideration should be given to bundling LID projects with other capital projects that the City secures bond funds to construct. For an LID to proceed, it must have a reasonable chance of being self-financing, with adequate reserves to ensure that payments are made on bonds/loans regardless of the property-owners’ repayment.</p> <p>If an LID project is considered by the City Engineer to be a partial improvement (less than ultimate planned design), the City should require that interim improvements conform to current City standards in a manner which will allow for completion of the total facility at such time that resources are available.</p> <p>New LIDs may be initiated by petition or resolution of the City Council.</p> <p><u>Formation of an LID by Petition</u></p> <p>The City Council shall evaluate new LIDs proposed by petition to determine if City resources should be expended to formulate an engineer’s report. Only those projects with substantial public support should proceed. An LID petition that includes non-remonstrance agreements and/or petitions of support from property owners representing 75% of the benefited area shall be presumed to have substantial public support.</p> <p>If an LID petition seeks to leverage other funding to achieve 100% of the project costs then the City Council should consider the likelihood of whether or not those funds will be available within the timeframe that they would need to be committed for construction.</p> <p>When the City receives petitions for multiple LIDs, priority should be given to prospective LIDs with the highest level of documented support, as measured by recorded non-remonstrance agreements and/or petitions in the benefit area in question.</p> <p>The cost of completing the engineer’s report should be included in the total LID assessment. The City should update its fee schedule to include a nonrefundable LID Application Fee to be paid by LID petitioner(s) for petition-initiated LIDs.</p> |



| Table 3-1. Comp Plan Goals and Policies | |
|---|---|
| Item | Policy, standard, or guideline statement |
| | <p>City Council Initiated LIDs</p> <p>The City Council on its own motion or upon recommendation by the City Manager may initiate an LID without a petition. In doing so the City Council shall consider the following factors:</p> <ul style="list-style-type: none"> • Project purpose and need, including whether or not the improvement addresses an immediate health and safety risk or if it has been identified as a priority improvement in an adopted public facility plan. • Whether the improvement will address existing deficient infrastructure that is chronically failing. • Capital cost of the improvement. • Project cost contingencies and related construction risk factors, such as the need to acquire new public right-of-way, unique construction challenges, or environmental issues. • Nature of the area benefited, including its existing condition. • The amount of potential non-LID funding that is expected to be leveraged by the LID, if any. This may include, but is not limited to, federal or state grants, sewer or other types of service charges, urban renewal funds, revenue or general obligation bonds, and reimbursement districts. • Percentage of properties within the benefit area that have prerecorded non-remonstrance agreements or have owners that favor formation of an LID. <p>When considering multiple City-initiated LIDs, priority should be given to the LID that addresses the greatest number of factors identified above.</p> |
| Policy 7 | <p>The City may use various means to finance, in whole or in part, improvements to public services in order to maintain public facility service levels and to carryout improvements identified in public facility plans, and adopted city goals and policies. This includes but is not limited to consideration of federal or state grants; water, sewer, storm drainage and other types of service charges; urban renewal funds, revenue or general obligation bonds, local improvement districts, and reimbursement districts.</p> |
| Wastewater Goals and Policies | |
| Goal | <p>To provide a wastewater collection and treatment system with sufficient capacity to meet the present and future needs of the Newport urbanizable area in compliance with State and Federal regulations.</p> |
| Policy 1 | <p>On-site sewer systems shall not be allowed unless the city's sanitary sewer system is greater than 250 feet away. In any case, a subsurface permit from the Lincoln County Sanitarian must be obtained prior to any development that will rely on an on-site sewer system.</p> |
| Policy 2 | <p>City wastewater services may be extended to any property within the urban growth boundary. Except for the very limited circumstances allowed by state law and regulations, the city will not generally provide wastewater services outside the urban growth boundary. The city may require a consent to annexation as a condition of providing wastewater service outside the city limits. Nothing in this policy obligates the City to provide wastewater services outside of the city limits. For property outside the city limits but within the urban growth boundary, wastewater services may be provided at the City's discretion only for:</p> <ol style="list-style-type: none"> a. residentially zoned lands as allowed by county zoning without full services, and b. commercial and industrial zoned lands to existing lawful uses as of the date (9/4/07) of this amendment. |
| Policy 3 | <p>The city will design and develop the wastewater collection and treatment system in a way that addresses the demands of the various users under normal and predictable daily and seasonal patterns of use.</p> |

3.2 City Resolutions

A resolution is a policy that has been adopted by the City Council. The following sections summarize resolutions that address wastewater policies. A copy of the City’s resolutions, as noted below, are provided in Appendix G.



3.2.1 Wastewater Utility Rates: Resolution No. 3721

The City's *Resolution No. 3721: Setting the Rates for Sewer Utility Charges* was adopted on June 15, 2015 (City 2015b). The resolution went into effect July 1, 2015. This resolution establishes the rates for:

- Metered rates: Defines established sanitary sewer rates for properties within and outside of the city limits, establishes an “extra strength charge” for biochemical oxygen demand (BOD), and a monitoring sewage discharge rate
- Individually determined rate: Commercial customers shall have a sewer use charge established based on the impact of the property on the sewer system, as determined by the City Manager
- Septage: Defines a disposal rate for septage at the City's WWTP
- Class A sludge sales: Establishes the price per cubic yard of Class A sludge

The City's sewer rates should be evaluated according to the financial obligation required to complete the CIP projects established in this SSMP.

3.2.2 Infrastructure Improvement Fees: Resolution No. 3722

The City's *Resolution No. 3722* sets the utility infrastructure improvement fees for the water, wastewater, and stormwater utilities as authorized in the NMC (City 2015c). This resolution was adopted on June 15, 2015, and went into effect on July 1, 2015. This resolution establishes the rates for utility infrastructure improvement fees; customers pay a monthly utility infrastructure improvement fee based on the water meter size.

The City's utility infrastructure improvement fees should be evaluated according to the financial obligation required to complete the CIP projects established in this SSMP.

3.3 Newport Municipal Code

The NMC is a collection of the regulatory and penal ordinances and certain administrative ordinances of the City. Chapter 5.15 of the NMC, “Sewer System and Charges,” contains the ordinances most relevant to how the utility operates. The NMC in its entirety is a 700-page document that was too large to include as an appendix to this document; however, it can be accessed on the City's website or by requesting an electronic copy from the Department of Public Works.

3.3.1 Existing Municipal Code

Table 3-2 below summarizes the information pertaining to the sewer system in the NMC. The information is organized by the following categories:

- Service area
- Planning considerations
- Design standards
- Protection and improvement of the environment and public health
- Utility financing
- Wastewater quality
- Pretreatment
- Operations and maintenance

Table 3-2. Municipal Code Policies

| NMC | Policy, standard, or guideline statement |
|--------------------------------|---|
| Service Area | |
| 5.15.020 | <p><u>Connection Required</u></p> <p>A. All structures containing sanitary facilities that are located within 250 feet of a collection sewer or intercepting sewer other than a force main must be connected to the sewer system. Connection to the public sewer system for new buildings or structures is required prior to the issuance of a certificate of occupancy. Any building served by a private sewage disposal system shall be connected to the city sewer system within 60 days of the date that a city sewer line is extended to within 250 feet of the property and is available for connection. At the request of the property owner of an existing structure, the City Council may allow deferral of the connection if connection would impose an undue hardship on the property owner. In determining what constitutes an undue hardship, the Council may consider the following factors:</p> <ol style="list-style-type: none"> 1. Whether the property owner is contributing to the cost of extending the main. 2. The cost of connection. 3. The condition and capacity of the private sewage disposal system. <p>Deferral shall be allowed only if the existing structure is served by a private sewage disposal system in good condition and adequate to serve the sanitary facilities on the property. Council may require proof that the disposal system is properly and regularly maintained and pumped, and routinely inspected by the county. The Council’s decision shall be by written order with findings. Any deferral allowed by the Council may be revoked by the Council at any time.</p> <p>If sewer connection is deferred, the deferral is automatically revoked and sewer connection must occur within 30 days of:</p> <ol style="list-style-type: none"> 1. Failure of the private sewage disposal system; 2. Failure of the private sewage disposal system to comply with all applicable state and county standards and requirements; 3. Sale of the property; or 4. Any determination by the state or county that the private sewage disposal system presents a health or environmental risk. <p>B. All private sewage disposal systems allowed by subsection A shall comply with all applicable state and county standards and requirements.</p> |
| 14.06.050 | <p><u>Recreational Vehicles: General Provisions</u></p> <p>C. It shall be unlawful for any person occupying or using any recreational vehicle within the City of Newport to discharge wastewater unless connected to a public sewer or an approved septic tank in accordance with the ordinances of the City of Newport relating thereof. All recreational vehicle parks within the City of Newport shall comply with the sanitary requirements of the City of Newport and the State of Oregon.</p> |
| 14.09.030 | <p><u>Temporary Living Quarters.</u></p> <p>Notwithstanding any other restrictions and prohibitions in this code, a recreational vehicle may be used as a temporary living quarters subject to the following conditions:</p> <p>C. The recreational vehicle used as the temporary living quarters must be self-contained for sanitary sewer.</p> |
| Planning Considerations | |
| 5.15.030 | <p><u>Permit and Construction Requirements</u></p> <p>A. No person, firm, or corporation shall construct or reconstruct any sanitary or storm drains within the city on private property or in public ways without a city permit.</p> <p>B. Applications for permits to construct or reconstruct sanitary sewers or storm drains shall be made in writing on a city form and include the location of the property, the name of the owner, the name of the person or firm engaged to construct or reconstruct the proposed sanitary sewer or storm drain and such other information and plans as may be required by the city.</p> <p>C. The applicant upon approval of permit shall pay all applicable fees established by Council resolution. If excavation work in the public right-of-way is required, the applicant shall deposit a cash bond in the amount determined by the city.</p> <p>D. All costs and expenses incidental to the installation of the building sewer connection shall be borne by the applicant.</p> <p>E. A separate building sewer connection shall be provided for every building, unless otherwise authorized in writing by the city.</p> <p>F. Existing building sewers may be used in connection with new buildings only when they are found, on examination and tests, to meet all requirements.</p> <p>G. All design, construction and materials and repairs shall conform to the city’s design and construction standards.</p> <p>H. Emergency repairs may be made without first obtaining a permit providing that the owner or his representative shall obtain a permit at the earliest possible time, by the end of the next normal business day.</p> <p>I. Sewer system users are responsible for all costs of service laterals and building sewers.</p> |



| Table 3-2. Municipal Code Policies | |
|---|---|
| NMC | Policy, standard, or guideline statement |
| 5.15.030 | <p><u>Permit and Construction Requirements</u></p> <p>D. No person, firm, or corporation shall construct or reconstruct any sanitary or storm drains within the city on private property or in public ways without a city permit.</p> <p>E. Applications for permits to construct or reconstruct sanitary sewers or storm drains shall be made in writing on a city form and include the location of the property, the name of the owner, the name of the person or firm engaged to construct or reconstruct the proposed sanitary sewer or storm drain and such other information and plans as may be required by the city.</p> <p>F. The applicant upon approval of permit shall pay all applicable fees established by Council resolution. If excavation work in the public right-of-way is required, the applicant shall deposit a cash bond in the amount determined by the city.</p> <p>G. All costs and expenses incidental to the installation of the building sewer connection shall be borne by the applicant.</p> <p>H. A separate building sewer connection shall be provided for every building, unless otherwise authorized in writing by the city.</p> <p>I. Existing building sewers may be used in connection with new buildings only when they are found, on examination and tests, to meet all requirements.</p> <p>J. All design, construction and materials and repairs shall conform to the city’s design and construction standards.</p> <p>K. Emergency repairs may be made without first obtaining a permit providing that the owner or his representative shall obtain a permit at the earliest possible time, by the end of the next normal business day.</p> <p>L. Sewer system users are responsible for all costs of service laterals and building sewers.</p> |
| 9.15.050 | <p><u>Standards and Conditions</u></p> <p>The city manager may approve the issuance of a permit for encroachment within the unimproved public right of way, easement, or public property where compliance with the following standards can be demonstrated or specific findings are made that the standard is not applicable. The city manager or designee may attach any conditions to the issuance of the permit that are reasonably related to ensuring compliance with this section, other applicable city codes and ordinances, and to protect the public interest.</p> <p>A. The following standards must be met for a permit to be granted</p> <p style="padding-left: 40px;">3. Clearances from manholes and underground pipelines such as city sewer lines, water lines, and storm drain lines shall be a minimum of 7 feet.</p> |
| 12.15.090 | <p><u>Prohibited Connection</u></p> <p>No person may connect to the water or sewer system of the city or obtain a building permit unless the appropriate SDCs have been paid, or the installment payment method has been applied for and approved.</p> |
| 13.05.035 | <p><u>Public Improvement Procedures.</u></p> <p>In addition to other requirements, public improvements installed by a developer that is dividing land, whether required or voluntarily provided, shall comply with this chapter, and with any public improvement standards or specifications adopted by the city. The following procedure shall be followed:</p> <p>D. Underground utilities, sanitary sewers, and storm drains installed in streets shall be constructed prior to the surfacing of the streets. Stubs for service connection for underground utilities and sanitary sewers shall be placed to allow future connections without disturbing the street improvements.</p> |
| 13.05.045 | <p><u>Adequacy of Public Facilities and Utilities (Electric and Phone)</u></p> <p>Tentative plans for land divisions shall be approved only if public facilities and utilities (electric and phone) can be provided to adequately service the land division as demonstrated by a written letter from the public facility provider or utility provider stating the requirements for the provision of public facilities or utilities (electric and phone) to the proposed land division:</p> <p>A. For public facilities of sewer, water, storm water, and streets, the letter must identify the:</p> <p style="padding-left: 40px;">2. Sewer mains sizes and locations, and pumping facilities needed, if any, to serve the land division.</p> |
| 13.05.095 | <p><u>Minor Replats and Partitions</u></p> <p>A. Procedure for Review. After an application for minor replat or partition is deemed complete, the community development director shall send notice to persons within 100 feet of the subject property and, if there are existing public easements, affected utilities, that the tentative plan has been filed. Notified parties shall be given 14 days to provide written comments. After the 14-day period, the community development director shall decide whether the application complies with the criteria and provide a written decision. The criteria for approval are:</p> <p style="padding-left: 40px;">4. The applicant has agreed to sign a consent to participate in sewer, water, or street local improvement districts that the subject lots or parcels would be part of once those districts are formed. The consent shall be a separate document recorded upon the lots or parcels subject to the partition. The document shall be recorded prior to final plat approval.</p> |



| Table 3-2. Municipal Code Policies | |
|---|---|
| NMC | Policy, standard, or guideline statement |
| 13.05.070 | <p><u>Land Division Application</u></p> <p>A. A person seeking approval of a land division shall submit the following to the Community Development Department:</p> <p style="padding-left: 20px;">11. Written letters from public facilities (water, sewer, storm water, and streets) and utilities (electric and phone) identifying requirements for providing service to the land division.</p> <p>C. The following general information shall be shown on the tentative plan of the land division:</p> <p style="padding-left: 20px;">A. The following existing conditions shall be shown on the tentative plan:</p> <p style="padding-left: 40px;">f. The location within the land division and in the adjoining streets and property of existing sewers, water mains, culverts, drain pipes, and utility lines.</p> |
| 13.05.025 | <p><u>Easements</u></p> <p>A. Utility Lines. Easements for sewers and water mains shall be dedicated to the city wherever a utility is proposed outside of a public right-of-way. Such easements must be in a form acceptable to the city. Easements for electrical lines, or other public utilities outside of the public right-of-way shall be dedicated when requested by the utility provider. The easements shall be at least 12 feet wide and centered on lot or parcel lines, except for utility pole tieback easements, which may be reduced to six (6) feet in width.</p> <p>B. Utility Infrastructure. Utilities may not be placed within one foot of a survey monument location noted on a subdivision or partition plat.</p> |
| 14.04.150 | <p><u>Aquaculture.</u></p> <p>By definition, "aquaculture" is the raising, feeding, planting, and harvesting of fish, shellfish, or marine plants, including facilities necessary to engage in the use.</p> <p>D. Aquaculture facilities shall be located far enough from any sanitary sewer outfalls to prevent any potential health hazard.</p> |
| 14.16.050 | <p><u>Development Standards – Accessory Dwelling Unit Standards.</u></p> <p>Accessory Dwelling Units shall conform to the following standards:</p> <p>H. An Accessory Dwelling Unit shall share water, sewer, electric, and gas connections with the primary dwelling.</p> |
| 14.20.050 | <p><u>Provisions for Flood Hazard Reduction.</u></p> <p>A. General Standards. In areas of special flood hazard as adopted by this ordinance (which may be illustrated on a zoning map as a Flood Hazard Overlay Zone (FH Zone)) the following provisions are required:</p> <p style="padding-left: 20px;">8. Subdivision Proposals.</p> <p style="padding-left: 40px;">b. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.</p> |
| 14.33.050 | <p><u>Criteria for Approval of an Adjustment.</u></p> <p>The approval authority may grant an Adjustment using a Type I or Type III decision-making process when it finds that the application complies with the following criteria:</p> <p>C. The Adjustment will not interfere with the provision of or access to appropriate utilities, including sewer, water, storm drainage, streets, electricity, natural gas, telephone, or cable services, nor will it hinder fire access;</p> |
| 14.33.060 | <p><u>Criteria for Approval of a Variance.</u></p> <p>The approval authority may grant a Variance using a Type III decision-making process when it finds that the application complies with the following criteria:</p> <p>E. The Variance will not interfere with the provision of or access to appropriate utilities, including sewer, water, storm drainage, streets, electricity, natural gas, telephone, or cable services, nor will it hinder fire access.</p> |
| 14.40.100 | <p><u>Procedure for Preliminary Development Plan (PDP) Application.</u></p> <p>A PDP shall be provided for each development phase of the destination resort. Completion of construction of a phase shall not be a prerequisite to approval of subsequent PDP's.</p> <p>A. The PDP application shall include:</p> <p style="padding-left: 20px;">d. Preliminary location of all sewer, water, storm drainage, and other utility facilities, and the materials, specifications and construction methods for the water and waste water systems;</p> |

Table 3-2. Municipal Code Policies

| NMC | Policy, standard, or guideline statement |
|--|--|
| Design Standards | |
| 11.05.130 | <p><u>Demolition</u></p> <p>A. The demolition of any building that contains asbestos or other hazardous materials shall be conducted in accordance with all applicable state laws and regulations, including regulations relating to removal, transportation and disposal of asbestos or other hazardous materials</p> <p>B. The Building Official may require any or all of the following as conditions of issuing demolition permits:</p> <p>4. Compliance with all applicable local, state and federal laws and regulations, including regulations relating to asbestos and hazardous materials and regulations relating to the protection of water and sewer systems.</p> |
| 13.05.040 | <p><u>Public Improvement Requirements</u></p> <p>A. The following public improvements are required for all land divisions, except where a subdivision plat is reconfiguring or establishing rights-of-way for future public streets:</p> <p>3. <u>Sanitary Sewers</u>. Sanitary sewers shall be installed to serve each lot or parcel in accordance with standards adopted by the city, and sewer mains shall be installed in streets as necessary to connect each lot or parcel to the city's sewer system.</p> |
| 14.04.180 | <p><u>Outfalls</u>.</p> <p>By definition, an "outfall" is an outlet through which materials are discharged into the estuary. Outfalls include sanitary (sewer) discharges, storm drainage facilities, waste seawater discharges, and industrial waste discharges.</p> <p>A. As applicable, the standards for dredging, shoreline stabilization, and placement of structures as set forth in this ordinance must be complied within the installation of outfalls.</p> <p>B. Sanitary outfalls shall not be allowed in poorly flushed areas of the estuary.</p> |
| 14.04.190 | <p><u>Submerged Crossings</u>.</p> <p>By definition, "submerged crossings" are power, telephone, water, sewer, gas, or other transmission lines that are constructed across the estuary, usually by embedding into the bottom of the estuary.</p> <p>A. Trenching or other bottom disturbance undertaken in conjunction with installation of a submerged crossing shall conform to the standards for dredging as set forth in this ordinance.</p> <p>B. Submerged crossings shall be designed and located so as to eliminate interference with present or future navigational activities.</p> <p>C. Submerged crossings shall be designed and located so as to ensure sufficient burial or water depth to avoid damage to the crossing.</p> |
| 14.32.070 | <p><u>Alteration, Expansion, or Replacement of Nonconforming Uses or Structures</u>.</p> <p>A. After verification of the status of a nonconforming use pursuant to subsection 14.32.030, the approval authority may authorize alteration, expansion, or replacement of any nonconforming use or structure when it is found that such alteration, expansion, or replacement will not result in a greater adverse impact on the neighborhood. In making this finding, the approval authority shall consider the factors listed below. Adverse impacts to one of the factors may, but shall not automatically, constitute greater adverse impact on the neighborhood.</p> <p>3. Adequacy of infrastructure to accommodate the use. For the purpose of this subsection, infrastructure includes sewer, water, and streets;</p> |
| Protection and Improvement of the Environment and Public Health | |
| 5.15.020 | <p><u>Connection Required</u></p> <p>C. No person shall discharge any sewage into any storm drain or natural drainage outlet.</p> |
| 5.15.060 | <p><u>Discharge Regulations</u></p> <p>E. No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any part of the sewer system.</p> <p>F. The public works director may adopt specifications and additional regulations consistent with city ordinances to carry out the purpose of this chapter. A copy of such additional material shall be maintained in the public works department.</p> |
| 5.15.080 | <p><u>Violation – Penalty</u></p> <p>A. A violation of any provision of this chapter is a civil infraction subject to a civil penalty of up to five hundred dollars. Each day a violation continues shall be considered a separate violation.</p> <p>B. Violations that constitute a health hazard are nuisances and may be abated as nuisance or by any other legal means of eliminating the hazard.</p> |



Table 3-2. Municipal Code Policies

| NMC | Policy, standard, or guideline statement |
|--------------------------|--|
| Utility Financing | |
| 5.15.070 | <p><u>Sewer Service Charges</u></p> <p>A. Users of sanitary sewer service shall be charged fees established by resolution of the City Council. The amounts may be based in whole or in part on the amount of water consumed at the property. The Council may establish fees for any service or impact on the system, including, but not limited to:</p> <ol style="list-style-type: none"> 1. Application fees. 2. Connection fees. 3. Usage fees. 4. Inspection fees. 5. Fees for improper connection. 6. Fees for misuse of the system. 7. Disconnection fees. <p>C. Sewer users are responsible for payment for sewer services as follows:</p> <ol style="list-style-type: none"> 1. The city shall prepare and mail billings for sanitary sewer services monthly. Billing shall be in the same manner as billings for water services, and shall be combined with water bills, if applicable. Deadlines for payment shall be the same as for water bills. 2. A delinquent fee in an amount established by Council resolution shall be added to all delinquent accounts. 3. The city shall charge a fee of 10% per year on all accounts that remain delinquent for more than three months to cover interest and collection costs. 4. The finance director is authorized to determine what constitutes a de minimis account balance and to waive the penalties in paragraphs two and three of this subsection in de minimis or extenuating circumstances. 5. The city may require deposits prior to providing sanitary sewer service or in lieu of a deposit, obtain a signed agreement from the property owner, whether the user of the system or not, that the owner will be ultimately liable for the user charges. 6. In addition to other lawful remedies, the city may enforce the collection of charges authorized by this chapter by withholding delivery of water to any premises where the sanitary sewer service fees are delinquent or unpaid, following the procedures and standards for shutting off water service for nonpayment of water bills. However, the city shall not deny or shut off water service to any subsequent tenant based upon an unpaid claim for services furnished to a previous tenant who has vacated the premises. |
| 12.05.005 | <p><u>Initiation of Local Improvement Districts</u></p> <p>The Council by motion or on petition of the owners of half the property benefited by the proposed public improvement may direct that a preliminary engineering report be prepared to assist the Council in determining whether a local improvement district should be formed to pay all or part of proposed street, sewer, sidewalk, drain, and/or other public improvements.</p> |
| 12.10.020 | <p><u>Application for a Reimbursement District</u></p> <p>A. Any person who is required to or chooses to pay for some or all of the cost of a street, water, sewer or other improvement in excess of what is needed to provide services to the person's property may, by written application filed with the city engineer, request that the city establish a reimbursement district. The street, water and sewer improvements must include improvements in addition to those that are required in connection with an application for permit approval and must be available to provide service to property other than property owned by the applicant. Examples include but are not limited to full street improvements instead of half street improvements, off-site sidewalks, connection of street sections for continuity, and extension or over-sizing of water or sewer lines. The city may be an applicant. The application shall be accompanied by a fee or deposit in an amount set by Council resolution sufficient to cover the city's administrative costs. If the Council establishes a deposit system, the applicant shall be responsible for supplementing the deposit on demand by the city in an amount sufficient to cover all anticipated costs by the city, including the costs of engineer's reports.</p> |
| 12.10.070 | <p><u>City Council Action</u></p> <p>D. The City Council resolution and reimbursement agreement shall determine the boundaries of the reimbursement district and shall determine the methodology for imposing a fee which considers the cost of reimbursing the applicant for financing the construction of a street, water or sewer improvement within the reimbursement district.</p> |



| Table 3-2. Municipal Code Policies | |
|------------------------------------|---|
| NMC | Policy, standard, or guideline statement |
| 12.10.110 | <p><u>Obligation to Pay Reimbursement Fee</u></p> <p>A. The applicant for a permit related to property within any reimbursement district shall pay the, in addition to any other applicable fees and charges, the reimbursement fee established by the Council, if within the time specified in the resolution establishing the district, the person applies for and receives approval from the city for any of the following activities:</p> <ol style="list-style-type: none"> 5. Connection to or new use of a sewer improvement, if the reimbursement district is based on the sewer improvement; |
| 12.15.020 | <p><u>System Development Charged Imposed; Method for Establishment</u></p> <p>B. Unless otherwise exempted, SDCs for water, wastewater, storm water, transportation and parks are imposed on all development within the city, on all development outside the city that connects to the water and/or sewer facilities of the city, and on all other development which increases the usage of the water and/or sewer system or that contributes to the need for additional or enlarged capital improvements. This shall include new construction and the alteration, expansion or replacement of a building or development if such alteration, expansion or replacement results in a change in any of the components of the formula for determining the amount of SDCs to be paid. For redevelopment, the amount of the SDC to be paid shall be the difference between the rate for the proposed redevelopment and the rate that would be applicable to the existing development.</p> |
| 12.15.050 | <p><u>Collection of Charge</u></p> <p>A. The SDC is payable on:</p> <ol style="list-style-type: none"> 2. Issuance of a development permit or approval for development not requiring the issuance of a building permit. A permit or approval to connect to the water and/or sewer system; 4. Issuance of a permit to connect to the sewer system or actual connection to the sewer system if a permit is not obtained. <p>B. SDCs are payable only for those types of improvements affected by the development, permit or connection. For example, a permit to connect an existing structure to the sewer system does not necessarily trigger an obligation to pay Parks, Transportation, Water or Stormwater SDCs.</p> <p>C. The amount of SDC payable shall be established by resolution relying on an approved methodology and SDC project plan. The SDC project plan, methodology and amount of charge may be adopted in a single resolution, and more than one type of SDC (water, sewer, storm, transportation and park) can be included in a single resolution.</p> |
| 12.15.065 | <p><u>Credits</u></p> <p>B. On termination of a use for which SDCs have been paid, a credit certificate shall be issued on written request of the property owner.</p> <ol style="list-style-type: none"> 1. The credit shall be for water, sewer and transportation SDC improvement fees only. |
| Wastewater Quality | |
| 5.15.060 | <p><u>Discharge Regulations</u></p> <p>A. No person shall discharge or cause to be discharged any stormwater, surface water, groundwater, roof runoff, cooling water or unpolluted industrial process waters to any sanitary sewer. In the event the sewer system user fails to comply with any order requiring disconnection or it is impractical to require the disconnection of any storm drain from the sewer system, the sewer system user shall be required to pay a surcharge for the use of the system as established by Council resolution.</p> <p>B. Stormwater and all other unpolluted drainage shall be discharged to storm drains, ditches, or natural storm drainage facilities or into drywells as approved by the city.</p> <p>C. Except as provided in this section, no person shall discharge or cause to be discharged any of the following waters or wastes to any public sewer:</p> <ol style="list-style-type: none"> 1. Any liquid or vapor having a temperature higher than one hundred fifty degrees Fahrenheit; 2. Any water or waste which may contain more than one hundred parts per million, by weight of fat, oil, or grease; 3. Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid or gas; 4. Any garbage except organic wastes from a commercial source that have been shredded by a disposal system with a maximum 1.5 horsepower; 5. Any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure, or any other solid or viscous substance capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewer system; 6. Any waters or wastes having pH lower than 5.5 or higher than 9.0 or having any other corrosive property capable of causing damage or hazard to structures, equipment and personnel of the sewage works; 7. Any waters or wastes containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment process or constitute a hazard in the receiving waters of the sewage treatment plant; |



| Table 3-2. Municipal Code Policies | |
|------------------------------------|---|
| NMC | Policy, standard, or guideline statement |
| | 8. Any waters or wastes containing suspended solids of such character and quantity that unusual attention or expense is required to handle such materials at the sewage treatment plant; 9. Any noxious or malodorous gas or substance capable of creating a public nuisance; 10. Any material from septic tanks or recreational vehicle holding tanks except at dump stations for that purpose operated or authorized by the city. D. Grease, oil, and sand interceptors shall be provided when necessary for the handling of those wastes; except that interceptors shall not be required for private living quarters. All interceptors shall be of a type and capacity approved by the city and shall be located so as to be easily cleaned and inspected. Where installed, all grease, oil and sand interceptors shall be maintained by the sewer system users, at their expense, in continuously efficient operation. The city may inspect facilities at any time for proper operation and maintenance. |
| Pretreatment | |
| | <u>Sewer Service Charges</u> B. When an industrial or commercial sewer system user will discharge sewage of unusual strength or character, the city reserves the right to reject the application for service, to require pretreatment of such waste, and/or require the sewer system user to pay additional charges as provided in this chapter. |
| | <u>Discharge Regulations</u> E. The admission into the sewer system of waters or wastes having: <ol style="list-style-type: none"> 1. A five-day Biochemical Oxygen Demand greater than 300 parts per million by weight, or 2. Containing more than 350 parts per million by weight of suspended solids, or 3. Containing any quantity of the substances described in Subsection C., or 4. Having an average daily flow greater than 2% of the average daily sewer flow of the city shall be subject to the review and approval of the city manager. The city may require pretreatment at the owner’s expense and may establish a fee for acceptance of the wastes. |
| | <u>Industrial Pretreatment</u> All non-domestic users of the city sewer system shall comply with industrial pretreatment standards of 40 CFR Chapter 1 Part 403. |
| Operations and Maintenance | |
| | <u>Power and Authority of Inspectors</u> A. Duly authorized city employees shall be permitted to enter upon all properties for the purposes of inspection, observation, measurement, samplings and testing. B. It shall be the permittee or permittee’s representative responsibility to request inspection of the work and to allow reasonable time for the city to schedule the inspection. Inspections shall be requested for and made during the normal business hours of the city. Should inspections be required during non-business hours, the permittee shall reimburse the city for all overtime costs incurred. |

3.3.2 Proposed Municipal Code Updates

BC has identified items that could be added or amended into the NMC that could provide additional protection for the City. Some of these items the City may choose to implement while others may be too politically sensitive to adopt. It is recommended that all NMC updates presented below be reviewed by the City Attorney.

Vegetation Requirements. The City may consider implementing new municipal code that grants the City the right to fall any trees necessary to install or maintain improvements, including sewer infrastructure, within the public right-of-way, or utility easements (temporary or permanent).

Root Control. The City may consider to include language in its municipal code that reserves the right to address vegetation on public or private property whose roots have entered the sewer and are restricting flow.



Side Sewer Condition Education Requirement. The City may consider implementing a side sewer condition education requirement to help educate homeowners on the condition of their private sanitary sewer system. This program would require educational flyers to be distributed to the homeowners at the time of sale or major remodel. The intention of this program is to raise awareness and encourage owners to maintain their private system, with the goal of reducing infiltration/inflow (I/I) in the City's system. In addition, the City may choose to provide financial assistance for side sewer rehabilitation to qualified customers to incentivize the program.

Charge for Commercial/Industrial Wastewater User Groups. The City may consider implementing new requirements or modifying its current "unusual strength or character" charges (5.15.070, 060) specific to commercial and industrial users based on their constituent strength, flow quantity, and/or duration and timing of discharge. The latter component not being covered in 5.15.060. Because of the sensitive nature of a secondary treatment plant's biological mass (i.e., biomass), large slug loads of high-strength material on an intermittent basis could result in reduced performance or efficiency of the treatment plant. Also, restaurants may be added to a specific billing category, with their rate table adjusted based on the implementation of a grease-retention service.

Voluntary Pretreatment Program. The City may consider amending the NMC to include the implementation of a voluntary pretreatment program. The implementation of a program in advance of a new National Pollutant Discharge Elimination System (NPDES) permit may provide the City with the most flexibility to manage pretreatment issues. Currently, the City has an expired permit that has been administratively extended. A new permit is needed; however, timing is unknown. The DEQ and EPA have specific requirements for implementing a pretreatment program, which can be explored at a later date if warranted.

I/I Reduction. The City may consider developing new municipal code to support the implementation of I/I-reduction activities. Code may be developed to require the disconnection of sump pumps, roof leaders, and footing drains where alternatives to the sanitary sewer are available. New code is required to support the rehabilitation of service laterals. Because the most effective I/I abatement programs include rehabilitation of the service laterals, the City needs the authority to have this work performed. Factors to be considered in developing new code language for service lateral rehabilitation include the following:

- Will the homeowner or the City perform the required upgrades?
- Who will pay for the upgrades, or what will be the cost-sharing mechanism?
- At what point will the improvements be required?
- How long will the homeowner have to perform the improvements if they are required to perform them?

Section 4

Flow Projections and Modeling

Hydraulic modeling of the City's trunk sewer system was performed to identify hydraulic capacity deficiencies in the existing wastewater sewer collection system for existing, 20-year, and buildout planning scenarios. This section documents the modeling process that was performed.

As part of the modeling effort, a hydrologic/hydraulic model was constructed. Base wastewater flows and rainfall-derived infiltration/inflow (RDII) were loaded into the model and calibrated. A capacity analysis was performed to determine hydraulic capacity issues during a design flow recurrence for current, 20-year, and buildout development planning scenarios.

4.1 Flow Monitoring Activities

Nine flow meters were installed from mid-December 2012 through March 2013 to collect information about wastewater flows in the conveyance system. Flow meters were distributed throughout the wastewater conveyance system to capture flow data for each of the major branches of the piped system.

SFE Global, Incorporated (SFE), under contract with BC, installed and maintained the flow monitors. SFE used an ISCO Model 2150 area-velocity flow monitor at each site. The flow monitoring information was used to develop dry weather flow diurnal patterns and calibrate wet weather response to rainfall. The flow data included 5-minute averages for a range of conditions including between a 2-year and 5-year storm event (i.e., 3.6 inches in 24 hours) in December and periods of both wet and dry weather. Rainfall for the overall flow monitoring period was approximately 40 percent below average, with rainfall in March being 65 percent below average.

The pump run time information was recorded by the City's SCADA system located at the major pump stations. Pump run time and nameplate pump capacity were used to estimate the flows pumped from the pump stations. Actual pump capacity could be less than the nameplate value dependent on force main and impeller conditions. A more accurate representation of these flows would require calibrated flow monitors installed in the force main, or extensive pump draw down testing. This additional effort was not deemed appropriate for this planning document. The flow monitoring sites and associated tributary areas, along with pump station observation locations, are shown in Table 4-1.

| Flow meter ID | Location | Manhole ID | Date range |
|---------------|----------------------------------|------------|---------------------|
| U12-144-1 | SE 50th Street PS | 8115 | 12/15/2012-4/1/2013 |
| U12-144-2 | 134 NE 4th Street | 7010 | 12/20/2012-4/1/2013 |
| U12-144-3 | NE Nye Street at 5th Street | 6256 | 12/21/2012-4/1/2013 |
| U12-144-4A | NW 3rd Street at Cliff Street | 6014 | 12/15/2012-4/1/2013 |
| U12-144-4B | 729 NW Beach Drive | 6084 | 12/21/2012-4/1/2013 |
| U12-144-5 | NW Ocean View at Big Creek Park | 4031 | 12/21/2012-4/1/2013 |
| U12-144-6 | 130 NW 48th Street | 3501 | 12/14/2012-4/1/2013 |
| U12-166-7 | 506 SE Bay Boulevard | 7572 | 12/13/2012-4/1/2013 |
| U12-166-8 | On trail south of 134 Nye Street | 4022 | 1/5/2013-4/1/2013 |

The boundaries shown in Figure 4-1 below define the extent of each calibration. The extent of each monitoring basin also defines the extent to which portions of the model were calibrated. The model's hydrologic parameter sets are defined by monitoring basin.

4.2 Model Development

The Storm Water Management Model (SWMM) urban hydrology and conveyance system hydraulics software was used for this effort. The following were completed as part of the model development:

- The model network was created using the City's pipe and manhole GIS data. Elevation data contained in the GIS were supplemented with a survey of select structures, record drawings, and surface elevation contours. The vertical datum used to report elevations in this plan is the North American Vertical Datum of 1988 (NAVD88).
- The major pump stations were included in the model with a simulated peak flow equivalent to their published firm capacity.
- Pipe elevation profiles of the trunk sewers were reviewed for continuity error and adverse pipe slope.

Note: Although SWMM is named as a storm water model, its hydrologic and hydraulic modeling components make it a model of choice for many engineers who model wastewater collection systems.

4.3 Model Extents and Design Parameters

The model includes all major trunk lines (i.e., greater than 10 inches diameter), major pump stations, and sewers that could be impacted by future growth. Figure 4-2 below shows the model extents.

The main modeling parameter selected for sizing gravity sewers, pump stations, and force mains is the once-per-10-year, 24-hour duration recurrence flow interval. The flow condition was selected based on guidance provided by the Oregon Administrative Rules (OAR), specifically OAR 340-041-0009 (6) and (7) which prohibits discharge of raw sewage to waters of the state with some exceptions. The most notable exceptions are that overflows from a pump station or sanitary structure are acceptable during a winter storm event greater than the 1-in-5-year, 24-hour duration storm or a summer storm event greater than the 1-in-10-year, 24-hour duration storm. The more conservative condition was used herein. The U.S. EPA recommends that municipalities evaluate a range of storm events (i.e., 5- through 20-year events is typical) and to select a storm event that provides a level of protection against sanitary sewer overflows (SSOs) that is in accordance with community values.

An additional design parameter for the conveyance system was set where the hydraulic grade maintains at least 7 feet of freeboard from the lowest sewer fixture during surcharged situations in the sewer (i.e., below-grade structures or the invert at below-grade spaces like a basement). This freeboard height was selected by BC based on past experience in other communities and confirmed acceptable by the City for use on the project.

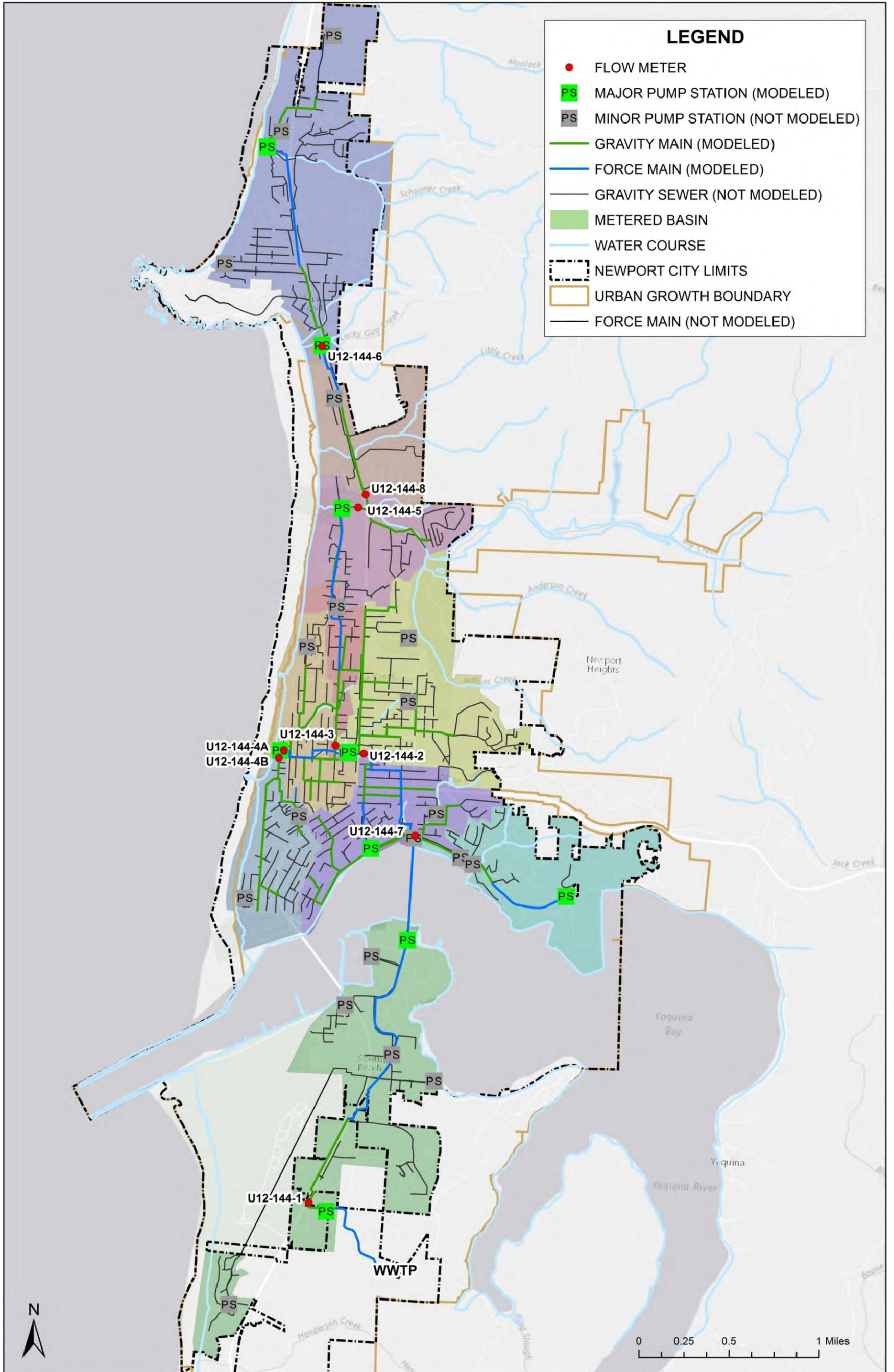


Figure 4-1. Flow monitoring sites

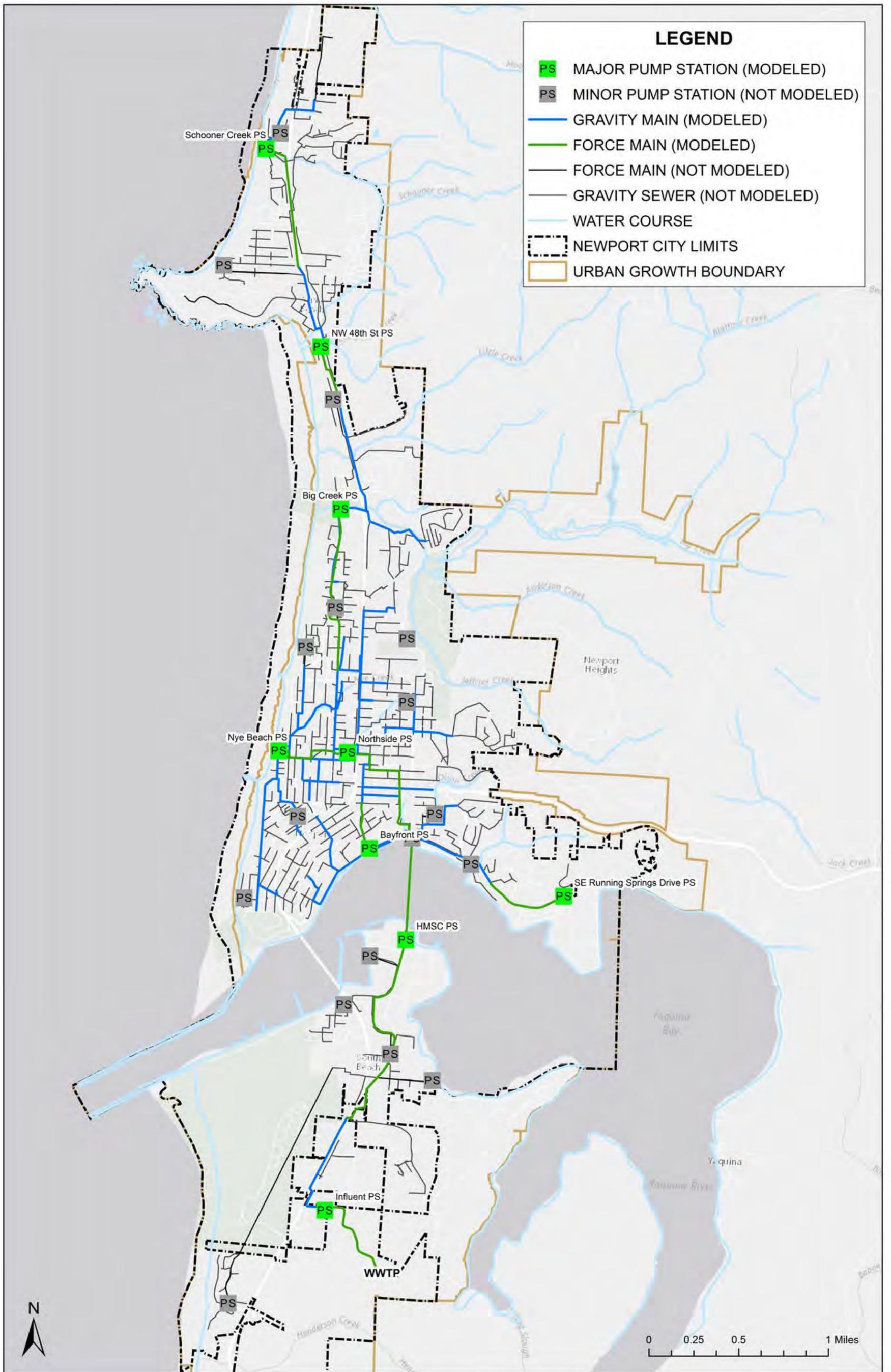


Figure 4-2. Model extents

4.4 Base Flows

Base sanitary sewer flows in the existing sanitary sewer collection system were developed from March 2013 recorded flows. The base flow includes wastewater contributions from residential, commercial, and industrial sources and continual groundwater infiltration that finds its way into sewers and manholes through cracks, joint separations, and other defects. RDII is not included in the base flow whereas groundwater infiltration is included. The flow monitoring record includes the groundwater sources so that with the addition of the wet weather I/I, the modeling portrays the entire wet weather flow regime.

4.5 Wet Weather Flows

RDII sewer flow was developed through the RTK method. The flow meter data were used to calibrate the RTK parameters and compare modeled flows to observed flows. Once calibrated, the model was used to simulate the design storm and determine capacity deficiencies in the system for both current and future development planning scenarios.

4.5.1 RTK Method

The RTK method uses a set of triangular unit hydrographs to generate flows. The hydrograph shapes are described by three parameters, R, T, and K, described as follows:

- R is the fraction of total precipitation that enters the sewer system as RDII
- T is the time to peak of the hydrograph
- K is the ratio of the recession time to time to peak

A typical hydrograph is shown in Figure 4-3.

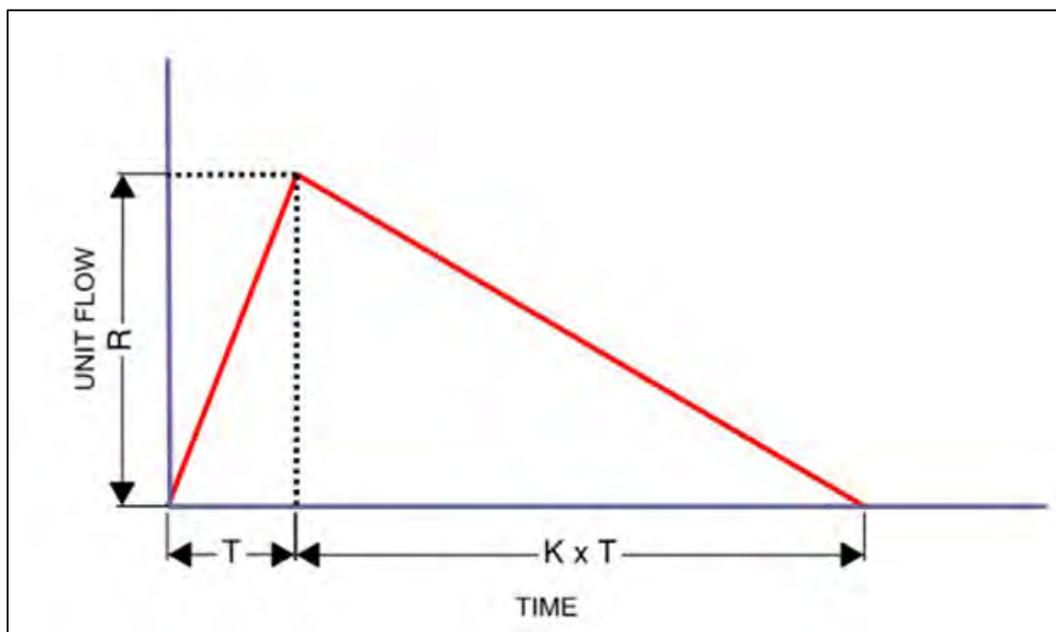


Figure 4-3. RTK unit hydrograph

Actual RDII hydrographs do not look like the simple triangular plot shown in Figure 4-3 because they are influenced by several different phenomena including inflow from rainfall sources, RDII, and direct infiltration from groundwater sources. To model this varied phenomenon, the RTK analysis is represented by three unit hydrographs corresponding to rapid inflow, moderate groundwater infiltration, and slow groundwater infiltration. Figure 4-4 depicts all three unit hydrographs combined into one that can be used to approximate RDII flows in a sewer system.

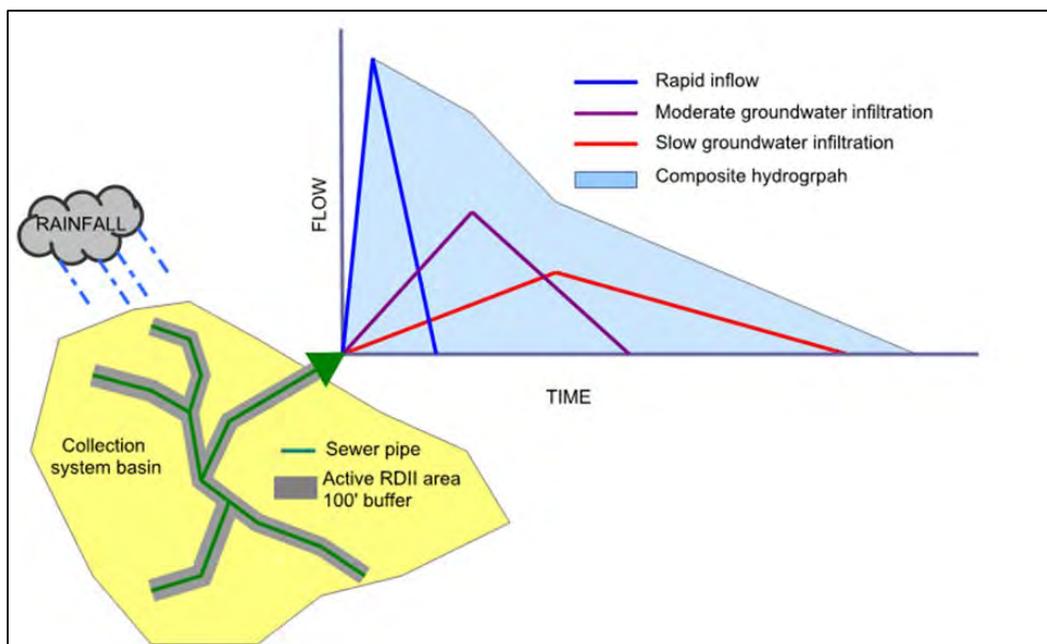


Figure 4-4. RTK method schematic

4.5.2 Precipitation Data

To calculate the R parameter for the RTK analysis, precipitation data representative of the sewer system are required. Rainfall data sets were obtained from the following sources and compared. Figure 4-5 below includes rain gauge locations:

- Rain Gauge 1 (RG-1): This rain gauge was installed in Newport during the flow metering period, mid-December 2012 through March 2013. The data provided for this gauge are in 5-minute increments.
- HMSC rain gauge: HMSC has a rain gauge with data from September 1996 through the present. The data provided for this gauge are in hourly increments. Uncorrected hourly data from August 2009 to present can be obtained at OSU's weather website (OSU 2016).
Additional data for September 1996 through July 2009 were obtained electronically from HMSC. These data are provided as an electronic deliverable in Appendix A.
- Newport Municipal Airport rain gauge: The Newport Municipal Airport rain gauge was used to provide antecedent precipitation conditions for the flow monitoring period. Uncorrected provisional 20-minute data from January 2002 to present can be obtained online (WU 2016).

The RG-1 data, with Newport Municipal Airport rain gauge data added to the beginning of the time series (from October 1 to December 31, 2012), were used for model calibration.

The HMSC rain gauge data were used in the long-term model simulation described in Section 4.5.5.

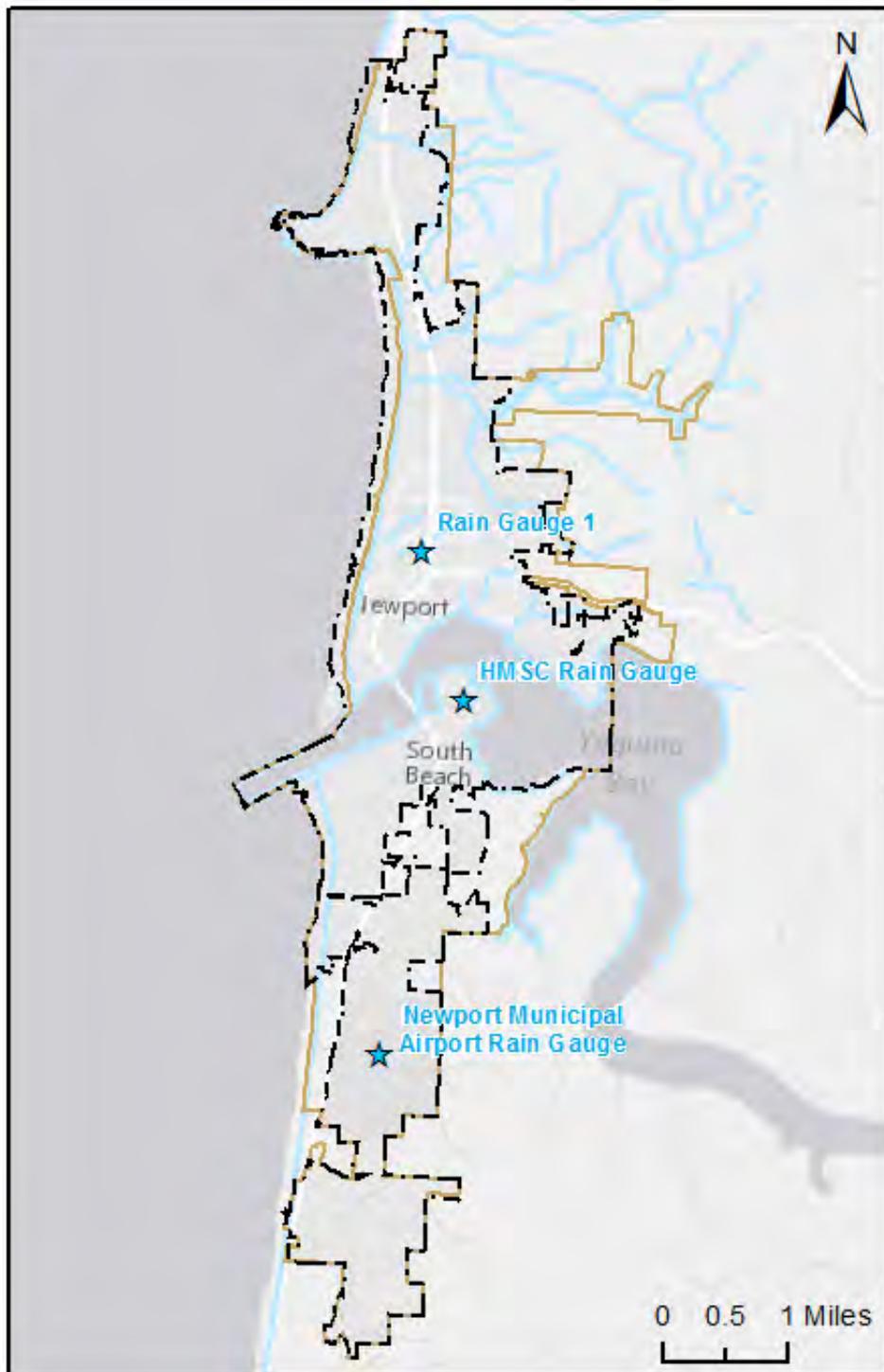


Figure 4-5. Rain gauge locations

4.5.3 Area Contributing to Rainfall-Derived Infiltration and Inflow

As shown in Figure 4-4 above, only a portion of a sewer basin was assumed to contribute to RDII in the sewer system. This portion of the overall area was estimated by applying a 100-foot buffer to all active sanitary mainline sewers in the system. This buffer area was distributed among all of the active model manholes based on upstream pipe length using GIS.

4.5.4 Wet Weather Model Calibration

The wet weather flow prediction capabilities of the model were verified against actual recorded flows to calibrate the model for wet weather conditions. Calibration of a model involves applying base flows and selecting RTK parameters that match RDII occurring during an observed storm event. Confidence in the prediction capabilities of the model are then increased by applying the parameters to other storm events in the flow record.

Calibration of the model was completed for each flow meter location and each pump station with recorded data from the field monitors. The results for the available flow meters are shown in Figures 4-6 through Figure 4-13, below.

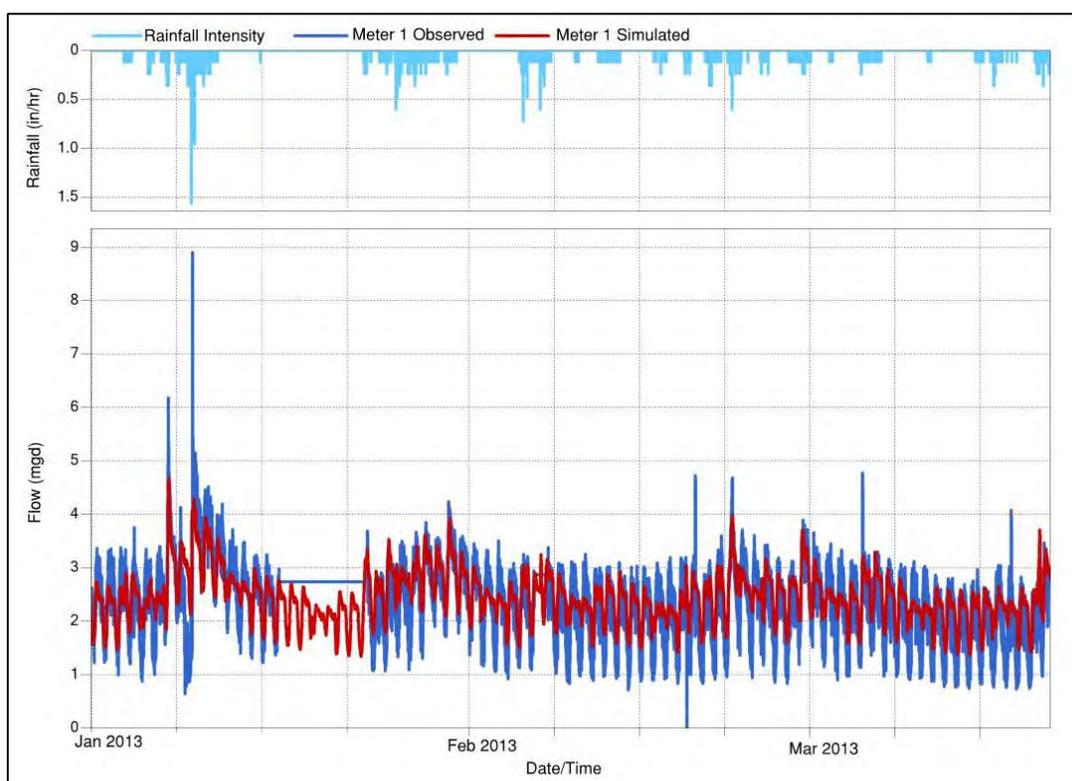


Figure 4-6. Meter 1 calibration

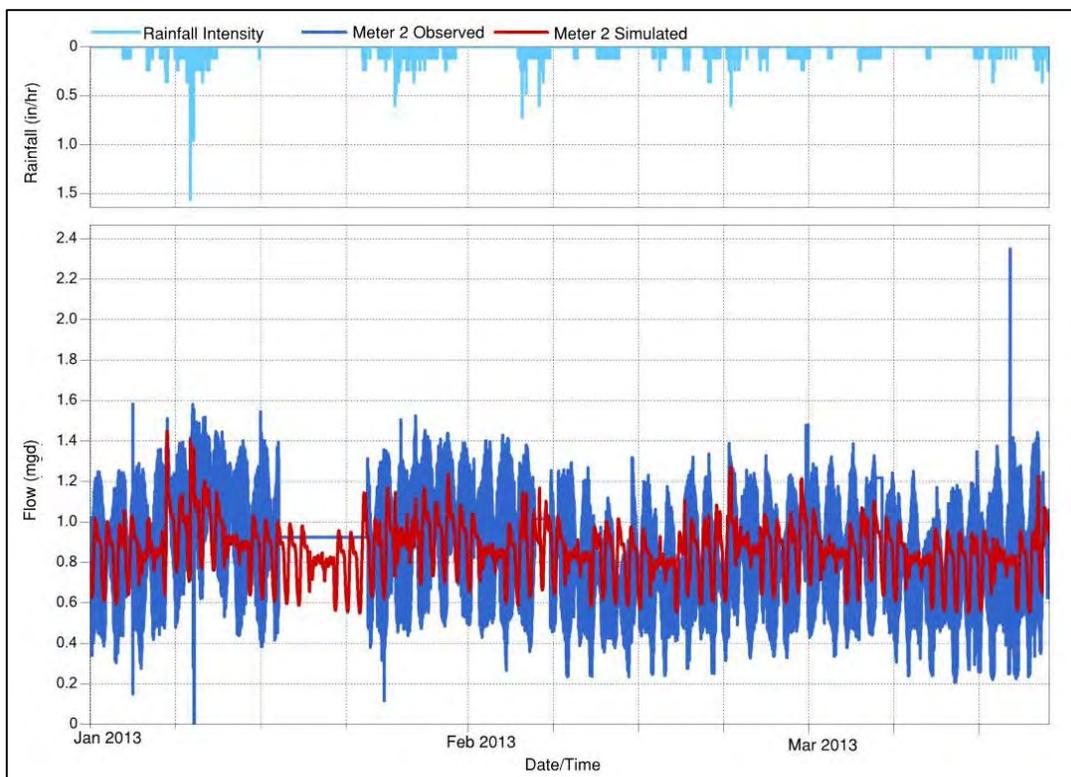


Figure 4-7. Meter 2 calibration

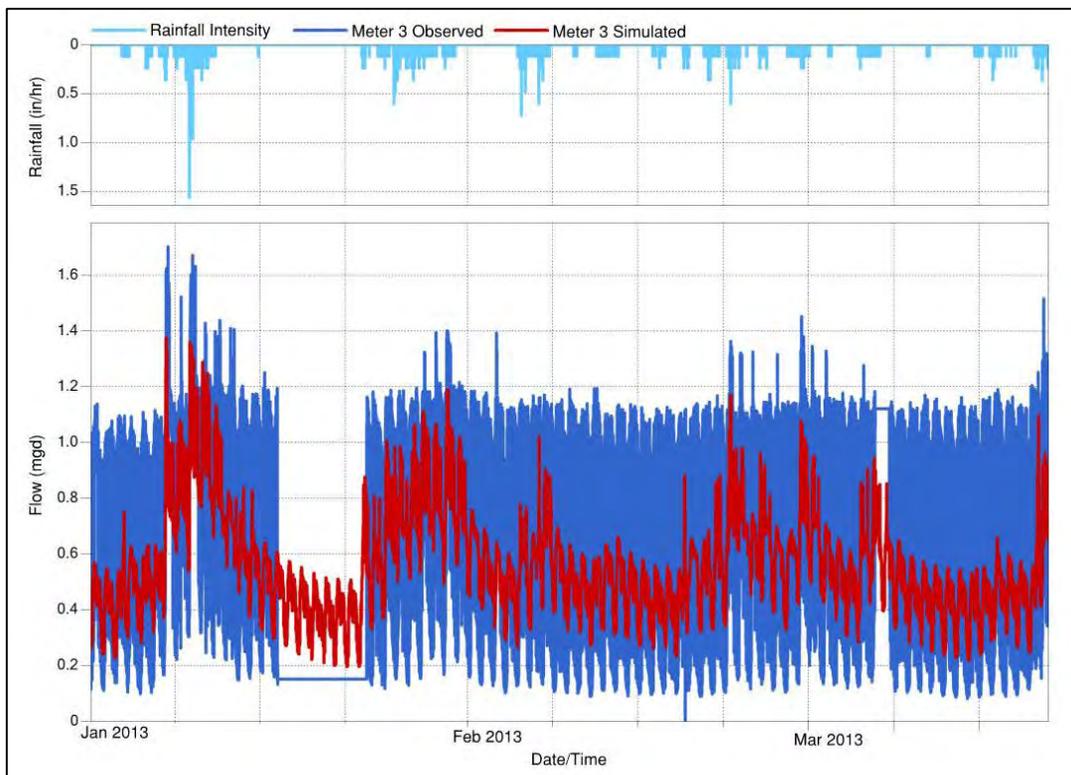


Figure 4-8. Meter 3 calibration



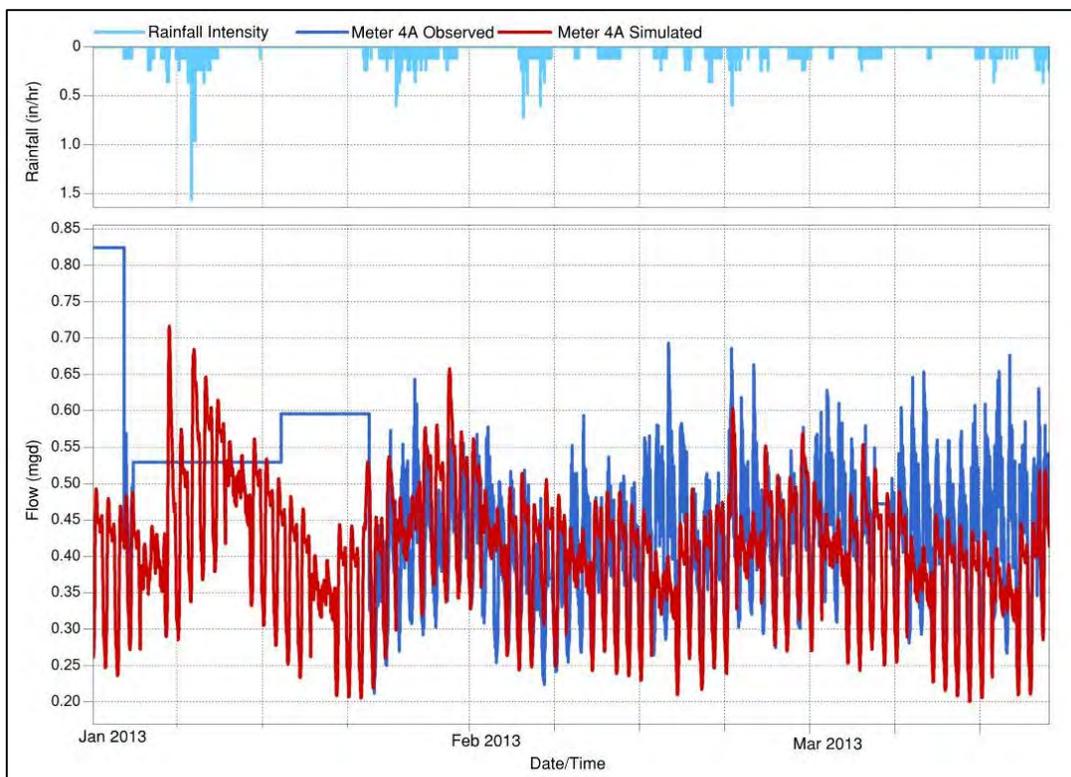


Figure 4-9. Meter 4A calibration

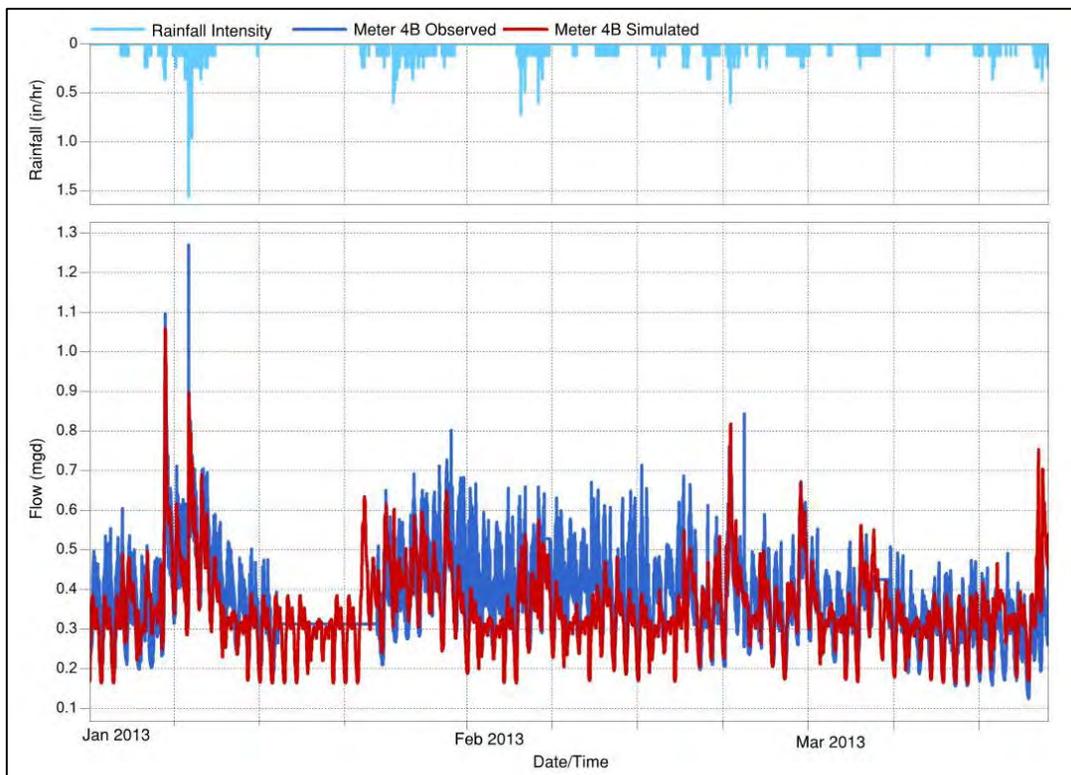


Figure 4-10. Meter 4B calibration



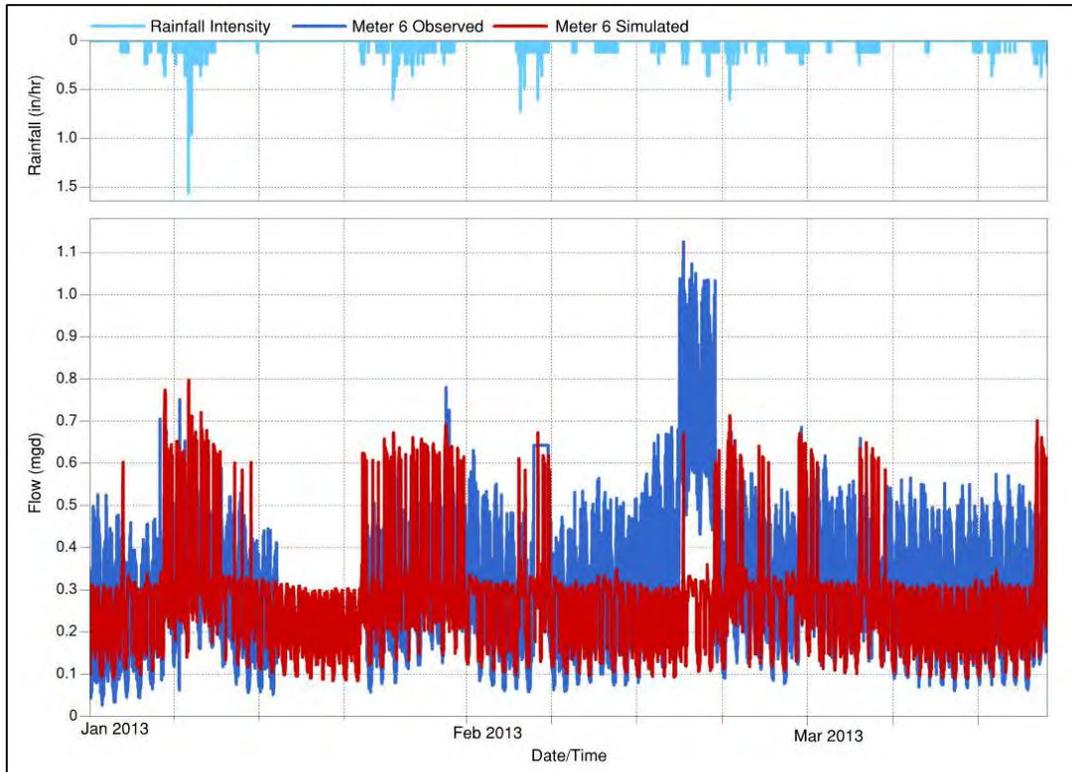


Figure 4-11. Meter 6 calibration

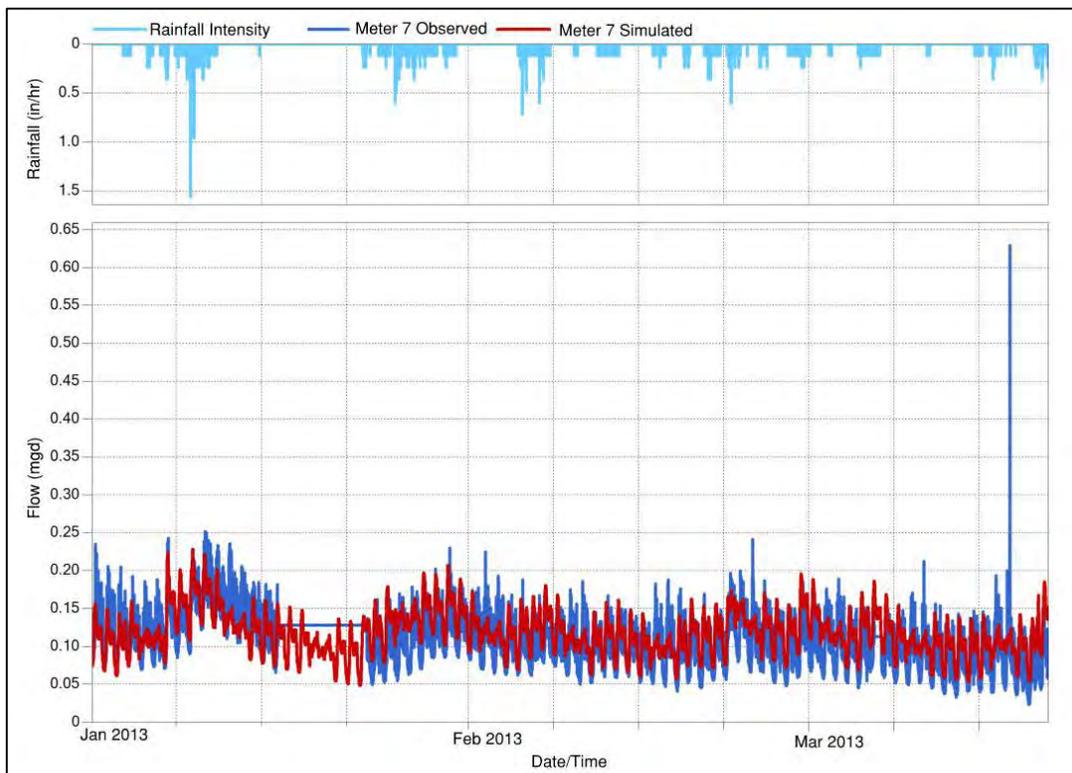


Figure 4-12. Meter 7 calibration



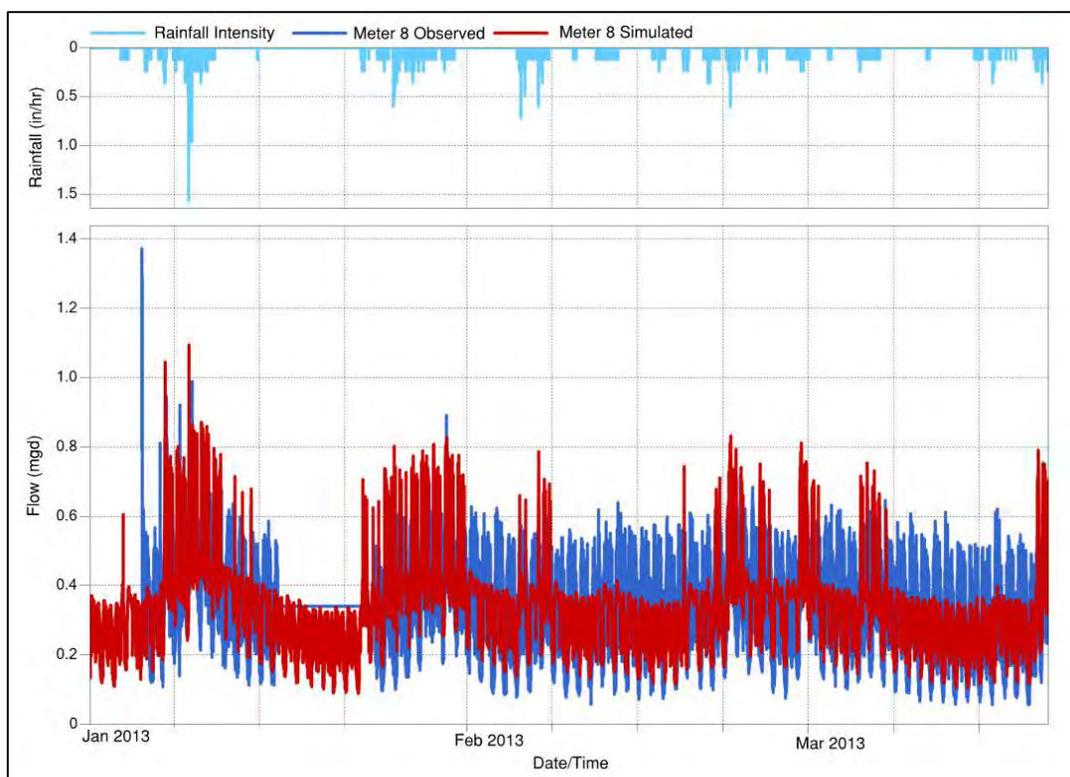


Figure 4-13. Meter 8 calibration

4.5.5 Long-Term Simulation

BC ran hydrologic model simulations to calculate long-term flow hydrographs that can be used to analyze the magnitude and frequency of historical wet weather events. The long-term rainfall record (described in Section 4.5.2) provides enough data for the model to be run from September 1, 1996, through December 31, 2015 (19 years). Identification of the 10-year flow recurrence event is necessary, based on previously stated goals. Running the model through a 10-year flow recurrence interval storm will indicate areas of the system that back up or flood, which can help to identify areas that do not meet the stated level of service.

Each of the hydrologic/hydraulic models was run using the 19-year rainfall record. The flooded and surcharged portions of the system were then evaluated using an 8-hour inter-event duration to isolate periods when the RDII peaked above a threshold minimum flow value. This means that only the events that produced a peak RDII were included, and smaller events were removed from the analysis.

The selected events were ordered from largest to smallest and assigned a rank. A rank of 1 was assigned to the largest storm, 2 to the second-largest, and so on. Cunnane plotting parameters were used to estimate the recurrence interval for each event in years, as follows (Maidment 1992):

$$TR = \frac{i + 0.2}{Rank - 0.4}$$

Where:

i = number of simulation years

Rank = rank of storm where 1 is the largest storm



The above equation will not identify a historical storm event that has exactly a 10-year peak flow recurrence. For a 19-year record, the second-largest event is estimated to have about a 12-year recurrence and the third-largest event is estimated to have about an 8-year recurrence using Cunnane parameters.

Figure 4-14 and Table 4-2 below provide an example of the peak inflow frequency for specific recurrence intervals based on log-interpolation between plotted events. Therefore, the 10-year recurrence event is determined using a log-interpolation between the 8-year and 12-year events.

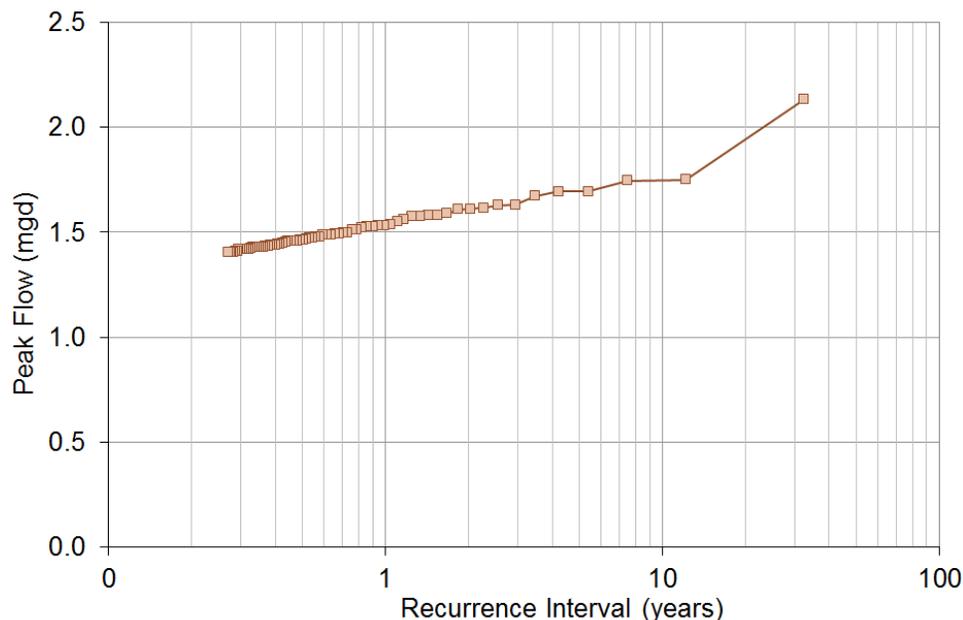


Figure 4-14. Example peak flow Cunnane plot

| Flow threshold | Flow, mgd |
|------------------|-----------|
| Q ₂₅ | 2.03 |
| Q ₁₀ | 1.75 |
| Q ₅ | 1.69 |
| Q ₂ | 1.61 |
| Q _{1.5} | 1.58 |
| Q ₁ | 1.53 |

10-year peak RDII frequency values were calculated for each capacity-limited area to examine the relative contributions from each basin. The unit RDII values are calculated by dividing the peak RDII by the total length of the upstream collection system. This value provides insight into how leaky the pipes are for each monitoring basin.

Table 4-3 provides the peak current conditions RDII statistics for each monitoring basin. The peak RDII for downstream monitoring basins does not account for the inflows from the upstream basins.

In other words, the RDII values are specific to the RDII created solely within the monitoring basin regardless of the influence of upstream basins.

Monitoring basins U12-144-1 and U12-144-4A illustrate the importance of calculating unit RDII values. Although U12-144-1 has a higher 10-year peak RDII than U12-144-4A, the unit RDII per mile of pipe for each basin is the same. This indicates that the pipes within the U12-144-4A monitoring basin may be in worse physical condition than those in the U12-144-1 basin, as U12-144-4A pipes create more RDII per length of pipe.

| Monitoring basin | Current conditions RDII, mgd | RDII/mile ^a , mgd/mile |
|------------------|------------------------------|-----------------------------------|
| U12-144-1 | 2.7 | 0.1 |
| U12-144-2 | 1.3 | 0.1 |
| U12-144-3 | 2.0 | 0.1 |
| U12-144-4A | 0.4 | 0.1 |
| U12-144-4B | 1.5 | 0.2 |
| U12-144-5 | - | - |
| U12-144-6 | 1.5 | 0.1 |
| U12-166-7 | 0.4 | 0.2 |
| U12-166-8 | 0.1 | 0.0 |

a. RDII per mile is a calculation of the peak RDII divided by the total length of upstream pipe in miles without regard for the size of those upstream pipes.

4.6 Future Flows

Base flows and RDII from future developments were estimated and routed through the model to estimate future capacity deficiencies in the trunk sewer system. Three types of future development areas were included in the analysis:

- Large future development areas at the boundaries of the City's urban growth area
- Undeveloped land parcels within the city limits with future development potential
- Parcels currently serviced by onsite septic systems that are anticipated by the City to connect to the sanitary sewer system

4.6.1 Future Base Flows

Future average daily base flows were estimated from industry standard rates for each land use designation. For some large development areas, the proposed unit development was provided by the City. For other areas, the developed acreage was calculated assuming that 20 percent of the gross acreage would be used for local roads, easements, and other utilities. Table 4-4 below lists the rates used to develop future base flows.

| Table 4-4. Future Sewer Base Flow Unit Rates | | |
|--|-----------|-----------|
| Land use | Unit type | Unit flow |
| Residential ^{a,b} | gpcd | 100 |
| Commercial ^c | gpad | 1,000 |
| Light industrial ^c | gpad | 2,000 |
| Heavy industrial ^c | gpad | 5,000 |

Note: gpcd = gallon(s) per capita per day.

- a. An average of 2.19 people per household was assumed.
- b. Development densities specified in the NMC were used to determine the number of dwellings per acre. LDR = 5 dwellings per acre, MDR = 10 dwellings per acre, HDR = 10 dwellings per acre.
- c. Unit flow rates for commercial, light industrial, and heavy industrial areas were based on industry standard.

4.6.2 Future Wet Weather Flows

RDII from future areas was calculated by estimating the amount of future sewer areas and applying an I/I rate of 1,000 gallons per acre per day (gpad). I/I were not applied to parcels within the city limits that are already developed, because it was assumed the I/I contribution from these parcels already would be accounted for in the existing conditions model.

Section 5

Hydraulic Analysis

This section documents the results of the hydraulic analysis used to evaluate the collection system under existing and future planning scenarios.

5.1 Assessment Criteria

This section discusses the criteria used to determine the adequacy of existing and future collection system infrastructure.

5.1.1 Gravity Sewer Pipelines

Two criteria are used to evaluate whether pipes are too small to convey the design flow. The first criterion is percent capacity, which is a ratio of maximum predicted flow (Q) to pipe capacity (Q_m) expressed as a percentage. The maximum predicted flow, Q , is the calculated peak flow in each pipe from the model. The pipe capacity, Q_m , is the theoretical pipe capacity according to Manning's equation, which assumes unpressurized flow (no surcharging). A percentage greater than 100 indicates the pipe is carrying more flow than is theoretically possible for unpressurized flow given a certain pipe slope, diameter, and internal roughness. A percent capacity greater than 100 is an indication of a surcharged pipe.

The percent capacity cannot be the only parameter used for determining pipe capacity. This is due to the way that SWMM-based models report data. In some situations, peak flows reported by the model exist for extremely short periods of time, sometimes only for seconds. Consequently, some of these peak flow values should not be used as the basis for pipe replacement. The second criterion, the ratio of depth of water to pipe diameter (d/D) is often more reliable. Use of the d/D ratio is described in more detail below.

In an unpressurized pipe, or a pipe with open-channel flow characteristics, the hydraulic grade line (HGL) is the elevation of the water surface within the pipe, or the d value. In a pipe that is surcharged (pressurized flow), the HGL is defined by the elevation to which water would rise in an open pipe, or manhole, as shown in Figure 5-1. In hydraulic terms, the HGL is equal to the pressure head measured above the invert of the pipe.

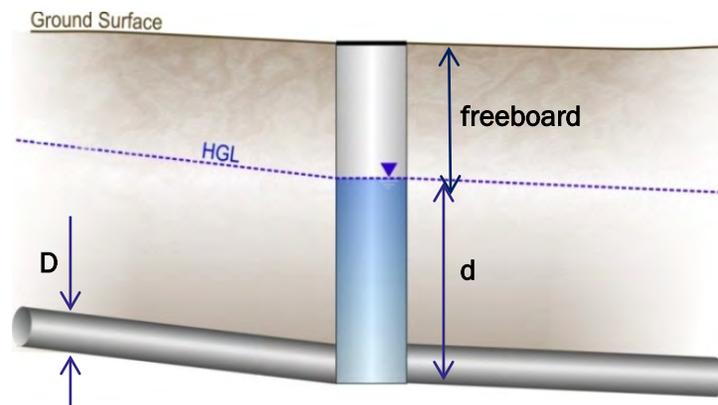


Figure 5-1. HGL for surcharged condition

The distance from the HGL to the top of a structure or to the invert of a pipe in a below-grade building (i.e., basement) is called “freeboard.”

The recommended approach for determining which pipes need to be upsized is to consider the amount and frequency of surcharging. For example, if minor surcharging (i.e., maintaining more than 7 feet freeboard) were to occur only during large storm events (i.e., the 1-in 10-year storm) and the surcharging did not impact property or create an SSO, City staff should not consider upsizing this pipe. However, if the frequency or amount of surcharging were to increase and endanger property or overflow, then the pipe should be upsized or capacity reclaimed through reduction of I/I.

Pipes that surcharge frequently should be upsized (or tributary I/I reduced) because frequent surcharging has the potential to reduce structural stability because of loss of pipe support from fine-grain soils washing into the sewer. Similarly, City staff should consider the amount of remaining freeboard with regard to the risk of SSOs or basement backups. As flows increase in the future, City staff will need to monitor water surface elevations throughout the system to determine when pipes should be upsized. This approach will help to ensure that the City has adequate capacity for conveying the design flows without spending more capital dollars than necessary.

In general, sewers with more than 7 feet of freeboard are not identified for replacement. City staff should monitor these sewers during large storm events to quantify the amount of surcharging that actually occurs. If the observed surcharging increases to the point of risking property or becoming an SSO, then the pipe or pipes creating the capacity limitation should be upsized (or I/I reduction sought). Some pipes with minor surcharging are identified for replacement even though they have more than 7 feet of freeboard. Upsizing of these pipes will help to reduce more significant surcharging in the upstream system.

5.1.2 Pump Stations and Force Mains

The existing capacities of the pump stations are based on the available wetwell and pump operational data. Recommendations to upsize capacity are made when influent flows to the wetwell exceed existing stated capacities of the pumps. As part of the modeling, influent flows were generated for existing, peak, and buildout conditions.

Capacity of a force mains is largely based on the age of the pipe and the velocity that is maintained during operating conditions. If the velocity increases beyond recommended values, negative impacts can be seen with energy consumption, abrasiveness on the pipe material, and unfavorable discharge conditions. DEQ’s *Oregon Standards for Design and Construction of Wastewater Pump Stations*, recommends force main velocities be between 3.5 and 8.0 feet per second (fps) for pump discharge lines and force mains (DEQ 2001).

5.2 Existing Conditions Planning Scenario: Modeling Results

The existing conditions modeling scenario represents the existing collection system, including the current Agate Beach Improvement Project, under current flow conditions. This modeling scenario identifies the hydraulic deficiencies that are currently within the system. Based on discussions with City staff, the model predictions generally support its observations.

In general, the existing conditions modeling scenario provides an initial priority ranking of required sewer improvements because sewers that are currently undersized should be upsized prior to addressing problems associated with future flows.

Highlights of the modeling results are discussed below.

5.2.1 Gravity Sewers

The modeling of the existing conditions planning scenario revealed surcharging throughout the collection system with 12 sewers showing minor to severe surcharging during a 10-year, 24-hour duration event. Surcharged sewers include all sewers with a modeled d/D ratio of greater than 1.0 and with less than 7 feet of available freeboard. The locations of the surcharged sewers are shown in Figure 5-2 and listed in Appendix C. City staff should note the remaining freeboard predicted by the model. Sewers with limited freeboard should be monitored to determine if, and when, improvements may be required to prevent basement backups or SSOs.

Not all of the identified sewers would need to be replaced to eliminate or reduce the surcharging. The upsizing of a number of strategically located downstream sewers will significantly reduce the number of sewers that need to be replaced because many sewers are surcharged because of downstream restrictions in the collection system. In addition, the implementation of an I/I-reduction program may reduce the number of pipes that must be replaced.

The existing conditions planning scenario provides information on which sewers should be upsized first, but the flows shown for this scenario should not be used as the basis of upsizing the pipes. Rather, the future conditions planning scenario should be used for pipe sizing information (or for I/I-reduction targets). Refer to Chapter 6 for capital improvement recommendations.

5.2.2 Pump Stations and Force Mains

The pump run time information was recorded by the City's SCADA system located at the major pump stations. Pump run time and nameplate pump capacity were used to estimate the flows pumped from the pump stations. Actual pump capacity could be less than the nameplate value dependent on force main and impeller conditions. A more accurate representation of these flows would require calibrated flow monitors installed in the force main, or extensive pump draw down testing. This additional effort was not deemed appropriate for this planning document.

Two of the modeled pump stations were found to lack firm capacity for conveying the existing peak 10-year, 24-hour recurrence interval flows. The Bayfront PS has an estimated peak flow of 2.2 million gallons per day (mgd) and a current firm capacity of 1.7 mgd. The Nye Beach Pump Station has a projected project peak flow of 2.67 mgd and a current firm pumping capacity of 2.0 mgd. These values are indicated in bold red text below as part of the pump station and force main flow statistics listed in Table 5-1. Additional values presented in bold are forcemain velocities that exceed the recommended range. The locations of the pump stations are shown in Figure 5-2, below.

Table 5-1. Flows to Pump Stations, Existing Conditions Planning Scenario

| PS | Current firm pumping capacity ^a , mgd | Number of pumps | Existing 10-year peak flow, mgd | FM size, in. | Maximum FM velocity ^b , fps |
|-----------------------------|---|--------------------|------------------------------------|-----------------|---|
| Bayfront | 1.70 | 2 | 2.20 | 8 | 7.5/ 9.8 |
| Big Creek | 3.50 | 3 | 2.60 | 14 | 5.1/3.8 |
| HMSC | 2.00 | 2 | 0.40 | 8 | 8.9 /1.8 |
| Influent | 15.00 | 6 | 8.10 | 24 | 7.4/4.0 |
| Northside | 8.50 | 3 | 8.00 | 20-24 | 6.0/5.7 |
| NW 48th Street ^c | 1.75 | 2 | 1.70 | 10 | 5.0/4.8 |
| Nye Beach | 2.00 | 2 | 2.67 | 12 | 3.9/5.3 |
| Schooner Creek ^c | 0.92 | 2 | 0.70 | 8 | 4.2/3.1 |
| SE Running Springs Drive | 0.22 | 2 | 0.05 | 4 | 3.9/0.9 |

a. The firm pumping capacity is based on PS operation without the use of the redundant pump(s).

b. The first number is the maximum velocity based on firm pumping capacity, the second number is the velocity based on the existing 10-year peak flow from the model.

c. The NW 48th Street PS, Schooner Creek PS, and Schooner Creek FM are currently being upgraded as part of the Agate Beach Improvement Project. These values represent their planned improvements.

5.3 Future Conditions Planning Scenario: Modeling Results

The results of the future conditions planning scenario modeling are described in this section. Refer to Chapter 6 for capital improvement recommendations.

5.3.1 Gravity Sewers

Surcharged gravity sewers for the 20-year and buildout planning scenarios are shown in Figure 5-3 and Figure 5-4, respectively. Capacity-limited sections of gravity mains with less than 7 feet of freeboard must be upsized to prevent excessive surcharging that could lead to basement backups and/or flooding (i.e., SSOs). Flooding is predicted in one location in the City's system: downstream of the Bayfront FM, along NE Avery Street. Surcharging occurs at miscellaneous areas throughout the City as shown in Figure 5-3 and Figure 5-4.

The flooding and surcharging predicted by the model will increase in frequency and volume as growth increases unless pipes are upsized and/or I/I reduction is achieved.

Buildout planning scenario results should be consulted for Capital Improvement Plan (CIP) sizing rather than the results of the existing conditions or 20-year planning scenario modeling. It is recommended that a detailed analysis is completed during the design phase of each project to confirm facility sizing.

Some of the identified sewers shown in Figure 5-3 and Figure 5-4 are not identified for replacement, but are locations where the surcharging conditions should be monitored by City staff. In general, these are sewers with less than 7 feet of freeboard. The surcharging of these sewers could present a risk of flooding for homes and businesses with basements. City staff should monitor flow levels in these sewers for frequent surcharging and/or surcharging that is too high in elevation.

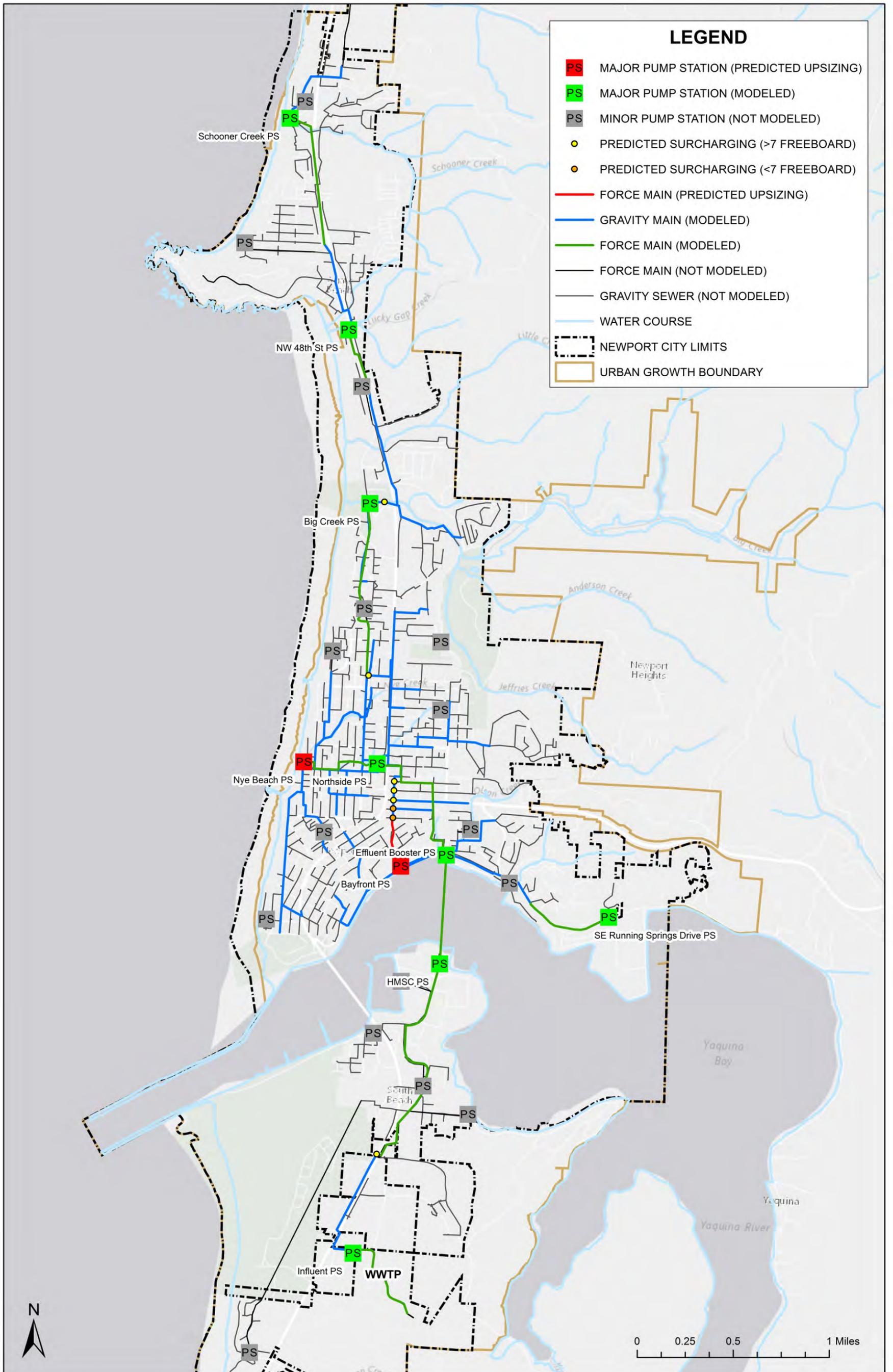


Figure 5-2. Model simulation results (existing conditions)

5.3.2 Pump Stations and Force Mains

Three of the nine modeled pump stations were found to lack firm capacity for conveying the future 20-year conditions peak flows. The Bayfront PS has a projected peak flow of 2.3 mgd and a current firm capacity of 1.7 mgd. The Nye Beach PS has a projected peak flow of 2.69 mgd and a current firm pumping capacity of 2.00 mgd. The Northside PS has a projected peak flow of 9.0 mgd and a current firm capacity of 8.5 mgd. These values are indicated in bold red text below as part of the pump station and force main flow statistics listed in Table 5-2. Additional values presented in bold are forcemain velocities that exceed the recommended range.

| PS | Current firm pumping capacity ^a , mgd | Number of pumps | Future 20-year peak flow, mgd | FM size, in. | Maximum FM velocity ^b , fps |
|-----------------------------|--|-----------------|-------------------------------|--------------|--|
| Bayfront | 1.70 | 2 | 2.30 | 8 | 7.5/ 10.2 |
| Big Creek | 3.50 | 3 | 3.00 | 14 | 5.1/4.3 |
| HMSC | 2.00 | 2 | 0.70 | 8 | 8.9 /3.1 |
| Influent | 15.00 | 6 | 8.90 | 24 | 7.4/4.4 |
| Northside | 8.50 | 3 | 9.00 | 20–24 | 6.0/6.0 |
| NW 48th Street ^c | 1.76 | 2 | 1.76 | 10 | 5.0/5.1 |
| Nye Beach | 2.00 | 2 | 2.69 | 12 | 3.9/5.3 |
| Schooner Creek ^c | 0.92 | 2 | 0.90 | 8 | 4.2/4.0 |
| SE Running Springs Drive | 0.22 | 2 | 0.12 | 4 | 3.9/ 2.1 |

a. The firm pumping capacity is based on PS operation without the use of the redundant pump(s).

b. The first number is the maximum velocity based on firm pumping capacity, the second number is the velocity based on the existing 10-year peak flow from the model.

c. The NW 48th Street PS, Schooner Creek PS, and Schooner Creek FM are currently being retrofitted as part of the Agate Beach Improvement Project. These values represent their planned improvements.

Four of the nine modeled pump stations were found to lack firm capacity for conveying the future buildout conditions peak flows. The Bayfront PS has a projected peak flow of 2.3 mgd and a current firm capacity of 1.7 mgd. The Nye Beach PS has a projected peak flow of 2.74 mgd and a current firm pumping capacity of 2.00 mgd. The Northside PS has a projected peak flow of 9.2 mgd and a current firm capacity of 8.5 mgd. The SE Running Springs Drive PS has a projected peak flow of 0.27 mgd and a current firm capacity of 0.22 mgd. These values are indicated in bold red text below as part of the pump station and force main flow statistics listed in Table 5-3. Additional values presented in bold are forcemain velocities that exceed the recommended range.

| Table 5-3. Flows to Pump Stations, Buildout Conditions Planning Scenario | | | | | |
|--|--|-----------------|-----------------------|--------------|--|
| PS | Current firm pumping capacity ^a , mgd | Number of pumps | Future peak flow, mgd | FM size, in. | Maximum FM velocity ^b , fps |
| Bayfront | 1.70 | 2 | 3.10 | 8 | 7.5/13.7 |
| Big Creek ^c | 3.50 | 3 | 3.00 | 14 | 5.1/4.3 |
| HMSC | 2.00 | 2 | 0.80 | 8 | 8.9/3.5 |
| Influent ^c | 15.00 | 6 | 8.90 | 24 | 7.4/4.4 |
| Northside | 8.50 | 3 | 9.20 | 20-24 | 6.0/6.8 |
| NW 48th Street ^d | 1.76 | 2 | 1.76 | 10 | 5.0/5.0 |
| Nye Beach | 2.00 | 2 | 2.74 | 12 | 3.9/5.2 |
| Schooner Creek ^d | 0.92 | 2 | 0.92 | 8 | 4.2/4.1 |
| SE Running Springs Drive | 0.22 | 2 | 0.27 | 4 | 3.9/4.8 |

- a. The firm pumping capacity is based on PS operation without the use of the redundant pump(s).
- b. The first number is the maximum velocity based on firm pumping capacity, the second number is the velocity based on the existing 10-year peak flow from the model.
- c. The Influent PS has a design capacity greater than the future peak flow, as predicted by the modeling exercise. Though upgrades are not required based on capacity concerns, the City should still maintain regular inspections.
- d. The NW 48th Street PS, Schooner Creek PS, and Schooner Creek FM are currently being retrofitted as part of the Agate Beach Improvement Project. These values represent their planned improvements.

The Bayfront PS and Nye Beach PS lack the firm capacity to convey existing, 20-year, and buildout conditions peak flows; the Northside PS lacks firm capacity to convey the 20-year and buildout conditions peak flows and the SE Running Springs Drive PS lacks firm capacity to convey the buildout conditions peak flow.

The NW 56th Street Pump Station is located in a geologically unstable area. Though the station does not exceed parameters for flow or velocity it is recommended that it be included on the pump station upgrade list. Initial efforts should be focused on completing an alternative analysis to determine the best solution (e.g., stabilize the current infrastructure, relocate).

Timing for required station upgrades depends on the timing and type of future development. The City should monitor the flows at the pump stations and periodically assess the need to provide the increased pumping capacity.

As listed in Table 5-2 above, the velocities in most force mains are within acceptable limits with the exception of Bayfront and HMSC for future peak flows and firm pumping capacity, respectively.

Though the minor pump stations were not modeled as part of this planning effort, condition of each of the pump stations has been monitored by the City. The City has indicated that many are experiencing intermittent problems and/or nearing the end of their useful life. While each pump station has unique concerns, a rehabilitation program would be a useful in starting to repair and prevent deficiencies from occurring throughout the system. Locations of the minor pump stations are located in Figure 5-3, below.

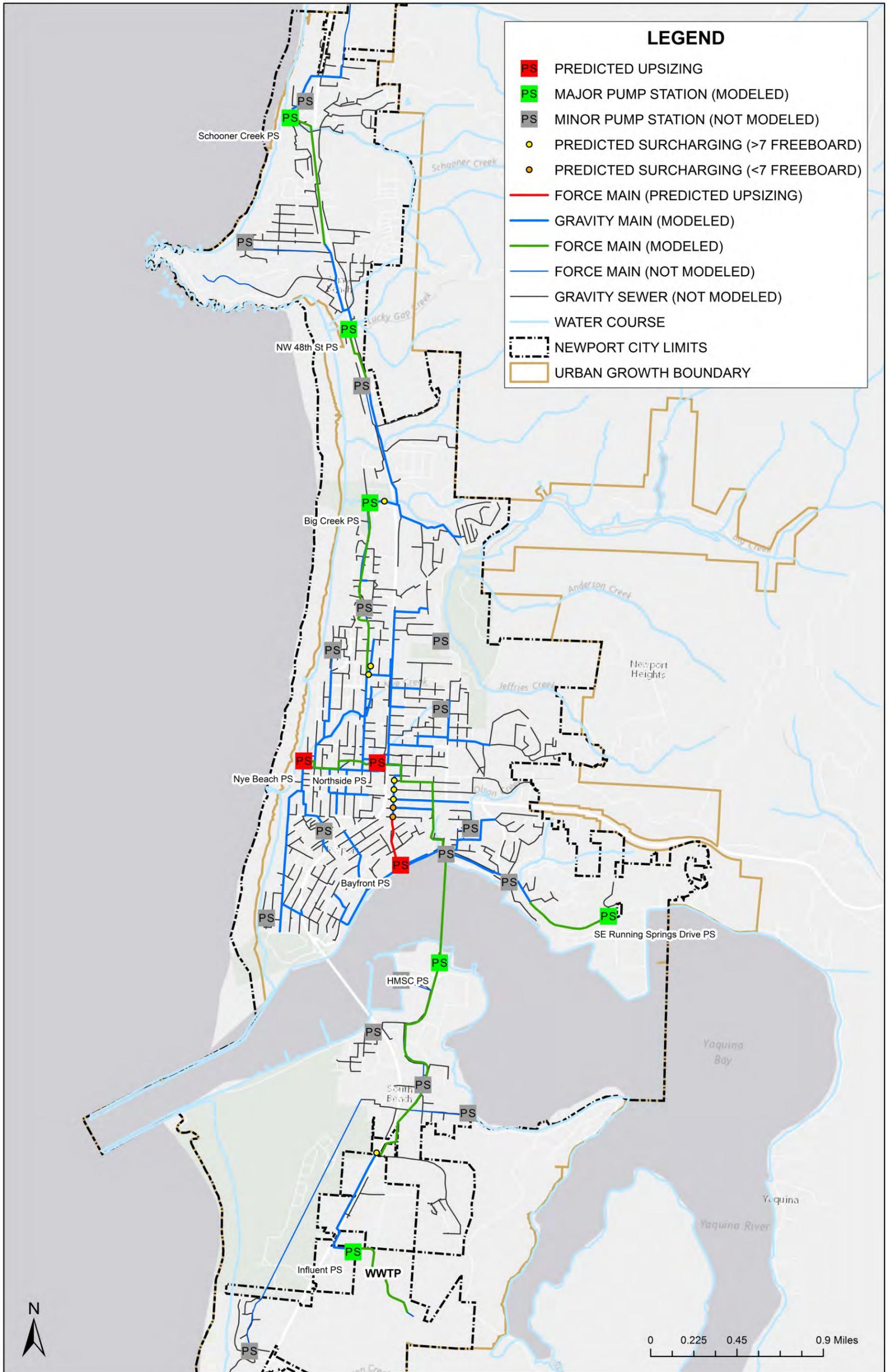


Figure 5-3. Model simulation results (20-year conditions)

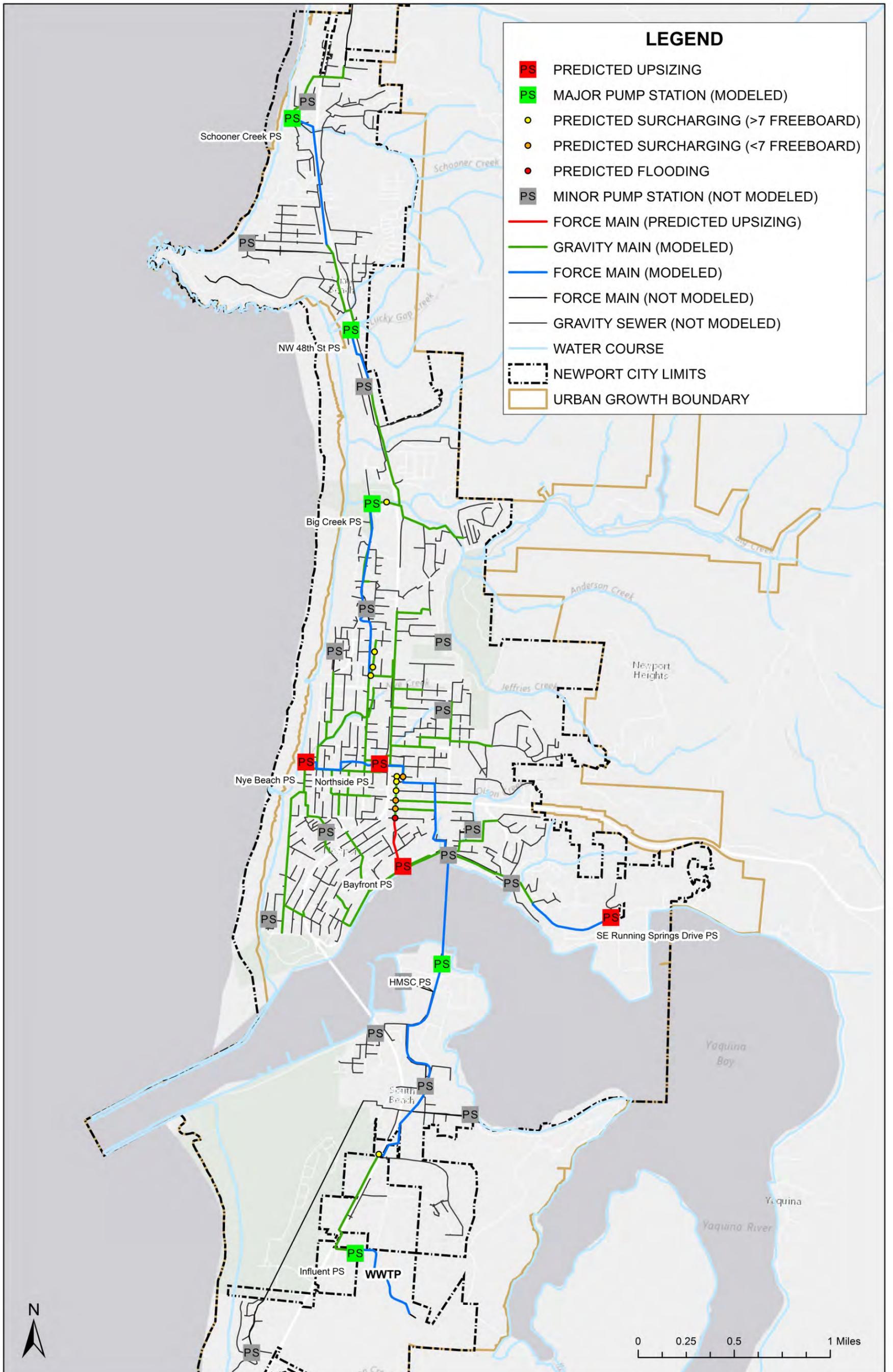


Figure 5-4. Model simulation results (buildout conditions)

Section 6

Capital Improvement Plan

This section presents the recommended CIP for the City's sanitary sewer collection system. The CIP is based on reviewing existing conditions and applying the results of the modeling effort. The CIP is intended to help the City make decisions on existing and potential expected deficiencies given growth and flow increases in the system. It also provides guidance for expanding the system to meet the City's future growth needs.

Capital improvements have been developed based on the buildout condition planning scenario. These include sewer replacements that will be required to convey future flows and sewer extensions and pump stations that will be required to provide new sewer service to areas of the city without sewer service and to areas that may be annexed by the City in the foreseeable future.

The recommendations contained herein should be updated as required to address future conditions that may differ from conditions used to develop this SSMP.

6.1 Existing Conditions Planning Scenario

The existing conditions planning scenario serves two general purposes:

- Project prioritization: In general, existing deficiencies should be addressed before those associated with future conditions.
- Rate/system development charges (SDCs): Upon acceptance of this SSMP, it is anticipated that the City will have a financial analysis performed to determine future sewer rates and SDCs. The financial analysis will depend, in part, on the excess capacity in the existing collection system that is available to serve growth.

System improvements recommended to address existing collection system capacity limitations are sized to convey buildout flows.

6.2 Capital Improvement Recommendations

This section describes the improvements recommended to address the capacity and known condition deficiency needs of the City-owned sanitary sewer system for the 20-year future conditions planning scenario and to provide new sewer service to areas of the city without sewer service and to areas that may be annexed by the City in the foreseeable future. The City's implementation of an I/I-reduction program may be sufficient to address the capacity needs of many of the sewers identified for replacement. Further analysis is required to determine where I/I reduction may be implemented cost-effectively.

6.2.1 Gravity Sewer Replacements

Individual sewer replacements were grouped into projects to expedite design- and construction-related activities. Typically, each project consists of several replacements. The projects were limited in size so that no single project would be too large for funding and bidding purposes.

Table 6-1 names the specific projects, defines the sewers to be replaced, and identifies the estimated project costs. Figures 6-1 and 6-2 provide an overview and detailed view of recommended pipe replacements, respectively. Included on Figure 6-1 are the pump station and force main improvement projects, based on capacity upgrade criteria only.

| Table 6-1. Recommended CIPs: Gravity Sewer Improvements | | | | | | |
|---|------------|------------------------|--------------------------------|----------------|--------------------------------------|---------------------------------|
| Pipe ID | Length, LF | Existing diameter, in. | CIP diameter, in. ^a | CIP technology | Estimated cost, dollars ^b | Estimated project cost, dollars |
| (1) NE Avery Street | | | | | | |
| 7504-7045 | 258 | 14 | 18 | Open cut | 137,000 | 1,230,000 |
| 7045-7043 | 234 | 14 | 18 | Open cut | 124,000 | |
| 7043-7040 | 264 | 14 | 18 | Open cut | 140,000 | |
| 7040-7028 | 251 | 12 | 18 | Open cut | 133,000 | |
| 7028-7026 | 140 | 12 | 18 | Open cut | 74,000 | |
| 7026-7027 | 170 | 12 | 18 | Open cut | 90,000 | |
| 7027-7011 | 293 | 10 | 18 | Open cut | 155,000 | |
| 7011-7010 | 268 | 12 | 18 | Open cut | 142,000 | |
| 7010-7059 | 345 | 12 | 18 | Open cut | 183,000 | |
| 7059-7060 | 80 | 12 | 18 | Open cut | 42,000 | |
| 7060-7058 | 23 | 12 | 18 | Open cut | 12,000 | |
| (2) NW Nye Street | | | | | | |
| 5023-5037 | 330 | 15 | 13.5 | CIPP | 109,000 | 1,140,000 |
| 5037-5040 | 122 | 15 | 13.5 | CIPP | 40,000 | |
| 5040-5043 | 204 | 15 | 13.5 | CIPP | 67,000 | |
| 5043-5513 | 329 | 15 | 13.5 | CIPP | 109,000 | |
| 5513-5520 | 340 | 15 | 18 | Pipe burst | 163,000 | |
| 5520-5542 | 328 | 15 | 18 | Pipe burst | 157,000 | |
| 5542-6253 | 333 | 15 | 18 | Pipe burst | 159,000 | |
| 6253-6256 | 225 | 15 | 18 | Pipe burst | 108,000 | |
| 6256-6257 | 109 | 15 | 18 | Pipe burst | 52,000 | |
| 6257-6258 | 80 | 16 | 18 | Pipe burst | 38,000 | |
| 6258-7057 | 145 | 16 | 18 | Pipe burst | 69,000 | |
| 7057-7058 | 76 | 16 | 18 | Pipe burst | 36,000 | |
| 7058-Northside PS | 53 | 20 | 21 | Open cut | 31,000 | |
| Total all sewer improvements | | | | | | |

^a A pipe diameter reduction of 10% was assumed for CIPP rehabilitation.

^b Estimated costs include a 30% allowance for construction contingencies and a 20% allowance for engineering design and administration. See Appendix E for unit cost tables—assumes a depth of 10' per cost condition and 2' for gravity sewers.

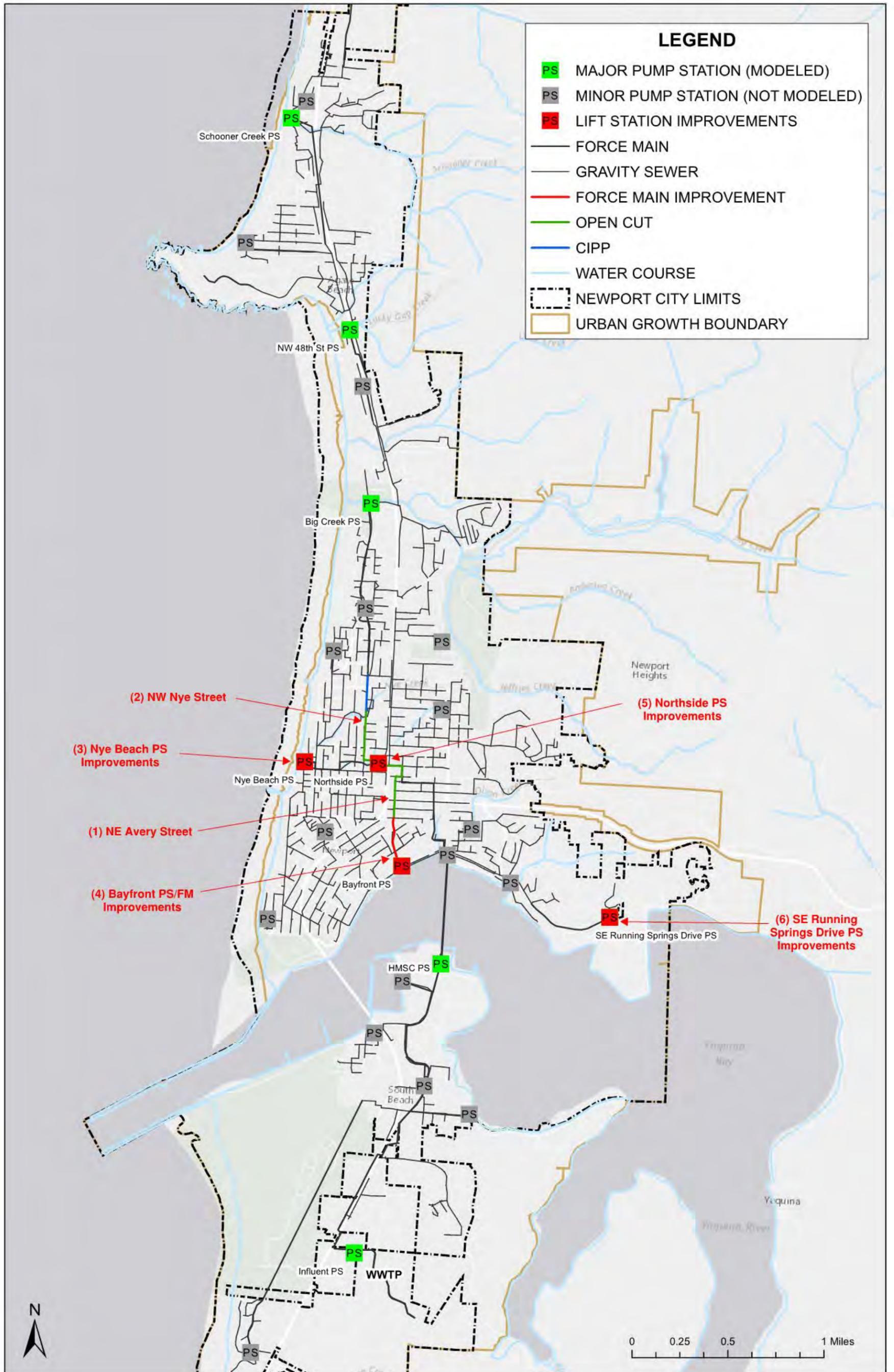


Figure 6-1. Capacity-based capital improvements summary

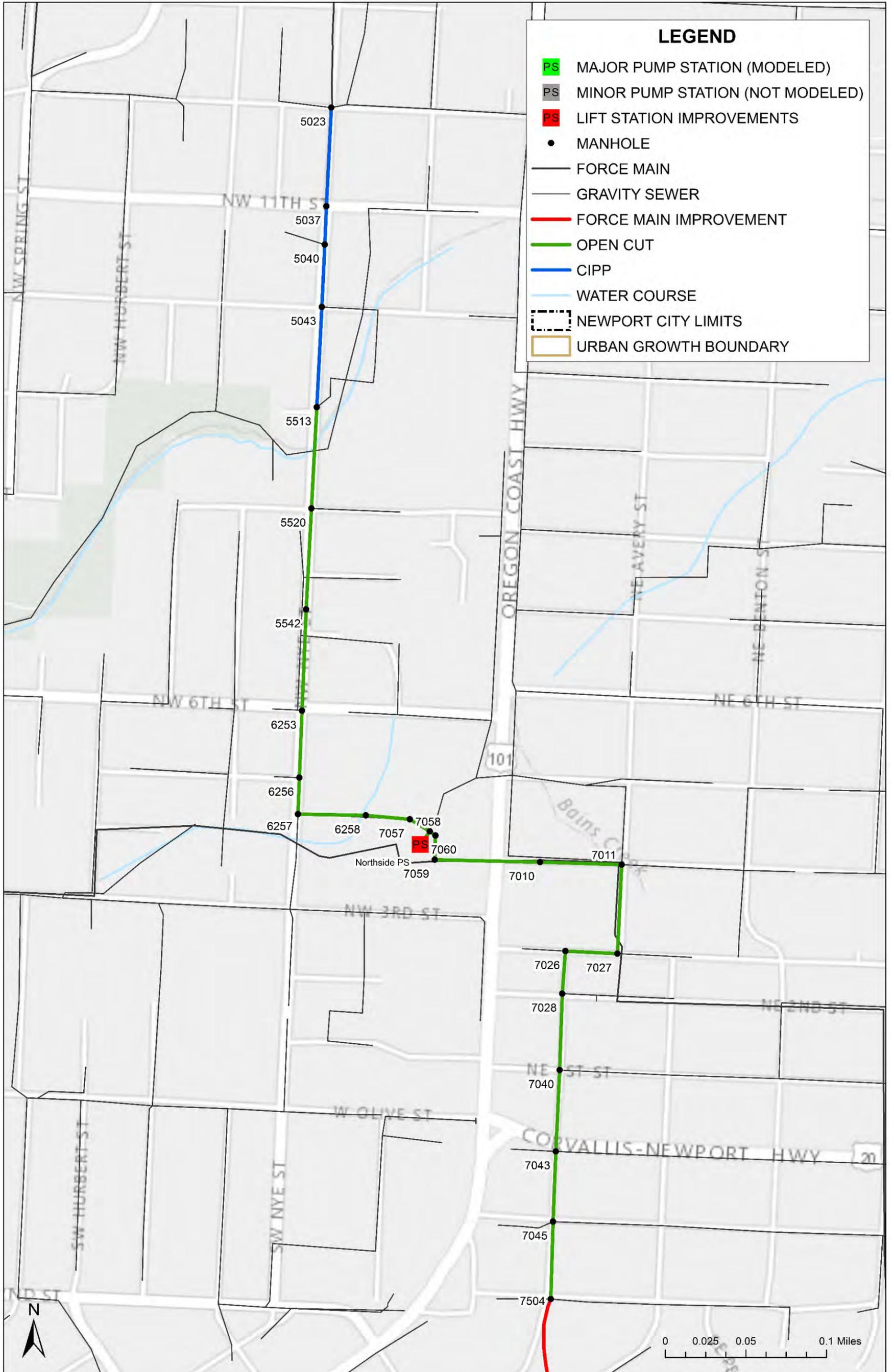


Figure 6-2. Capacity-based capital improvements: detailed view

6.2.2 Pump Station and Force Main Improvements

Four of the nine modeled pump stations were found to lack firm capacity for conveying the future buildout conditions peak flows: Nye Beach, Bayfront, Northside, and SE Running Springs. One pump station was identified to be at risk from unstable soil conditions.

One force main, Bayfront, will require upsizing—it is recommended that the pump station and force main be replaced at the same time to potentially benefit from economy of scale pricing, however, the City may want to postpone the installation of the new force main until later in the planning period once the buildout condition is met. Currently, that force main is appropriately sized but nearing the upper limit of acceptable peak velocities.

The HMSC force main appears to be undersized; however, flow is expected to be reduced in this area, which may mitigate concerns related to elevated force main velocities.

A summary of the costs required to provide the necessary improvements is listed in Table 6-2. Modeled design flow rates for sizing the pump stations and force mains are listed in Table 5-3. A breakdown of the pump station costs are included in Appendix H.

| PS | Description of improvement | Project number/name | Estimated cost of improvements, dollars ^a |
|---|--------------------------------------|------------------------------|--|
| Nye Beach | Upgrade PS firm capacity to 2.74 mgd | (3) Nye Beach | 2,828,000 |
| Bayfront | Upgrade PS firm capacity to 3.24 mgd | (4) Bayfront | 3,224,000 |
| Bayfront | Upgrade FM capacity to 14" | (4) Bayfront | 490,000 |
| Northside | Upgrade PS firm capacity to 9.2 mgd | (5) Northside | 2,780,000 |
| SE Running Springs Drive | Upgrade PS firm capacity to 0.27 mgd | (6) SE Running Springs Drive | 1,178,000 |
| SE Running Springs Drive | Realign 4" FM | (6) SE Running Springs Drive | 330,000 |
| NW 56th Street ^b | Study PS and upgrade | (7) NW 56th Street PS | 1,347,000 |
| Total all PS and FM improvements | | | 11,357,000 |

a. Estimated costs include a 30% allowance for contingency, a 20% allowance for engineering design and administration, and a 25% allowance for contractor markups.

b. Not part of capacity-based upgrade criteria.

The City has one major pump station, Nye Beach, that uses a FM constructed partially of AC. EPA has identified asbestos as a hazardous material requiring special precautionary handling and disposal procedures. DEQ has developed a Fact Sheet with information about AC pipe—this Fact Sheet is provided in Appendix F.

6.2.3 Sewer Extensions

Sewer extensions are required to provide service to those areas that do not have City sewer service. Areas without sewer service include homes on septic systems, areas within the current UGB to be developed, and miscellaneous properties inside the city boundary that are not located near existing sewers.



Generally, sewer extensions are not funded by rates. Instead, most sewer extensions are funded by developers with potentially some of the costs being SDC-reimbursable. In areas of the city not currently connected to the sewer, Local Improvement Districts (LIDs) and special assessment districts may need to be formed to fund the projects. Developers and the general public who want more information on funding options should contact the City.

The following sections describe the sewer extension projects that the City anticipates.

New Development. The City has identified 20 areas for development in the 20-year and buildout conditions. A summary of these developments is provided in Table 2-2 and Figure 2-4. Fact sheets for these developments are provided in Appendix B.

Infill Development. The City maintains an Access database of parcels that are undeveloped, as shown in Figure 2-4.

Under the 20-year conditions, infill parcels were anticipated to be developed 30 percent. Because of the inability to distinguish between which parcels will be developed first, the flows were applied evenly across the northern portion of the collection system.

Under the buildout conditions, the flow was applied to the appropriate adjacent node in the collection system.

Septic Conversion. In the southern portion of the city, the Newport Municipal Airport and the Surfland neighborhood are currently served by a septic sewer system. The City plans on extending its sewer service out to the Surfland neighborhood and the Newport Municipal Airport.

A summary of the costs required to provide the necessary improvements is listed in Table 6-3.

| Table 6-3. Recommended CIPs: Sewer Extension Improvements | | | |
|---|------------------------------|------------------|--|
| Project | Description of improvement | Project no./name | Estimated cost of improvements, dollars ^a |
| Septic conversion | Construct new gravity system | (9) Surfland | 4,620,000 |
| | Construct new PS | (9) Surfland | 1,000,000 |
| | Construct new FM | (9) Surfland | 612,000 |
| Total all sewer extension improvements | | | 6,232,000 |

a. Estimated costs include a 30% allowance for contingency and a 20% allowance for engineering design and administration.

A preliminary layout for the Surfland septic conversion is provided in Figure 6-3, below.



Figure 6-3. Surf land septic conversion

6.3 Continued Observation

The hydrologic/hydraulic (H/H) model identified sewers that are predicted to surcharge during the existing, 20-year, and buildout planning scenarios. The sewers experiencing surcharging are identified in Section 4 with a detailed list of all surcharged pipes included in Appendix C. Pipe upsizing is not recommended where there is at least 7 feet of freeboard below grade; this amount of surcharging was not deemed to be excessive because it typically does not result in basement backups or manhole flooding.

The H/H model assumes pipes are not restricted because of operational issues (e.g., I/I, debris, etc.) and have a consistent slope (i.e., do not contain sags). It is recommended that the sewers identified with surcharging be observed during large wet-weather events to establish the maximum depth of water that occurs. If City staff observe water surface elevations that are higher than predicted by this SSMP, or deemed excessive by staff, then additional actions to alleviate the surcharging (e.g., CCTV inspection, maintenance, etc.) should be considered by the City.

6.4 Rehabilitation and Replacement Program

As a collection system ages, the structural and operational condition of the sewer system will decline as the number and type of defects in the piped system increase. If unattended, the severity and number of defects will increase along with an increased potential of sewer failure. Sewer failure is defined as an inability of the sewer to convey the design flow. It is manifested by hydraulic and/or structural failure modes. Hydraulic failures can result from inadequate hydraulic capacity in the sewer. Loss of hydraulic capacity can result from a reduction of pipe area because of accumulations of sediment, gravel, debris, roots, fats, oil, and grease, and structural failure. Also, a major loss of hydraulic capacity can be the result of excessive I/I or inappropriate planning for future growth that results in flows in excess of pipe capacity. Structural defects left unattended can lead to catastrophic failures such as pipe collapses and SSOs. Structural failures may start from common structural defects such as cracks, fractures, holes, corrosion, and joint separations. Both hydraulic and structural failures can have a significant negative impact on the community and the environment.

An R&R program is required to reduce the potential for sewer failures and to extend the useful life of the collection system. A proactive R&R program rehabilitates sewers prior to failure. Such a program extends the useful life of assets at minimum cost (since the cost of rehabilitation is typically half the cost of pipe replacement) and is even more economical when compared with the cost of repairing a failed sewer. The most frequently used sewer rehabilitation technologies are discussed in Appendix D.

The City should develop and implement an R&R program. It should be based on a sewer inspection and condition assessment program that assesses sewer and manhole condition. Sewer condition and other risk factors should be identified such that a priority ranking system is established for identifying the order in which sewers should be rehabilitated. The recommended system would be a risk-based approach for identifying when sewers should be rehabilitated. The risk-based approach considers the likelihood and consequences of sewer failure. The likelihood of sewer failure is based on the sewer's structural and hydraulic condition. The consequences of sewer failure are based on several factors, including emergency sewer repair costs, sewer location, environmental, and health impacts that could be realized should the sewer fail. A risk-based approach to implementing an R&R program helps ensure that capital dollars are spent where they will provide the greatest benefit.

The R&R program should be coordinated with the recommended sewer upsizing recommendations in this SSMP.

6.4.1 Inspection Program

The foundation of an R&R program is built on knowing the structural and operational condition of the collection system. EPA's proposed Capacity, Management, Operation, and Maintenance (CMOM) Program identifies a sewer inspection program as being an essential element of a proactive maintenance program and its complementary R&R program.

6.4.1.1 Pump Stations

The City currently conducts routine and limited pump station inspections. Because of the number of pump stations a comprehensive inspection is not possible given the current staffing. It is recommended that additional time, and if needed, additional staff be added to complete a thorough analysis of the condition and performance of pump stations. These inspections will provide useful information for identifying and prioritizing future pump station rehabilitation and/or replacement projects. An allowance for pump station inspections is included in the costs provided below.

In addition, force mains should be inspected given their lack of redundancy and high consequence of failure. Unlike gravity sewers, force main inspection technology costs can vary greatly depending on access, diameter, and material type. Progressive pigging, acoustic leak detection, and remote-field eddy current inspection are all tools that can be used while the force main is in operation and can be used to assess the condition of the force mains. These tools are relatively new and still somewhat expensive. A budgetary cost of \$20/LF should be assumed for force main inspection. If a force main can be taken out of service, a lower cost CCTV inspection may be a good initial screening to determine if there are other issues, such as corrosion, pitting, holes, or leaks.

6.4.1.2 Gravity System

In 2015, the City developed an inspection program that systematically inspects its sanitary sewer collection system on a recurring 7-year basis. Because a majority of the City's system had not yet been inspected, the 2015 inspections included about 50,000 LF of pipe with the highest criticality (e.g., crosses under Highway 101, along the major spine of the system, etc.) but were not inspected in the last 5 years. In addition, pipes that are plastic (PVC or HDPE) were excluded from the initial inspections. The recurring 7-year program is meant to begin in 2016. Pipes inspected during 2015 can be excluded during the first cycle, from 2016 to 2018. For further detail on the location of the selected pipes for each year in the recurring cycle, see Figure 3-5. Programmatic recommendations are as follows:

- 2016: Approximately 43,000 LF of sanitary sewers located west of U.S. Highway 101 between NW Olive Street and 21st Street. This group of pipes includes locations such as Newport Plaza, Nye Creek, Historic Nye Beach, and Wilson Square. The Nye Beach and North Side Pump Stations are also located within this group of pipes.
- 2017: Approximately 40,000 LF of sanitary sewer located along U.S. Highway 101 and east between SE 2nd Street and NE 20th Street. This group of pipes contains locations such as U.S. Highway 20, Pacific Village, and Sea Towne.
- 2018: Approximately 43,000 LF of sanitary sewers in SW Newport and includes locations such as Bay Bridge Retail District and City Center.
- 2019: Approximately 42,000 LF of sanitary sewers located mainly in SE Newport with some pipes located in NE Newport as well. The pipes located in NE Newport are located east of Eads Street. Pipes in SE Newport include areas such as the Historic Bay front and the easternmost reaches of the sanitary sewer collection system.

- 2020: Approximately 40,000 LF of sanitary sewers located in northern Newport. These pipes stretch north from Whaler’s Village and Pacific Plaza to Lucky Gap. The Big Creek and 48th Street pump stations are located within this reach of pipes.
- 2021: Approximately 41,000 LF of sanitary sewer in the northern end of Newport north of Lucky Gap Street. The group of pipes includes those around Schooner Creek pump station.
- 2022: Approximately 31,000 LF of sanitary sewer located south of Yaquina bay.

Because this cycle does not account for any additional sewers that may be added to the City’s sanitary sewer collection system, newer sewers can be added to the inspections in 2022 (which purposefully has a significantly smaller amount of footage than other years). This preliminary inspection cycle includes the entire sanitary sewers currently in the City’s jurisdiction and is shown graphically in Figure 6-4. The total LF of sanitary sewer will be refined as the City continues to update their GIS database.

6.4.2 Condition Assessment

Once a sewer has been inspected, the observed defect information is used to assess both the structural and operational condition of the sewer. Both categories are important because a failure in either category can lead to sewer failure if the proper maintenance, repairs, and/or rehabilitation are not performed in a timely manner. For most sewer inspection and condition assessment processes, each observed defect is given a score or grade. The City utilizes the National Association of Sewer Service Companies’ (NASSCO’s) Pipeline Assessment and Certification Program (PACP), a widely accepted grading system. Each defect is assigned a grade ranging from 1 to 5, with 5 being the worst grade, as listed in Table 6-4. Then, PACP offers several ways of rating the condition of a sewer:

- Defect grade: The worst defect observed is used to grade the entire pipe. A pipe with one Grade 5 defect would be given a Grade 5 for either the structural or operational condition.
- Segment grade: The number of occurrences of each defect grade is multiplied by the value of the defect grade. For example, a sewer with two Grade 5 defects, and four Grade 4 defects, and no other defects would have a segment grade of 26. Some municipalities create a look-up table to convert the total conditional grade score into a 1 to 5 scale. Total grades are established for both the structural condition and operational condition.
- Pipe Rating Index (PRI): The segment grade is divided by the number of defect occurrences. Using the above example, the PRI would be 4.3 (26.0 divided by 6.0).

Table 6-4. Structural and Operational Condition Grades for Sewers

| Condition grade | Grade description | Defect description | Structural condition grade implication | Operational condition grade implication |
|-----------------|---------------------|--|---|--|
| 5 | Immediate attention | Sewers requiring immediate attention | Collapsed or collapse imminent | Unacceptable infiltration or blockages; surcharging of pipe during high flow with possible overflows |
| 4 | Poor | Severe defects that will continue to degrade with likely failure in 5-10 years | Collapse likely in 5-10 years | Pipe at near surcharge condition during high flow; overflows still possible at high flows |
| 3 | Fair | Moderate defects that will continue to deteriorate | Collapse unlikely in near future; further deterioration likely | Surcharge or overflows unlikely but increased maintenance required |
| 2 | Good | Minor and few moderate defects | Minimal near-term risk of collapse, potential for further deterioration | Routine maintenance only |
| 1 | Excellent | No defects, condition like new | Good structural condition | Good operational condition |



Figures 6-5 and 6-6 below show the sewers that have been inspected to date (approximately 6 percent by length), along with the operational and structural condition grades. Grade 4 and 5 sewers should be the focus of the R&R program.

As additional inspections are performed and condition grades assigned, the City will develop a more complete and accurate understanding of existing pipe conditions. This information should be managed by the City with a computerized maintenance management system, GIS, or other software tool(s) so that the inspection information can be readily available to both engineering and maintenance staff. This condition information should be used for making informed decisions on the amount and type of maintenance that may be required and for identifying when to rehabilitate sewers and the type of rehabilitation such that the performance and condition of the collection system are maintained.

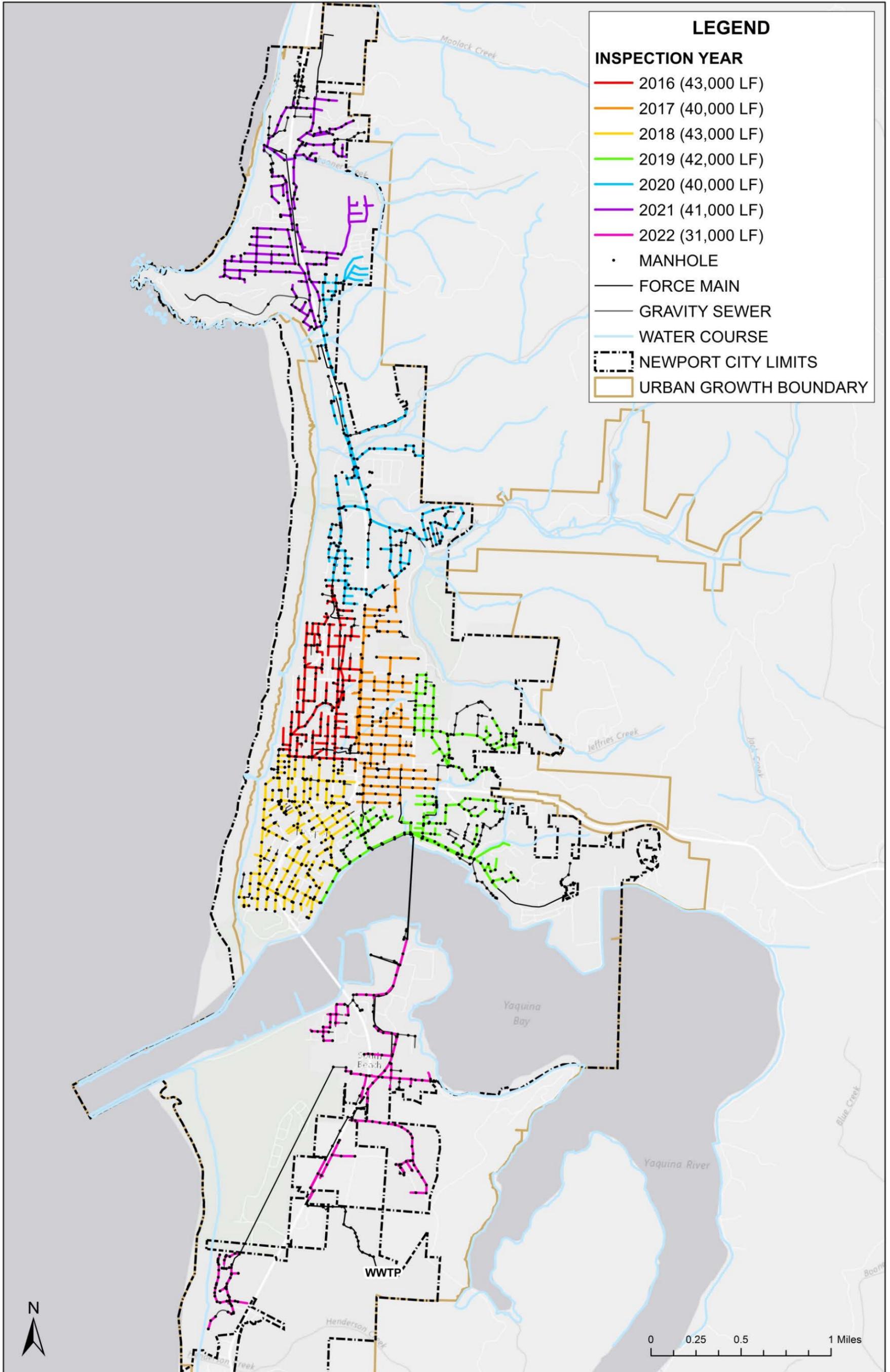
6.4.3 Infiltration/Inflow Abatement

Reducing the amount of I/I in the collection system can improve the hydraulic capacity of the existing system such that some pipes may not need to be replaced to convey future flows. In addition, I/I reduction can help prevent some types of structural failures. Some cracked and broken sewers are the result of a condition called soil piping. Soil piping in this context is a loss of pipe bedding and backfill support because of small grain soil particles washing out of the supporting soils into the sewer as a result of infiltration at sewer cracks and separated joints. If these conditions are not addressed, sewers can fail, resulting in sinkholes, basement backups, and SSOs.

The I/I projects that come from the investigative work will include sewer R&R, service lateral replacement, and potentially the construction of new sanitary sewers.

Laterals must also be addressed for I/I control and to preserve structural integrity. In a program that addresses mains and laterals, laterals account for about 25 to 50 percent of the overall project cost depending on density of development. The City will need to determine how to fund lateral replacements. Many different lateral funding strategies are in use throughout the Pacific Northwest.

The purpose of the investigation is to determine if and where I/I can be removed from the system cost-effectively. For definition purposes, cost-effective I/I reduction is achieved when the cost of eliminating I/I from within a portion of a sanitary drainage basin is less expensive than improvements to the downstream conveyance and treatment systems. It is recommended that the City move forward with some of the recommended first steps of an I/I abatement program to gain additional understanding of I/I sources from within the city limits.



Note: Inspection areas are from the City's 2015 Sewer Inspection Report. Project scope may change according to better available data.

Figure 6-4. Sewer inspection program

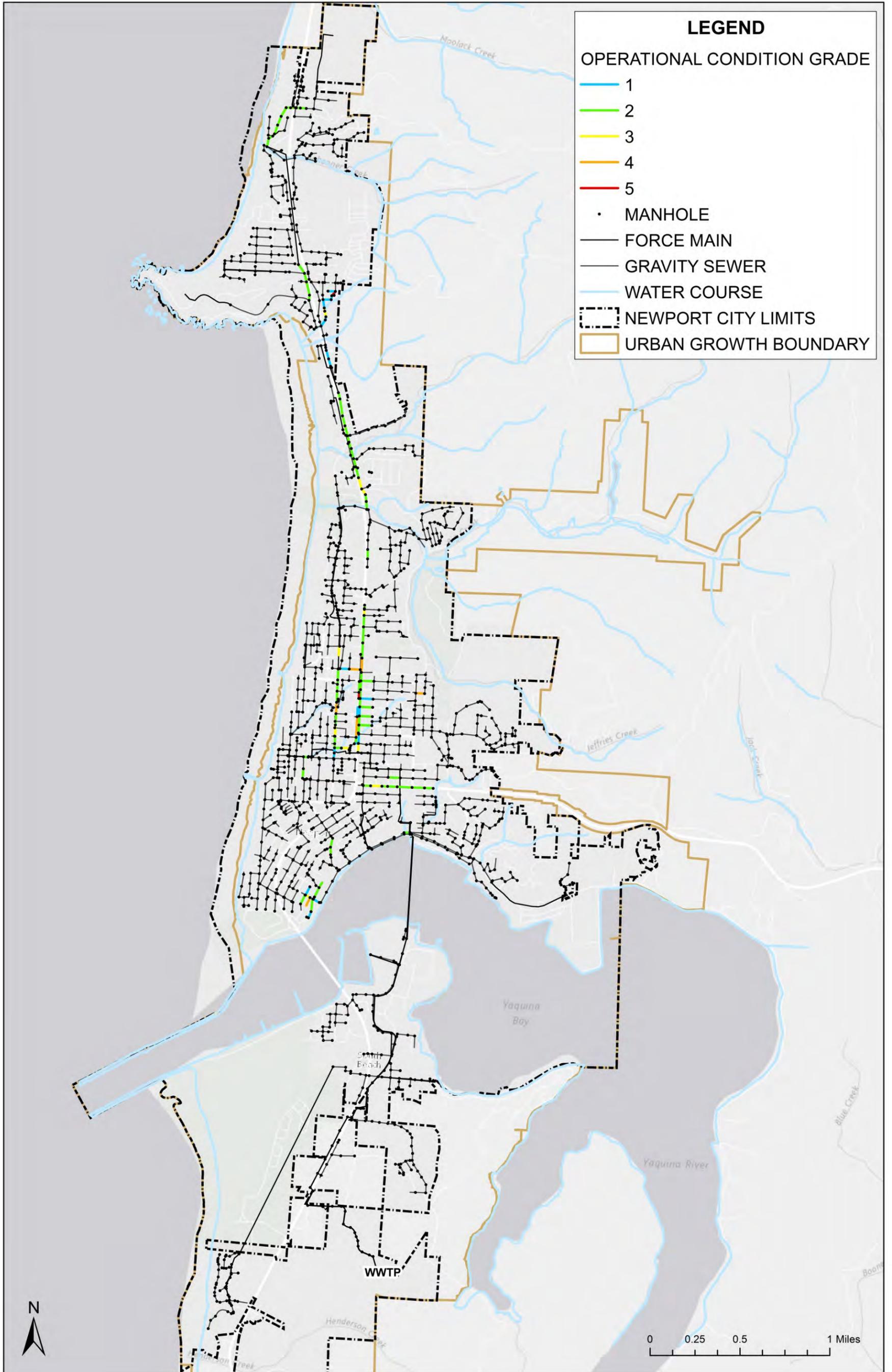


Figure 6-5. Inspection results: operational condition grades

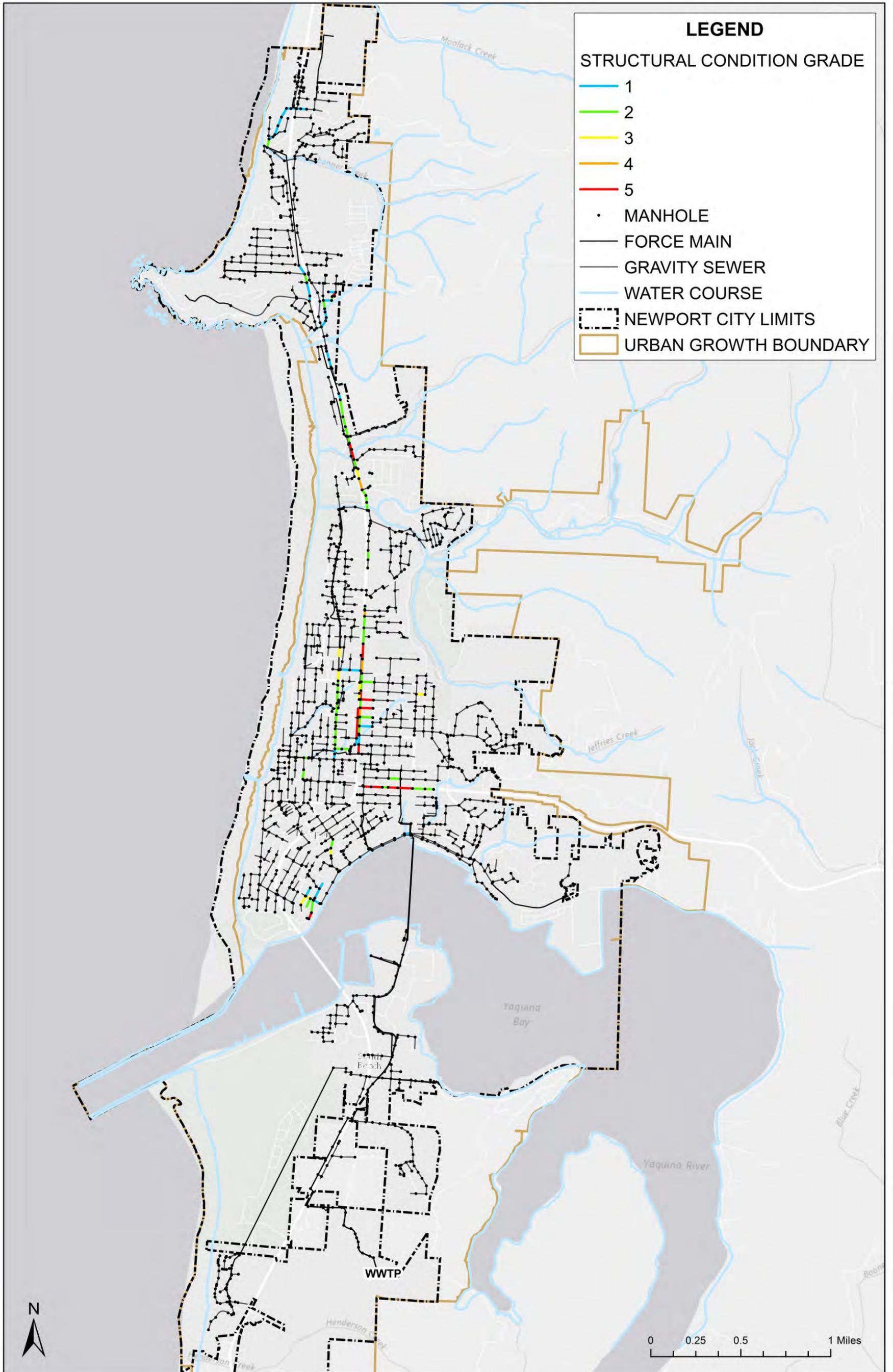


Figure 6-6. Inspection results: structural condition grades

6.4.4 Rehabilitation and Replacement Program Implementation

The City should be implementing a repair and rehabilitation (R&R) program to address their aging collection system. While the focus of many R&R programs is to restore the structural integrity of existing sewers, such activities will also help reduce the amount of infiltration that finds its way into the collection system.

The City's GIS database identifies approximately 330,000 LF of gravity sanitary sewer. From the first 2 years of CCTV inspection, approximately 10 percent of the inspected pipes were rated as Grade 5 and an additional 4 percent of the inspected pipes were rated as Grade 4. The remaining inspected sewers were Grade 3, 2, 1 pipes. For the purposes of a high level R&R plan, it is assumed that Grade 5 pipes need to be open-cut replaced and Grade 4 pipes can be addressed through a combination of spot repairs and trenchless technologies such as pipe-bursting or cured-in-place lining. It is also assumed that Grade 3, 2, and 1 pipes will continue to deteriorate but if the City continues with their recurring inspection program, Grade 3, 2, and 1 pipes that become Grade 4 pipes can be addressed using the lower cost trenchless technologies. Since the City's system is approximately 50 years old and assuming that the useful life of a sanitary sewer is 100 years, once all Grade 5 and 4 pipes are addressed, the R&R program should address the remaining Grade 3, 2, and 1 sewers such that 2 percent is replaced or rehabilitated each year. The cost for R&R of force mains assumes replacement of all force mains over the next 50 years.

Most sewer rehabilitation technologies, including cured-in-place-pipe and pipe-bursting, are less expensive than complete replacement costs. The R&R program costs are based on an assumed \$250 per LF for Grade 5 pipes, and \$150 per LF for Grade 4 pipes. This assumption assumes that Grade 5 pipes will require open-cut replacement and that Grade 4 pipes will be through a combination of spot repairs and trenchless technologies.

The City should budget approximately \$1M per year in 2016 dollars to the R&R program, assuming that 2 percent of its system per year will be rehabilitated. Table 6-5 presents a more detailed breakdown of the recommended R&R implementation strategy. The assumption that 2 percent will be rehabilitated is an approximate estimate based on information gathered from existing condition assessment information.

Years 1 through 16 should focus on the most severely deteriorated sewers, the Grade 5 sewers identified by the closed-circuit television (CCTV) inspections. The less deteriorated Grade 4 sewers should be addressed during years 5 through 16. As future inspections are conducted, additional Grade 4 and Grade 5 sewers will be identified. The LF listed in Table 6-8 for the unknown (i.e., yet to be inspected) Grade 4 and 5 sewers are estimated based on the distribution of grades for sewers inspected to date. These sewers are identified for R&R during years 1 through 16. The future inspections may find that the actual LF for each grade may vary from these projections. Also, the City should anticipate that additional R&R will be required in the future as the collection system ages.

Table 6-5. Costs for Recommended R&R Program Activities

| Work item | R&R pipe, LF | 2016 - 2031 R&R activities, 2016 dollars | | | |
|---------------------|--------------|--|--------------------|--------------------|--------------------|
| | | 2016 - 2019 | 2020 - 2023 | 2024 - 2027 | 2028 - 2031 |
| Grade 5 (known) | 4,990 | \$1,248,000 | - | - | - |
| Grade 4 (known) | 2,395 | \$359,000 | - | - | - |
| Grade 5 (assumed) | 22,954 | \$1,081,000 | \$2,329,000 | \$2,329,000 | - |
| Grade 4 (assumed) | 11,017 | \$311,000 | \$671,000 | \$671,000 | - |
| Grade 1, 2, or 3(a) | 288,644 | - | - | - | \$3,464,000 |
| Force Mains(b) | 46,500 | \$930,000 | \$930,000 | \$930,000 | \$930,000 |
| Total Cost | | \$3,929,000 | \$3,930,000 | \$3,930,000 | \$4,394,000 |
| Annual Cost | | \$982,000 | \$983,000 | \$983,000 | \$1,099,000 |

- a. Over time, pipes that are currently grade 1, 2, or 3 will escalate to being a Grade 4 pipe. It is estimated that the City will need to rehabilitate 2% of current Grade 1-3 pipes to maintain a sustainable inspection program. This is an estimated value; it is recommended that the City continues to evaluate the results of their inspection program to determine a refined R&R rate.
- b. The force main R&R scope does not include the cost of replacing the Big Creek FM, NW 48th St FM, or Schooner Creek FM. These force mains were recently evaluated as part of the Agate Beach Improvement Project. In addition, the Northside, SE Running Springs Dr, and Bayfront force mains were excluded, as they are included as individual CIPs.

Some of the pipe R&R projects may overlap with the sewers recommended for replacement due to hydraulic deficiencies. In addition, the R&R program should be structured to address the structurally- and operationally-deficient sewers including those sewers with excessive I/I. Table 6-8 does not include costs to construct new sanitary sewers to support downspout, foundation drain disconnects, or laterals.

Other factors that affect cost include level of data analysis to be performed, time of year that inspections are performed, and how much work is done in-house versus using outside consultants. Note that the City's existing CCTV program is included in this category. Table 6-6 also includes pump station inspections, as noted from above and rehab and rehabilitation costs for City selected minor pump stations. Tables 6-5 and 6-6 present annual known and assumed costs.

Table 6-6. Per Annum Costs for Recommended I&I Investigative Activities

| Work item | Quantity | Assumptions | Annual estimated cost, 2016 dollars |
|--------------------------|--------------------|---|-------------------------------------|
| CCTV inspections | 47,000 LF per year | <ul style="list-style-type: none"> 7-year inspection cycle. Assume an average of \$2.50/LF | 117,500 |
| Pump station inspections | 25 total | <ul style="list-style-type: none"> Inspect pump stations (excluding SE 3rd Street PS), with smaller stations costing \$10,000 and larger stations costing \$20,000. Assume an average of \$15,000/station. | 15,000 |
| Force main inspections | 9,300 LF per year | <ul style="list-style-type: none"> 7-year inspection cycle. Assume an average of \$20/LF. | 186,000 |
| Minor PS R/R Program | 20 years | <ul style="list-style-type: none"> A schedule should be established to conduct these improvements on an annual basis. Priority pump stations include, but are not limited to: <ul style="list-style-type: none"> Embarcadero PS SW Minnie St PS Bayfront PS NE 10th St PS | 200,000 |
| Total | | | 518,500 |

6.5 System Development Charges

The purpose of the SDC is twofold: (1) to promote equity between new and existing customers, and (2) to provide a source of revenue to fund capital projects. An SDC refers to a one-time charge imposed on new customers as a condition of connection to the utility system.

SDC revenues provide a source of cash flow used to support utility capital needs; revenue can be used only to fund utility capital projects or pay debt service incurred to finance those projects.

In the absence of an SDC, growth-related capital costs would be borne in large part by existing customers. In addition, the net investment in the City's Sanitary Sewer Utility (Utility) already collected from existing customers—whether through rates, charges, and/or assessments—would be diluted by the addition of new customers, effectively subsidizing new customers with prior customers' payments.

To establish equity, an SDC should recover a proportionate share of the existing and future infrastructure costs from a new customer. From a financial perspective, a new customer should become financially equivalent to an existing customer by paying the SDC.

The City calculates the percent of a project funded by SDCs as follows:

$$\text{Percent of Project Funded by SDCs} = 100 * \frac{\text{Future Peak Flow} - \text{Current Peak Flow}}{\text{Additional Capacity Required}}$$

Table 6-7 provides a list of the CIP projects, related to capacity-based criteria, and their associated SDC funding amounts.

| Project number | Description of improvement ^a | Current capacity, mgd | Current peak flow, mgd | Future peak flow, mgd | Additional capacity required, mgd | Percent of project funded by SDCs, % | Total project costs, \$M | Costs funded by SDCs, \$M |
|----------------|---|-----------------------|------------------------|-----------------------|-----------------------------------|--------------------------------------|--------------------------|---------------------------|
| 1 | NE Avery Street | 1.24 | 3.17 | 3.28 | 2.04 | 5.4 | 1.232 | 0.067 |
| 2 | NW Nye Street | 1.91 | 3.18 | 3.34 | 1.43 | 11.2 | 1.138 | 0.127 |
| 3 | Nye Beach PS | 2.00 | 2.67 | 2.74 | 0.07 | 9.5 | 2.828 | 0.269 |
| 4 | Bayfront PS and FM | 1.70 | 2.34 | 2.59 | 0.89 | 28.1 | 3.714 | 1.040 |
| 5 | Northside PS | 8.50 | 8.00 | 9.20 | 0.70 | 100.0 | 2.780 | 2.780 |
| 6 | SE Running Springs Drive PS and FM | 0.22 | 0.05 | 0.27 | 0.05 | 100.0 | 1.178 | 1.178 |

a. SE 3rd Street PS and NW 56th Street PS projects are not a capacity-based upgrade; thus, they are expected to not impact SDC charges.

6.6 CIP Implementation Schedule

The improvement projects recommended in the previous sections are summarized in Table 6-8, below. The project locations are shown in Figures 6-1 and 6-2. The anticipated years for performing the work are also shown in the recommended CIP tables. The City reserves the right to modify the priority based on flow conditions and funding.

| Table 6-8. Cost of Recommended CIPs and Implementation Schedule | | | | |
|--|-----------------------------|--|-----------------------|---|
| Project number | Project name | Project description | Year completed | Estimated cost of improvements, 2016 dollars^a |
| Gravity Sewer Improvements | | | | |
| 1 | NE Avery Street | Upsize gravity sewer from the Bayfront FM to the Northside PS | 5-10 | 1,230,000 |
| 2 | NW Nye Street | Upsize and rehabilitate gravity sewer from the Big Creek FM to the Northside PS | 1-5 | 1,140,000 |
| Total all gravity sewer improvements | | | | 2,370,000 |
| Major PS and FM Improvements | | | | |
| 3 | Nye Beach PS | Upgrade PS firm capacity to 2.74 mgd | 1-5 | 2,828,000 |
| 4 | Bayfront PS | Upgrade PS firm capacity to 2.59 mgd | 1-5 | 3,224,000 |
| 4 | Bayfront PS | Upgrade FM to 14" diameter | 1-5 | 490,000 |
| 5 | Northside PS | Upgrade PS firm capacity to 9.2 mgd | 5-10 | 2,780,000 |
| 5 | Northside FM | A conservative cost estimate was assumed from previously chosen alternatives | 5-10 | 1,500,000 |
| 6 | SE Running Springs Drive PS | Upgrade PS firm capacity to 0.27 mgd | 5-10 | 1,178,000 |
| 6 | SE Running Springs Drive FM | Upgrade FM to 14" diameter | 5-10 | 330,000 |
| 7 | SE 3rd Street PS | Replace PS with a gravity line extending to SE 4th Street | 10-15 | 310,000 |
| 7 | NW 56th Street PS | PS is located in a geologically unstable area; conduct alternative analysis and implement project solution | 10-15 | 1,347,000 |
| Total all PS and FM improvements | | | | 13,987,000 |
| Sewer Extension Improvements | | | | |
| 8 | Surfland Septic Conversion | Construct new gravity system | 15-20 | 4,620,000 |
| 8 | Surfland Septic Conversion | Construct new PS | 15-20 | 1,000,000 |
| 8 | Surfland Septic Conversion | Construct new FM | 15-20 | 612,000 |
| Total all sewer extension improvements | | | | 6,232,000 |

Table 6-8. Cost of Recommended CIPs and Implementation Schedule

| Project number | Project name | Project description | Year completed | Estimated cost of improvements, 2016 dollars ^a |
|--|-----------------------------------|---|----------------|---|
| Other Improvements | | | | |
| 9 | Maintenance Program | Conduct a study to establish a cleaning schedule for sewer mains; currently the City has 19 sewer mains identified for regular cleaning. | 1-5 | 20,000 |
| 10 | Re-route building crossings | Re-route sewer mains that cross under buildings including: <ul style="list-style-type: none"> Gravity system just east of NW Nye Street, north of NW 12th Street Sewer main under Washington Federal Bank, 505 N Coast Highway (SSMH 7003 to 7002 to 7061) Sewer main under house at 1819 NW Crestview Place (SSMH 4774 to 4787) Sewer main under house at 270 SE Penter Lane (SSMH 7531 to 7533) The sewer main under the Newport Fire Station, 245 NW 10th Street (SSMH 5045 to 5518) will be addressed by the Nazarene Church Sewer Replacement project and is not included in this cost | 10-15 | 760,000 |
| Total all other improvements | | | | 780,000 |
| Annual R&R Costs | | | | |
| 11 | Sewer R&R Program (excluding PSs) | Rehabilitate sewers and FMs based on R/R implementation plan. Target Grade 5 and 4 sewers ^b . | Annual | 1,011,750 |
| 12 | Inspection Program | Inspect 47,000 LF of gravity pipe per year | Annual | 117,500 |
| 12 | Inspection Program | Inspect 9,300 LF of force mains per year | | 186,000 |
| 12 | Inspection Program | PS inspection program | Annual | 15,000 |
| 13 | Minor PS R&R Program | A schedule should be established to conduct these improvements on an annual basis. Priority PSs include, but are not limited to: <ul style="list-style-type: none"> Embarcadero PS SW Minnie Street PS San Bay-O PS NE 10th Street PS | Annual | 200,000 |
| Total all annual costs^b | | | | 1,530,000 |
| Total of 20-year CIP (without annual R&R costs, no inflation) | | | | 23,369,000 |
| Total of 20-year CIP (with annual R&R costs, no inflation) | | | | 53,969,000 |

a. Estimated costs include a 30% allowance for construction contingencies and a 20% allowance for engineering design and administration. PS costs include a 25% allowance for contractor markups. See Appendix E for unit cost tables—assumes a depth of 10' per cost condition 2 for gravity and sewer extensions.

b. Costs associated with this part of the CIP program are based on existing inspection data which was used to generate an assumed percent of the total system that will require R/R in the future. This approach assumes that existing Grades 2-4 will become Grade 5 or that new Grade 5 will be identified in later inspections, thus needing repair within 5-years of identifying. This approach carries some risk for pipes yet to be inspected, where Grade 5 pipe may currently exist in areas that will not be targeted for many years; thus, failure could prematurely occur and require emergency repairs. An alternate approach for consideration would be to complete a comprehensive inspection of the entire system and establish a more accurate understanding of Grade 5 deficiencies so that the plan can be revised to reflect actual versus assumed conditions. This approach may require more upfront costs, but has the potential of reducing future expenditures as the planning period advances.

Table 6-9 presents the estimated costs for recommended CIPs based on 5-year periods. Annual averages for each category have been provided for quick reference. Increased spending, beyond the yearly average, is expected to be needed for the early phased planned projects.

| Table 6-9. Estimated Annual Costs for Recommended CIPs, 5-year Periods | | | |
|---|--|---|--|
| Year completed | Planned project costs, per period, 2016 dollars | Annual R&R costs, per period, 2016 dollars | Total costs, per period, 2016 dollars |
| 1-5 | 7,702,000 | 7,651,000 | 15,351,000 |
| 6-10 | 7,778,000 | 7,651,000 | 15,427,000 |
| 11-15 | 1,657,000 | 7,651,000 | 9,306,000 |
| 16-20 | 6,232,000 | 7,651,000 | 13,881,000 |
| Average (per year) | 1,168,000 | 1,530,200 | 2,697,800 |

Section 7

Limitations

This document was prepared solely for the City of Newport in accordance with professional standards at the time the services were performed and in accordance with the original contract between the City of Newport and Brown and Caldwell dated November 27, 2013, and as amended thereafter. This document is governed by the specific scope of work authorized by the City of Newport; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the City of Newport and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Planning Commission Work Session Agenda Item Report

Agenda Item No. 2016-2295

Submitted by: Sherri Marineau

Submitting Department: Community Development

Meeting Date: March 26, 2018

SUBJECT

Presentation by DOGAMI Regarding "Beat the Wave" Modeling Assumptions

Recommendation:

ATTACHMENTS

- [DOGAMI Presentation.pdf](#)

Memorandum

To: Planning Commission/Commission Advisory Committee
From: Derrick I. Tokos, AICP, Community Development Director 
Date: March 22, 2018
Re: DOGAMI Presentation Regarding "Beat the Wave" Time Distance Modeling Assumptions

Representatives from the Department of Geology and Mineral Industries (DOGAMI) and the Department of Land Conservation and Development (DLCD) will be attending the work session to share with the Commission the assumptions built into the "beat the wave" time/distance modelling that they will be performing for areas in Newport that are within tsunami inundation areas. Maps will be produced showing the results of the modelling and the work will be used to inform potential amendments to the City's Comprehensive Plan, land use regulations, and capital improvement plan relative to tsunami evacuation infrastructure.

This is a follow-up to the Planning Commission's January 8, 2018 work session where the project was introduced. The Commission requested this subsequent work session so that the members could get a better sense of how the modelling work will be performed.