City of Port Orchard

Comprehensive Sanitary Sewer Plan Update

August 2010

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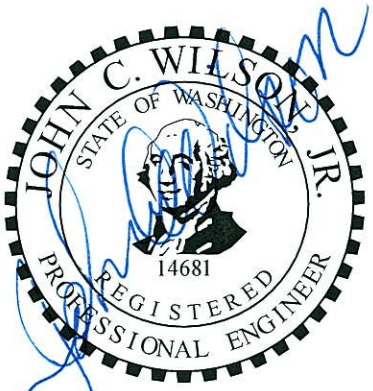

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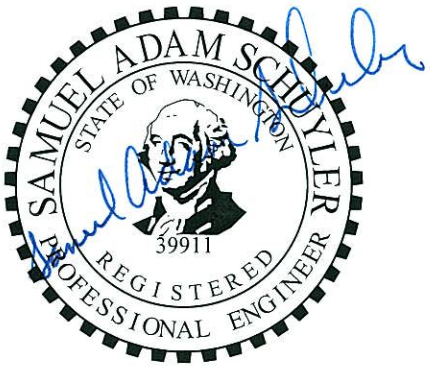

Adam Schuyler PE
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Greetings Mark and John. I have attached my comments on the Port Orchard Comprehensive Sewer Plan Update, November 2009. Sorry for the long delay. Let me know if you have questions. Just want to let you know I will be on vacation from 7/15 (Friday) through 7/26 (Monday).

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Port Orchard Comprehensive Sanitary Sewer Plan Update, BHC Consultants, November 2009 - Comments

(1) Page 30, Calculation below First Paragraph: It appears that 0.428 MGD used in the calculation below the first paragraph should be 0.66 MGD based on the flow estimates (Projected Average Day Domestic Sewage) shown above this paragraph. If this is the case, subsequent calculations for the flow estimates will also need to be revised.

(2) Page 39, Last Paragraph and Page 40, First paragraph: Please note that infiltration is considered excessive when flows are greater than 120 gallons per capita per day (gpcd) during periods of high groundwater, and inflow is considered excessive when flows are greater than 275 gpcd during storm events.

(3) Page 45: The report states "Surcharging the sewer pipes as indicated has no apparent capital cost; and little risk beyond the possibility of a brief sewer overflow should peak flow briefly exceed projections, which may involve some maintenance cost if cleanup becomes required". Sewer overflows from surcharging manholes would very likely result in the risk to human health and and/or the environment. The sewer system design should not allow for overflows from manholes.

(4) Page 49, Section 7.5, Paragraph 3: The regulatory requirements to produce 'Class A' reclaimed water are not based on regulations issued by the Environmental Protection Agency. These regulatory requirements are based on the 1992 enactment of the reclaimed water act by the Washington State Legislature.

(5) Page 49, Section 7.5, Paragraph 4, #2: The turbidity standards for reclaimed water produced by MBR systems are: The average monthly operating turbidity shall not exceed 0.2 NTU and turbidity shall not exceed 0.5 NTU at any time as measured continuously at the sampling point following membrane filtration and prior to final disinfection.

(6) Page 50, Last Line: The report states "…….but the quality does not have to meet the standards for groundwater aquifer recharge". Please refer to (i) RCW 90.46.080 for the existing discharge limit requirements for contaminants for surface percolation of reclaimed water, and (ii) Reclaimed Water Rule WAC 173-219-810 (Draft) for minimum requirements for groundwater recharge by reclaimed water percolation.

(7) Page 53, Paragraph under Table 7-4: The report states "Table 7-4 indicates that satellite treatment facilities could remove about 5.0 MGD of peak hour flow from the rest of the City sewer system for 2025. That exclusion would reduce the need to add capacity to trunk piping, the pump stations, and the Karcher Creek treatment facility". Please note that the use of reclaimed water produced by satellite treatment facilities would be possible mostly during dry weather periods, whereas, the highest flows in the collection system occur during wet weather periods.

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GLOSSARY

ABREVIATIONS

APPENDICIES

A SEPA Checklist
B Public Hearing
C City of Port Orchard & West Sound Utility District Agreement
D Fact Sheet – Joint Wastewater Treatment Plant
E Pump Station Site Visit, July 9, 2008, by John Freck PE, BHC Consultants
F Pump Station Flow Evaluation
G Trunk Sewer Capacities
H Capital Cost Estimation Spreadsheets
I Financial Documentation
J Comments Received

DOCUMENTS INCORPORATED BY REFERENCE

City of Port Orchard Comprehensive Plan 2007
City of Port Orchard 2007 Water System Plan
City of Port Orchard Comprehensive Sewer Plan 2000
City of Port Orchard, SKIA Infrastructure Assessment & Technical Memorandum July 28, 2008
Kitsap County Comprehensive Plan Update, December 11, 2006
West Sound Utility District Sewer Comprehensive Plan, November 2007
Engineering Report Update, April 2002, City of Port Orchard & Karcher Creek Sewer District
South Kitsap Industrial Area Plan, September 30, 2003
City of Bremerton, Financial Assessment, SKIA Area Annexation, June 16, 2008

GLOSSARY

100-year flood: The magnitude of a flood likely to occur, on average, once every 100 years.
Average Wet Weather Flow: Wastewater flow during period when groundwater table is high and precipitation is at its peak, generally from October to May in the Sultan area.
Biochemical Oxygen Demand (BOD): Measure of the biodegradable material in a wastewater sample by the amount of oxygen used by waste-consuming organisms over 5-days**.**
Bioselector: Process component in beginning of wastewater treatment train wherein air and nutrients are kept at a level to select for the most desirable organisms to biodegrade the organic materials in the wastewater.
Class 'A' Reclaimed Water: An oxidized, coagulated, filtered, disinfected wastewater with the median number of total coliform organisms not exceeding 2.2 per 100 milliliters and the maximum number of total coliform organisms in any one sample not exceeding 23 per 100 milliliters.
Class 1 Stream: A perennial or intermittent stream that is used by threatened or endangered fish or larger numbers of other fish, or that is used as a direct source of water for domestic use.
Infiltration: Groundwater entering the sewage collection system through defective joints, pipes, and improperly sealed manholes.
Inflow: Sewage flows resulting from stormwater runoff entering the sewage collection system, typically through manhole covers, roof leaders, and area drains connected directly to sewer, cross connections from storm drains and catch basins, and direct flows into broken sewers.
Maximum Monthly Flow: Average daily flow during the highest flow month of the year.
National Flood Insurance Program: Federally funded program providing flood insurance to property owners in flood plains; provided the local government meets certain criteria for management of flood damage risk.
Orange Book: *Criteria for Sewage Works Design*, published by the Washington State Department of Ecology
Oxidation Ditch: Activated sludge wastewater treatment system wherein wastewater is pumped around an oval using a surface aerator.
Peak Hourly Flow: Wastewater flow during the highest flow hour.
Polymer: Chemical mixed with sludge to enhance coagulation in the dewatering process.
Sensitive Area: Area in which development potential is limited by environmental factors such as steep slopes, cultural resources, wetlands, and valuable natural habitat.
Secondary Clarifier: Large quiescent tank in which activated sludge is directed into a center hopper and clear effluent is discharged over a weir.
Sewer Lateral: A sewer from a sewer main to serve one or more customers with no other common sewers discharging into it.
Sewer Submain: A sewer that receives flow from one or more sewer lateral.
Sewer Main or Trunk: A sewer that receives flow from one or more submains.

Sewer Interceptor: A sewer that receives flow from a number of main or trunk sewers, force mains, etc.
Total Suspended Solids: Measure of the total of biodegradable and non-biodegradable solids in wastewater.
UV Disinfection: Disinfection of clarified treated sewage effluent by exposure to ultraviolet radiation using banks of lamps suspended in a narrow effluent channel.

ABBREVIATIONS

AWWF	Average Wet Weather Flow
BOD	Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CWA	Clean Water Act
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Act
FPS	Feet per second
FWPCA	Federal Water Pollution Control Act (“The Clean Water Act”)
GPCD	Gallons per capita per day
GPAD	Gallons per acre per day
GPD	Gallons per day
HPA	Hydraulic Project Approval
I & I	Infiltration and Inflow
MGD	Million Gallons per Day
mg/L	Milligrams Per Liter
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OCD	Washington State Office of Community Development
OFM	Washington State Office of Financial Management
PVC	Polyvinyl Chloride
RCW	Revised Code of Washington
SRF	State Revolving Fund
TSS	Total Suspended Solids
USFWS	United States Fish and Wildlife Service
UV	Ultraviolet

EXECUTIVE SUMMARY

Four areas are authorized for sewer service in and around the City of Port Orchard including: area within the existing city limits, the expanded City urban growth area (UGA), the South Kitsap UGA/ULID #6, and potentially the South Kitsap Industrial Area (SKIA). Responsibility for providing sewer service within this geographic area is shared between the City sewer utility and the West Sound Utility District. This Plan identifies the additional sewer facilities required by the City to provide sewer service within that part of the UGA that is the City's responsibility; and to confirm the commitment by the City to provide the sewer service in a timely manner.

For purposes of planning future needs, Kitsap County has divided the entire County into Transportation Analysis Zones (TAZ). Population and employment for each TAZ has been projected by the County for the year 2025 and at build-out under current land use plans with the UGA boundaries as presently defined. This Plan identified the TAZ affecting the defined UGA, and where some City sewer responsibility exists. The County 2025 and build-out population and employment projections were extracted for these TAZ. In many cases only part of a TAZ would receive sewer service, and be served by City sewers. Populations and employment projections were apportioned from these TAZ, recognizing that most development would occur within the UGA where parcels receive sewer service.

Historic City records for wastewater flow sent from the Marina Pump Station to the treatment facility operated at Karcher Creek by the West Sound Utility District were reviewed. Annual average day wastewater flows were identified and the unit flow attributable to a typical City resident or employee were determined from past population records. Average day wastewater flows for 2025 and build-out conditions were projected. The historic ratio of peak day flow to annual average at the Marina Pump Station was established. The peak flow for 2025 and build-out conditions was projected.

The potential sewer service area tributary to the City sewer system was divided into sewer basins based on drainage topography and existing sewer service patterns. Existing trunk sewers and principal pump stations conveying wastewater from and through these basins were identified. City records were reviewed to determine the peak hour capacity from the existing pumping capacities plus the tributary pipe sizes and slopes, which then indicated existing peak hour trunk capacity.

Projected peak hour flow in each trunk under build-out conditions was compared with existing capacity available. Where additional capacity will be needed, the added trunk sewer size was identified. Capacity needs for 2025 were then compared with existing capacity and with build-out needs to establish trunk sewer upgrade priorities.

These improvements total about $ 14,800,000. Approximately $ 6,170,000 is projected to be funded within the next six years by the City. Additional improvements may be funded by property development as well as the new collector sewer extensions. The annual average day flow for 2025 is projected to be about 1.47 MGD, and adequate treatment capacity will be built.

A variety of funding options are available to the City to implement the required improvements.

1. PURPOSE

1.1 Need for Plan Update

A number of changes have occurred within the City vicinity since the last Comprehensive Sanitary Sewer Plan was prepared in 2000. This 2009 Comprehensive Sanitary Sewer Plan Update has been prepared as one step in demonstrating compliance with the Growth Management Act (GMA).

1.2 Growth Management Compliance

Figure 1-1 shows the location of the City of Port Orchard in relation to the Puget Sound area. Existing wastewater treatment facilities within 20 miles of the City are also indicated.

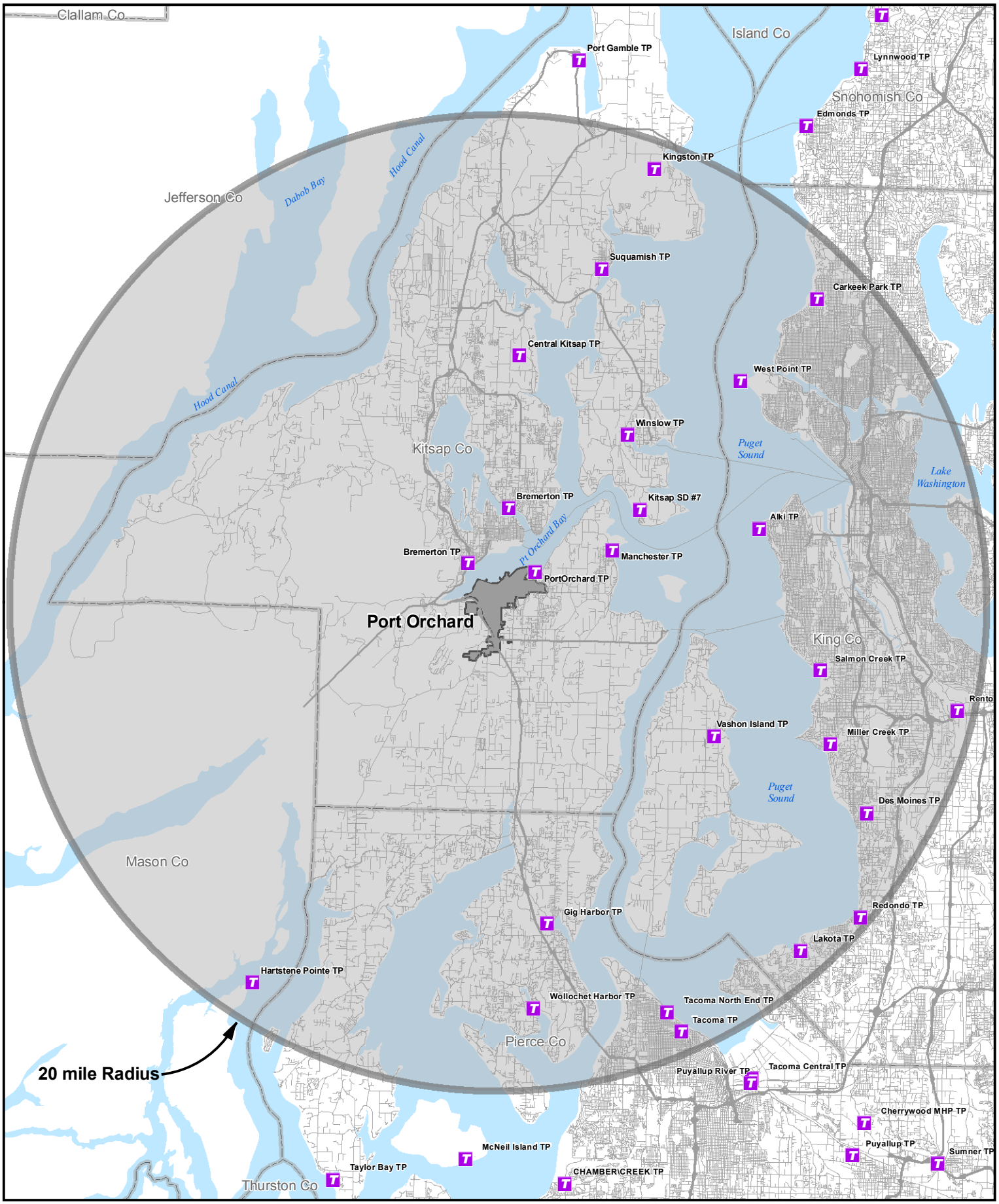
The immediate vicinity surrounding the City of Port Orchard and the urban growth area (UGA) assigned to the City plus the South Kitsap UGA and potentially the SKIA is shown in Figure 1-2. This Comprehensive Sanitary Sewer Plan shows how sewer service will be extended throughout that portion of the UGA that is the responsibility of the City of Port Orchard.

1.3 System Responsibilities

The City of Port Orchard operates a sewer collection and interception system within part of the UGA assigned to the City. Portions of the area within the existing city limits are served by this sewer system, as are some areas outside the current city limits.

West Sound Utility District also operates sewer collection facilities serving part of the UGA including some portions within the current city limits for Port Orchard. District boundaries are shown on Figure 1-2.

Wastewater treatment and disposal facilities are operated by the West Sound Utility District for both the City and the District under an inter-local agreement defining responsibilities and financial obligations.



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MAP DATE AUGUST 2008; UPDATED NOVEMBER 2009

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N

0 2.5 5 Miles

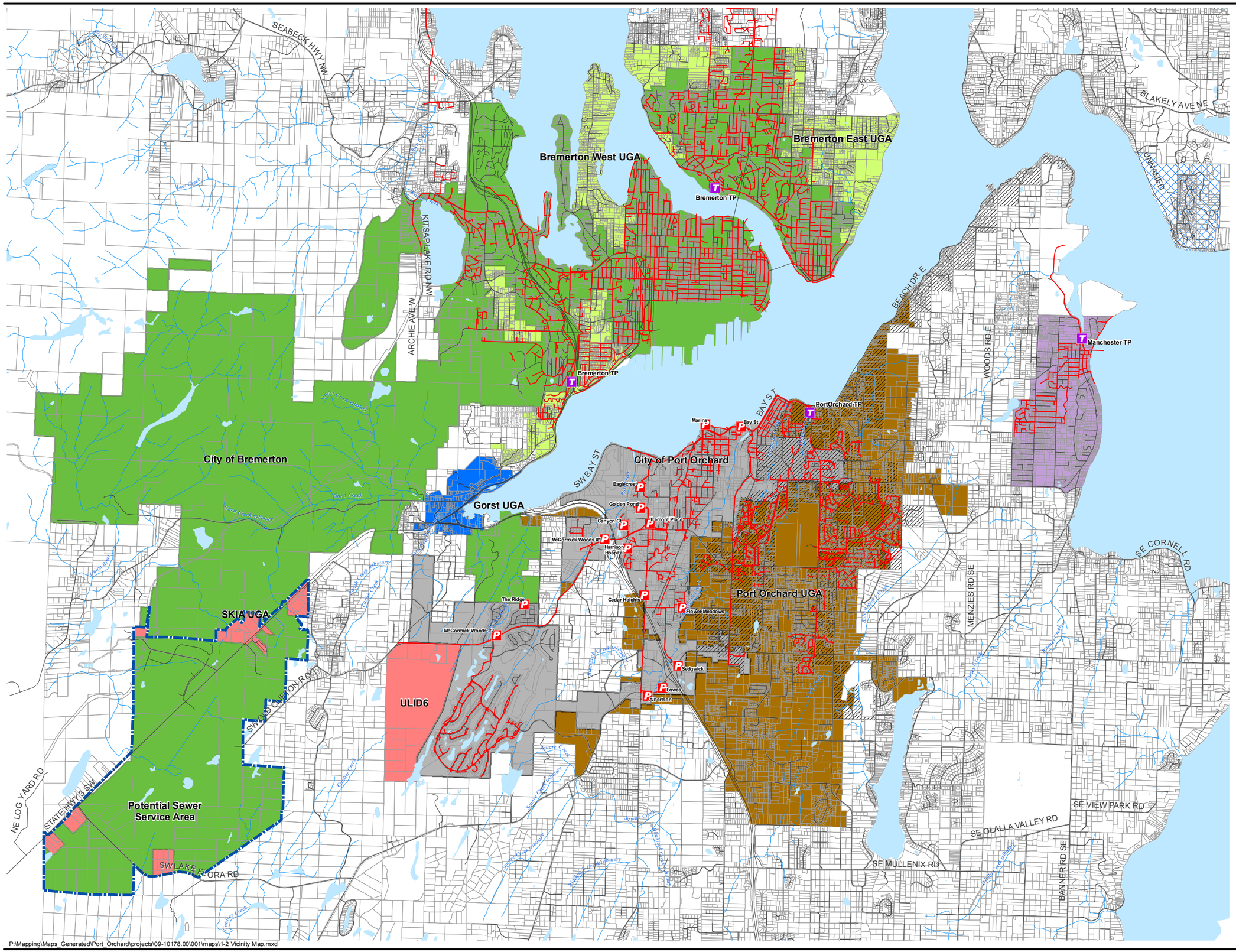
Legend

- Treatment Plants
- City of Port Orchard
- Counties
- Water Bodies
- Freeways

Comprehensive Sanitary Sewer Plan Update
City of Port Orchard WA

Location Map

Figure 1-1



City of Port Orchard
WASHINGTON

Comprehensive Sanitary Sewer Plan Update

Legend

- Treatment Plant
- Pump Stations
- Sewer Pipes
- West Sound District Boundary
- Fort Ward Sewee District #7
- LAMIRD
- City of Port Orchard
- City of Bremerton
- Port Orchard UGA
- Bremerton UGA
- Gorst UGA
- Unincorporated Urban Growth Area
- SKIA UGA
- Water Bodies
- Rivers & Streams

N

0 2,500 5,000 10,000 Feet

Data Sources: Kitsap County 2009
This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

MAP DATE: DECEMBER 13 2007; UPDATED NOVEMBER 2009

Port Orchard Vicinity Map

Figure 1-2

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2. GOALS AND POLICIES

2.1 Approach

City of Port Orchard manages and operates their sewer system in accordance with all known state, local and federal regulations. The policies and criteria described in this chapter are established by the City to provide a framework for the planning, design, operation, and management of the system. Used together, policies and criteria provide the desired level of service to sewer utility customers.

While the City has many policies related to the City Customers and Public Infrastructure, these policies are provided to seek goals of uniform treatment to all City customers, today and in the future. These policies are limited to those things related to the sewer system and its design and operation.

While the City has discretion in setting performance and design criteria and standards for its sewer system, the criteria set must meet or exceed the minimum standards for public sewers as set forth by the Washington State Department of Ecology (DOE) through Chapters 90.48, 90.52, and 90.54 RCW. The criteria focus on planning, design parameters, and other details that have been developed to establish consistency and to ensure that adequate levels of service are provided throughout the system. The criteria also provides the planning process with measuring tools to identify any areas of the existing system that need to be improved to achieve the desired level of customer service.

Other publications such as the Developer's Handbook, 2004, and the Sewer System Design Standards document the design standards and procedures for development of the sewer system.

The Goals and Policies documented in the Chapter are drawn from existing City documentation, with such statements shown in regular type. New statements added through this Comprehensive Sewer Plan Update are shown in *italics.*

Accordingly the City of Port Orchard establishes the following goals for sewer service:

Goal 1*: Provide safe, reliable and timely sewer service to its consumers at a fair and reasonable price.*

Goal 2: *Provide reliable levels of service and ensuring adequate capacity within the sewer system by upgrading the system to protect the natural environment, as deemed necessary.*

Goal 3: *Ensure that sewer system infrastructure expansion provides an adequate level of public service to support new development consistent with the City's policies, criteria, and standards. In addition, sewer system expansion should also be consistent with current land use plans and development regulations of the State of Washington, Kitsap County, and appropriate local planning agencies.*

In order to achieve these goals, the City has developed the policies and criteria presented herein.

1. Service Area, Extensions, and Service Ownership. Service area and extension policies define the sewer service area and conditions for service extension within those boundaries. The customer service policies define the level of service provided to sewer utility customers, as well as public and private ownership and responsibility for sewer system components. City will provide sewer service to that part of the urban growth area not within the West Sound Utility District sewer service area.

2. Coordination/Cooperation with Other Agencies. These policies summarize the City's willingness to coordinate and cooperate with other agencies, as well as to enter into interlocal agreements with neighboring jurisdictions for the provision of sewer service.

3. Sewer System Design. The sewer system design policies and criteria detail the City's design standards for sewer system infrastructure necessary facilities required to provide safe, continuous sewer service.

4. Environmental Stewardship. These policies outline the City's dedication to develop and implement facilities and programs that will protect the environment.

5. Operation and Maintenance Standards. The City's operation and maintenance standards define the Operation's Plan and Maintenance Program for the sewer utility infrastructure.

6. Financial. This section summarizes the City's general financial policies and criteria *to create and maintain a self-supporting utility through* sewer rate structures, connection charges and capital improvement financing.

2.2 Management

Service area and extension policies define the sewer service area and conditions for service extension within those boundaries. The customer service policies define the level of service provided to sewer utility customers, as well as public and private ownership and responsibility for sewer system components.

Service Area

The City of Port Orchard should plan for and provide sewer service to property within the City limits and within the established boundaries of Kitsap County ULID #6, as agreed upon by West Sound Utility District and the City.

The City should provide sewer service to property outside the City limits but within the Urban Growth Area, *subject to annexation unless otherwise* approved by the City Council. If the property is outside an Urban Growth Area, the City should not provide sewer service unless the Kitsap County Health District requests such service for health reasons or unless the service existed prior to the establishment of the Urban Growth Boundary.

Agreements

The City should establish agreements with neighboring utility districts, cities, and Kitsap County for the provision of sewer services. These agreements will establish a defined sewer service area for the City.

The City has established an agreement with Karcher Creek Sewer District (formerly Sewer District #5) for the District to operate and maintain treatment and discharge facilities serving the City of Port Orchard and the Sewer District. West Sound Utility District is now responsible for the Karcher Creek agreements.

The City has established (1994) an agreement with Kitsap County regarding sewer system extension from ULID #6. The City agrees to accept wastewater flow from properties within ULID #6 and as out-of-city customers per terms of the agreement and upon conditions consistent with the rules, regulations and resolutions governing the City. Wastewater shall be conveyed from ULID #6 to the treatment plant using City owned transmission mains. The City shall assess a fee to latecomers to ULID #6 to connect to the system.

Service Extensions

All homes and businesses within 200 feet of a sewer main that have failing on-site systems and are within the urban growth area shall connect to that main. Sewer system service extensions should be allowed to provide sewer service within the City's sewer service area if the development is consistent with adopted development polices and all sewer utility policies and criteria. The proponent's development may require an improvement as described in the comprehensive plan that shall be made at the cost of the proponent. If the City makes a determination that the proponent's development requires system upgrades beyond any upgrade planned by the City and/or before a scheduled capital project, the upgrades shall be made at the cost of the proponent. Said extensions should be installed pursuant to Methods 1, 2, or 3 as described below.

Local Improvement Districts - Method 1

The Local Improvement District is the conventional means to provide sewer facilities. This allows the new customer to share the cost of the improvement and to finance the expense over a long period of time, such as 20 years. It *may* eliminate *most* up-front costs to the new customer.

A property owner may petition for the formation of a Local Improvement District (LID) orUtility Local Improvement District (ULID) to install an extension to the City's sewer system. The property owner may request the City Council authorize a petition for formation of the ULID or the property owner may request formation of a ULID by Resolution of the City Council. Upon successful completion of the required steps to form the ULID as prescribed by statute, the City should proceed with the construction of the facilities. All costs of design, construction, and associated ULID requirements, shall be borne by assessments to the benefited properties within the ULID.

Developer Financed with Reimbursement - Method 2

The City provides for Developer Extension Agreements, as per Ordinance 1587. The Developer Extension Agreement allows the developer to recoup a specific cost from specific properties when those properties connect to the improvement that the developer has financed. The agreement cannot be accepted by the City until there is a public hearing to allow all affected parties the opportunity to participate in the discussions.

Developer Financed without Reimbursement - Method 3

When the developer decides not to request a public hearing and a Developer Extension Agreement, then the cost of the improvement is borne by the developer.

Service Ownership

The portion of any side sewer pipe from the main to the edge of street right-of-way or sewer easement shall be kept within exclusive control of the City. The portion of the side sewer and any associated appurtenances beyond said right-of-way or sewer easement shall be the responsibility of the sewer customer or property owner served by the pipe.

2.3 Cooperation and Coordination

These policies summarize the City's willingness to coordinate and cooperate with other agencies, as well as to enter into inter-local agreements with neighboring jurisdictions for the provision of sewer service.

Regional/County Participation

The City should support and participate in applicable regional planning efforts with Kitsap County to provide and maintain a reliable and adequate sewer system.

Mutual Aid

The City will investigate opportunities in mutual aid agreements with adjacent jurisdictions, including the state-wide WA-WARN mutual aid program, to provide personnel and equipment to each other upon request for assistance during a disaster or emergency.

2.4 Sewer System Design

The sewer system design policies and criteria detail the City's design standards for sewer system infrastructure necessary facilities required to provide safe, continuous sewer service.

In accordance with all applicable federal, state, and local regulations, the City should design its sewer system facilities with sufficient capacity to handle the anticipated peak daily flow under normal conditions during at least a 5-year storm event without any overflows to the environment. If the sewer system facilities must be installed or upgraded as a result of a developer's impacts,

the new facilities or upgrades shall conform to the City's policies, criteria and standards and shall be accomplished at the developer's expense. The City, however, shall be responsible for any portion of the costs that are attributable to general facilities such as over-sizing or over-depth requirements.

The City complies with the standards of the American Public Works Association and the Washington State Department of Ecology.

Main Line Requirements

The minimum diameter for gravity collector pipes shall be 8 inches, unless specifically exempted by the City Engineer. Pipe sizes larger than 8 inches may be required for major conveyance or interceptor lines and trunks. The pipe size selection shall consider the design flow, design slope, pipe material and roughness, cleaning equipment available to the City and normal maintenance scheduling.

In cases of proximity near water mains, the sewer main shall:

1) be lower than the water main,
2) be at least 10 feet from the water main, if the pipes are parallel, and
3) be at least 36 inches below the water main if the pipes cross.

Detecting tape with wire for underground locates shall be installed over all non-metallic sewer mains and laterals. The tap shall be 1 foot above the pipe and extend its full length.

Sewer mains shall be televised prior to acceptance. The main shall hold 5 psi for 15 minutes.

Sewer Stub Service Requirements

The minimum diameter for sewer service line shall be 4 inches. *One or* two dwelling units *can be served with a 4-inch sewer service line*. Otherwise the minimum diameter shall be 6 inches *for up to six dwelling units. Sewer service to seven or more dwelling units shall have an 8-inch sewer main extension.* Each single-family residence, apartment or other building shall have its own sewer lateral from its building to the sewer main. Two laterals may be connected at the right of way to be served by one service line to the main.
Cleanouts are required at the right of way and by the building being served by sewer. The cleanout shall be flush with the final grade.

Manholes

Manholes shall be provided at a minimum of 400 feet. In addition, manholes will be installed at locations where the pipe diameter of the main increases and where the main changes grade and or direction and/or intersections of sewer mains. All new manholes shall be water tight and grouted from both the outside and inside.

Manholes shall be provided at the beginning of a new sewer main, unless otherwise approved by the City Engineer.

Sewers shall have uniform slope between manholes.

The manhole diameter shall be 48 inches. The bottom of the manhole shall be formed to provide for a channel of flow. Joints between the precast units shall have rubber gaskets and shall be grouted.

Inside drops are acceptable in existing manholes. All drops will be extended to the floor of the manhole and directed into the channel flow.

Pump Stations

Pumped systems may be used only when construction of gravity system is not feasible. Pumped systems shall be design in accordance with DOE'S "Criteria for Sewage Works Design" and the City's current Sewer Design Standards. The City has established control panel requirements to maintain operational consistency. *Unless otherwise approved by the Public Works Director, all pump stations shall be duplex submersible pump installations with on-site emergency power and telemetry.*

The force main pipe material shall be PVC water main, HDPE, or DI, as defined by the City. The minimum diameter for sewer force mains shall be 4 inches to allow transport of a 3-inch minimum diameter solid with maximum velocity of 8 feet per second.

Grinder Pump Stations

Transporting sewage by gravity is the best method of providing sewer service. A single residential lot may be served by a grinder pump provided gravity sewer service is *deemed* not feasible *by the Public Works Director* and said service is approved by the City. However, alternative pressure systems may be permitted in those circumstances where a gravity system would be impractical, unreasonably expensive, result in unreasonable impacts to the environment or would be otherwise infeasible.

The grinder pump installation shall comply with the City's Sewer System Standards in the Developer Handbook, specifically Kitsap County's Division VI Individual Grinder Pump Installations guidelines.

2.5 Environmental Stewardship

These policies outline the City's dedication to develop and implement facilities and programs that will protect the environment.

Best Management Practices (BMP's)

The City will perform operations and maintenance activity using BMP's to reduce the impact to environmental resources adjacent to work areas.

Reuse

The City is committed to wastewater reuse and rainwater reclamation. They can serve as cost effective and environmentally beneficial sources of water for industrial processes, sanitation and irrigation and thereby increase the security and reliability of the area's drinking water supply. The City will explore opportunities to reclaim wastewater for reuse in stream augmentation, irrigation, and other non-potable uses.

Conservation

The City encourages water conservation by requiring the use of low-flow plumbing fixtures in new construction and by structuring water rates of non-residential accounts into tiered groups based on water use, thereby reducing the total volume of sewerage.

The City supports energy conservation by installing gravity sewer mains instead of a pump stations where possible to minimize electrical requirements of the collection system.

Water Resource Protection

The City shall protect groundwater resources within their service area from degradation related to the City's sewer system operations.

2.6 Operations and Maintenance

The City's operation and maintenance standards define the Operation's Plan and Maintenance Program for the sewer utility infrastructure.

Operations Plan

The City shall establish and regularly update an operations plan for the sewer collection system to include preventative maintenance activities and safety procedures to maintain system efficiency and enhance worker safety.

Maintenance Program

Public Works employees shall perform regularly scheduled inspection and maintenance activities on select sewer mains, manholes and all sewer pump stations *according to an established priority list*. Maintenance includes cleaning and vacuuming of *all* sewer mains (semi-annually, monthly, *or* as needed), monthly inspection of manholes that have recurring problems, and daily/weekly inspections *servicing, and maintenance* of all pump stations.

Safety and Emergency Operations

The City is committed to the health and safety of each Public Works employee. Each employee will be trained in *operations and maintenance duties, safety, and* first aid. *Each employee will* receive annual certification renewal.

Confined Spaces

Without the proper precautions, entry into a confined space, such as a manhole, is inherently dangerous and lethal. Public Works employees required to enter confined spaces shall follow established City policies and procedures to minimize the safety risk of such activity. Public Works employees who may be required to enter a confined space shall receive annual formal training from a City representative. Each new Public Works employee shall receive one session of individual training before the new employee is allowed to enter any confined space. City procedures for confined space work shall include requirements for pre-entry, entry, and post-entry tasks, equipment, and documentation.

Emergency Operations

The City shall invest the resources necessary to develop and maintain an Emergency Response Plan in coordination with Police, Fire, and other agencies.

Public Works will construct, maintain and rehabilitate the sewer system infrastructure and equipment to ensure that customers are provided with consistent, reliable service. All City owned pump stations shall have permanent backup power, such as a generator, and an automatic switching station, unless specifically exempted by the City Council.

Infiltration and Inflow

The City shall continue to fund and execute its existing Infiltration and Inflow (I&I) program to minimize I/I to the collection system. The City's overall goal is to reduce I&I flow. The City shall continue to prohibit direct connections to the sewer system from roof drains, storm water catch basins and other improper connections. The program shall include television inspections and grouting of manholes and other infrastructure.

2.7 Financial Policies

This section summarizes the City's general financial policies and criteria and includes sewer rate structures, connection charges and capital improvement financing.

Rate Structure

The City shall establish rates, charges, and fees to maintain sufficient funds to operate, maintain, *retire debt*, and upgrade its sewer system as necessary to provide safe reliable sewer service to its customers. *These rates should be evaluated periodically as part of the budget process. This will ensure that forecasted expenses and impacts of regulations are reflected in the rate structure.*

Sewer rates are based on a monthly rate and are billed on a bimonthly schedule, according to the rate class. *Monthly sewer rates are intended to pay all operation, maintenance, and administrative costs plus retire all debt.* In the event that an established rate does not accurately reflect the impact on the sewer system, the City Engineer may determine the specific monthly rate.

Fess shall be established to reimburse the City for the costs of the service provided, such as late fees, inspections, and similar activities.

Properties served which are outside the city limits shall have a 50 percent surcharge on the monthly rate.

Development Fees

The City has established fees and charges to recover its costs related improving the sewer infrastructure to accommodate growth. Sewer fees are paid at the time a building permit is issued.

The Connection Fee is designed to mitigate the impact of new demands on the existing sewer system.

An Installation Fee is designed to reimburse the utility for construction cost of connection. New accounts are assessed a Fee In Lieu of Assessment (with exceptions).

The Facility Construction Fee mitigates future construction costs for wastewater treatment facilities as jointly approved by the City and the West Sound Utility District.

The ULID No 6 Latecomer Fee is applicable to properties outside the boundaries of the ULID who connect to the improvements constructed as part of ULID No 6.

Capital Financing Plan

The City shall establish a Capital Facility Plan that describes the anticipated repairs, improvements, expansions, or modifications to the sewer system for the next 10-year period. The plan should address required repairs to the sewer system, planned replacement of aging facilities, upgrades to existing facilities to provide additional capacity for projected growth, and the construction of general facilities to aid growth.

3. SEWER SERVICE AREA

3.1 Urban Growth Area

The Urban Growth Area designated by Kitsap County in the City of Port Orchard vicinity is shown on Figure 3-1. The Urban Growth Area in effect on February 15, 1999, is delineated as well as the revised urban growth boundary as amended June 11, 2007, following the 10-year update of Kitsap County planning for urban growth management.

Zoning within the City of Port Orchard Urban Growth Area has been established by Kitsap County as shown in Figure 3-2.

3.2 Existing City of Port Orchard Sewer System

Zoning within the existing city limits is shown on Figure 3-3. The existing City sewer system is shown on Figure 3-4, which is derived from the graphic information system (GIS) files maintained by Kitsap County.

These GIS files were prepared by Kitsap County and were assembled by inputting record CAD drawings. Field verification of horizontal and vertical data should be done when time and budget permit. Vertical data available, such as manhole lid or invert elevations are very limited; and not all pipe attributes were available, such as pipe diameters and lengths. The resulting GIS files are not sufficient for direct transfer into a hydraulic model to compute hydraulic capacities.

The principal trunk sewers are highlighted on Figure 3-4 with pertinent characteristics summarized in Table 3-1. The full pipe capacity in millions of gallons per day (MGD) for each trunk identified in Table 3-1 is defined by the most limiting pipe segment within that trunk based on City record drawings.

Table 3-1
Existing Trunk Sewer Capacities

Trunk	Location	From	To	Diameter	Slope	MGD
A	Bay Street	North Bay	Bethel	12	0.2239 %	1.05
B	Bethel Road	Melcher	Bay	10	0.80 %	1.25
C-east	Bay Street	Bethel	Marina PS	18	0.155 %	2.6
C-west	Bay Street	Pt Orchard	Marina PS	24	0.092 %	4.3
D – 1	Port Orchard (old)	Tremont	Bay	12	0.90 %	2.15
D – 2	Port Orchard (new)	Tremont	Bay	12	1.68 %	2.9
E	Pottery & stream	Lippert	Tremont	10	0.37 %	0.83
F	Bay Street	Caseco	Pt Orchard	18	0.155 %	2.6
G	Pottery Avenue	Fireweed	Lippert	10	0.26 %	0.7
H	Tremont Street	Pottery	Pt Orchard	15	0.69 %	3.3
I	Old Clifton Road	Berry Lake	McCormick 1	15	1.30 %	4.7
J	Old Clifton Road	Feigley	McCormick 2	15	0.90 %	3.9
K	McCormick Woods	Marymac	Old Clifton	10	0.33 %	0.80

The City sewer system formerly included a wastewater treatment facility on the waterfront; and the trunk sewers conveyed all flow to that location. The treatment facility was replaced with the Marina Pump Station and wastewater flow is now conveyed east through an 18-inch force main to a new treatment facility on City property that is operated by the West Sound Utility District. The Marina Pump Station operating parameters are summarized in Table 3-2 from City records.

Table 3- 2
Marina Pump Station

Pump	GPM	Horsepower	TDH
1 - variable	1,500 to 2,400	150	115
2	2,400	150	115
3	1,150	20	37
4	1,150	20	37

Note: Station has an overflow into Sinclair Inlet

The firm capacity of the Marina Pump Station is defined by leaving one of the large pumps out of service. The total existing capacity of the remaining three pumps is something less than the 4,700 GPM total, perhaps about 4,000 GPM or 5.8 MGD, but has not been verified by hydraulic modeling or field measurements.

The remaining City sewage pump stations are shown in Table 3-3 with the associated parameters including horsepower (HP) and total dynamic head (TDH) derived from City records.

Table 3-3
Existing Pump Stations

Station	Location	Pump 1			Pump 2			Force Main
		GPM	HP	TDH	GPM	HP	TDH	
Bay Street	1207 Bay Street	515	7.5	20	515	7.5	20	---
Tremont Place	281 Tremont Place	60	3	23	60	3	23	---
Eagle Crest	1091 Eagle Crest Pl	100	5	35	100	5	35	---
Cedar Heights	2220 Pottery Avenue	50	7.5	150	50	7.5	150	---
Sedgwick	505 Sedgwick Road	180	25	165	180	25	165	6
McCormick #1	1190 Old Clifton Rd	1000	75	122	1000	75	122	16
McCormick #2	2200 Old Clifton Rd	1000	25	60	1000	25	60	16
Canyon Court	512 Cedar Canyon Ct	50	7.5	150	50	7.5	150	---
Harrison Hospital	444 So Kitsap Blvd	350	40	118	350	40	118	---
Golden Pond	385 Golden Pond Rd	137	7.5	78	137	7.5	78	---
Ridge		200	15	90	200	15	90	6
Albertson		176	30	100	176	30	176	6

Notes: Canyon Court PS has a third pump identical to the two pumps shown in Table 3
Albertson PS is currently privately owned, though maybe transferred to the City
Bay Street PS has an overflow into Sinclair Inlet

No overflows have been recorded within the sewer pipe systems or at any pump stations. This record appears to indicate that the existing sewer system has adequate capacity for current conditions.

3.3 McCormick Woods – ULID No 6

The area known as McCormick Woods has been developing under the South Kitsap UGA/ULID #6 Sub-Area Plan dated December 8, 2003, as revised in 2006. Land use within this Sub-Area is planned as shown on Figure 3-5 and is summarized in Table 3-4.

Table 3-4
McCormick Woods Land Use Designations

Land Use Designation	Density per Buildable Acre	Gross Acres
Urban Low Residential	4 to 9 dwelling units	1,306
Urban Cluster Residential	4 to 9 dwelling units	905
Urban Medium Residential	10 to 18 dwelling units	78
Urban Village Center	Up to 18 dwelling units	10
Business Park	----	52
Public Facilities	-----	19
Total		2,370

The original houses in McCormick Woods were developed with on-site septic systems. These were converted to septic tank effluent pump (STEP) units discharging to a community drainfield south of Old Clifton Road near the extreme west of the UGA.

Under ULID # 6, the City of Port Orchard agreed to provide sewer service and to assume responsibility for the STEP units. Two pump stations were built to facilitate sewer service, McCormick Woods 1 and McCormick Woods 2, in addition to trunk sewer pipe extensions in Old Clifton Road.

One of these pipe extensions was to the west edge of the UGA to collect effluent from the former drainfield, and to allow future service to the SKIA. This drainfield is no longer used and the 8-inch sewer connection into the Old Clifton Trunk sewer has been plugged. A 4-way cross at McCormick Woods and Marymac Drives SW with valves on each leg has the line to the old community drainfield closed so no effluent from the STEP units can go there. All effluent flows through Trunk K into McCormick Woods PS 2.

Additional and subsequent developments north of Old Clifton Road known as McCormick Woods No. 2, or The Ridge, are served through conventional sewers into the Ridge Pump Station, now owned by the City, which discharges into the Old Clifton Road trunk sewer, downstream of McCormick Woods Pump Station No 2. The new development south of Old Clifton Road enters Trunk K by gravity.

Although shown within an urban growth boundary, McCormick Woods has not been formally assigned to any city for eventual annexation. The City of Port Orchard anticipates annexing this area in the near future.

3.4 South Kitsap Industrial Area

The SKIA Plan covers about 3,400 gross acres, of which about 2,300 acres are described as available for development. About 550 net acres are anticipated to be developed during the planning period extending through 2021. In 1997 there were about 500 employees within the SKIA. All or part of the SKIA is a potential sewer service area for the City of Port Orchard.

At present, all parcels use on-site septic systems and most are connected to a community system operated by the Port of Bremerton. The community system has a capacity of 72,000 GPD with an average day flow in 2001 of about 14,000 GPD, which is about 28 GPD per employee.

Commercial-industrial customers within the SKIA consumed an average of about 50,681 gallons of potable water per day during that year, or an average of about 101 gallons per day per employee. Water is provided by the City of Bremerton.

There are no residences within the SKIA and none are expected under the SKIA Plan.

The SKIA Plan does project that during the planning period new development may increase employment to a total of 9,350 employees; and that average day demand (ADD) for water would increase to about 1.4 million gallons per day (MGD). Maximum day demand (MDD) is projected as double the ADD, or 2.8 MGD. No projection is provided in the SKIA Plan for peak hour demand (PHD). A schematic water distribution plan was included with the SKIA Plan, which shows a proposed water trunk extending around the northeast end of the runway and due south along the east SKIA property line. Further water mains would be extended by developers.

Wastewater flows for the anticipated 9,350 employees are projected in the SKIA Plan to be 1.2 MGD for the average day of the year. No peak or wet weather flow projection was included in the Plan; nor has a schematic sewer system layout yet been developed.

The City of Bremerton annexed the SKIA urban growth area in 2009 and is now the planning authority for urban services in this area. Sewer service to the SKIA may be provided by the City of Bremerton; or potentially all or part of the SKIA may be served by the City of Port Orchard.

3.5 West Sound Utility District Facilities

The District operates the wastewater treatment facilities for the City under NPDES Permit WA-002034-6 from the State Department of Ecology under a 1982 contract with the City. The treatment facilities actually consist of three interrelated and complementary systems:

- Activated sludge secondary treatment system
- Membrane bioreactor secondary treatment system production reclaimed water
- Ballasted clarifier for advanced primary treatment system for peak storm flows

These facilities are designed for a flow of 4.2 MGD during the average day of the maximum month with a peak day capacity of 16 MGD. Flows exceeding 6 MGD may be treated through the ballasted clarifier to achieve a blended effluent meeting the effluent requirements define in the NPDES permit. The City and the District have agreed that this capacity is to be shared equally.

The highest average daily flows recorded during November and December 2006 were 3.94 MGD and 4.6 MGD during days of measured rainfall of 2.1 and 2.41 inches. Neither flow was sufficient to require operation of the ballasted clarifier. However, the 3 December 2007 storm produced about 8.8 MGD and the ballasted clarifier performed as designed.

Annual average day flow for 2007 was about 1.7 MGD. The District projects wastewater flow will increase to about 2.3 MGD by 2025 with an average day flow during the maximum month of about 7.7 MGD. Hydraulic capacity will be increased by then to be 16 MGD. The District and the City expect to continue sharing treatment capacity about 50-50 for each agency.

The District also operates an extensive sewerage collection system. Some of the District sewers in the immediate vicinity of City sewers are shown on Figure 3-4. Figure 3-4 also shows that some parcels within the city limits are served by the District.

The sewer service area boundary has not been defined by formal agreement, but has evolved as various properties have developed and needed sewer service based on topography and guidance from the SAC. The intent is for service to be provided by the agency at the least infrastructure cost to the developer. The District serves east of Blackjack Creek except for the SR 16 intersection. Eventually, the City expects to annex the entire UGA.

3.6 Existing and Planned Drainage Basins

The ‘Comprehensive Sewer Plan 2000’ divided the City sewer system into four ‘branches’:

- East – the area east of Blackjack Creek
- Central – from Sidney/Tremount intersection northward along Cline Avenue
- South – from Sedgwick/Sidney intersection northward into Port Orchard Boulevard
- West – McCormick Woods and area west of SR 16 as shown in Figure 3-5

These branches each comprise areas tributary to a trunk sewer that still remains in service. However, to evaluate the adequacy of the existing capacity in these trunks and to project future capacity requirements, a finer subdivision of the City sewer service area into sewer basins was employed. These basins and the associated trunk conveyance facilities are described in Table 3-5, with the basins delineated on Figure 3-6.

Table 3-5
Sewer Basins

Basin	Acres	Trunk	Tributary Facilities	Discharge Terminus
1	547	L	Basin 21	Trunk J
2	300	future	none	Trunk I
3	288	future	none	Albertson PS
4	123	A	none	Bay Street PS
5	270	B	none	Bay Street PS
6	460	C	none	Marina PS
7	178	H	McCormick 1	Trunk D
8	141	D	Trunks E and H	Trunk C
9	245	I	The Ridge PS, McCormick 2, Basins 2, & 15	McCormick 1
10	438	F	none	Trunk C
11	262	E	G	Trunk D
12	247	Albertson	Basin 3	Trunk G
13	131	G	Albertson PS	Trunk E
14	347	E	Bravo Terrace PS	Trunk E
15	67	I	none	Trunk I
16	64	Ridge	none	Trunk I
17	347	J	none	McCormick 2
18	192	J	Basins 1 & 21	McCormick 2
19	105	K	Basin 20	McCormick 2
20	418	K	none	Trunk K
21	300	K	none	Basin 20

3.7 Topography

The City is built on uplands rising from Sinclair Inlet. These uplands are cut irregularly by streams and ravines that are generally unbuildable. Within the presently developed city limits and City sewer service area, these uplands reach a maximum elevation of about 250 feet above sea level. McCormick Woods is being developed on a plateau west of the existing city limits. These lands range in elevation from 300 to 500 feet above sea level.

The SKIA properties further west from McCormick Woods generally are on a plateau at elevations from about 440 to 480 feet above sea level. However the western properties of the SKIA fall away to elevations of about 240 feet.

3.8 Water Features

The City of Port Orchard is located along the south shore of Sinclair Inlet, which is an arm of Puget Sound. The City is immediately across the water from the US Navy Yard and the City of Bremerton. A number of marine-related businesses and features exist along the Port Orchard waterfront.

A number of streams flow north into Sinclair Inlet from the upper elevations in and south of the City. Some of these are within the West Sound sewer service area of the City UGA. The more prominent creeks within the City portion of the UGA sewer service area include the following:

- Blackjack Creek
- Unnamed stream in the ravine of Port Orchard Boulevard
- Ross Creek
- Anderson Creek
- Two unnamed streams flowing north from McCormick Woods
- Tributaries to Gorst Creek originating in McCormick Woods and the SKIA

Long Lake is a significant water body that borders the UGA for the City, but is outside of the City sewer service area and in the West Sound sewer service area. Several small ponds, marshes, and wetlands exist within the City sewer service area.

Many of the streams flowing through the City are believed capable of supporting fish runs, though stream flows are often small. The City has agreed to augment the flow in two streams at the locations described below, and perhaps others in the future:

- Ross Creek at the future extension of St. Andrews Drive SW
- Blackjack Creek at Sedgwick Road west of SR 16

An excerpt of the stream augmentation facility for Ross Creek is shown in Figure 3-7. This representation is similar for other augmentation sites. Augmentation is seasonal using potable water at the rate of 5 GPM. It may be practical to construct a small satellite wastewater treatment facility, perhaps using a membrane bioreactor (MBR), so reclaimed water could be used for this application and conserve potable water from other uses.

3.9 Water Systems

Five water purveyors provide water service within the City and the sewer service area as described below:

- City of Port Orchard – serves within the city limits and selected adjacent areas as shown on Figure 3-8. The system is supplied by six active wells into a Low Zone with a hydraulic grade line (HGL) of 260 feet, an Intermediate Zone at HGL 336, and a High Zone at HGL 391. Five reservoirs provide 4,200,000 gallons in storage. There is an intertie to the City of Bremerton HGL 256 Zone and a second to the West Sound Utility District. Two booster pump stations can move water from the Low Zone through the Intermediate Zone to the High Zone. The pipe system totals over 300,000 feet of pipe ranging from 4 to 18-inch diameter.

- McCormick Woods Water Company – which is owned and operated by the City, serves McCormick Woods and ULID No 6. The existing facilities include a 450,000 gallon reservoir near SW Clifton Road at Figley Road with a booster pump station serving the existing 580 zone from two tanks totaling 120,000 gallons supplied by three wells. Pipe sizes range from 6 to 10-inch diameter.

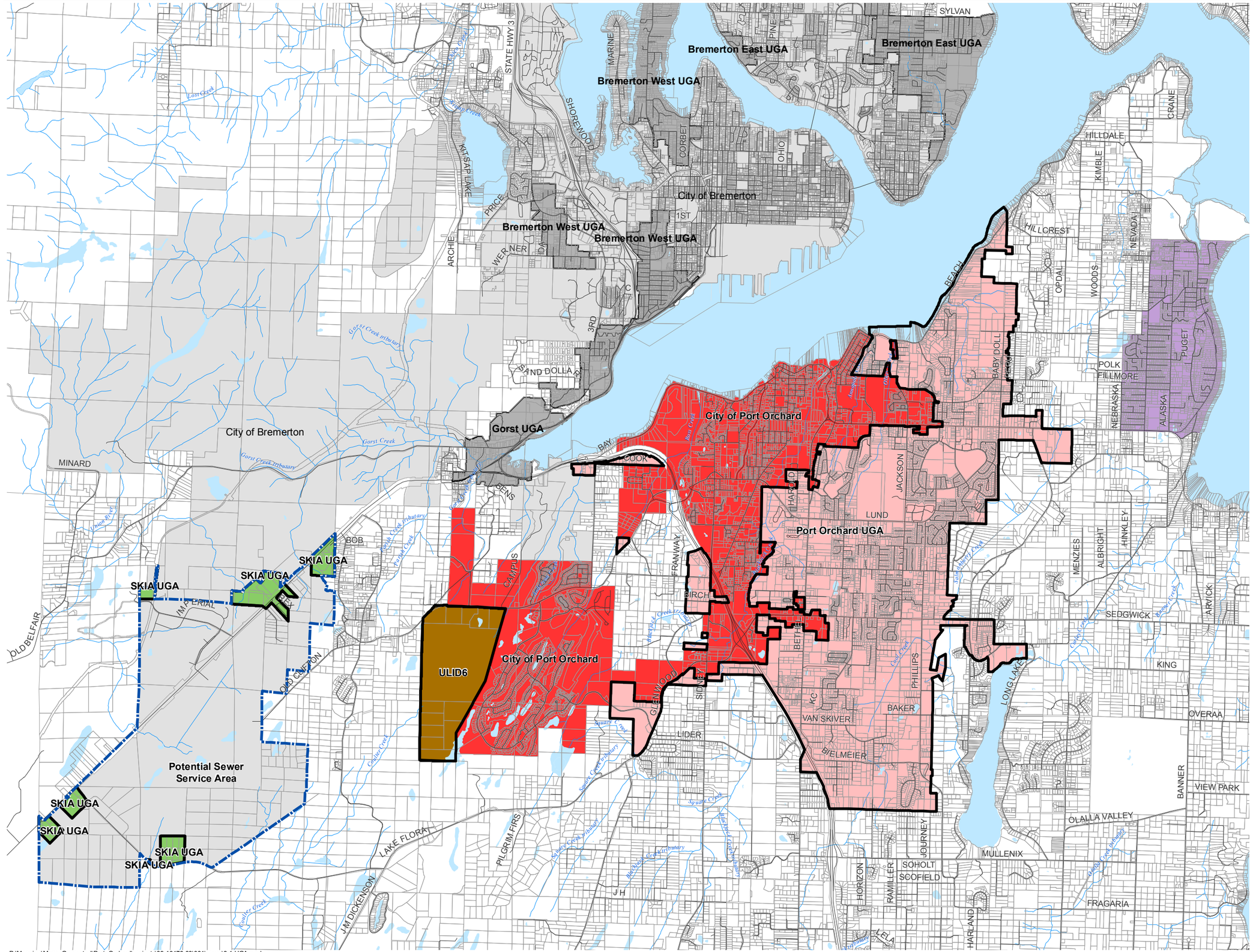
- City of Bremerton – serves the SKIA through a transmission pipeline from Gorst with a 1,200,000 gallon storage tank and a booster pump station with three installed pumps with capacity totaling 3,600 GPM.
- Berry Lake Manors – buys water from the City and serves a 30-unit mobile home park
- West Sound Utility District – serves properties east of Blackjack Creek and generally outside the City sewer service area.

Aquifer recharge areas in the vicinity of Port Orchard are shown on Figure 3-9. The principal facilities comprising the City of Port Orchard water system are summarized in Table 3-6.

Table 3-6
City of Port Orchard Water Facilities

Description	Dimensions	Capacity
Wells		
PO 5 – Port Orchard Blvd	240 feet x 10-inches	40 GPM
PO 6 – Maple Street	806 feet x 10-inches	250 GPM
PO 7 – Port Orchard Blvd	804 feet x 10-inches	725 GPM
PO 8 – Sidney Avenue	577 feet x 12-inches	450 GPM
PO 9 – Sidney Avenue	624 feet x 12-inches	450 GPM
PO 10 – (pending)	1,074 feet x 10-inches	1,000 GPM
McCormick Woods 1	281 feet x 12-inches	175 GPM
McCormick Woods 2	210 feet x 12-inches	350 GPM
McCormick Woods 3	183 feet x 12-inches	350 GPM
Interties		
Bremerton	260 zone	8-inch meter
Bremerton	580 zone	8-inch meter
West Sound - Sedgwick	390 zone	6-inch meter
Reservoirs		
Park	130 feet diameter	2,000,000 gallons – 260 zone
Morton Street	14.59 diameter x 100 feet high	100,000 gallons – 260 zone
Maple Street		50,000 gallons – 260 zone
South Sidney	13.6 diameter x 73 feet high	100,000 gallons – 390 zone
Old Clifton	100 diameter x 30 feet high	1,000,000 gallons – 390 zone
Sedgwick	68 diameter x 40 feet high	1,000,000 gallons – 390 zone
McCormick Woods 580	42 feet high	450,000 gallons – 580 zone
McCormick Woods Tank 1	25 diameter x 15 feet high	60,000 gallons – 431 to 580 zone
McCormick Woods Tank 2	25 diameter x 15 feet high	60,000 gallons – 431 to 580 zone
Booster Pump Stations		
City Hall	260 zone	690 and 620 GPM
Melcher Street	390 zone	1000 and 750 GPM
McCormick 580	580 zone	350 and 350 GPM
Well 6 Booster	260 zone	400 GPM

Development of the western part of McCormick Woods will require a new reservoir of at least 300,000 gallons with a booster pump station to create the 660 zone. An additional water source of at least 187 GPM and 191 acre-feet per year will be needed to support new development. The McCormick Woods Golf Course is presently irrigated separately with a non-potable private well.



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City of Port Orchard
WASHINGTON

Comprehensive Sanitary Sewer Plan Update

Legend

- City of Port Orchard
- Port Orchard UGA
- SKIA UGA
- Unincorporated UGA
- Bremerton UGA
- LAMIRD
- Parcels
- Water Bodies
- Rivers & Streams

N

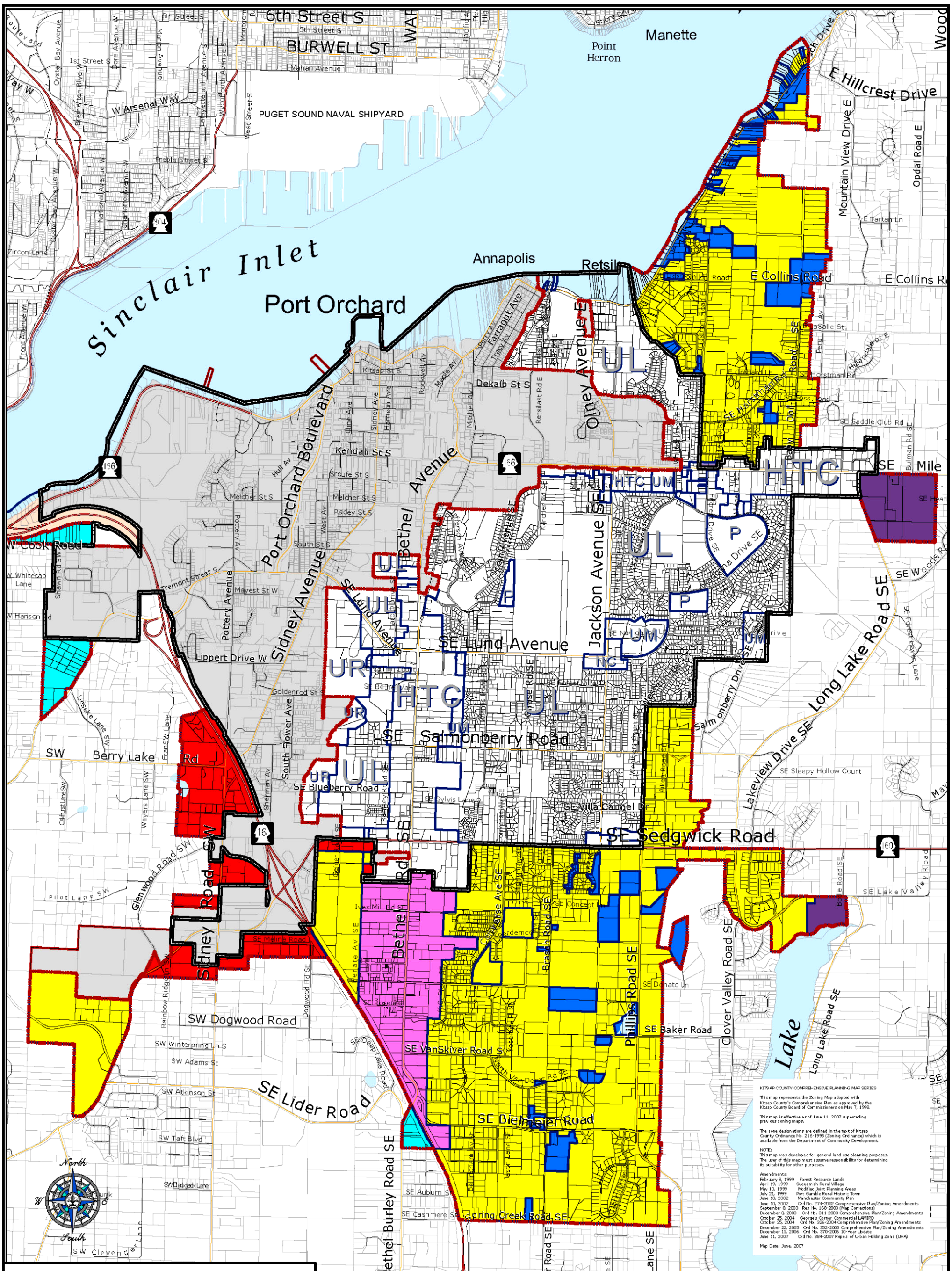
0 2,500 5,000 10,000 Feet

Data Sources: Kitsap County 2009
This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

MAP DATE: DECEMBER 13 2007; UPDATED NOVEMBER 2009

Port Orchard Urban Growth Area

Figure 3-1



City of Port Orchard WA
Comprehensive
Sanitary Sewer
Plan Update

Figure 3-2

PORT ORCHARD URBAN GROWTH AREA

KITSAP COUNTY, WASHINGTON

Zoning

Expansion Areas per 10-Year Update

Effective February 15, 1999
Amended June 11, 2007

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City of Port Orchard
WASHINGTON

Comprehensive Sanitary Sewer Plan Update

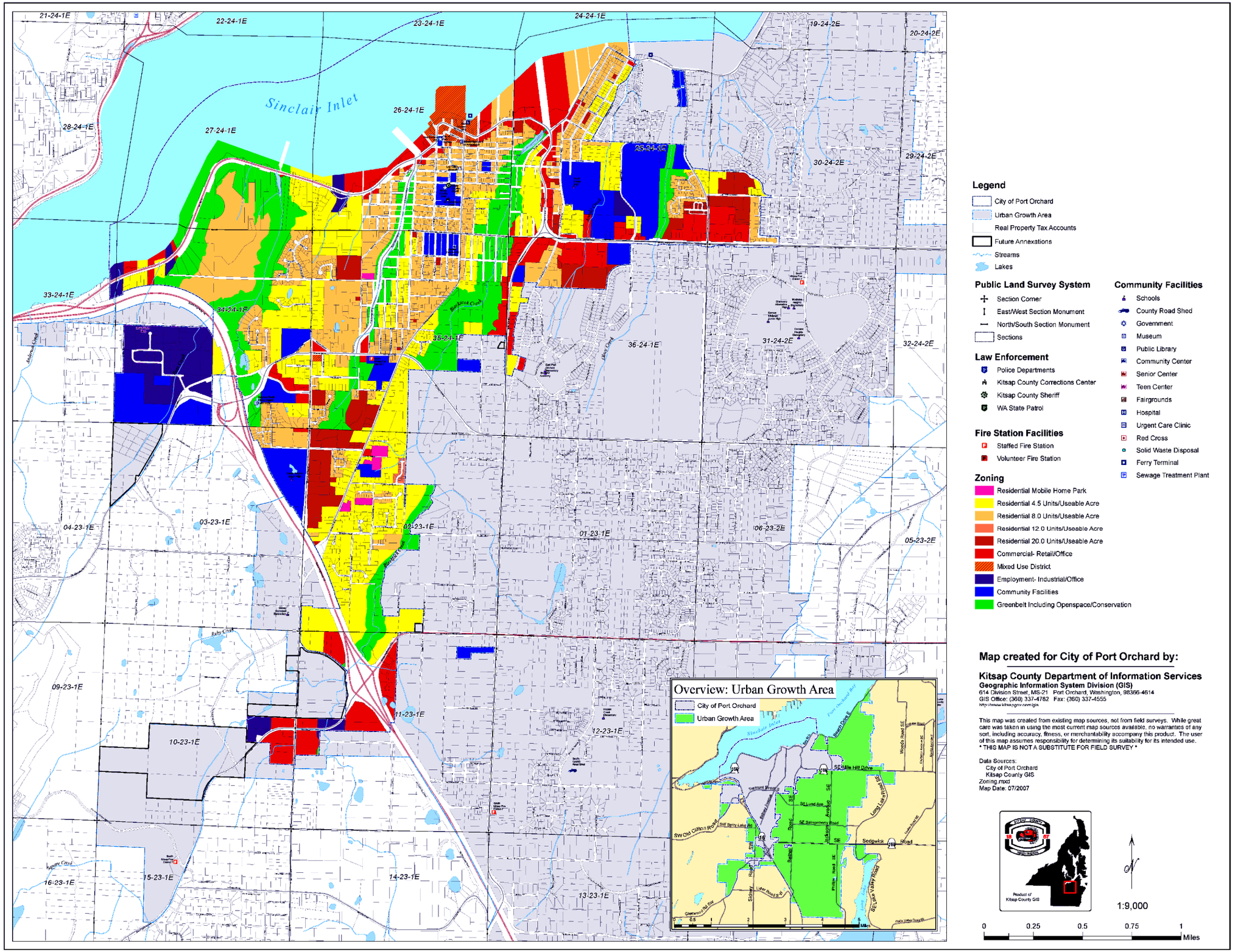

Image Source: Kitsap County
This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

MAP DATE: DECEMBER 13 2007

City of Port Orchard Zoning

Figure 3-3

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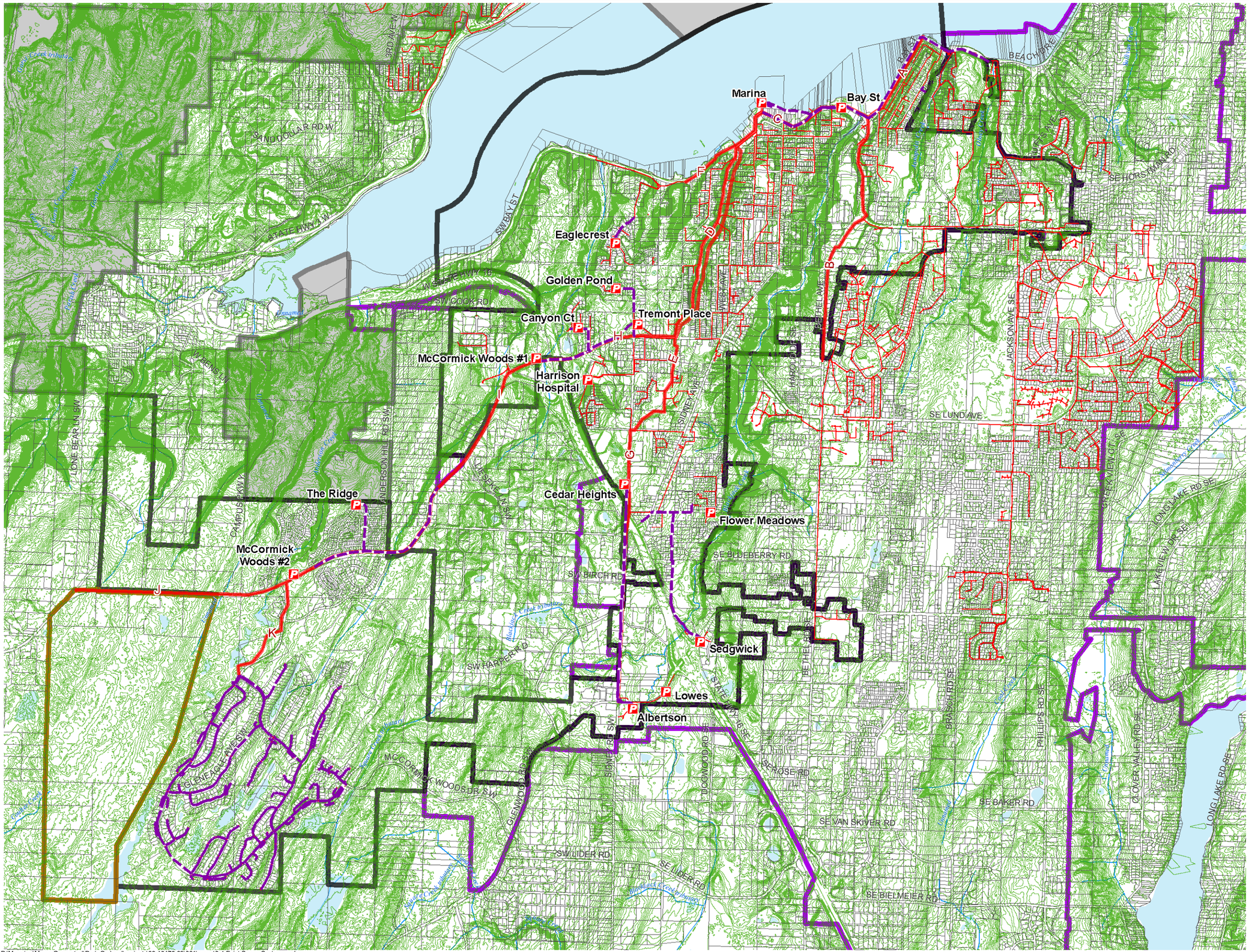

City of Port Orchard
WASHINGTON

Comprehensive Sanitary Sewer Plan Update

Legend

- Pump Stations
- Sewer Gravity Trunks
- Sewer Force Mains
- Sewer Pipes
- Port Orchard UGA
- Unincorporated Urban Growth Area
- City of Bremerton
- Parcels - Kitsap Co Nov 2009
- Water Bodies
- Rivers & Streams
- Contours 5ft

N

1 inch = 2,500 feet

0 1,000 2,000 4,000 Feet

Data Sources: Kitsap County 2009
This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

MAP DATE: DECEMBER 13 2007; UPDATED NOVEMBER 2009

Existing Sewer System

Figure 3-4

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South Kitsap UGA/ULID #6

County Proposed Land Use

Proposed Comprehensive Plan

- Mineral Resource (1 DU/20 Ac)
- Forest Resource Lands (1 DU/40 Ac)
- Interim Rural Forest (1 DU/20 Ac)
- Rural Protection (1 DU/10 Ac)
- Rural Residential (1 DU/5 Ac)
- Limited Areas of More Intense Development
- Urban Restricted (1-5 DU/Ac)
- Urban Low Residential (4-9 DU/Ac)
- Urban Medium Residential (10-18 DU/Ac)
- Urban High Residential (19-24 DU/Ac)
- Urban Reserve (1 DU/10 Ac)
- Urban Cluster Residential (4-9 DU/Ac)
- Village Center (5-18 DU/Ac)
- Commercial
- Industrial
- Urban Industrial Reserve
- Business Park
- Parks (P)
- Public Facilities
- Airport (A)
- Incorporated Cities

- Proposed ULID #6 Boundary
- Tax Parcels

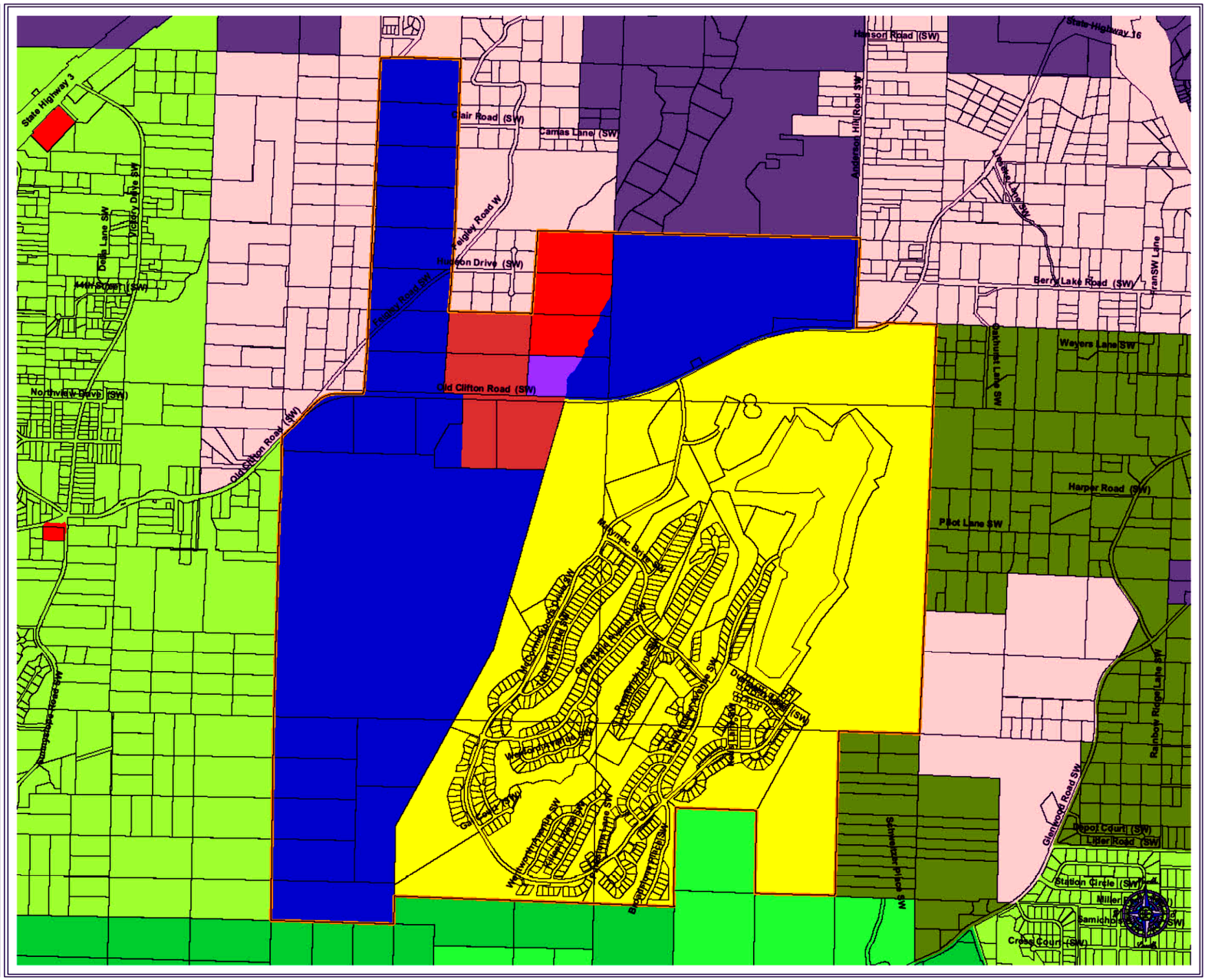
Arterial Type

- State Highway
- Principal Arterial
- Major Arterial
- Major Collector
- Collectors
- Neighborhood Roads

November 20, 2003

Kitsap County Department of Community Development
614 Division Street, MS-36, Port Orchard, Washington 98366
VOICE (360) 337-7181 * FAX (360) 337-4925

1,000 500 0 1,000 2,000 3,000 Feet



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Comprehensive Sanitary Sewer Plan Update

Image Source: Kitsap County
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MAP DATE: DECEMBER 13 2007

South Kitsap UGA/ULID #6 Sub-Area Plan

Figure 3-5

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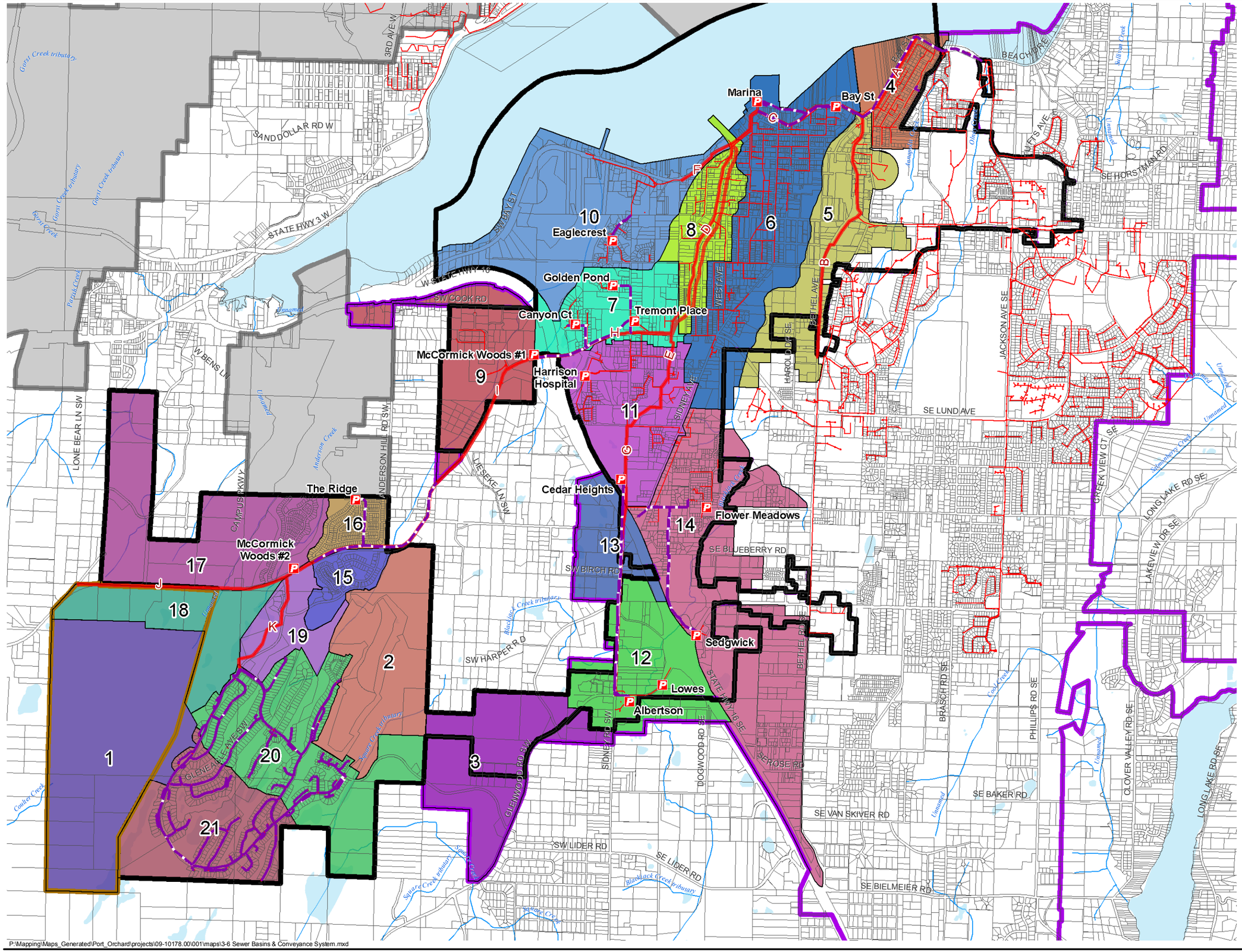

P:\Mapping\Maps_Generated\Port_Orchard\projects\09-10178.00\001\maps\3-6 Sewer Basins & Conveyance System.mxd

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Comprehensive Sanitary Sewer Plan Update

Legend

- Pump Stations
- Sewer Gravity Trunks
- Sewer Force Mains
- Sewer Pipes
- Sewer Basins
- City of Port Orchard
- Port Orchard UGA
- Unincorporated Urban Growth Area
- City of Bremerton
- Parcels - Kitsap Co June 07
- Water Bodies
- Rivers & Streams

1 inch = 2,500 feet

0 1,000 2,000 4,000 Feet

Data Sources: Kitsap County 2009
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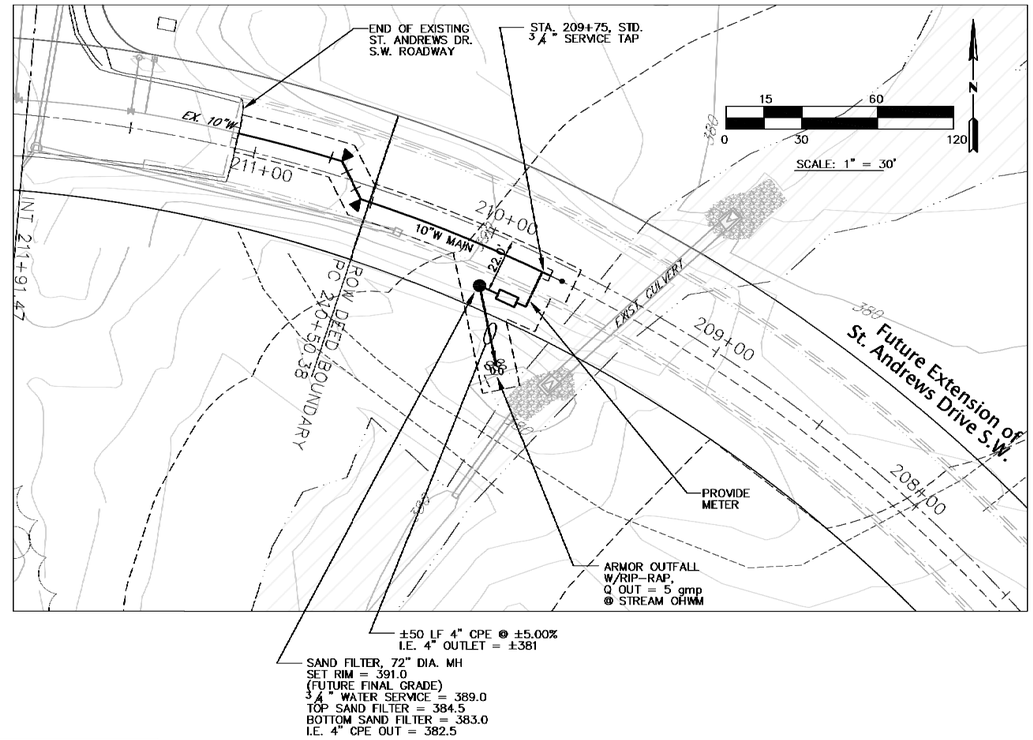
MAP DATE: DECEMBER 13 2007; UPDATED NOVEMBER 2009

Sewer Basins & Conveyance System

Figure 3-6



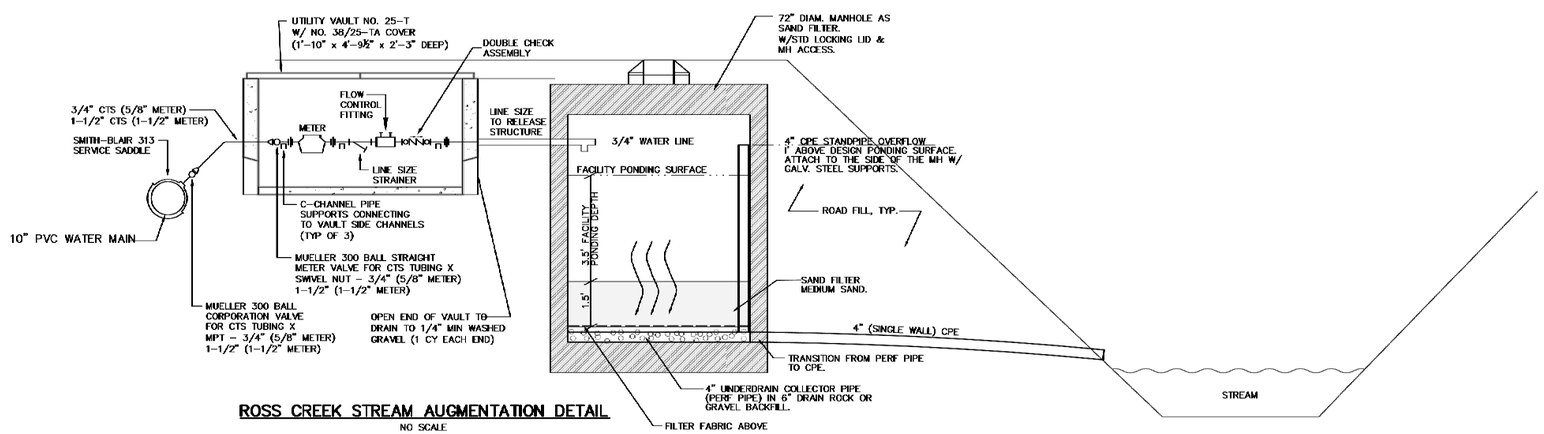
DETAIL NOTES:

1. TAP ON EXISTING WATER MAIN WOULD BE A STANDARD CITY OF PORT ORCHARD TYPICAL WATER SERVICE CONNECTION PER SECTION 5.0 WATER SYSTEMS STANDARDS OF THE CITY OF PORT ORCHARD DEVELOPERS HANDBOOK (2006).

2. FLOW CONTROL APPARATUS AND VALVE BOX CAN BE SEPARATE VENDOR COMPILATION OF APPURTENANCES, OR A VENDOR KIT FROM A WATERWORKS OR IRRIGATION SYSTEMS MANUFACTURER.

3. SAND FILTER MATERIAL SHALL BE MEDIUM SAND WITH A HYDRAULIC CONDUCTIVITY EQUAL TO 8 inches/hour.

AUGMENTATION LOCATION	DEPTH OF PERF. PIPE	AUGMENTATION FLOW	WATER METER SENSUS MODEL SR TOUCH READ	DOUBLE CHECK ASSEMBLY SIZE	GRISWOLD FLOW CONTROL FITTING	
					MODEL NO.	PRESSURE DROP RANGE (PSID)
ROSS CREEK	N.A.	5.0 GPM	5/8" x 3/4"	WATTS 3/4" – 007QT	3/4"–3524–1.00 GPM	4–57



ROSS CREEK STREAM AUGMENTATION DETAIL

NO SCALE

Source: Goldsmith and Associates, Inc
Ross Creek Stream Augmentation System, Novemeber 2007

BHC CONSULTANTS

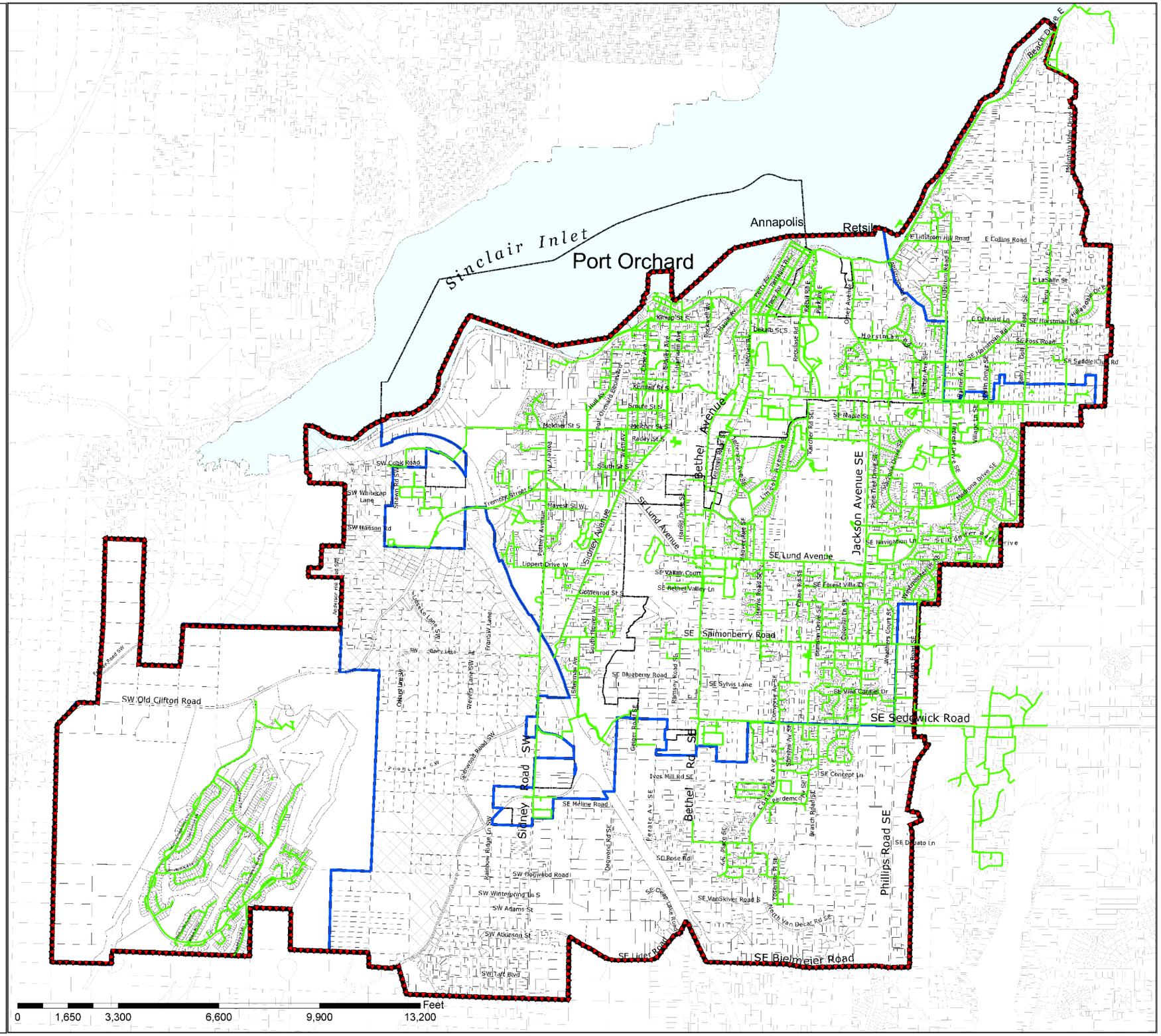
BHC Consultants, LLC
1601 Fifth Avenue, Suite 500
Seattle, Washington 98101

206.505.3400
206.505.3406 (fax)
www.bhcconsultants.com

Ross Creek Stream Augmentation
Comprehensive Sanitary Sewer Plan
Port Orchard, Washington

Figure
3-7

PLOT DATE & TIME: AUG 19 2009 10:35:35
FILE NAME (UPDATED BY): S:\CAD\PORT ORCHARD\07-10096\DWG\F07-10096_3-7.DWG (PLS)
XREFS: NONE



South Kitsap Water Lines

Urban Growth Area

Joint Planning Area

Incorporated City

Preliminary Focus Group Boundary

City of Port Orchard
WASHINGTON

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Image Source: Kitsap County
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MAP DATE AUGUST 2008; UPDATED AUGUST 2009

Port Orchard & the South Kitsap Water Lines

Figure 3-8

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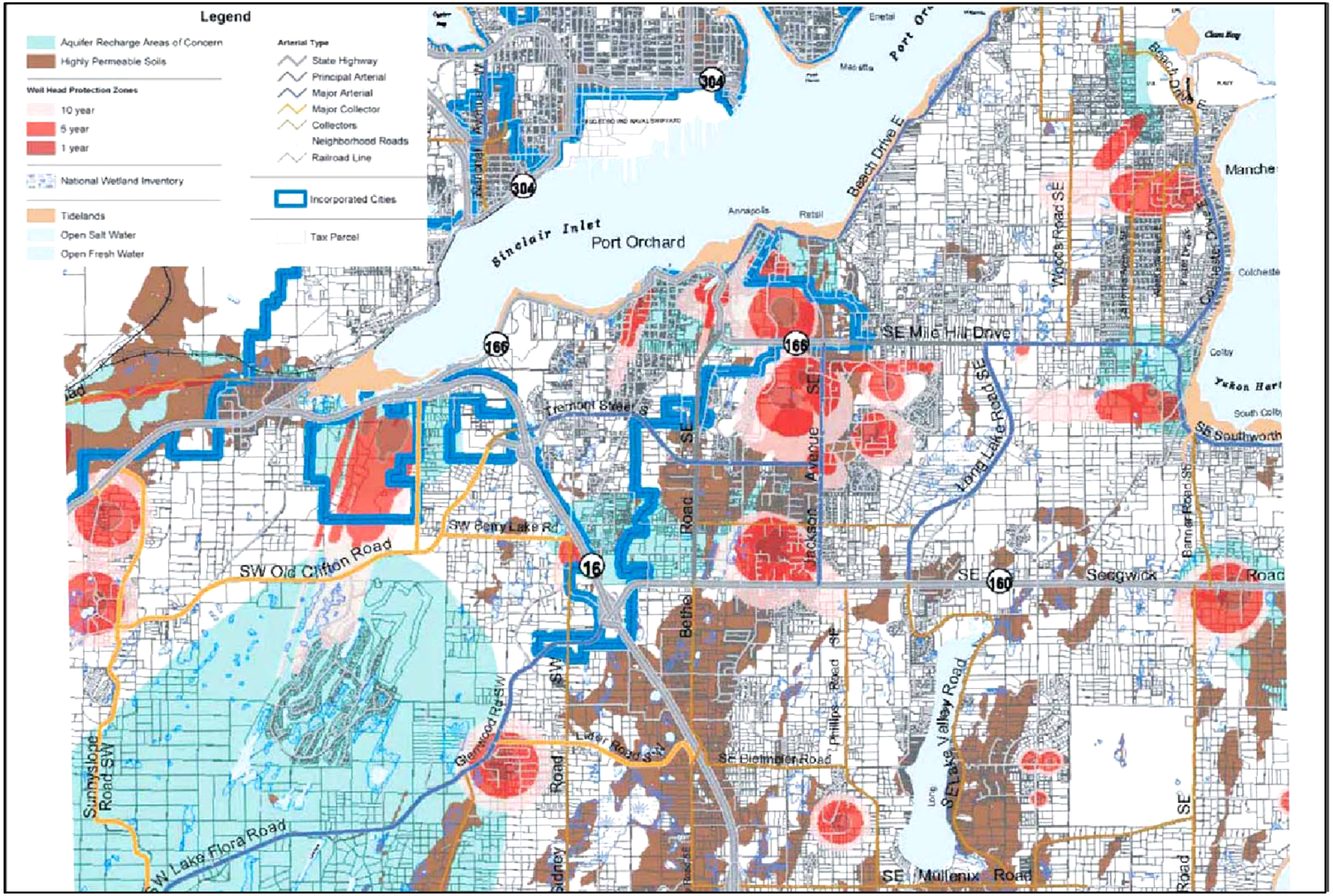

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MAP DATE AUGUST 2008; UPDATED AUGUST 2009

Aquifer Recharge Areas

Figure 3-9

P:\Mapping\Maps_Generated\Port_Orchard\projects\07-10096.01\009\maps\3-9 Aquifer Recharge Areas.mxd

4. PROJECTED POPULATION

4.1 Existing Population

Table 4-1 summarizes the population estimates prepared by the Washington State Office of Financial Management since the 2000 census.

Table 4-1
Historic Population

Year	Kitsap County		City of Port Orchard		
	Population	Percent Change	Population	Percent Change	Percent of County
2000 Census	231,969	---	7,693	---	3.32
2001 Estimate	233,400	0.60	7,810	1.52	3.35
2002 Estimate	234,700	0.56	7,900	1.15	3.37
2003 Estimate	237,000	0.98	7,910	0.13	3.34
2004 Estimate	239,500	1.05	8,060	1.90	3.37
2005 Estimate	240,400	0.38	8,250	2.36	3.43
2006 Estimate	243,400	1.25	8,310	0.73	3.55
2007 Estimate	244,800	0.58	8,420	1.01	3.44

Table 4-1 does show a distinct trend for the City of Port Orchard to capture an increasing share of the Kitsap County population. This is in accord with the intent of the Growth Management Act and indicates that current City and County policies are successful.

City sewer service is budgeted based on the mix of commercial and residential customers reduced to the 'equivalent residential units' or ERU. One ERU is defined as the sewage generated by one single family home, estimated at 180 GPD. Table 4-2 summarizes the historic relationship between residential and commercial customers served by City sewers as estimated by the City Department of Public Works.

Table 4-2
Equivalent Residential Units for City Sewer System

Budget Year	Total ERU	Residential		Commercial	
		ERU	Percent of Total	ERU	Percent of Total
2001	4,087	2,791	68.3	1,296	31.7
2002	4,201	2,855	68.0	1,346	32.3
2003	4,077	2,853	70.0	1,224	30.0
2004	4,185	2,895	69.2	1,290	30.8
2005	4,319	3,011	69.7	1,308	30.3
2006	4,407	3,030	68.8	1,377	31.2

In addition to the Table 4-2 ERU numbers, McCormick Woods added an additional 616 ERU in 2005 and 629 ERU in 2006. Thus the total ERU served by the City sewer system was 4,935 in

2005 and 5,036 in 2006. Total ERU for the City sewer system through October 2007 is 4,643 units, plus an additional 659 customers in McCormick Woods for a total of 5,302 ERU. Most of the McCormick Woods customers are effluent pump units, which influences the organic loading but does not affect the sewer hydraulic loads as the sewage flow would be similar to regular homes.

The City share of the treatment plant capacity as operated by the West Sound Utility District has been about 45 or 46 percent in recent years.

Typical household size for Kitsap County is reported by OFM to be about 2.5 persons. However, Port Orchard may average only about 2.4 persons per household. In both cases, the trend is for continued gradual reductions in the average household size. Table 4-3 describes recent estimates of the share of City population served by the City sewer system.

Table 4-3
City Population Served by City Sewers
Based on 2.4 Persons per Household

Year	City Population	Residential ERU	Served Population	Percent Served
2004	8,060	2,895	6,948	86.2
2005	8,250	3,010	7,226	87.6
2006	8,310	3,030	7,272	87.5

Table 4-3 indicates that City sewers are serving a slightly increasing share of the City population. It also may be that most of the population growth within the city limits is occurring in areas served by the City sewer system.

4.2 Kitsap County Population and Employment Projections

Kitsap County has identified a series of Transportation Analysis Zones (TAZ) for the entire County, an excerpt of which is shown as Figure 4-1. The TAZ associated with the City of Port Orchard, the urban growth area served by the City sewer system, and McCormick Woods are shown in Figure 4-2.

As part of transportation analysis, population and employment projections for Kitsap County are distributed among all TAZ for 2025 conditions and for Build-out at current land use planning densities by County Planning. The resulting projections have been assembled as summarized in Table 4-4.

Table 4-4
Population and Employment by TAZ

TAZ	Area in Acres	Basins	2025 Projections		Build-Out Projections	
			Population	Employment	Population	Employment
154	222	4 & 5	1,104	380	1,111	398
156	59	6	170	775	170	775
158	51	4 & 5	224	106	225	105
159	96	5 & 6	177	521	177	522
161	29	6	30	461	30	480
162	56	6 & 8	215	104	215	117
163	182	8 &10	342	37	342	39
164	273	7, 8, 10	1,194	710	1,195	714
165	39	6	231	913	232	914
166	72	5 & 6	415	48	415	49
168	58	5	114	527	120	537
169	314	7,10, 11	1,186	22	826	29
170	53	6 & 8	349	133	350	133
171	28	6	57	7	57	7
172	18	5	34	43	24	49
173	148	5, 6, 8	254	206	842	223
180	72	6 & 8	655	26	725	47
181	60	5 & 6	86	2	655	2
182	119	5	105	124	287	266
183	481	9	681	195	800	693
188	1,043	9, 16, 17	826	75	826	827
191	694	17	382	12	476	191
194	109	6, 7, 11	1,212	400	1,213	89
195	141	7 & 11	427	490	427	401
197	43	6	90	2	96	4
199	28	5	163	384	173	384
201	304	9 & 13	210	135	220	373
202	335	11 & 14	2,053	364	2,072	383
203	294	14	468	79	839	850
211	1,338	3, 12, 13	1,229	114	619	1,054
212	108	12 & 13	54	119	61	608
215	1,296	2, 15, 19, 20, 21	2,569	89	4,150	92
216	2,013	1, 18, 21	2,997	0	3,526	0
217	336	14	1,203	263	2,108	986
223	468	12	242	73	280	376
225	217	3 & 12	230	155	250	362
Totals	**11,194**	**---**	**21,969**	**8,094**	**26,134**	**13,079**

Some anomalies can be seen as the projections move from 2025 to Build-Out conditions. Some residential properties will convert to commercial use, and some existing commercial land uses will evolve. These differences are not deemed significant for the sewer system as a whole, or even for specific sewer trunks.

4.3 Projected Growth Distribution by Basin

The TAZ population and employment projections are proportioned among the sewer basins to generate wastewater flow into the trunk sewer system. Of course some TAZ are not entirely with the City sewer service area so only part of the area, population, and employment shown in Table 4-4 will actually contribute to the City sewers. The resulting distribution of population and employment follow specific parcels and are not directly related to proportional areas. Some portions of certain basins and the relevant TAZ cannot be developed due to sensitive area concerns. The resulting assumed distributions are summarized in Table 4-5.

Table 4-5
Population and Employment Projections by Basin

Basin	2025 Projections		Build-Out Projections	
	Population	Employment	Population	Employment
1	1,199	0	1,410	0
2	642	18	1,038	618
3	1,000	39	1,000	247
4	508	178	512	186
5	611	925	935	1,035
6	2,319	2,664	2,832	2,707
7	937	422	1,117	554
8	942	411	957	426
9	513	139	585	536
10	1,166	288	1,022	293
11	1,955	343	1,986	600
12	240	289	195	1,318
13	173	92	115	513
14	1,824	373	2,059	801
15	257	9	415	9
16	165	8	165	83
17	387	40	401	452
18	599	0	705	0
19	385	36	623	37
20	771	27	1,245	28
21	1,113	0	1,535	0
Totals	17,706	6,301	20,839	10,211

The resulting projections of population and employment shown in Table 4-5 allow wastewater flows to be projected for the two future conditions.

4.4 Industrial Connections

The City has three structures classified as an industrial/manufacturing building type by the City Building Inspector. These are summarized in Table 4-6.

Table 4-6
Industrial Structures

Address	Owner	Telephone	Business
1340 Lumsden Road	Tony Jacobellis	206-842-6352	
1420 Lumsden Road	Gig Harbor Holdings LLC	360-876-5800	ICS Controls
1540 Leader International	Rick Flaherty	360-895-1184	

In addition, there are a number of marine related businesses, which are summarized in Table 4-7.

Table 4-7
Marine Related Businesses

Name	Address	Contact	Phone
Port Orchard Marine Railway	405 Bay Street	Jeremy McNeil	702-966-8041
Sinclair Inlet Marina	501 Bay Street	Peter & Kathleen Tierman	360-895-5167
Thompson Pile Driving	1089 Bay Street	Paul Fritts	360-731-8911
Port Orchard Marina	707 Sidney Ave	Brian Sauer	360-876-5535 ext 23
Dock Side Yacht Sales	53 Bay Street		360-876-9016
Kitsap Marina	1595 Bay Street	Rudolph Oelofse	206-634-3080
Suldan's Boat Works	1345 Bay Street	Greg, Mark, Mike Suldan	360-867-3435

None of these facilities are believed to have a State Waste Discharge Permit from the Department of Ecology.

4.5 South Kitsap Industrial Area

Bremerton National Airport has been the most visible facility within the SKIA. These aircraft related facilities include terminal buildings, hangers, aircraft maintenance facilities, aviation fuel storage, and other aviation related businesses. Kitsap County Public Works has a number of facilities within SKIA including the Public Works Annex, plus the Household Hazardous Waste Facility and the Olympic View Transfer Station operated by Waste Management.

The former Kitsap County Landfill is also within the SKIA. This facility has been closed and capped. Historically, leachate from this facility was spread on the vegetation ground cover. The City has recently reached an agreement for the leachate to be trunked to the City sewer system for discharge into a manhole in Bay Street at SW Wilkens Drive.

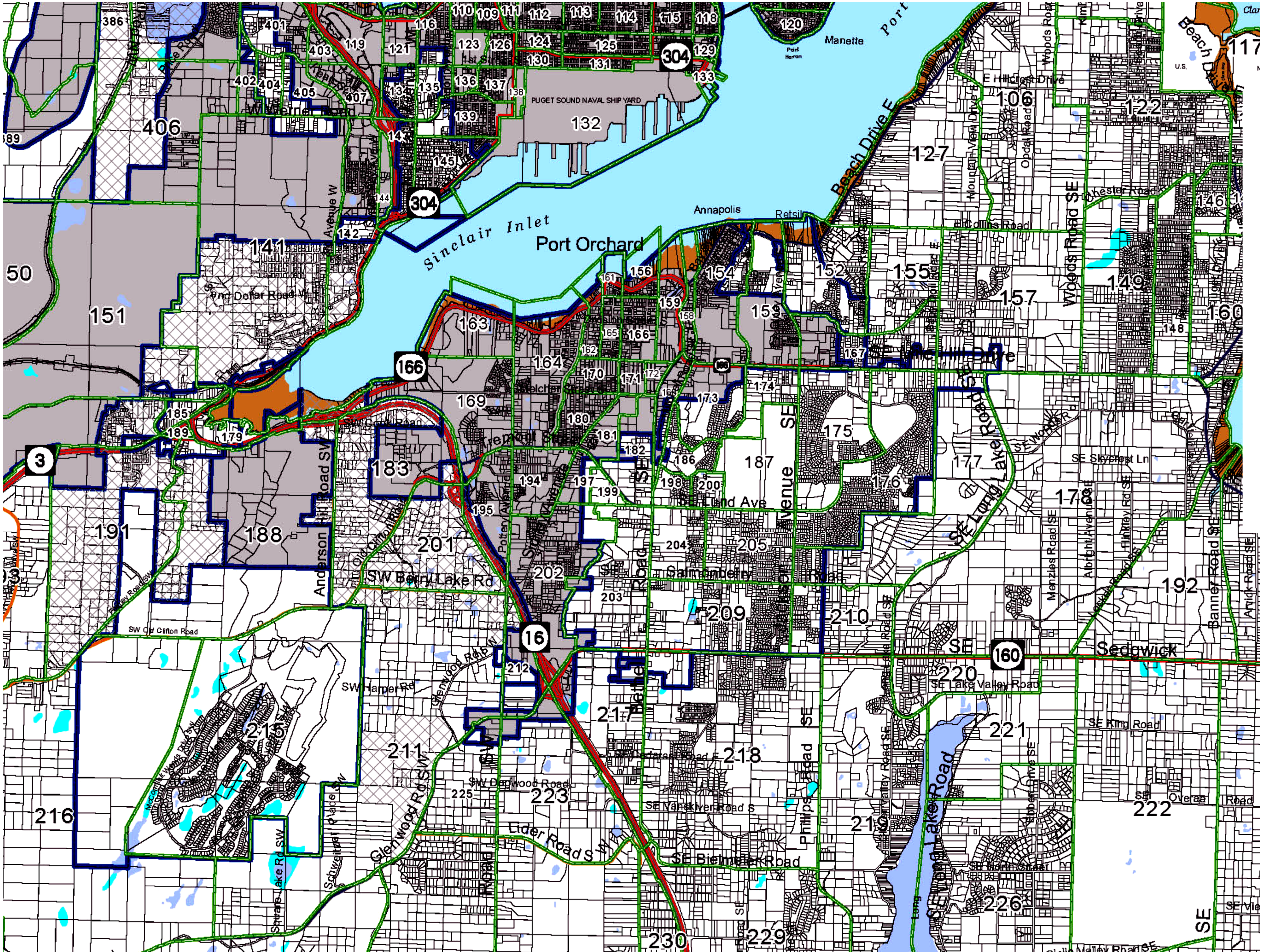

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Image Source: Kitsap County
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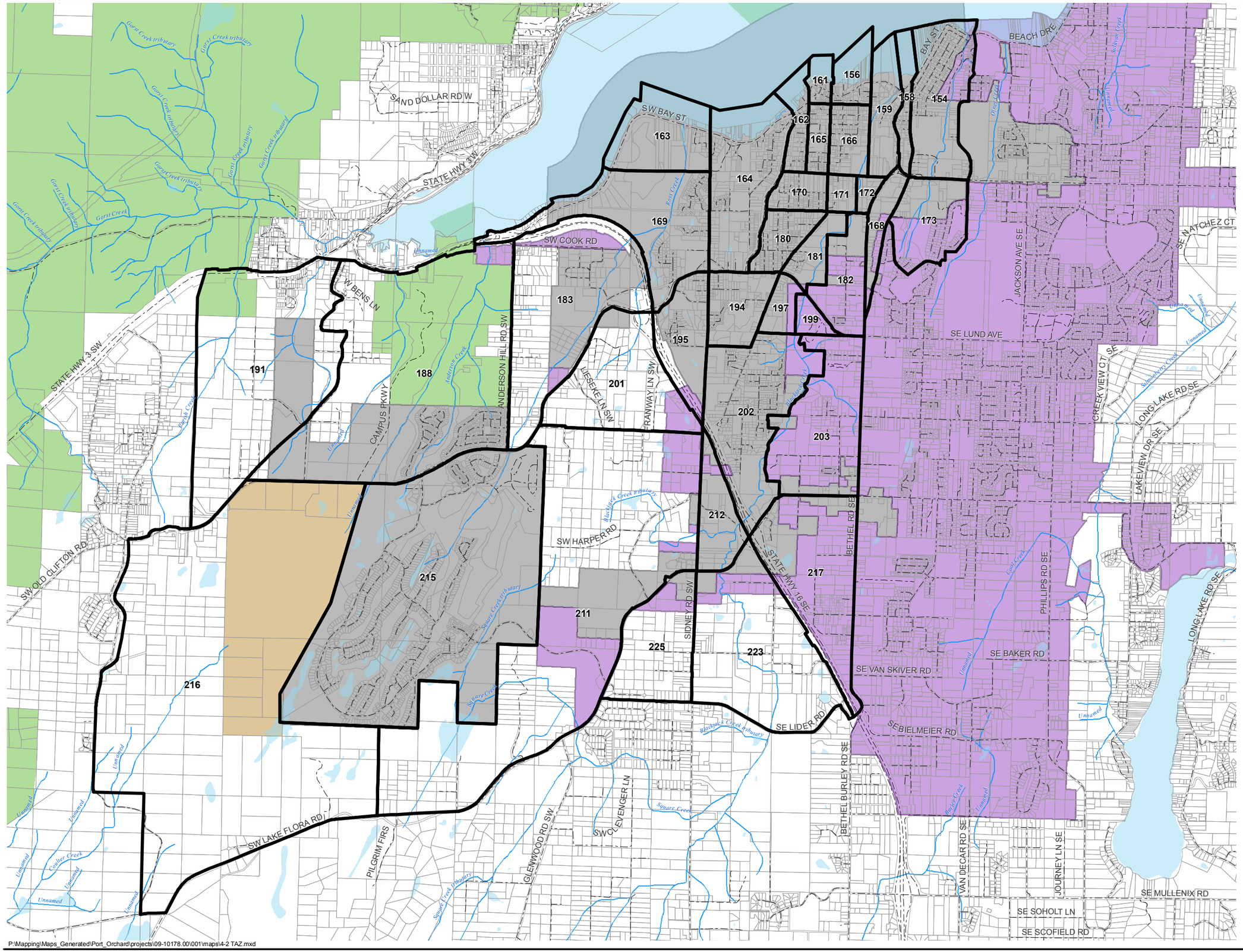
MAP DATE: DECEMBER 13 2007

Kitsap County TAZ Map Excerpt

Figure 4-1



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Comprehensive Sanitary Sewer Plan Update

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Legend

- TAZ - Studies
- City of Port Orchard
- Port Orchard UGA
- Unincorporated Urban Growth Area
- City of Bremerton
- Parcels - Kitsap Co June 07
- Water Bodies
- Rivers & Streams
- Roads

1 inch = 3,000 feet

0 1,500 3,000 6,000 Feet

Data Sources: Kitsap County 2009
This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

MAP DATE: DECEMBER 13 2007; UPDATED NOVEMBER 2009

Transportation Analysis Zones

Figure 4-2

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5. WASTEWATER FLOWS

5.1 Historic Wastewater Flows

All wastewater from the City sewer system passes through the Marina Pump Station to reach the South Kitsap Water Reclamation Facility. Flow at the pump station is metered. Wastewater flow for Port Orchard is seasonal, as it is for most western Washington communities. Late summer from July through September is usually dry and flows are minimal. Early winter brings significant rainstorms and wastewater flow rises accordingly.

Review of metered wastewater flow over several recent years allows four flow parameters to be identified that are useful in projecting future flow conditions:

- The total annual flow defines the average daily flow.
- Summer minimal flows define the approximate sewage component
- Winter flows during periods without significant rain, less the summer minimum, defines the infiltration component
- Winter flow during or following a significant rainstorm defines the rain-induced infiltration inflow component

Selected City flow records for the Marina Pump Station are summarized in Table 5-1.

Table 5-1
Marina Pump Station Flow Summary
Monthly Average Flow in Millions of Gallons per Day

Month	2007	2006	2005	2004
July	0.679	0.658	0.657	na
August	0.663	0.633	0.643	0.675
September	0.688	0.641	0.651	0.683
Average	0.677	0.644	0.650	0.679
January	0.902	1.266	0.843	1.037
February	0.740	0.849	0.728	0.794
November	0.778	1.128	0.792	0.722
December	1.087	1.001	0.991	0.856
Average	0.877	1.061	0.839	0.852
Maximum Day	3 Dec @ 3.84	14 Dec @ 3.37	18 Jan @ 1.75	10 Dec @ 2.08
Rain inches	5.15	2.41	1.50	2.15

Note: Flow data are not available for some months, and other months are incomplete.

The early December 2007 storm event was likely an abnormal occurrence. The maximum daily flow was recorded on 3 December 2007 was 3.84 MGD, which is within the existing station capacity of 4,000 GPM (5.8 MGD) as discussed in Section 3.2. Average daily flows over entire years for the City sewer system are computed as shown in Table 5-2 for the calendar years 2004, 2005, and 2006 from City records for the Marina Pump Station.

Table 5-2
Annual Average Daily Flow in MGD

Month	2007	2006	2005	2004
Jan	0.902	1.266	0.843	1.037
Feb	0.740	0.849	0.728	0.794
Mar	0.802	0.744	0.766	0.758
Apr	0.699	0.702	0.796	0.687
May	0.721	0.692	0.726	0.714
Jun	0.708	0.684	0.695	0.700
Jul	0.679	0.658	0.657	0.000
Aug	0.663	0.633	0.643	0.675
Sep	0.688	0.641	0.651	0.683
Oct	0.716	0.644	0.681	0.000
Nov	0.758	1.128	0.792	0.722
Dec	1.097	1.001	0.991	0.856
Total	9.164	9.642	8.969	7.626
Average	**0.764**	**0.804**	**0.747**	**0.763**

As shown in Table 5-2, the 2006 calendar year included three months with flows averaging more than 1.000 MGD. These high months may have been unusual due to severe rainstorms such as the event on December 2nd when 5.15 inches of precipitation was recorded. These severe events form the benchmarks to gage the capacity of the sewer system. No overflow occurred during that event any where in the City sewer system – meaning, the sewer system has adequate capacity to accommodate such peak storm events under existing conditions.

5.2 Existing Unit Flows

Annual average daily flows as shown in Table 5-2 divided by the number of ERU described in Section 3.1 for the referenced year, including McCormick Woods, provides the unit flow in gallons per day per ERU. These computations are summarized in Table 5-3.

Table 5-3
Average Day Flow per ERU

Parameter	2007	2006	2005	2004
Annual Average Day Gallons	764,000	804,000	747,000	763,000
ERU		5,036	4,935	4,830
Gallons per ERU		160	151	158

Table 5-3 indicates that on an annual average day basis, each equivalent residential unit connected to the City sewer system contributes about 160 gallons. At the City housing rate of

2.4 persons per household, the historic per capita wastewater generation rate has been about 67 GPD per person, which is similar to other communities in the Puget Sound area.

Wastewater flow per employee is a more difficult value to derive. Commercial flow varies widely. Retail stores may generate little wastewater. Food establishments and some industries may generate high flows per employee. Even establishing the number of employees within city limits poses challenges. Puget Sound Regional Council has employment data; however the basis of PSRC data collection changed between 2004 and 2005, which resulted in significantly different employment numbers. This is the best employment data available and provides the best basis for estimating the average wastewater flow generated in the City as summarized in Table 5-4 based on 160 GPD per ERU divided by the Employees per ERU for the relevant year.

Table 5-4
Wastewater Flow per Employee

Year	Employment	Commercial ERU	Employees per ERU	GPD per Employee
2006	4,778	1,377	3.5	45.7
2005	4,873	1,308	3.7	43.2
2004	2,108	1,290	1.6	100.0
2003	1,910	1,224	1.6	100.0

The data for 2005 and 2006 appears to be the most complete in terms of an accurate estimate of employment connected to City sewers. An average day wastewater flow of 45 GPD per employee is believed to be similar to the experience of other Puget Sound jurisdictions, though slightly higher, and will be used for this planning analysis.

5.3 Peaking Factors

Comparison of the maximum day events recorded in recent years defines the peak day factors experienced by the City sewer system. These comparisons are summarized in Table 5-5.

Table 5-5
Historic Peak Day Factor for City Sewer System

Peaking Elements	2007	2006	2005	2004
Peak Day of Year in MGD	3.838	3.367	1.754	2.075
Average Day of Year in MGD	0.764	0.804	0.747	0.763
Peak Day Factor	5.0	4.2	2.3	2.7

Available data is not sufficient to establish the peak hour flow for the City sewer system. The peak hour factor needs to recognize that the storm hydrograph as it moves through the sewer system may coincide with the diurnal peak for the day. Accordingly, the peak hour factor for the City sewer system is estimated at 6 multiplied by the average day flow. For the year 2007, the peak hour flow is estimated to have been about 6 x 0.764 MGD = 4.6 MGD. This rate is within the existing capacity of the Marina Pump Station as discussed in Section 3-2. Since the station was able to accommodate the 14 December 2006 event without an overflow, this peaking factor

is believed to be appropriate. The general experience of most communities is that peaking factors decline as the population and employment increases, especially if the sewer system is rehabilitated to reduce extraneous flows such as infiltration and inflow.

5.4 South Kitsap Industrial Area Projections

The potable water demand stated for the projected 9,350 employees in the SKIA Plan is presented as the average day demand in 2017 being 1.4 MGD, or about 150 GPD per employee. The industrial development is projected to generate an average day wastewater flow of about 1.2 MGD, or about 85 percent of the potable water demand. This is a typical relationship. However, historic recorded flows indicate wastewater averages about 28 GPD per employee.

No specific quantity is mentioned in the SKIA Plan for peak hour wastewater flow. Peak hour industrial/commercial/business wastewater flow is usually at least double the average, which would be about 2.4 MGD. An allowance for infiltration/inflow must also be included. These extraneous flows during a winter storm may average 800 GPD per acre. At that rate the 550 net developed acres would produce about 0.44 MGD. Therefore, the total peak hour SKIA wastewater flow projected from the Plan would be about 2.84 MGD.

The projected water demand stated in the SKIA Plan is considerably more than the 101 GPD/employee used in 1997 (the only date referenced). Even the 1997 value is about triple the usual water use in commercial and business park development. The SKIA Plan could be indicative that a water-intensive industrial use is expected within SKIA. This seems unlikely. The high water use recorded in 1997 may be due to washing of aircraft stored at the airport, which is not a water demand likely to increase significantly.

The Kitsap County Solid Waste Facility is located within the SKIA and leachate from that facility has been discussed as a possible contribution to any sewerage facilities serving the area. The projected wastewater volume would seem adequate to include this flow, though the pollutant loading may need separate consideration.

The SKIA is a large site with many possibilities for future development, such as a NASCAR race track or another major facility. However, these possibilities are only speculative for now. Consequently, longer term or build-out projections of wastewater flow projection for the SKIA have not yet been developed by the City of Bremerton or the Port of Bremerton.

5.5 McCormick Woods

The June 2005 ‘Sewer Capacity Analysis’ prepared for McCormick Woods North Phase 1 summarizes the current land use planning for parcels within the McCormick Woods development that will be tributary to the Old Clifton Road sewer as shown on Figure 5-1 (an excerpt from the planning map prepared for that development). That ‘Analysis’ provides more detail of future development than the TAZ projections shown in Tables 4-4 and 4-5; and such detail is appropriate to the largest development area now served by the City. Those development parcels that will be tributary to the McCormick Woods Pump Station No 2 through the 15-inch pipe from the west can be summarized as follows for average day wastewater flow conditions:

Residential	2,677 units	160 GPD/unit	0.428 MGD
Commercial	4,291 employees	45 GPD/employee	0.193 MGD
High School	1,100 students & staff	26 GPD/person	0.029 MGD
Recreation Park	little use during school	----------	0.010 MGD
Projected Average Day Domestic Sewage			0.660 MGD

This portion of the McCormick Woods development totals about 487.1 acres. Under wet weather conditions, infiltration and rain-induced inflow may average 800 GPD per acre at peak hour for these parcels that include many homes using low pressure sewer systems instead of conventional gravity sewers. The resulting extraneous flow is projected to total about 0.390 MGD. Total flow from the west in the 15-inch pipe in Old Clifton Road under peak hour conditions is estimated as follows:

Domestic Sewage = 0.660 MGD x 3.0 peak factor	= 1.980 MGD
Infiltration & Inflow = 487.1 acres x 800 GPD/acre	= 0.390 MGD
Total peak hour wastewater flow	2.370 MGD

Additional parcels enter Pump Station No 2 through other piping as summarized below:

Residential	808 units	160 GPD/unit	0.129 MGD
Commercial	347 employees	45 GPD/employee	0.016 MGD
Club House	90 persons	50 GPD/person	0.005 MGD
Inn/Motel	200 rooms	130 GPD/room	0.026 MGD
Total average day sewage flow			0.176 MGD

These additional parcels encompass about 658.6 acres. Under wet weather conditions, this land area may average 800 GPD per acre. The total peak hour flow from these parcels is estimated as follows:

Domestic Sewage = 0.176 MGD x 3.0 peak factor	= 0.528 MGD
Infiltration & Inflow = 487.1 acres x 800 GPD/acre	= 0.527 MGD
Total peak hour wastewater flow	1.055 MGD

Pumping capacity required for the McCormick Woods parcels at Pump Station 2 is summarized as follows:

From the west in Old Clifton Road	2.370 MGD
From other parcels	1.055 MGD
Total Peak Hour Flow	3.425 MGD = 2,379 GPM

This value indicates that when the parcels are fully developed some years in the future, the McCormick Woods Pump Station No 2 capacity will need to be about doubled. The influent gravity pipes and the force main have adequate capacity to accommodate this increase.

Several additional parcels are planned to discharge through separate pump stations downstream of the McCormick Woods Pump Station No 2. The flow from these parcels is summarized below:

Residential	687 units	160 GPD/unit = 0.110 MGD x 3.0 peak	= 0.330 MGD
Land area	338.7 acres	800 GPD/acre	= 0.271 MGD
Total additional peak hour flow to force main			= 0.601 MGD

The peak hour flow from McCormick Woods parcels without SKIA in the 15-inch gravity sewer in Old Clifton Road between McCormick Woods Pump Station No 2 and No 1 would total about 3.425 + 0.601 = 4.026 MGD, which is within the flowing full capacity of 4.8 MGD for this pipe stretch.

5.6 Sedgwick Road Developments

The sewer basins along SW Sedgwick Road and Pottery Avenue as shown on Figure 3-6 as Basins 3, 12, 13, and 14 are experiencing considerable development interest. The build-out population for Basin 3 in particular may exceed the projections shown in Table 4-5 due to the proposed Stetson Heights development proposed by Quadrant Homes. This development alone is planned for 385 single family homes. At the typical household size for Port Orchard of 2.4 persons, these homes would contain over 900 people; yet Table 4-5 projects the population for the entire basin as only 530 people.

A number of commercial developments have occurred in recent years and others are planned for this area. However, available data does not indicate a reason to question the employment projections.

5.7 Projected Wastewater Flows

Wastewater flows are projected to future conditions to identify the sewerage facilities needed to accommodate residential and commercial developments based on the land uses established by current zoning for the urban growth area tributary to the City sewer system.

Build-out conditions were projected first to establish the maximum capacities needed as summarized in Table 5-6 assuming future unit flows are similar to those recorded in the past based on the basin delineation shown in Figure 3-6 and including SKIA.

Table 5-6
Projected Build-Out Wastewater Flow in Trunk Conveyance Facilities

Trunk Facility	Contributing Basins	Avg. Day GPD	Peak Factor	Peak Hour Flow Build-Out Capacity Needed
A	4	43,000	5.0	0.21 MGD
B	5	109,000	5.0	0.55 MGD
Bay Street	4 & 5	152,000	5.0	0.76 MGD & 630 GPM
C-east	6 & Coast PS	471,000	5.0	2.32 MGD
C-west	D & F	2,553,000	4.0	10.21 MGD
D	8 + E & H	2,471,000	3.5	8.65 MGD
Marina PS	C-east & west	3,016,000	4.5	12.07 MGD & 10,060 GPM
Sedgwick	14-S	23,000	5.0	0.115 MGD & 96 GPM
E	11, 13, & 14-N + Bravo & Albertson	501,000	4.5	2.45 MGD
F	10	82,000	5.0	0.41 MGD
G	3 & 13	354,000	3.0	1.42 MGD
Albertson PS	3 & 13	154,000	3.0	0.46 MGD & 390 GPM
H	7 + McCormick PS 1	1,608,000	4.0	6.43 MGD
McCormick 1	I	1,793,000	4.0	7.17 MGD & 5,000 GPM
Ridge PS	16	15,000	5.0	0.074 MGD & 62 GPM
I	2, 9, 15 + Ridge & McCormick 2	1,793,000	4.0	7.17 MGD
McCormick 2	J & K	1,617,000	3.0	4.85 MGD & 4,000 GPM
J	1, 17, & 18	1,386,000	3.5	4.85 MGD
K	19, 20, & 21	231,000	5.0	1.16 MGD
SKIA	SKIA	1,197,000	2.4	2.87 MGD & 2,000 GPM

Future peaking factors identified in Table 5-5 from historic data are expected to decline as the system expands and population grows, as shown in Table 5-6 for several reasons:

- Some decline can be expected simply as sewer systems increase in size and the local peaks become averaged with the broader system.
- New constriction is anticipated to allow less infiltration and inflow to enter the sewers, which is a major contributor to peak flows.
- Some rehabilitation of existing sewers will also occur, which should at least allow the existing sewers to maintain the historic peaking factors and may reduce these factors somewhat.

Accordingly, a peak factor of less than 5 multiplied by average day flow is believed appropriate for several parts of the system. This factor will decrease to about 4.0 or even 3.0 as more trunks are combined. Commercial areas will be a further exception, since their peaking factors are normally even less; perhaps as low as 2.4 may be appropriate.

Conditions were then projected for 2025 to establish the facilities needed in a more immediate timeframe as summarized in Table 5-7.

Table 5-7
Projected 2025 Wastewater Flow in Trunk Conveyance Facilities

Trunk Facility	Contributing Basins	Avg. Day GPD	Peak Factor	Peak Hour Flow
A	4	42,000	5.0	0.21 MGD
B	5	88,000	5.0	0.42 MGD
Bay Street	4 & 5	130,000	5.0	0.65 MGD & 540 GPM
C-east	6 & Coast PS	407,000	5.0	2.04 MGD
C-west	D & F	2,405,000	4.5	9.62 MGD
D	8 + E & H	2,314,000	4.5	8.10 MGD
Marina PS	C-east & west	2,813,000	4.0	11.25 MGD & 9,380 GPM
Sedgwick	14-S	23,000	5.0	0.12 MGD & 96 GPM
E	11, 13, & 14-N + Bravo & Albertson	381,000	4.5	1.72 MGD
F	10	91,000	5.0	0.46 MGD
G	3 & 13	343,000	4.0	1.37 MGD
Albertson PS	3 & 13	150,000	3.0	0.45 MGD & 370 GPM
H	7 + McCormick PS 1	1,525,000	4.0	6.10 MGD
McCormick 1	I	1,661,000	4.5	6.65 MGD & 5,540 GPM
Ridge PS	16	11,000	5.0	0.057 MGD & 48 GPM
I	2, 9, 15 + Ridge & McCormick 2	1,661,000	4.0	6.65 MGD
McCormick 2	J & K	1,533,000	3.0	4.60 MGD & 3,830 GPM
J	1, 17, & 18	1,378,000	3.5	4.82 MGD
K	19, 20, & 21	155,000	5.0	0.78 MGD
SKIA	SKIA	1,197,000	2.4	2.87 MGD

The projected peak hour flows shown in Tables 5-6 and 5-7 allow the existing conveyance facilities to be evaluated for adequate capacities to accommodate future flow conditions.

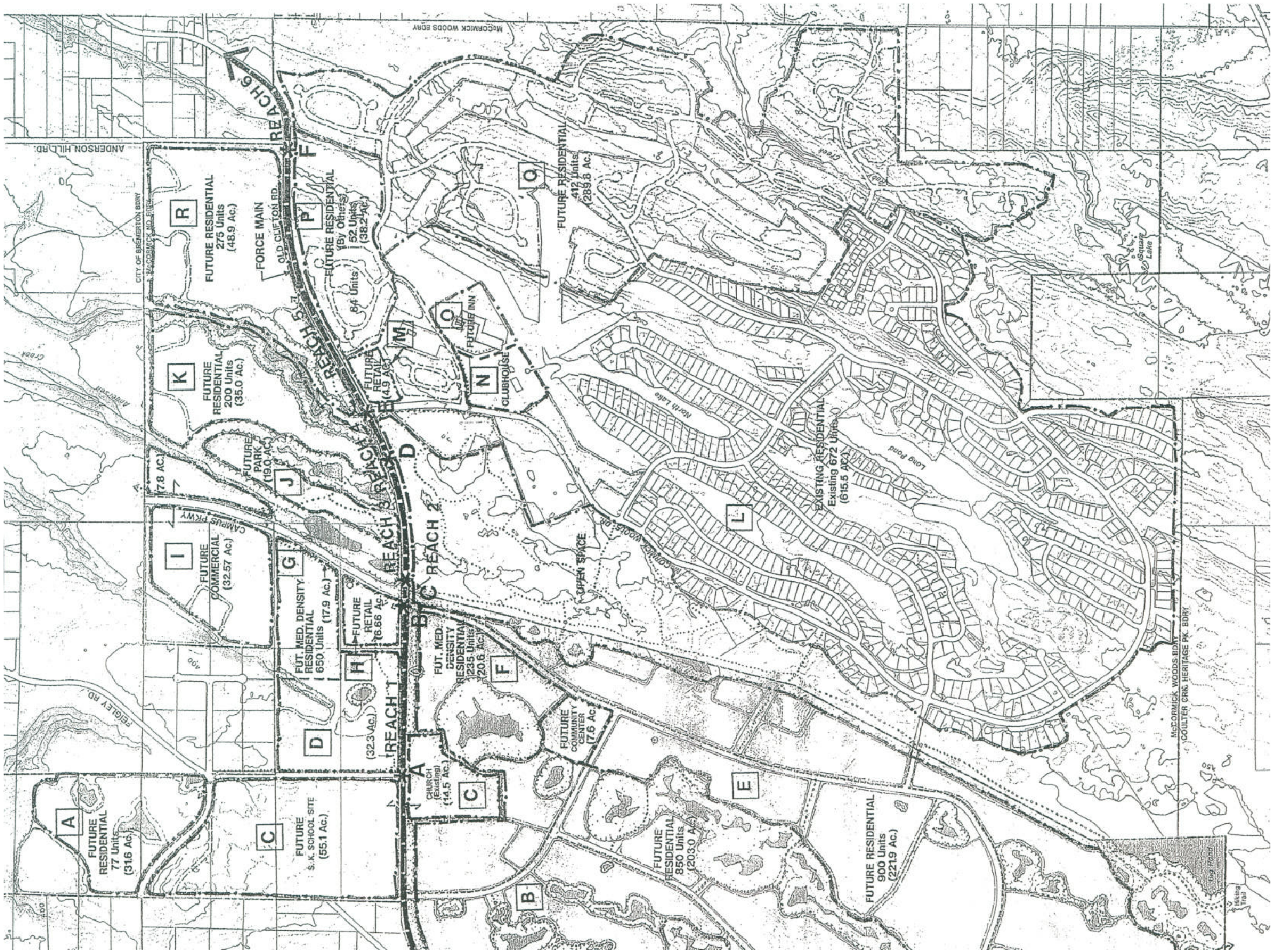
Average day flow in 2025 is projected from the population projection shown in Table 4-4 at 67 GPD per capita, plus the projected employment at 45 GPD per employee. The 2025 average day flow projection is 2.813 MGD, which is about 3.5 times the average day flow recorded at the Marina Pump Station for 2006 as shown in Table 5-2.

The projected annual average day flow for the Build-Out Projection shown in Table 4-4 is about 3.016 MGD, which is only about 7 percent above the 2025 projected average day flow.

These values are only projections based on data currently available. Planning assumptions do change over the years. The flow projections should be reviewed from time to time as better planning data becomes available.

City of Port Orchard
WASHINGTON

Comprehensive Sanitary Sewer Plan Update



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Data Source: Goldsmith and Associates, Inc
Sanitary Sewer Capacity Analysis, June 29, 2005

McCormick Woods Urban Village Conceptual Master Plan

Figure 5-1

FILE NAME (UPDATED BY)
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PLOT DATE & TIME
AUG 19 2009 10:36:21
XREFS: NONE

6. CONVEYANCE SYSTEM

6.1 Existing City Sewer Pipe System Evaluation

Not all of the flows projected in Table 5-6 and 5-7 can be conveyed by the existing City sewer system of interceptor pipes, pump stations, and force mains. Table 6-1 summarized the City conveyance system in relation to the projected peak hour flows to identify which elements will be stressed.

Table 6-1
Projected Conveyance Pipe Capacity Limitations
Peak Hour Flow Projections

Trunk	Location	Exist Inches Diameter	2025 Projection		Build-out Projection	
			MGD	Pipe Inches	MGD	Pipe Inches
A	Bay Street	12	0.21	ok	0.21	ok
B	Bay Street	10	0.42	ok	0.55	ok
C-east	Bay Street	18	2.04	ok	2.32	ok
C-west	Bay Street	24	9.62	33	10.21	ok
D – 1	Port Orchard	12 (new)	8.10	ok	8.65	ok
D – 2	Port Orchard	12 (old)		18		18
E	ravine	10	1.72	15	2.45	15
F	Bay Street	18	0.46	ok	0.41	ok
G	Pottery Avenue	10	1.37	15	1.42	15
H	Tremont Street	15	6.10	21	6.43	24
I	Old Clifton Road	15	6.65	18	7.17	18
J	Old Clifton Road	15	4.82	18	4.85	18
K	McCormick Woods	10	0.78	ok	1.16	12

Several of the trunks are shown in Table 6-1 to need more capacity for 2025 or built-out flow projections. These trunks are discussed below; and the alternatives believed appropriate are explored in the next chapter.

6.2 Existing Sewer Pump Stations

Table 6-2 provides a summary of capacity limitations for the principal pump stations of the City trunk sewer system, and the associated force mains.

Table 6-2
Projected Pump Station Capacity Limitations

Pump Station	Existing Parameters		2025 Projection		Build-out Projection	
	GPM	Force Main Inches	GPM	Pipe Inches	GPM	Pipe Inches
Coast	515	none – lift station	540	ok	630	ok
Marina	3,700	18	9,380	24	10,060	24
McCormick 1	1,000	16	5,000	ok	5,540	18
McCormick 2	1,000	16	3,830	ok	4,000	ok
Albertson	176	6	380	ok	370	ok
Sedgwick	180	6	96	ok	96	ok

Force main should be designed with sufficient pipe diameter that velocities remain below 8 feet per second under peak flow conditions and above 2 feet per second at low flow conditions, which is the criteria used to indicate acceptable force mains in Table 6-2.

Engineering field inspections were conducted for three pump stations within the City sewer system to identify improvements needed that should be included in the capital improvement program. The McCormick Woods Pump Stations No 1 and No 2 plus the Marina Pump Station are the most important stations to the functioning of the City sewer system, and were selected for this evaluation.

Marina Pump Station

Existing Facilities: Marina lift station is located on Bay Street and was built in 1983. The pump control and generator room was built on an existing concrete wastewater treatment tank, likely a clarifier. The exact age of the tank and surrounding sheet pile is unknown, but it was likely built in the early 1960s. The pump station wet well and drywell were also constructed in 1983 and are in the parking lot just south of the control building. The structure that houses the wetwell and drywell is substantial with 18-inch reinforced concrete walls and a 36-foot by 28.5-foot by 24-foot deep building envelope.

The Marina Pump Station is located at the shoreline and is the last pump station before the City wastewater reaches the treatment plant. The station collects sewage from the upper basin and the heavy STEP component that entering McCormick Woods Pump Stations 1 and 2 has been diluted. The Marina Pump Station does receive a great deal of storm water flow form older parts of the sewer system during storm events. Odor is confined to the wet well and corrosion associated with sewage does not seem to be an issue.

The pump station is designed with two 25 HP chopper pumps to convey typical sewage flow and two larger 150 HP centrifugal pumps to convey high flows associated with storms. The large pumps are each rated for 2,600 GPM at 115 feet of lift. Storm flows that exceed the capacity of the two main pumps discharge excess flow through an overflow pipe leading to Sinclair Inlet.

The large 150 HP pumps are plumbed from the wet well and to an 18-inch force main with 14-inch ductile iron pipe. Each large pump is equipped with a 14-inch plug valve on the inlet side and a 14-inch check valve and plug valve on the discharge side. The smaller 25 HP chopper pumps are plumbed from the wet well and to the force main in a similar fashion with 8-inch pipe and valves. Separate flow meters measure flow from the large pump and the small pumps and are located before the 18-inch force main. These flow meters measure low flows associated with sanitary sewer and the high flows discharged during storm events.

The drywell is in excellent condition and the valves are likely to be in working order. Verification of the valve's heath and proper operation is recommended. The capacity of these valves and force mains are in excess of the current pump discharge rates and provide capacity into the future. For example, the large pumps are rated for force main are ideally designed between 4 and 8 feet per second (fps) fluid velocity. Following this criteria a 14-inch valve can convey approximately 3,900 GPM at 8 fps and an 18-inch force main can convey about 6,800 GPM at 8 fps.

A detailed list of equipment sizes and dimensions of equipment was developed for this evaluation based on a field visit on July 9th, 2008, and on plans developed by KCM, Incorporated for the Marina Pump Station, dated March 1983.

Deficiencies: The main deficiencies at the Marina Pump Station include the following: The large pumps are reaching the end of their lifespan. Control of the large pump includes one VFD system and one constant speed system resulting in the VFD controlled pump being operated more often causing uneven wear. The engine-generator is becoming difficult to maintain as parts are becoming scarce, the generator's automatic transfer switch (ATS) is 25 years old, and the generator fuel storage does not provide secondary containment. The drywell ventilation needs to be continuous and provide 6 air exchanges per hour to meet DOE requirements. The ventilation duct work appears to be adequately sized and a new fan and controls may be all that is needed. The sheet pile structure around the water side of the control room is beginning to fail potentially compromising the building foundation.

Items that need further investigation before it can be determined if replacement, repair or modification is required include, the plug and check valves around the pumps and on force main, drywell and control room lighting, the potable water connection for cross connection control, drywell sump pump, wetwell access, wetwell condition, and the level sensing system.

Recommendations: Replace the two large 150 HP pumps and replace the constant speed controller of Pump 2 with new VFD system. Replace generator, fuel tank and ATS. Replace ventilation fan and controls in drywell ventilation system to provide 6 air exchanges per hour and to operate continuously. Construct new ring of sheet pile around control room and replace backfill.

Upon further investigation the following items may need to be replaced or rehabilitated if they are determined to be in poor condition. These items include, check and plug valves in drywell associated with pumps and force main, the drywell sump pump, the wet well interior, the level sensor system, and the potable water system cross connection control valve.

Optional changes that would improve the stations operation, but are not absolutely required are described as follows. Replace the existing VFD that controls Pump 1 to provide a matched set of controllers. Improve lighting in the drywell and control room. Increase access to wet well for better maintenance.

McCormick Woods Pump Stations No 1 and No 2

Existing Conditions: McCormick Woods Pump Stations 1 and 2 were built as part of ULID No 6 in late 1994 or 1995. Pump Station No 1 is located on Old Tremont Street just west of SR 16 and Pump Station No 2 is located on Old Clifton Road near McCormick Woods. The pump stations share a common design with the exception of the pump and generator size. Both pump stations are designed with duplex submersible pumps, an exterior control panel, a stand alone generator, a 10-foot by 10-foot fiberglass reinforced building to house chlorine bleach injection equipment and air compressor for force main corrosion control, chemical holding tank and an air scrubber for odor control.

Both pump stations are constructed with the same valve arrangement. A 10-inch check and plug valve follow each pump, piping then combines to flow through a 16-inch isolation plug valve and into the force main. The capacity of these valves and force mains are well in excess of the current pump stations demands and provide capacity well into the future. For example, force main are ideally designed between 4 and 8 feet per second (fps) fluid velocity. Following this criteria a 10-inch valve can convey approximately 2,000 GPM at 8 fps and a 16-inch force main can convey about 5,100 GPM at 8 fps.

A detailed list of equipment sizes and dimensions of equipment was developed based on a field visit on July 9th, 2008, plus plans developed by NL Olson and Associates for ULID No. 6, McCormick Woods Lift Stations 1 and 2, dated June 1994.

Pump Station No 1 collects flow from the County Juvenile Detention Center, an office park, the decant facility operated by the City, and flow from McCormick Woods Pump Station No 2. The sewage is a mixture of fresh gravity sewage and aged STEP sewage from Pump Station No 2. Odor and corrosion is an issue, but not as severe as Pump Station 2. Ragging is occasionally a problem as a result of the inmates at the detention center flushing items down the toilets.

Pump Station No 2 receives sewage from the McCormick Woods development. Most houses in the McCormick Woods area have septic tanks with effluent pumps (STEP systems) that discharge the effluent to Pump Station No 2. As a result, the sewage reaching the pump station is aged and odorous. Efforts to reduce the odor and possibly other constituents in the aged influent sewage with chlorine bleach (NaOCl) have led to tremendous corrosion problems.

Deficiencies: Pump Station 1 and 2 have similar problems with those at Station 2 being more severe. Each station has corrosion issues with aged valves that do not operate, pipe saddles that are corroded and have failed or are close to failure, check valves that are slow to close due to

missing or rusted springs resulting in loud operation and pressure surges in the force main, and rails and rail mounts that are corroded and need replacement.

Discharge piping from the pump up to the elbow exiting the wet well is designed with an 8-inch force main. This pipe is oversized, likely to provide for future growth. The problem that can occur from the excess size is the exit velocity can be too low to carry larger solids up the stack. As a result, a chunk of gravel or other large and dense solid can get trapped near the pump causing unnecessary damage. This is not likely a problem with STEP systems as in Pump Station 2, but may be a problem with Pump Station 1.

Odor control systems that filter the exhaust air are not currently operated at the either pump station since they are not effective at removing odor. Operator reports that the odor control systems have never worked effectively suggest the media in the systems may not have been well matched for the odor creating chemicals present in the STEP system effluent.

Related to odor control is the wet well storage volume. The construction drawings show 7-feet of active storage in the wet well. This provides excessive storage causing sewage in the wetwell to age unnecessarily. The active storage in the wet well should about one-quarter the volume for Station 2 and one-third the volume for Station 1 to protect the pumps against over-cycling.

Chemical injection systems at each pump station use chlorine bleach that is hazardous, causes corrosion, and may inhibit treatment processes down stream at the wastewater treatment plant.

The pumps and control systems are close to 25-years old and are likely nearing the end of their lifespan. This was reinforced by the fact that on the day of my site visit, one of the pumps failed at Pump Station 2.

No equipment is available to remove and service pumps other than independent contractor. No area lighting provided. These deficiencies make maintenance difficult.

More examination of the wetwell, force main and discharge piping is recommended. The existing equipment is sized large enough for future use. For this report is assumed that the structures may be reused.

Recommendations: Replace pump system including pumps, controls and panels, level sensors, rails and reducers connecting to existing discharge elbows. Provide free standing roof structure above the pump control panel with integrated lights to illuminate area and to protect workers from the rain with a design similar to the McCormick Ridge installation. Replace check valves, plug valves and saddles downstream of the pump station in kind. Reduce the volume of storage in the wet well to reduce odors caused by long residence time. Employ new corrosion control system utilizing less toxic chemicals. If odor remains an issue at the station with the new corrosion control system, provide an odor control system that treats hydrogen sulfide and also the complex odors formed by STEP system effluent. Purchase a truck with a Pump with a swinging boom to be used to service all the pump stations.

6.3 Infiltration and Inflow

Ecology Publication No 97-03 defines criteria for determination of whether excessive infiltration or inflow may exist in a sewer system based on the served population. Table 6-3 shows the maximum day flow recorded at the Marina Pump Station in relation to the annual average day flow. The ratio of these flows is an indication of the magnitude of infiltration and the response to rainfall. The approximate served population shown in Table 6-3 was derived from the historic populations shown in Table 4-1 and the residential ERU shown in Table 4-2 at 2.4 persons per residential unit.

Table 6-3
Marina Pump Station Flow Summary
Monthly Average Flow in Millions of Gallons per Day

Month	2007	2006	2005	2004
Maximum Day	3 Dec @ 3.84	14 Dec @ 3.367	18 Jan @ 1.754	10 Dec @ 2.075
Rain inches	5.15	2.41	1.50	2.15
Annual Average	0.764	0.804	0.747	0.763
Ratio	5.0	4.2	2.3	2.7
Served Population	7,333	7,272	7,226	6,948
Average GPD per Capita	104	110	103	110
Average GPD per Capita in Storm	702	463	243	299

The early December 2007 storm event was likely an abnormal occurrence. The maximum daily flow was recorded on 3 December 2007 was 3.84 MGD, which is within the existing station capacity of 3,700 GPM (5.33 MGD) as discussed in Section 2.2. Average daily flows over entire years for the City sewer system are computed as shown in Table 6-3 for the calendar years 2004, 2005, and 2006 from City records for the Marina Pump Station.

As shown in Tables 5-1 and 5-2, the 2006 calendar year included three months with flows averaging more than 1.000 MGD. These high months may have been unusual due to severe rainstorms such as the event on December 14th when 2.41 inches of precipitation was recorded. These severe events form the benchmarks to gage the capacity of the sewer system. No overflow occurred during that event any where in the City sewer system – meaning, the sewer system has adequate capacity to accommodate such peak storm events.

‘Possibly excessive infiltration’ is defined in Ecology Publication No 97-03 as annual average day flow exceeding 120 GPD per capita during periods of high groundwater. Table 6-3 shows the annual average day flow was typically 110 GPD per capita. Infiltration into the Port Orchard sewer system as a whole does not appear excessive. Selected pipe reaches within the system may exceed this criteria and warrant rehabilitative efforts.

'Possibly excessive inflow' is defined in Ecology Publication No 97-03 as annual average day inflow exceeding 275 GPD per capita during storm events. Table 6-3 shows the flow per capita during the largest storm of the year exceed that criteria during some years. However, the publication defines 'significant rain storms' as 'any storm that creates surface ponding and runoff'. Clearly the largest storms of the year exceed that criteria, and are not intended as the basis for 'possibly excessive inflow' determination. However, even the peak storm of some years does not exceed the criteria. Therefore, inflow does not appear to be excessive into the City sewer system as a whole. Selected pipes within the system, however, may exceed the criteria and may warrant rehabilitation efforts.

A more local picture of infiltration/inflow issues can be achieved by evaluating the records of individual pump stations. Table 6-4 compares flows from McCormick Woods No 2 and through McCormick Woods No 1 for 2007.

Table 6-4
2007 Flow Comparisons in GPD
McCormick Woods No 1 and 2

Month	McCormick 1	McCormick 2	Difference
Jan	82,839	63,677	19,162
Feb	70,071	53,571	16,500
Mar	75,290	56,129	19,161
Apr	69,200	52,800	16,400
May	73,161	54,387	18,774
Jun	73,400	54,000	19,400
Jul	74,129	54,774	19,355
Aug	74,323	53,226	21,097
Sep	78,600	54,200	24,400
Oct	78,581	51,677	26,904
Nov	84,600	56,400	28,200
Dec	108,968	70,452	38,516
Annual Average	78,597	56,275	22,322
Maximum Day	342,000 (Dec 3)	282,000 Dec 3)	60,000
Ratio	4.35	5.02	2.69

Table 6-4 indicates that the McCormick Woods Pump Station No 2 experiences larger peak flows than McCormick Woods Pump Station No 1. This means that a significant infiltration/inflow contribution comes from within the McCormick Woods development.

These results indicate that construction and long-term integrity of the sewer system within McCormick Woods has not matched design expectations, and thus is using more system capacity than originally intended. Some system rehabilitation would seem appropriate to minimize capacity additions to the interceptors and three major pump stations.

As shown in Table 6-3, flow through the Marina Pump Station for the peak day during 2007 also was five times the annual average day flow. This indicates that some areas downstream from

McCormick Woods Pump Station No 1 also have a sufficient response to rainfall to increase the peaking factor back up to about five times the annual average day flow. These areas are likely to be among the older sections of the sewer system, and those pipe reaches in depressions with high ground water.

7. ALTERNATIVES CONSIDERED

7.1 Trunk Sewers Required for Build-Out

There are four basic alternatives to address capacity concerns within the trunk piping system:

1. Allow pipe to surcharge since the capacity is only needed for brief peak hour flows
2. Replace the trunk with a larger pipe, or install a parallel pipe
3. Divert some or all flow to a new or different trunk
4. Intercept some flow to a satellite treatment facility for reclamation and reuse as stream augmentation, irrigation, or other purposes

Each of the trunks identified in Table 6-1 as requiring additional capacity for build-out conditions are discussed below. It is best to consider first the capacity that may be needed in comparison with the need projected for build-out flow conditions. Capacity needed by 2025 as shown in Table 6-1provides an indication of the urgency the capacity issue should be addressed.

Trunk C-west – Bay Street

Existing Conditions: The existing 24-inch pipe in Bay Street extends from Port Orchard Boulevard to the Marina Pump Station. The pipe burial is reported to average about 10-feet of cover reported for most pipe reaches.

Deficiencies: Future peak hour flows under the build-out scenario may cause the pipe to surcharge for periods of several hours.

Alternatives: Three alternatives are possible:

A. Surcharging of the sewer pipe may be acceptable for limited time periods as there are no basements known to exist along this alignment.
B. Pipe capacity can be increased by pipe bursting or by installing a parallel pipe.
C. Flow can be reduced by use of satellite treatment facilities to produce reclaimed water for stream augmentation or reused in other manners.

Trunk D – Port Orchard Boulevard

Existing Conditions: Two 12-inch pipes have been installed at different dates in ravine corridor containing Port Orchard Boulevard.

Deficiencies: Some portions of the older pipe in this alignment have only 4-feet of cover.

Alternatives: Three alternatives are possible:

A. Surcharging of the sewer pipe may be acceptable for limited time periods as there are no basements known to exist along this alignment.
B. Pipe capacity can be increased by pipe bursting or by installing a parallel pipe.
C. Flow can be reduced by use of satellite treatment facilities to produce reclaimed water for stream augmentation or reused in other manners.

Trunk E – Port Orchard Ravine

Existing Conditions: An existing 10-inch pipe connects Pottery Avenue into the dual 12-inch trunks flowing north from Tremont Street in Port Orchard Boulevard. This existing 10-inch pipe is laid in an easement with the stream corridor without the benefit of a dedicated public right-of-way. The stream is a 'sensitive area', which severely limits access for maintenance or reconstruction. Five lateral or collector sewers discharge into the existing 10-inch sewer along this stretch of pipe.

Deficiencies: Maintenance access is currently difficult for this stretch of pipe. South up Pottery Avenue towards Sedgwick Road is one of the rapidly developing areas of the City. Additional sewer capacity will be needed in the immediate future. Yet the 'sensitive area' designation severely limits opportunities to reconstruct or replace this pipe, even at abnormally high costs.

Alternatives: Two basic alternatives are possible regarding capacity limitations for the 10inch pipe, and combinations of these two basic alternatives offer a range of variations:

A. Construct a new pump station on Pottery Avenue at Lippert Drive with a force main north in Pottery Avenue to discharge into the sewer in Tremont Street.
B. Using membrane bioreactor (MBR) technology, construct a satellite wastewater treatment facility near Pottery Avenue at Sedgwick Road to produce reclaimed water for the new commercial development occurring in this vicinity and/or augment flow in Blackjack Creek.

Excess flow and sludge from the MBR facility would continue to flow through the existing 10-inch sewer.

Trunk G – Pottery Avenue

Existing Conditions: The existing trunk in Pottery Avenue is 10-inch diameter.

Deficiencies: Development in the Pottery-Sedgwick-Sidney area is threatening to exceed the capacity available.

Alternatives: Two alternatives seem feasible:

A. Surcharging of the sewer pipe may be acceptable for limited time periods as there are no basements known to exist along this alignment.
B. A satellite MBR wastewater treatment facility could be built near Pottery Avenue at Sedgwick Road to produce reclaimed water for the new commercial development occurring in this vicinity and/or augment flow in Blackjack Creek.

Trunk H – Tremont Street

Existing Conditions: The 16-inch force main from McCormick Woods Pump Station No 1 discharges into an existing gravity sewer is 15-inch diameter in Tremont Street, which extends

from the hospital east to Pottery Avenue. The record drawings indicate the minimum pipe gradient is about 0.69 percent.

Deficiencies: The existing 15-inch pipe receives the 1,000 GPM (1.44 MGD) discharge from McCormick Woods Pump Station No 1, which is within the pipe capacity when flowing full of about 3.4 MGD. The pipe also receives the 50 GPM discharge from the Canyon Court Pump Station as well as the Harrison Hospital Pump Station at 350 GPM. The pipe capacity is clearly adequately at present but will be exceeded in 2025 when flow is projected to reach 6.10 MGD.

Alternatives: The existing 15-inch pipe should be replaced with a pipe having capacity for about 4,500 GPM or about 6.5 MGD. A 24-inch pipe at a gradient of 0.30 percent would be adequate.

Trunk I – Old Clifton Road

Existing Conditions: The lower part of Old Clifton Road contains a 15-inch trunk from the terminus of the 16-inch force main from McCormick Woods Pump Station No 2 east and north into McCormick Woods Pump Station No 1.

Deficiencies: The existing pipe may need additional capacity when the SKIA properties reach full development.

Alternatives:

A. Surcharging of the sewer pipe may be acceptable for limited time periods as there are no basements known to exist along this alignment.
B. Flow can be reduced by use of satellite treatment facilities to produce reclaimed water for stream augmentation or reused in other manner.

Trunk J – Old Clifton Road

Existing Conditions: A 15-inch trunk exists in upper Old Clifton Road from the west edge of the McCormick Woods tract at Feigley Road east to McCormick Woods Pump Station No 2.

Deficiencies: The existing pipe may need additional capacity when the SKIA properties reach full development.

Alternatives:

A. Surcharging of the sewer pipe may be acceptable for limited time periods as there are no basements known to exist along this alignment.
B. Flow can be reduced by use of satellite treatment facilities to produce reclaimed water for stream augmentation or reused in other manner.

Trunk K – McCormick Woods

Existing Conditions: A 10-inch trunk convey wastewater from the STEP systems within McCormick Woods north to the McCormick Woods Pump Station No 2.

Deficiencies: This pipe capacity may be inadequate when McCormick Woods is fully developed.

Alternatives: Three alternatives may be feasible:

A. Surcharging of the sewer pipe may be acceptable for limited time periods as there are no basements known to exist along this alignment.
B. Pipe capacity can be increased by pipe bursting or by installing a parallel pipe.
C. Flow can be reduced by use of satellite treatment facilities to produce reclaimed water for stream augmentation or reused in other manners.

The alternatives described above for each of the trunk sewer capacity concerns is believed feasible. Cost considerations can be generally described as follows:

> Surcharging the sewer pipes as indicated has no apparent capital cost. Temporary surcharging of the sewer pipe during peak events may lead to minimal surcharging of conveyance manholes but would not result in overflows.

> Pipe reconstruction, either by pipe bursting, installing a parallel sewer, or by replacing the existing pipe has significant capital cost, though little added on-going maintenance or operating costs. The community disruption during construction may be severe however.

> Building and operating satellite MBR treatment facilities likely have the most expensive direct costs. However, such facilities may have off-setting savings in extending available water sources, environmental benefits, and improved community relations.

Selection of which alternative to implement for each of the various trunk capacity issues may vary depending on the preferences of the participating property owners, funding available, and the community priorities.

SKIA Wastewater Flow Management

Existing Conditions: The SKIA is presently served by onsite sewage systems. These facilities are adequate for current conditions and may remain sufficient indefinitely. The City of Port Orchard has the potential to provide at least some capacity for the SKIA in Trunk J and onwards to the wastewater treatment facility.

Deficiencies: Capacities of the existing onsite systems will eventually be exceeded in accordance with the development projected in the SKIA Plan. The existing capacity in the City system is limited and may not suffice for build-out development planned for the SKIA.

Alternatives: The City has two basic alternatives to providing added wastewater capacity:

A. Enlarge all downstream facilities
B. Provide a satellite treatment facility within the SKIA

Alternative A is very expensive and disruptive. Alternative B can be implemented when needed at SKIA, the water can be reclaimed and percolated into the ground for aquifer recharge, and the sludge can be trucked or pumped to the existing sewer in Old Clifton Road. Discharge can be

managed to occur only during off-peak times so capacities throughout the City sewer system do not need to consider SKIA at all in defining peak hour capacities.

7.2 Pump Station Improvements Required for Build-Out

Capacity needed for build-out conditions at the principal pump stations in the City sewer system are summarized in Table 7-1.

Table 7-1
Projected Pump Station Capacities Needed for Built-Out Conditions

Station	Existing GPM	Required GPM	Station Adequacy	Existing Force Main - inches	Force Main Needed - inches
Bay Street	515	633	no	none	lift into trunk
Bravo Terrace	180	96	ok	6	Adequate
Albertson	176	390	no	6	Adequate
Ridge	200	46	ok	6	Adequate
McCormick 1	1,000	2,237	no	16	Adequate
McCormick 2	1,000	1,749	no	16	Adequate
Marina	3,500	6,217	no	15	Adequate

Force mains shown in Table 7-1 may be adequate with velocities less than 8 feet per second at the Build-Out peak pumping rate. The resulting dynamic head loss and power requirements to use the existing force mains may warrant some replacements though.

7.3 Trunk Sewers Required for 2025

Table 7-1 also indicates that several pump stations will need additional capacity under projected Build-Out conditions. Conditions were then projected for 2025 to establish the facilities needed in a more immediate timeframe as shown in Table 7-2.

Table 7-2
Projected Facility Capacities Needed for 2025 Conditions

Facilities Exceeded at Build-Out	Pipe Capacity Available/Required in MGD			
	Existing	Build-Out	2025	Upgrade Needed
Trunks C-west	4.3	10.21	9.62	Surcharge ok in 2025
D	5.1	8.65	8.10	Surcharge ok in 2025
E	0.83	2.45	1.72	Yes
G	0.70	1.42	1.37	Yes
H	3.4	6.43	6.10	Yes
I	4.70	7.17	6.65	Surcharge ok in 2025
J	3.90	4.85	4.82	Surcharge ok in 2025
K	0.80	1.16	0.78	No – maybe @ build-out
Pump Stations Bay Street	515	630	540	No – maybe @ build-out
Albertson	176	390	370	Yes
McCormick 1	1,000	5,000	5,540	Yes

McCormick 2	1,000	4,000	3,830	Yes
Marina	3,700	10,060	9,380	Yes

Table 7-2 indicates that under the current routing of wastewater flows, Trunks C-west, E, H, and I plus the three larger pump stations will needed to be upgraded before 2025.

7.4 Sewer Service Alternatives for SKIA

Both Table 5-6 and Table 5-7 indicate substantial capacity increases are needed to accommodate peak hour wastewater flows from the SKIA as reflected in subsequent tables through Table 7-2. The City can provide this capacity through reconstruction of the existing facilities. However, there is little indication that the SKIA is prepared to provide the necessary funding in the short term for the benefit conferred. It is therefore necessary and appropriate that the City consider alternatives if sewer service is to be extended to the SKIA under the six-year capital improvement program developed in subsequent chapters.

Examination of the SKIA properties shows that almost all of the parcels proposed for development and served by the proposed water main extensions lie within the Union River watershed, including. Some approximate key elevations are summarized below:

SW Barney White @ SR 3	440
SW Barney White @ west SKIA boundary	240
SR 3 crest to northeast & Gorst	460
East boundary of the SKIA	480
Old Clifton Road @ Feigley Road SW	530

The SW Barney Road at SR 3 intersection can be considered as approximating the center of the developed area. The main SKIA pump station could be located near this interception. A tributary pump station would be needed near the west SKIA boundary on SW Barney White Road, and perhaps at other locations..

For wastewater from SW Barney White Road at SR 3 to reach the nearest City sewer in Old Clifton Road requires a pipeline length of about 13,000 feet. Table 5-6 identified the required pumping capacity as 2,000 GPM, which would need a 16-inch diameter force main to convey wastewater at about 3.3 feet per second with about 50 feet of dynamic head loss. The static head would be about 90 feet plus the wet well depth, for a total lift approaching 160 feet. This is near the limit for most wastewater pumping systems. Each pump would need at least a 125 horsepower motor. Odor and corrosion control would be an even more of a challenge than at present in the interceptor system from Old Clifton Road through McCormick Woods Pump Station 2, thence to Pump Station 1, and on to the Marina Pump Station.

However, the wastewater volumes shown in Table 5-6 are projected in the SKIA Plan only through about 2017, and only for 550 acres of 2,300 total acres that are considered developable. Build-out wastewater capacity needs for the entire site have not been estimated. The existing development is served through an on-site septic system with a capacity of 72,000 GPD. The SKIA Plan envisions development in phases. The first phase would extend until capacity is reached with the existing on-site system.

The second phase would provide connection to the City sewer system. Given the uncertainties involved and the funding constraints, this second phase might need an average day wastewater capacity of about 150,000 GPD, which is double the existing on-site capacity. This capacity would be provided by duplex 310 GPM pumps with 25 horsepower motors and an 8-inch force main to Old Clifton Road.

A third phase would be initiated with the second phase capacity is reached by constructing a satellite treatment facility using a membrane bioreactor (MBR) process to produce 'Class A' reclaimed water. Sludge wasted from the treatment facility would be sent through the phase 2 pump station and force main to the City sewer at old Clifton Road. The reclaimed water could be used by local businesses such as gravel washing, concrete production, or other processes. The water would also be available to augment the three streams draining from the SKIA:

- Gorst Creek flowing into Sinclair Inlet
- Union River flowing into Hood Canal
- Coulter Creek flowing into Case Inlet

The MBR treatment process would be designed in modular packages so it can be expanded as wastewater flows from the SKIA increase. The resulting impacts to the existing City sewer system downstream from Old Clifton Road would be significantly reduced as shown in Table 7-3 for the affected trunk sewers and pump stations.

Table 7-3
Sewer Improvements Revised for Reduced SKIA Flow

Facilities Exceeded at Build-Out		Pipe Capacity Available/Required in MGD			
Trunks	**Location**	**Existing**	**Build-Out**	**2025**	**Upgrade Needed**
J	Upper Old Clifton	3.9	1.2	1.2	No
McCormick 2	McCormick Woods	1.4	1.7	1.5	Yes
I	Lower Old Clifton	4.7	3.0	2.6	No
McCormick 1	SR 16	1.4	3.0	2.5	Yes
H	Tremont	3.4	4.5	3.6	Yes
D	Port Orchard Blvd	5.1	5.0	4.4	No
C-west	Bay Street	4.3	6.0	5.4	(see note)
Marina PS	Bay Street	5.8	7.7	7.1	Yes

Note: Trunk C-west may surcharge for a few hours during peak storm events

Comparison of the capacity needs shown in Table 7-3 with the capacity requirements shown in Table 7-1 and 7-2 shows that planning for a satellite MBR facility will significantly reduce the upgrades required to existing City sewer facilities, and the cost to operate the smaller resulting pump stations.

7.5 Satellite Treatment Alternatives

Intercepting at least some wastewater flow into a satellite treatment facility offers the potential to eliminate, reduce, and/or delay the need for capacity additions to several existing interceptor sewers and to the three major pump stations.

Membrane bioreactors (MBR) are currently the accepted 'state-of-the-art' treatment process for reclaiming wastewater to 'Class A' standards for reuse applications that may involve public contact. MBR processes are available from several manufacturers using two basic technologies: flat plate and hollow fiber. Both processes can readily produce 'Class A' reclaimed water. The hollow fiber process may be best suited to larger installations because the membrane density is higher. The flat plate processes has simpler, less expensive maintenance requirements.

Regulatory requirements to produce 'Class A' reclaimed water are defined in 'Water Reclamation and Reuse Standards' September 1997 by the Departments of Ecology and Health, which is based on the 1992 enactment of the Reclaimed Water Act. 'Class A Reclaimed Water' is defined as an oxidized, coagulated, filtered, and disinfected wastewater.

An MBR process does not normally include coagulation as a treatment step. However, the State of California has accepted the MBR technology as providing an equivalent treatment quality, and the State of Washington has followed suite. The required minimum effluent standards to qualify as Class A reclaimed water can be summarized as follows:

1. Biochemical oxygen demand (BOD) and total suspended solids (TSS) not exceeding 30 milligrams per liter (mg/L).
2. Average monthly operating turbidity not exceeding 0.2 nephelometric turbidity units (NTU) and not exceeding 0.5 NTU at any time.
3. Median total coliform not exceeding 2.2 organisms per 100 milliliters (mL) for the past seven days and no sample exceeding 23 per 100 mL.
4. Chlorine residual of 0.5 mg/L during conveyance from the reclamation facility to the use areas.

The MBR process will routinely exceed the Class A requirements as the effluent typically produced from a flat plate membrane will be less than 5 mg/L for BOD and TSS, while the turbidity will be less than 0.2 NTU. About 4-Log coliform reduction will occur through the membrane, though disinfection will still be required to meet the standard for viruses.

Nitrogen will be a concern with reclaimed water applications where surface streams or groundwater may be affected. The drinking water standard of 10 mg/L is generally the minimum requirement. Removal of nitrogen compounds is usually done through a biological process that is somewhat temperature dependent. A single stage nitrification-denitrification process can be included with an MBR facility and will remove total nitrogen to below 10 mg/L. A two-stage process will reduce total nitrogen to below 5 mg/L.

All MBR processes have significant limitations. The ability to accommodate peak flows is a major concern. Most MBR processes can accept flow at about twice the design rate for a limited time period. However, wastewater flow under storm conditions in Port Orchard can result in

peak flows of three, or four, or five, or more times the average day flow rates. Consequently, reliability and redundancy are key requirements in the treatment process design. Some of these considerations can be outlined as follows:

1. The treatment facility requires continuous monitoring with alarms providing warning for emergency conditions, which typically include at least power failure, high flow, aeration failure, disinfection failure, and disposal failure. These alarms will use a notification tree to individuals for appropriate responses.
2. Emergency power is usually provided through a standby generator with an automatic transfer switch with sufficient capacity to start and operate all required treatment and disposal components. The alarm and notification system will have an additional battery backup provision.
3. All treatment components shall have at least two units, with one unit capable of treating the design flow when one unit is out of service.
4. Flow equalization is required where influent flows may have peak rates exceeding the design capacity of the MBR process.
5. Emergency storage for at least 24-hours of influent flow is needed in the event the treatment process fails, or diversion to an alternate treatment facility provided.
6. Additional emergency storage of the treated effluent is required should the reuse/disposal facility fail or become unavailable, or an alternate disposal system provided.

A wide variety of reuse options for reclaimed water are described in the literature. Many uses are only seasonal and may not be suitable for Port Orchard. Some of the reuse opportunities that may be applicable to at least parts of the City system are briefly described as follows:

- Commercial uses can include water features or fountains, street cleaning, dust control, fire protection, as well as toilet and urinal flushing. Some of these uses can be designed into new structures, though they are often not cost-effective as retrofitting or remodeling.
- Industrial applications can include ship ballast, washing aggregate, making concrete, industrial cooling, and process water. Such uses may appear in the future though no immediate demands are known to exist.
- Irrigation can be provided for landscaping, golf courses, and agricultural produce; however, the application of water has to be at the agronomic rate suitable to the crop and growing season. This usually mean irrigation can only occur seasonally, and is not suitable during the winter, wet season when wastewater flows are generally largest and disposal needs are greatest.
- Stream augmentation is currently provided by the City using potable water at several locations within the sewer service area. These demands could be met with reclaimed water, though the requirement only exists during summer, low flow conditions. However, it may be feasible and acceptable to augment stream flows year-round if a beneficial use can be substantiated.
- Percolation to groundwater can be used through a surface application such as a percolation basin, drainfield, drip irrigation, or similar technology; provided the water quality protects meets the state drinking water contaminant criteria as measured in groundwater beneath or down gradient of the recharge location.

- Wetlands can be constructed to receive reclaimed water, and natural wetlands other than Category I or salt water can be used, provided beneficial use is demonstrated. The hydraulic loading can not exceed 2 centimeters per day (cm/day) for Category II or 3 cm/day for Category II and IV. The vegetation must be protected so the water level can not be increased more than 10 cm above average.

Class A reclaimed water facilities are required to meet various setback distances. Reclaimed water pipelines must be at least 50 feet from a potable well. A wetland or unlined reclaimed water storage pond must be at least 500 feet from a potable well unless the impoundment is sealed, in which case 100 feet of setback is required.

Several opportunities exist in and around Port Orchard where satellite treatment facilities may be appropriate. Three of these are briefly described below:

1. McCormick Woods, either within the existing developments or the proposed McCormick West, could have a satellite treatment facility with the reclaimed water used for irrigation of the existing golf course or similar sites, augmentation of Anderson Creek or other streams, or flow through various existing wetlands.

2. Stetson Heights and other existing or proposed developments near the Sedgwick Road interchange with SR 16 could produce reclaimed water for augmentation of Blackjack Creek or through several existing wetlands.

3. SKIA offers several possibilities for reclaimed water. As an industrial area, commercial and/or industrial applications may be created. Stream augmentation is possible. There are wetlands that may be suitable. The airfield has extensive open space that may be suitable for percolation year-round.

Site requirements for an MBR facility are modest for just the treatment facilities, depending primarily on the design flow volume, the peak flow management, and the maintenance facilities to be included at the site. The area required for disposal is more variable and depends on the reuse concept employed, local soils, and the flow volumes.

7.6 Conveyance Improvement Priorities

The magnitude of difference between 'Existing Capacity' and 'Capacity Required in 2025' as shown in Tables 7-2 and 7-3 is an approximate indicator of the urgency as to when these existing conveyance upgrades will needed. The indicated priorities for pipe improvements are approximately as follows:

1.	Trunk H	in Tremont Street	Need 2.2 x existing capacity
2.	Trunk E	in ravine Pottery to Tremont	Need 2.1 x existing capacity
3.	Trunk G	in Pottery/Sidney Avenue	Need 2.0 x existing capacity

Improvements are also required to at least three pump stations as indicated in Table 7-3. A similar indication of priority can be assembled as shown below:

1. McCormick Woods PS 2 Need 1.8 x existing capacity
2. Marina Pump Station Need 1.2 x existing capacity
3. McCormick Woods PS 1 Need 1.1 x existing capacity

Section 6.2 outlined the principal deficiencies for these pump stations and described the recommended improvements, except for the recommended pumping capacities.

7.7 Proposed Interception Improvements

The three trunk alignments indicated in Tables 7-2 and 7-3 as needing to be upgraded before the year 2025, can be addressed as summarized below:

- Trunk H extends east in Tremont Street from the McCormick Woods Pump Station No 1 force main under SR 16 on east to Port Orchard Boulevard and Trunk D. No real alignment alternative exists. Capacity can be increased in either of two ways:
  - The existing pipe can be pipe burst to achieve the desired new diameter
  - A new pipe can be installed in a new trench, which allows service to continue in the existing pipe.

- Trunk E extends south from the Port Orchard Boulevard intersection with Tremont Street up the creek and wetlands to Pottery Avenue and thence south to Fireweed Street. The wetlands make reconstruction by any method along the existing alignment questionable as to obtaining environmental permits. A more realistic approach to adding capacity may be to construct a new pump station on Pottery Avenue at Lippert Drive with the force main extending north in Pottery Avenue to join Trunk H in Tremont Avenue.

- Trunk G is in Sidney Avenue north from Sedgwick Road until it becomes Pottery Avenue thence to Lippert Drive. No real alignment alternative exists. Capacity can be increased in either of two ways:
  - The existing pipe can be pipe burst to achieve the desired new diameter
  - A new pipe can be installed in a new trench, which allows service to continue in the existing pipe.

The alternative approach for managing capacity in these trunks and the associated pump stations would build satellite MBR facilities for McCormick Woods and/or near the Sidney/Sedgwick intersection. Table 5-6 and 5-7 indicate the potential reductions in trunk sewer flows, and the approximate treatment capacities needed, as restated in Table 7-4.

Table 7-4
Potential Satellite Treatment Facilities
Capacities in Millions of Gallons per Day

Parameters	SKIA	McCormick	Sidney-Sedgwick	Totals
2025 Average Day	1.20	0.16	0.34	1.70
Average Day Max Month	1.56	0.21	0.44	2.21
Peak Hour	2.90	0.78	1.37	5.05

Build-out Average Day	1.50	0.23	0.35	2.08
Average Day Max Month	2.00	0.30	0.46	2.76
Peak Hour	4.00	1.16	1.42	6.58
MBR Design Flow (in 2020)	1.00	0.22	0.45	1.67

Projected build-out flows not available for SKIA. The values shown in Table 7-4 are assumed.

Table 7-4 indicates that satellite treatment facilities could remove about 5.0 MGD of peak hour flow from the rest of the City sewer system for 2025. That exclusion would reduce the need to add capacity to trunk piping, the pump stations, and the Karcher Creek treatment facility. The reclaimed water from these satellite treatment facilities could possibly be used during dry weather periods for the options discussed in Section 7.5. However, the peak flows to these satellite treatment facilities will occur during wet weather periods when discharge using the options in Section 7.5 would be limited. Only the SKIA MBR facility is likely to show direct cost benefits. However, there are other considerations that may make the McCormick Woods and/or the Sidney-Sedgwick facilities attractive.

Washington State now requires reuse of wastewater be considered in all general sewer plans. However, implementation of an MBR treatment facility would be a major change in the operation of the City sewer utility. The technology is well-proven; however, there are a number of issues to be resolved besides just the capital cost comparisons. Some of these are outlined below:

- Acceptance of reclaimed water at the golf course
- Rate structure to pay the cost of operating the MBR facility
- Revisions to the City agreement with the Sewer District regarding wastewater treatment capacity and operations

These are issues that can be resolved during the next several years while the more immediate needs are implemented through the six-year capital improvement program.

8. RECOMMENDED IMPROVEMENTS

8.1 Six-Year Capital Improvement Program

Section 7.6 indicates that three sewer trunks may need at least double the existing capacity before the year 2025. Three major pump stations need at least rehabilitation and some capacity increase. Some of these improvements need to be addressed in the six-year capital improvement program (CIP) to be completed by about the year 2014.

These CIP decisions necessarily mean decisions should also be made regarding future wastewater management for the SKIA. Actual development planned for the SKIA is only conceptual at this point. It is not prudent for the City of Port Orchard to invest in capital improvements that may not be needed in the foreseeable future. This is particularly true since a satellite wastewater treatment facility using some form of land application within the SKIA-Airport property is almost certainly more environmentally responsible and cost-effective.

An MBR treatment and reuse facility for the SKIA would require capacity based on the average day during the maximum month of the design year, which is usually about 1.3 multiplied by the annual average day. Table 7-4 indicates that about 2,000,000 GPD for the average day of the maximum month may eventually be needed. Specific satellite treatment capacity would be made through a Facilities Plan for the SKIA to be provided in modular units bought and installed as flows increase. However, projections shown in the SKIA Plan indicate that the existing on-site treatment and disposal system will be adequate for at least 10 to 15 years. When additional capacity is needed; an improved on-site or satellite facility can be developed. It may be that a modest pump station with a force main to the City trunk in Old Clifton Road will eventually be cost-effective for movement of leachate and sludge.

Required increases in the capacities of other City facilities can be further minimized if satellite treatment facilities are built for McCormick Woods and/or Sidney-Sedgwick. However, in addition to the direct comparison of project costs, several other considerations deserve attention:

- Irrigation of the golf course currently uses water from a well that could become a potable water source, which has a significant dollar value.
- Below market interest rate loans or even grants may be available to implement water reuse facilities, so the funding availability would affect the life cycle cost comparison.
- At some point, additional treatment capacity would be required at the Karcher Creek treatment facility in lieu of the MBR at McCormick Woods.
- The ‘green’ image created through water reuse at the golf course has some value to the City of Port Orchard, and some environmental value in reducing discharge of secondary effluent into Sinclair Inlet, which may help relations with Tribes and other groups.

A facilities plan in accordance with the State Revolving Fund (SRF) checklist will be the appropriate method to develop the decision and preliminary design for these MBR treatment facilities and the Class A water reuse systems. An expanded SEPA Checklist may provide adequate environmental review for these projects.

Some additional property rights will be needed for the Pottery Pump Station, the MBR facility, the SKIA percolation site, and the McCormick irrigation site within the privately owned golf course. The actual sites for these facilities have not been established. Specific locations will affect facilities like force main lengths and pumping horsepower required, so only opinions are currently available. These details should be resolved through preparation of engineering reports for the specific projects that leads to preliminary design and SEPA once the implementation timing is defined.

Subject to the above assumptions, Table 8-1 summarizes the projects that appear to require action in the immediate future.

Table 8-1
Capital Improvement Program

Project	Improvement	Description	Construction Cost Estimate	Project Cost Estimate
A	Bay Street PS (09 budget)	Engineering Construction	$ ---------- 1,000,000	$ 250,000 1,100,000
B	Trunk H – Engr Report	Preliminary design	----------	20,000
C	Interim McC PS 2 Improv	Odor, mech & elect	180,000	200,000
D	Marina PS Engr Report	Preliminary design	----------	50,000
E	Trunk H –Tremont	1,00 LF x 24-inch	$ 500,000	$ 650,000
F	Marina Pump Station	5,000 GPM x 150 HP	1,740,000	2,100,000
G	Pottery PS Engr Report	Preliminary design	----------	20,000
H	Trunk E: Pottery PS Force Main	1,300 GPM x 50 HP 2,500 LF x 12-inch	1,300,000 400,000	1,600,000 500,000
I	Sidney-Sedgwick PS	Preliminary Design	----------	20,000
J	Sidney-Sedgwick PS	Construct PS & FM	850,000	1,000,000
K	McC PS 1 Engr Report	Preliminary design	----------	25,000
L	McCormick PS 1	2,000 GPM x 120 HP	680,000	820,000
M	Trunk G - Sidney Av	7,000 LF x 15-inch	2,510,000	3,060,000
N	McC PS 2 Engr Report	Preliminary design	----------	25,000
O	McCormick PS 2	1,400 GPM x 50 HP	630,000	740,000
P	SKIA Facilities Plan	MBR, PS, & FM	----------	100,000
Q	SKIA – Pump Station Force Main	310 GPM x 25 HP 13,000 LF x 8-inch	360,000 1,470,000	430,000 1,800,000
R	Tremont Place PS	Mechanical & elect	120,000	140,000
S	I/I Exist Pipe Rehab	$25,000 annually	150,000	150,000
	Estimated Total	----------	$ 11,890,000	$ 14,800,000

Our opinion of construction costs as shown in Table 8-1 are based on recent construction bids in the Puget Sound area for similar work, including state sales tax and contingencies for 2008 prices. However, the facilities described are only developed in a cursory manner and may change when more detailed engineering is performed.

Similarly, our opinion of project costs include engineering design, construction oversight,

property acquisitions, permit applications, environmental review, and project contingencies. These costs will be revised as the project specific requirements become better defined through the engineering reports. Financing costs are not included as these costs depend on the financing program actually adopted.

Improvements listed in Table 8-1 fall into two categories: Some are dependent on new development to drive the capacity increase and for those developments to provide the funding. The remaining improvements are needed to existing facilities, and are the financial responsibility of the City.

A series of engineering reports and one facilities plan are shown in Table 8-1. These documents would develop preliminary designs for the relevant facilities to verify that the capacities identified in the General Sewer Plan are appropriate for the time frame envisioned when construction is expected. This is a particular concern regarding the SKIA facilities where projected 2017 employment is rather large and the wastewater volume projected is larger than typical for such employment. These large projections affect capacity planning for downstream facilities including both McCormick Woods pump stations and the Marina pump station, plus the wastewater treatment facility. Facilities along Pottery and Sidney Avenues are also dependent on specific development plans. It is appropriate that the City prepare these engineering documents in advance of when the actual facilities may be needed so the designs are coordinated and funding can be secured, either from the property owners/developers or from other sources.

Accordingly, the improvements shown in Table 8-1 can be reorganized and numbered as shown in Table 8-2 to identify facilities that will be funded by the City-funded under some priority.

Table 8-2
Funding of Capital Improvements

Project	Improvement	Construction Cost Estimate	Project Cost Estimate
1	Bay Street Pump Station Improve	$ 1,000,000	$ 1,350,000
2	McCormick PS 2 Interim Improve	180,000	200,000
3	Trunk H – Engineering Report	----------	20,000
4	Trunk H – Construct -Tremont Widening	500,000	650,000
5	Marina PS Engineering Report	----------	50,000
6	Marina PS Improvements	1,740,000	2,100,000
7	Pottery PS – Engineering Report	----------	20,000
8	Pottery Pump Station & Force main	1,700,000	12,100,000
9	Sidney-Sedgwick PS – Engineer Report	----------	20,000
10	Sidney-Sedgwick PS & FM Const	850,000	1,000,000
11	McCormick PS 1 – Engineer Report	----------	25,000
12	McCormick PS1 - Construction	680,000	820,000
14	McCormick PS 2 – Engineer Report	----------	25,000
15	McCormick PS 2 – Construction	630,000	740,000
16	Existing Pipe Rehabilitation	150,000	150,000
	Estimated City Total	$ 7,430,000	$ 9,270,000

Additional improvements required as development occurs will be funded as an integral part of those projects under a less definite time frame. Some further sewer extensions from the existing system will also be required to serve specific parcels within the various developments. These extensions are not included in the CIP and can not be identified until the development plan actually materializes, which may occur in several phases.

The City-funded improvements required by 2014 are organized into a six-year capital improvement program as shown in Table 8-3.

Table 8-3
Six-Year Capital Improvement Program

Improvement	Annual Funding in $ 000						
	2009	2010	2011	2012	2013	2014	Total
1-Bay Street PS		250	1,100				1,350
2-McCorm 2 Interim	20	180					200
3-Trunk H Eng Rep	20						20
4 Trunk H Construct	50	600					650
5-Marina PS Eng Rep		50					50
6-Marina PS Improve			200	1,900			2,100
7-Pottery Eng Rep						20	20
9-Sidney PS Eng Rep	20						20
10-McCorm 1 Eng R			25				25
11-McCormick 1 PS				100	720		820
12-McCorm 2 Eng R				25			25
13-McCorm 2 Const					240	500	740
14-Ex Pipe Rehab	25	25	25	25	25	25	150
Totals	135	1,805	1,350	2,050	985	545	6,170
Escalated Totals	135	1,149	1,460	2,306	1,152	663	6,865

Estimated costs shown in Table 8-3 are shown in current 2009 dollars; then escalated at 4 percent annually to provide appropriate budget information.

8.2 Planned Facilities for Build-out Conditions

Tables 7-1 and 7-1 indicate the capacities needed to accommodate projected peak hour wastewater flow under build-out conditions based on the urban growth area as presently defined and the established land use densities. Conveyance facilities to be built under the six-year CIP or other programs should adhere to these capacity requirements unless different requirements are established in future land use plans or development agreements.

8.3 Sewer Extensions into Undeveloped Basins

New sewer extension will be needed to serve developments envisioned for several basins in and adjacent to McCormick Woods as shown on Figure 5-2. Specific plans for the sewer extensions

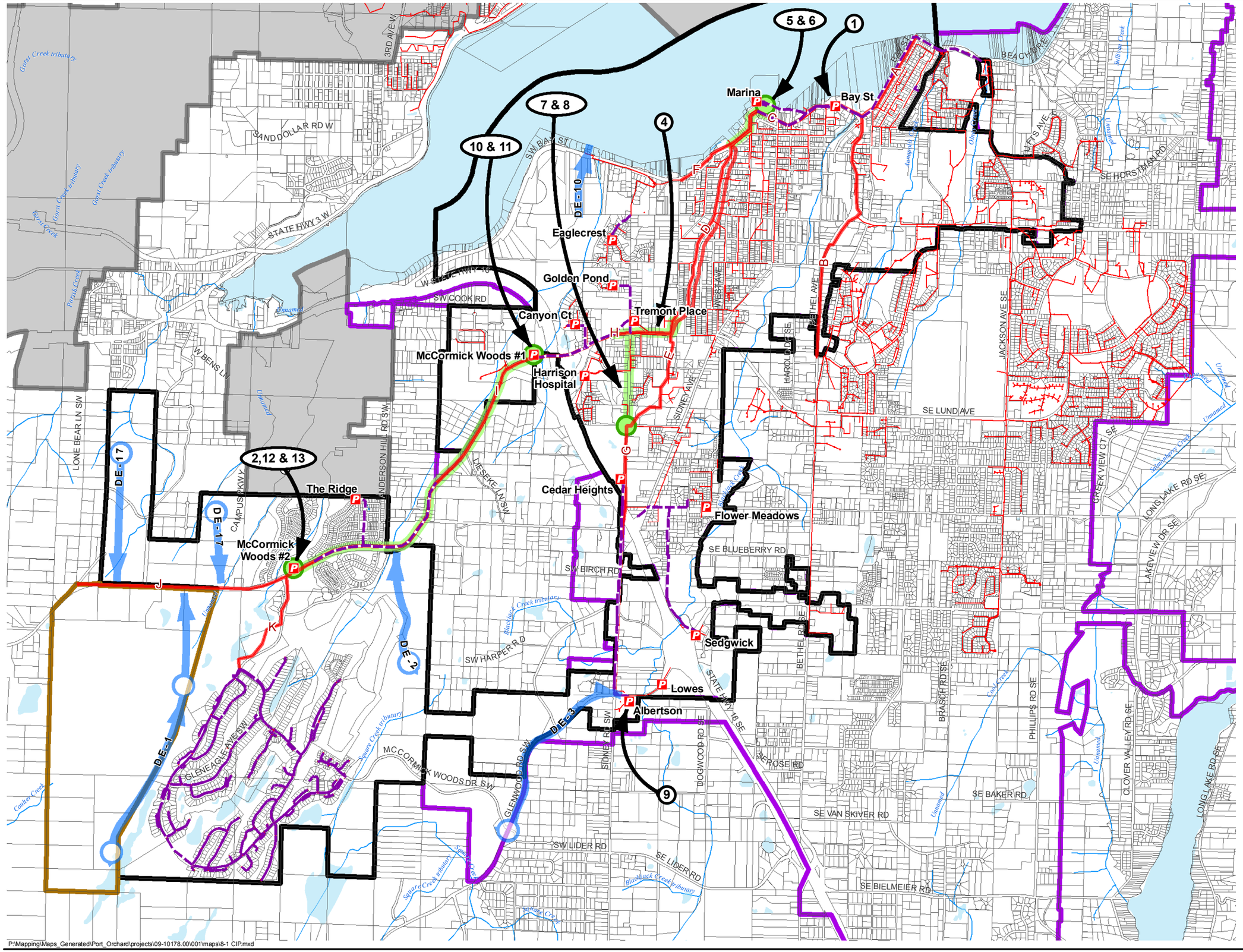
have not been prepared and will be the responsibility of the developer. Some of the developments shown will require local pump stations.

Specific plans for the development of the SKIA also remain to be prepared. Developments within the SKIA are intended to occur in phases over a number of years. This phasing scheme and local economic conditions may cause some adjustment to the sewer improvements planned by the City to serve these parcels.

Major land developers will be preparing site-specific plans for street layouts, residential lot distribution, commercial parcels, sensitive area delineations, required setbacks with buffers, and other land use intentions for approval by the permitting authorities. These land use decisions, and the timing of when specific parcels are developed will influence the sewer collection facilities within these basins. Some basins may use traditional gravity sewers, perhaps supplemented by one or more local pump stations, as has been the case for Basins 15 and 16. Other basins may consider alternative, innovative collection systems such as E-1 grinder pumps for individual homes, or vacuum sewer systems. The City of Port Orchard has decided that no additional STEP units will be allowed. Any of these sewer collection technologies can be compatible with an MBR treatment facility and reuse of the water.

Basin 10 presents a different development challenge, and for the extension of sewers. Trunk F currently extends about 2,500 feet west in Bay Street from Port Orchard Boulevard. This sewer can be extended further by using a pump station. However, most of the properties fronting Bay Street have steep slopes and may not be suitable for development. More suitable sites exist on the plateau about 200 feet above sea level. These parcels are separated by the Ross Creek gorge from other developments with sewer service west of Pottery Avenue. Either an additional pump station will be needed for the plateau to transfer wastewater into Basin 7, or a sewer can be laid down the steep slope west of Ross Creek to connect into Trunk F. These decisions need to be made in association with the interests of the property owners some time before 2025, and may or may not involve participation by the City for over-sizing or late-comer financing.

Some coordination between the City and the West Sound Utility District will be required as properties are developed along the fringes of their two sewer service areas to establish which agency will serve which properties. These sewer extensions are not expected to require significant financial investment by the City.



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City of Port Orchard
WASHINGTON

Comprehensive Sanitary Sewer Plan Update

LEGEND

CAPITAL IMPROVEMENTS

- Pump Station
- Trunk Upgrade
- Developer Extensions & Pump Stations
- Improvement Number from Table 8-3

EXISTING SEWER SYSTEM

- Pump Station
- Sewer Gravity Trunks
- Sewer Force Mains
- Sewer Pipes

BASE MAP

- City of Port Orchard
- Port Orchard UGA
- Unincorporated Urban Growth Area
- City of Bremerton
- Parcels
- Water Bodies
- Rivers & Streams

1 inch = 2,500 feet

0 1,000 2,000 4,000 Feet

Data Sources: Kitsap County 2009
This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

MAP DATE: DECEMBER 13 2007; UPDATED NOVEMBER 2009

Capital Improvement Program

Figure 8-1

9. FINANCIAL IMPLICATIONS

9.1 Financial Situation

Sewerage operation and finances for the City of Port Orchard comprise two parts:

- Sewer collection and interception system – totally the responsibility of the City
- Wastewater treatment facilities – Joint Partnership with West Sound Utility District

The Joint Partnership built the treatment facility using a utility local improvement district. Bonds for this construction have since been paid off. The Partnership continues to set the monthly rate per ERU for operating the treatment facility. An ERU is defined by the Partnership as 180 GPD. The Partnership has also established a Facilities Fee per ERU to pay for future capital improvements at the treatment facilities.

In addition to the Partnership fees, the City determines and collects an additional charge to operate and maintain the sewer collection system, the pump stations, and the transmission piping. An additional Facilities Fee is also collected from new connections to pay for capacity upgrades to the City sewer system.

9.2 Wastewater Funding Options

The identified capital improvements are divided between improvements needed to increase capacity, such as a new interceptor extension or enlarging an existing pipe. Facilities charges paid by new customers are a key funding source for these improvements.

Other improvements are needed simply to maintain the existing system, such as replacing mechanical or electrical equipment that is worn out. Corroded valves and piping replacement is another example. These costs are paid by existing customers through monthly service charges.

9.3 Sewer Rates

Chapter 13.04.020 of the City Code defines the present bimonthly sewer rates in effect. Sewer rates are defined for 19 customer classes. Class 1 being single-family residences, for example, which are billed $72.00 for two months of sewer service. Additional classes are defined for apartments, offices, various types of businesses, and public facilities with bimonthly sewer rates established for each class as a multiple or a fraction of the single-family rate. Several classes have defined sub-classes based on size (such as square feet or seating capacity) or by the inclusion particular services (such as a bakery or private kitchen).

9.4 Sewer Capital Facilities Charge

City Code Chapter 13.04.040 defines the Sewer Capital Facilities Charge as two components:

- General Facilities Fee $2,770.00 per ERU
- Wastewater Treatment Facility Fee $3,230.00 per ERU

Properties within Divisions 1 through 10 of the McCormick Woods Land Company are charged a Wastewater Treatment Fee of only $ 791.25, however.

These two charge components represent first, the capital costs of the general sewer facilities operated and maintained by the City; and second, the capital costs of those treatment facilities operated and maintained by the Partnership.

9.5 Financial Summary of Sewer Operations

Recent years have combined the financial accounting for water and sewer operations. Separate accounting has been maintained for revenues and direct operating expenses. Generally speaking, administrative expenses like management and billing are divided equally between the two utilities. Records for the past fives years are summarized in Table 9-1.

Table 9-1
Sewer Operations Financial Summary

OPERATING REVENUES	**2004**	**2005**	**2006**	**2007**	**2008**
Sewer Service – Flat Rate	1,326,830	1,572,023	1,845,635	1,923,341	1,479,138
Service to Public Municipalities	5,432	6,707	7,633	7,763	5,760
Sales to Public Authorities	118,553	134,873	153,573	148,023	100,894
Late Payment * Penalties*	12,387	13,959	14,613	16,044	15,326
TOTAL OPERATING REVENUE	1,463,202	1,727,562	2,021,454	2,095,170	1,601,118
OPERATING EXPENSES					
Power Purchased for Sewer Pumping	18,836	20,224	24,164	27,619	18,398
Labor & Expenses for Lift Stations	32,003	40,066	36,752	40,366	29,727
Maintain Pump Station Structures	256	444	10,360	1,923	615
Maintain Power Production Equipment	0	0	632	1,740	0
Maintain Pump Equipment	14,572	34,807	51,846	36,830	50,776
Chemicals – Sewage Treatment	16,740	11,634	11,860	14,416	1,012
Operations, Labor & Equipment – Sewage Treat	602,969	940,179	1,088,654	1,149,091	858,997
Maintenance Labor – Sewer Mains	43,453	54,615	71,166	195,173	129,697
Maintenance of Service	53,475	55,601	65,314	68,229	78,012
TOTAL OPERATING EXPENSES	782,304	1,157,570	1,360,748	1,535,388	1,167,234
CUSTOMER ACCOUNTS					
Customer Records & Collection Expense*	71,484	68,601	77,848	79,413	64,846
ADMINISTRATION/GENERAL EXPENSE*					
Administration & General Salaries	61,851	58,482	66,140	72,885	54,217
General Salaries – Clerical	42,531	59,063	64,485	90,387	84,480
Office Supplies & Other Expenses	10,744	14,793	13,669	16,905	11,475
Administrative Expense Transferred Overhead	(4,104)	(2,488)	(2,102)	(5,558)	(3,411)
Outside Services Employed	5,785	26,925	6,224	2,141	4,600
Property Insurance	17,157	13,702	14,725	16,339	13,150
Injury & Damages – Liability Insurance	25,736	20,553	22,087	24,508	19,725

	2004	2005	2006	2007	2008
Employee Pensions – Personnel Retirement	3,736	1,976	0	0	0
Employee Benefits – Vacation	11,017	14,560	13,462	18,139	12,918
Employee Benefits – Sick Leave	8,710	10,146	7,457	8,684	6,869
Employee Benefits – Holiday	9,597	7,441	7,777	8,647	6,367
Maintenance of General Plant	19,242	17,975	23,050	21,635	15,771
Transportation of Equipment Expense	10,876	11,215	15,515	13,298	15,723
TOTAL ADMIN/GENERAL EXPENSE*	222,878	254,343	252,489	288,010	241,883
TAXES – CITY & STATE					
City B&O Tax	72,419	84,219	100,267	103,390	85,409
State Excise Tax	19,685	17,020	20,749	27,706	21,859
TOTAL TAXES	92,104	101,239	121,016	131,096	107,267
TOTAL REVENUES	1,463,202	1,727,562	2,021,454	2,095,170	1,601,118
TOTAL EXPENSES/TAXES	1,168,770	1,581,754	1,812,101	2,033,906	1,581,230
OPERATING INCOME (LOSS)	294,432	145,808	209,352	61,264	19,889
DEPRECIATION EXPENSE	(239,238)	(266,080)	(229,137)	(233,898)	(175,424)
NET OPERATING INCOME (LOSS)	55,194	(120,272)	(19,784)	(172,634)	(155,535)

Note * Totals for these accounts reflect a split of 50% Water and 50% Sewer

Table 9-1 indicates that Total Revenue for the Sewer Utility exceeded Total Expenses & Taxes for the past five years. However, when Depreciation Expenses are included the sewer system has been operating at a loss.

An increase in Sewer Rates of about 10 to 12 percent has been needed for the past several years, according to Table 9-1.

9.6 Affect of CIP on Sewer Rates

Specific funding for the $14,800,000 Capital Improvement Program shown in Table 8-1 has not yet been established by the City. Some these improvements will be dependent upon developer or property owner funding. It is hoped that some of the $9,270,000 of City-funded improvements shown in Table 8-2 will be funded through the federal economic stimulus program, and some projects will not be needed within the next six years. It is anticipated that the remainder of the CIP cost will be funded in part through the General Facilities Fee with the rest financed by loans repaid through Sewer Rates. Table 8-3 shows the Capital Improvement Program being implemented over six years and the resulting cost escalation to become $6,865,000

Table 4-2 indicates that the City can anticipate adding an average of about 1 percent annually in population. A similar increase in ERU can be expected, or about 44 ERU annually. At the present General Facilities Fee, these additional ERU would generate about $730,000 during the six year of the proposed CIP. As part of the general increase in the capital valuation of the City sewerage facilities, an increase the General Facilities Fee of $500 is assumed realistic, which would generate an additional $130,000 during the six-year period of the CIP. Therefore funding generated by the General Facilities Fee is estimated to total about $860,000.

Accordingly, the anticipated funding for the City portion of the CIP can be summarized as follows:

Federal Economic Stimulus	$1,000,000
General Facilities Fee	860,000
Debt Funded through Rates	5,005,000
Total City-funded CIP	$6,865,000

A single bond issue for $5,005,000 to fund the CIP may carry a municipal interest rate of about 4 percent over a maturity of 20 years. The resulting capital recovery factor of 0.07358 would cost about $368,000 annually. For the approximately 4,500 existing customer ERU, the increased cost would be about $6.80 monthly, or an impact of about $13.60 for the bimonthly sewer bill.

Appendix A
SEPA Checklist

CITY OF PORT ORCHARD
PLANNING DEPARTMENT
DETERMINATION OF NON-SIGNIFICANCE (DNS)

DESCRIPTION OF PROPOSAL: Adoption of the 2009 update to Port Orchard Comprehensive Plan, Capital Facilities Plan Element: Wastewater Capital Facilities Plan.

PROPONENT: City of Port Orchard, Planning Department
216 Prospect Street
Port Orchard, WA 98366

LOCATION OF PROPOSAL: City Service Areas

LEAD AGENCY: City of Port Orchard, Planning Department

SEPA OFFICIAL: James Weaver, Development Director
216 Prospect Street
Port Orchard, WA 98366
(360) 876-4991

DETERMINATION: The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21 C.030(2)(c). The decision was made after review of a completed environmental checklist and other information on file with the lead agency. This Information is available to the public on request.

The DNS is issued pursuant to WAC 197-11-340(2)(a)(v); the lead agency will not act on this proposal for 14 days from the date of issue.

NOTE: The issuance of this DNS does not constitute project approval. The applicant must comply with all other applicable requirements of the City of Port Orchard and the State of Washington.

DATE OF ISSUE: **October 16, 2008**

COMMENT DEADLINE: **October 30, 2008**

James R. Weaver, AICP, City Development Director

October 16, 2009
Date

APPEAL PERIOD: Pursuant to RCW 43.21C, any person wishing to appeal this determination may file such an appeal within fourteen (14) days from the date of issuance of this DNS. You should be prepared to make specific factual objections. There is a $250 fee to appeal this determination.

ENVIRONMENTAL CHECKLIST

SEPA RULES

RCW 197-11-960 ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable:
City of Port Orchard - 2009 Comprehensive Sanitary Sewer Plan Update

2. Name of applicant:
City of Port Orchard Public Works Department

3. Address and phone number of applicant and contact person:
City of Port Orchard Public Works Department
216 Propsect Street
Port Orchard, WA 98366
(360) 876-4991
***Contact:* Mark R. Dorsey, P.E.**

4. Date checklist prepared:
September 25, 2009

5. Agency requesting checklist:
City of Port Orchard Planning Department
Washington State Department of Ecology

6. Proposed timing or schedule (including phasing, if applicable):
The proposed date for adoption of the 2009 Comprehensive Saintary Sewer Plan Update by the Port Orchard City Council is expected to be November 13, 2009.

7. Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.
This is a non-project action adopting the Comprehensive Sanitary Sewer Plan. In addition to the City's Comprehansive Sanitary Sewer Plan and the Capital Improvement Plan (CIP), incremental sanitary sewer facilities may be constructed in conjunction with private development, as they occur.

8. List any environmental information you know about that has been prepared, directly related to this proposal.
City of Port Orchard Comprehensive Plan Update, December 2008
City of Port Orchard 2009 Water System Plan Update (adoption pending)
City of Port Orchard 2000 Comprehensive Sewer Plan
City of Port Orchard SKIA Infrastructure Assessment & Technical Memorandum, July 2008
Kitsap County Comprehensive Plan Update, December 2006

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
Property owners and developers have, and are expected to apply for approval of development that will require sanitary sewer service. These developments are not addressed specifically in the Plan. The Plan provides for necessary public sewer collection and treatment improvements necessary to support such development in accordance with the Comprehensive Plan and development code. All project-level improvements will be subject to environmental review at the time of their application. No pending proposal will affect this non-project action.

10. List any governmental approvals or permits that will be needed for your proposal, if known.
The Plan must be approved by the Washington State Department of Ecology. Review by other jurisdictions and agencies include Kitsap County, West Sound Utility District, The City of Bremerton, the City of Port Orchard City Council, Kitsap County Health District and the State Department of Health.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description).
As needed for for demonstrating compliance with the Growth Management Act (GMA), this proposal involves adoption of amendments to the 2000 City of Port Orchard Comprehensive Sewer Plan. The amendments identify three categories of action:

<u>Programmatic</u> – Updating the Comprehensive Sewer Plan to address a revised 25-year population forecast for the urban growth area which has been expanded since the 2000 Plan. This will enable the City to address future needs for sanitary sewer service within the defined urban growth area.

<u>Capital Projects</u> – Updating the list of specific capital projects that are necessary to implement the Comprehensive Sewer Plan. These will be included in the Comprehensive Plan Capital Improvement Program Element. Subsequent project-level environmental review will be conducted at the time these projects are proposed for implementation.

<u>Operation, Maintenance& Repair</u> – Day-to-day and periodic projects necessary to maintain the current and future sewer system in working order are described in the Comprehensive Sewer Plan as further addressed in the sewer utility operations and maintenance standards and procedures.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur aver a range of area, provide the range or boundaries of the site(S). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The service area covered by the 2009 Comprehensive Sanitary Sewer Plan Update includes area within the current City of Port Orchard municipal limits and portions of the designated Urban Growth Area (UGA), which includes established boundaries of Kitsap County ULID #6, as agreed upon by Kitsap County, the City of Bremerton and the West Sound Utility District. Port Orchard is located on the Kitsap peninsula, south of Sinclair Inlet. The main body of Puget Sound is to the east.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep, slopes, mountainous, other.
The City of Port Orchard is characterized by shoreline adjacent to Sinclair Inlet. The topography is generally hilly with some flat areas.

b. What is the steepest slope on the site (approximate percent slope)?
There are steep slopes with in the City, however, this non-project action will not impact slopes generally, and any project proposed under this ordinance will be reviewed separately for SEPA compliance where required.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.
Soils and soil types are not generally impacted by this non-project action. An extensive discussion of the soils and their properties can be found in the *USDA Soil Survey of Kitsap County*.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.
Unstable soils and steep slopes will not generally be impacted by this non-project action. Separate site-specific review will determine impacts to soils and slopes and SEPA compliance.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.
No filling or grading is proposed as part of this non-project action. Fill or grading related to site-specific proposals under this ordinance will be reviewed separately for SEPA compliance.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
No clearing or construction is proposed as part of this non-project action.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?
No construction is proposed as part of this non-project action.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any?
No specific measures are proposed as part of this non-project action. Each project will be evaluated as part of site-specific project review for compliance with SEPA and other regulations in the Port Orchard Municipal Code.

2. **Air**

a. What types of emissions to the air would result from the proposal (i.e. dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if know.
This non-project action will have no impact on air quality. Air quality will be evaluated as part of site-specific project review and SEPA analysis.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
This non-project action will have no impact on air quality. Air quality will be evaluated as part of site-specific project review and SEPA analysis.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
This non-project action will have no impact on air quality. Air quality will be evaluated as part of site-specific project review and SEPA analysis.

3. **Water**

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds wetlands)/ If yes, describe type and provide names, if appropriate, state what stream or river it flows into.
Port Orchard is bordered on the north by the waters of Puget Sound. There are numerous wetlands, streams and creeks. Impacts on shoreline, surface water, seasonal streams and wetlands will be evaluated as part of site-specific project review and SEPA analysis.

2) Will the project require any work over, in or adjacent to (within 200 feet) the described water? If yes, please describe and attach available plans.
This non-project action will not require any work over, in or adjacent to these waters. Impacts on wetlands, surface water, seasonal streams and shoreline will be evaluated as part of site-specific project review and SEPA analysis.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
This non-project action will not require any filling or dredging. Impacts as a result of filling or dredging will be evaluated as part of site-specific project review and SEPA analysis.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.
This non-project action will not require any surface water withdrawals or diversions. The proposed permit, policy, and ordinances will provide additional protection for all water bodies. Impacts of this type will be evaluated as part of site-specific project review and SEPA analysis

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
Some areas of the City are identified as lying within the 100-year flood plain (as defined in the Federal Flood Disaster Protection Act of 1973.) This non-project action does not impact flood areas specifically. Any proposal involving flood areas will comply with Chapter 15.38, *Flood Damage Prevention,* of the Port Orchard Municipal Code and will be evaluated as part of site-specific review and SEPA analysis.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.
This non-project action will not require discharge of materials to surface waters. The proposed ordinance will prohibit the discharges of water materials and provide additional protection for all water bodies. Impacts of this type will be evaluated as part of site-specific project review and SEPA analysis

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.
This non-project action will not require any withdrawal of groundwater or discharge to groundwater. Impacts of this type will be evaluated as part of site-specific project review and SEPA analysis.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial, containing the following chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.
This non-project action will not require any discharge of waste material to groundwater. Existing health regulations control the location, type and density of development which utilizes septic tanks.

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if know). Where will this water flow? Will this water flow into other waters? If so, describe.
This non-project action will not impact surface and stormwater. Stormwater flow and outfall will be evaluated as part of site-specific project review and SEPA analysis

2) Could waste materials enter ground or surface waters? If so, generally describe.
This non-project action will not impact ground or surface waters and the goals to minimize the effects of discharge of waste materials. Possible contamination of ground or surface waters with waste materials will be evaluated as part of site-specific project review and SEPA analysis.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:
This non-project action will not have a effect on surface, ground or runoff waters. Possible impacts surface, ground, and runoff water impacts will be evaluated as part of site-specific project review and SEPA analysis.

4. Plants

a. Check or circle types of vegetation found on the site:

- ✔ **deciduous tree: alder, maple, aspen, other**
- ✔ **evergreen tree: fir, cedar, pine, other**
- ✔ **shrubs**
- ✔ **grass**
- ✔ **pasture**
- ✔ **crop or grain**

  wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
  water plants: water lily, eelgrass, milfoil, other
- ✔ **other types of vegetation**

b. What kind and amount of vegetation will be removed or altered?
This non-project action will have no effect on vegetation removal or alteration. Vegetation removal and enhancement will be evaluated as part of site-specific project review and SEPA analysis

c. List threatened or endangered species known to be on or near the site.
This non-project action will have no impact on threatened or endangered species. Flora will be evaluated as part of site-specific project review and SEPA analysis.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
No landscaping is proposed as part of this non-project action. Open space and planting regulations will be evaluated as part of site-specific project review and SEPA analysis

5. Animals

a. Underline any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: **hawk, heron, eagle, songbirds, other**
mammals: **deer, bear,** elk, **beaver, other: sea lion, raccoon**
fish: **bass, salmon, trout, herring, shellfish, other**

b. List threatened or endangered species known to be on or near the site.
This non-project action will not have an effect on wildlife. Effects of proposals on wildlife will be evaluated as part of site-specific project review and SEPA analysis.

c. Is the site part of a migration route? If so, explain.
Puget Sound, including Port Orchard, is an important nesting place, feeding area, and wintering ground for thousands of birds in the Pacific Flyway. This non-project action will have no effect on migration patterns. Effects on wildlife will be evaluated as part of site-specific project review and SEPA analysis

d. Proposed measures to preserve or enhance wildlife, if any.
This non-project action will not have an effect on animals or birds. Effects of individual proposals on wildlife will be evaluated as part of site-specific project review and SEPA analysis.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
No energy is required for this non-project action. Energy consumption will be evaluated as part of site-specific project review and SEPA analysis and in accordance with the Washington State Energy Code which the City has adopted.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
This non-project action will have no effect on solar access. Solar access will be evaluated as part of site-specific project review and SEPA analysis.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:
None. The City uses the Washington State Energy Code to enhance electricity conservation. Energy conservation features will be evaluated as part of site-specific project review and SEPA analysis.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill or hazardous waste, that could occur as a result of this proposal? If so, describe.
This non-project action not effect threats of environmental health hazards. Environmental health hazards will be evaluated as part of site-specific project review and SEPA analysis.

1) Describe special emergency services that might be required.
No special emergency measures will be required as part of this non-project action.

2) Proposed measures to reduce or control environmental health hazards, if any:
No measures to reduce or control environmental health hazards are necessary as part of this non-project action.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
Noise levels in Port Orchard are regulated under Chapter 9.24 *(Offenses Against Public Order)* of the Port Orchard Municipal Code. This non-project action will not be affected by noise levels.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.
This non-project action will have no effect on noise levels. Noise impacts of individual proposals will be evaluated as part of site-specific project review and SEPA analysis.

3) Proposed measures to reduce or control noise impacts, if any:
Noise levels on Port Orchard are regulated under Chapter 9.24 *(Offenses Against Public Order)* of the Port Orchard Municipal Code.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?
Land uses in Port Orchard are primarily residential and commercial, with some industrial, light Manufacturing, recreation, and open space.

b. Has the site been used for agriculture? If so, describe.
Not applicable.

c. Describe any structures on the site.
The proposal is a non-project action, and includes no specific development activity. Therefore there are no structures associated with the proposal.

d. Will any structures be demolished? If so, what?
This non-project action requires no demolition. Any future proposed demolition will be evaluated as part of site-specific project review and SEPA analysis.

e. What is the current zoning classification of the site?
Zoning in Port Orchard is according to the Official Zoning Map, adopted December 9, 2008, which is available at the Department of Planning and Community Development.

f. What is the current comprehensive plan designation of the site?
Comprehensive Plan designations are according to the Comprehensive Plan Land Use Map, adopted December 9, 2008, in accordance with GMA requirements. The Land Use Map is available at the Department of Planning and Community Development.

g. If applicable, what is the current shoreline master program designation of the site?
Not applicable.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
Environmentally sensitive areas in Port Orchard include wetlands, aquifer recharge areas, geologically hazardous areas, continuous and seasonal streams and waters including the waters of Puget Sound, and fish and wildlife habitat. These areas are inventoried in the City's Comprehensive Plan and are regulated under Chapter 14.04, *State Environmental Policy Act,* of the Port Orchard Municipal Code. Environmentally sensitive areas will be evaluated as part of site-specific project review and SEPA analysis.

i. Approximately how many people would reside or work in the completed project?
Not applicable to this non-project action.

j. Approximately how many people would the completed project displace?
Not applicable to this non-project action.

k. Proposed measures to avoid or reduce displacement impacts, if any:
Not applicable to this non-project action.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
This non-project action will have no effect on existing and projected land uses and plans.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
Not applicable to this non-project action.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
No units will be eliminated by the non-project action.

c. Proposed measures to reduce or control housing impacts, if any:
None

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
This non-project action has no effect on building and structure height. Building and structure height are regulated in the Zoning Code.

b. What views in the immediate vicinity would be altered or obstructed?
This non-project action will have no impact on views. View alteration and obstruction is regulated by the Zoning Code and the Shoreline Management Master Program. Views will be evaluated as part of site-specific project review and SEPA analysis.

c. Proposed measures to reduce or control aesthetic impacts, if any:
None

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
This non-project action will not produce any light and/or glare. Light and glare will be evaluated as part of site-specific project review and SEPA analysis.

b. Could light or glare from the finished project be a safety hazard or interfere with views?
This non-project action will not produce any light and/or glare. Light and glare will be evaluated as part of site-specific project review and SEPA analysis.

c. What existing off-site sources of light or glare may affect your proposal?
This non-project action will not be affected by any off-site source of light or glare. Off-site sources of light and glare will be evaluated as part of site-specific project review and SEPA analysis.

d. Proposed measures to reduce or control light and glare impacts, if any:
None

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?
Not applicable to this non-project action.

b. Would the proposed project displace any existing recreational uses? If so, describe.
This non-project action will not displace any existing recreational uses.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
None

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.
Archeological and historic resources are recorded at the State of Washington Departments of Community, Trade and Economic Development, Office of Archeology and Historic Preservation.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.
A map and listing of all the historic resources is available at the Department of Planning and Community Development, 216 Prospect Street, Port Orchard, WA. 98366.

c. Proposed measures to reduce or control impacts, if any.
None

14. Transportation

a. Identify public streets and highway serving the site, and describe proposed access to the existing street system. Show on site plans, if any.
State Route 16 connects the City with the balance of the Kitsap Peninsula. The City has an extensive system of arterials, suburban and local public streets. Location of, and access to, public streets and highways will be evaluated as part of site-specific project review and SEPA analysis

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?
The City is served by Kitsap Transit. Kitsap Transit operates a commuter system which is coordinated with the ferry schedules in neighboring communities in addition to a dial-a-ride service.

c. How many parking spaces would the completed project have? How many would the project eliminate?
This is a non-project action. Parking requirements are contained in Chapter 16.45, *Parking Standards*, of the Port Orchard Municipal Code.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).
This non-project action will not create the need for any new or improved streets. Transportation facilities will be evaluated as part of site-specific project review and SEPA analysis.

e. Will the project use or occur in the immediate vicinity of water, rail or air transportation? If so, generally describe.
The various modes of transportation will be evaluated as part of site-specific project review and SEPA analysis.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.
This non-project action will have no direct impact on vehicular trips. Trip generation and the cumulative impact will be evaluated as part of site-specific project review and SEPA analysis.

g. Proposed measures to reduce or control transportation impacts, if any:
This non-project action will have no direct impact on transportation. Transportation impacts will be evaluated as part of site-specific project review and SEPA analysis.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? Is so, generally describe.

This non-project action will have little effect on public services, except as would normally be required for individual proposals. The need for public services will be evaluated as part of site-specific project review and SEPA analysis.

b. Proposed measures to reduce or control direct impacts on public services, if any.
This non-project action will have no effect on public services.

16. Utilities

a. Circle utilities currently available at the site: **electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system,** other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.
This non-project action will not directly affect public utilities. The provision of utilities for individual proposals will be evaluated as part of site-specific project review and SEPA analysis.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them it make its decision.

Signature: _____

Date Submitted June 3, 2009

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS
(Do not use this sheet for project actions.)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?
This non-project action will have no effect on discharges to water bodies. No negative impacts will occur in terms of emissions to air; production or storage of toxic or hazardous substances; or production of noise

Proposed measures to avoid or reduce such increases are:
Effects on discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise will be reviewed as part of site-specific review and SEPA analysis.

2. How would the proposal be likely to affect plants, animals, fish or marine life?
This non-project action will have no effects to plants, animals, fish or marine life. All specific effects to plant, animal, fish and other marine life will be evaluated as part of site-specific project review and SEPA analysis.

Proposed measures to protect or conserve plants, animals, fish,
or marine life are:
Effects of individual proposals on wildlife and marine life will be reviewed as part of site-specific review, and SEPA analysis.

3. How would the proposal be likely to deplete energy or natural resources?
This non-project action will not affect energy or natural resources. Effects of individual proposals on energy or natural resources will be reviewed as part of site-specific review, and SEPA analysis

Proposed measures to protect or conserve energy and natural resources are:
Construction of individual projects is reviewed under the Washington State Energy Code, adopted under Chapter 15 of the Port Orchard Municipal Code

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection, such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?
This non-project action not impact environmentally sensitive areas or other areas designated for protection. Effects of individual proposals on environmentally sensitive areas or other protected areas will be reviewed as part of site-specific review, and SEPA analysis.

Proposed measures to protect such resources or to avoid or reduce impacts are:
Impacts of individual proposals on environmentally sensitive areas or other protected areas will be reviewed as part of site-specific review, and SEPA analysis.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?
This non-project action will not affect land or shoreline use. Impacts of individual proposals on land or shoreline use will be reviewed as part of site-specific review, and SEPA analysis.

Proposed measures to avoid or reduce shoreline and land use impacts are:
Impacts of individual proposals on land or shoreline use will be reviewed as part of site-specific review, and SEPA analysis.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?
This non-project action will have no effect on the demand for transportation or public service and utilities.

Proposed measures to reduce or respond to such demand(s) are:
None. Projects approved under this ordinance are subject to review by the City Planning Department, Public Works Department, and the local Health District.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws requirements for the protection of the environment.
The non-project proposal is consistent with all local, state and federal requirements for the protection of the environment.

Appendix B
Public Hearing

City of Port Orchard
Council Meeting Minutes
Regular Meeting of November 24, 2009

1. CALL TO ORDER AND ROLL CALL

Mayor Lary Coppola called the meeting to order at 7:00 p.m. Councilmembers Fred Chang, Jerry Childs, John Clauson, Jim Colebank, Fred Olin, and Rob Putaansuu was present and constituted a quorum. Staff present: Public Works Director Mark Dorsey, Assistant City Engineer Archer, Development Director Weaver, City Treasurer Martin, Associate Planner Bonsell, City Clerk Patti Kirkpatrick, Deputy Clerk Brandy Rinearson, and Assistant City Attorney Forbes were also present.

Councilmember Powers was absent.

A. Pledge of Allegiance

Richard Brown led the audience and Council in the Pledge of Allegiance.

2. CITIZENS COMMENT

Judd Turner Chair of the Sidney Art Museum, reconfirmed the museum should be not included in any proposals for the parking garage as the Museum Board was not interested in being temporarily relocated or included in the plans for the parking garage.

Steve Dutton noted he represented the applicant for the Turtle Ridge project and was available to answer any questions regarding this project.

Diane Hubert voiced opposition to the Tremont roundabout, citing safety concerns.

Vance Vaught voiced opposition to the Tremont roundabout and the proposed designation of the downtown core as an Urban Growth Center, noting this designation would not be a good fit for the City of Port Orchard.

3. APPROVAL OF AGENDA

The following item was removed from the agenda:

- 4D Approval of Fireworks Permit: Festival of Chimes and Lights

Councilmember Childs moved and Councilmember Putaansuu seconded the motion to approve the agenda.

4. APPROVAL OF CONSENT AGENDA

A. Approval of Claim Warrants Nos. 52660 through 52731 in the amount of $139,608.03
B. Approval of the November 10, 2009, Council Meeting Minutes
C. Setting Meeting for Work Study Session to December 15, 2009, at 7:00 p.m. at City Hall (Kirkpatrick)
~~**D.** Approval of Fireworks Permit: Festival of Chimes and Lights (Kirkpatrick)~~

Councilmember Putaansuu moved and Councilmember Clauson seconded the motion to approve the Consent Agenda as amended. *Upon vote, the motion passed unanimously; Councilmember Powers absent.*

5. PRESENTATION

There were no presentations.

6. PUBLIC HEARING

A. Public Hearing: Sanitary Sewer Facilities Comprehensive Plan

Public Works Director Dorsey presented the staff report, noting on October 16, 2009, the City of Port Orchard issued a SEPA threshold Determination of Non-Significance (DNS) for the proposed 2009 Comprehensive Sanitary Sewer Plan Update ("Plan"), as prepared by BHC Consultants LLC. The City received comments on the SEPA determination from the West Sound Utility District, the City of Bremerton and McCullough Hill, PS (representing Overton & Associates Holdings, LLC). This public hearing meets the public participation phase of the Plan adoption process, as required by the Washington Growth Management Act (GMA) and the Revised Code of Washington (RCW). The next step in the adoption process is to incorporate and address the comments from the public hearing with previously received comments. It is anticipated the 2009 Comprehensive Sanitary Sewer Plan update will be adopted concurrently with the Port Orchard Comprehensive Plan Update, which is scheduled for adoption at the December 22, 2009, City Council Meeting.

Mayor Coppola opened the Public Hearing, and there being no testimony, closed the Public Hearing at 7:14 p.m.

B. Public Hearing: Amendments to Title 16 Land Use Regulatory Code

Development Director Weaver presented the staff report, noting in an effort to accommodate the efficient and equitable processing of development applications as well as implementing the goals and policies within the Port Orchard Comprehensive Plan, the Port Orchard Planning Department has worked with the Planning Commission under Council direction to develop proposed changes to the Port Orchard Municipal Code Title 16: Land Use Regulatory Code.

B. Public Hearing: Amendments to Title 16 Land Use Regulatory Code

Development Director Weaver presented the staff report, noting in an effort to accommodate the efficient and equitable processing of development applications as well as implementing the goals and policies within the Port Orchard Comprehensive Plan, the Port Orchard Planning Department has worked with the Planning Commission under Council direction to develop proposed changes to the Port Orchard Municipal Code Title 16: Land Use Regulatory Code. Planning Commission input and consideration was identified as an essential step for implementation and needed clarifications to our existing code and regulations that support the goals and policies of our Comprehensive Plan. Meetings were noticed and held with the Planning Commission in January, February, March, and April of 2009. Draft code language was prepared as a result of the Planning Commission recommendations.

Mayor Coppola opened the Public Hearing at 7:30 p.m.

Martina Fears voiced opposition with proposed higher impact fees for small businesses, noting she will not be able to start a small business due to the costs.

Frank Tweten expressed concerns with Title 16, noting the City was zoning certain areas as Business Professional, which denied many professional businesses office space. While property owners could apply for a conditional use permit, that process could take many months and was an unnecessary expense.

Winnie Smith voiced concerns that most citizens don't know the difference between *Commercial* and *Business Professional* zones or height restrictions, noting she main concern regarded the different zoning regulations and whether it will increase single-family residence (SFR) taxes and will the City protect those residences when taxes are being assessed.

Development Director Weaver explained the difference between *Business Professional* and *Commercial*: *Business Professional* is a transitional area from *Single-Family Residential* to *Commercial* that supports governmental agencies or hospitals. He also indicated that approximately 28 parcels are affected by the proposed zoning language.

There being no further testimony, Mayor Coppola closed the Public Hearing at 7:44 p.m.

C. Public Hearing: Update to Port Orchard Municipal Code Title 18: Environmental Regulations

Development Director Weaver presented the staff report, noting the Critical Areas Ordinance is intended to assist developers and land owners in gathering important site information for development on property within the City of Port Orchard. All cities and

counties under the Growth Management Act (GMA) are required to classify and designate critical areas through comprehensive planning and develop regulations to protect them. The ordinance contains specific regulations to protect critical areas that include the following categories and ecosystems, wetlands, streams, geologically hazardous areas, and frequently flooded areas. Port Orchard adopted its last Critical Areas Ordinance (CAO) on December 13, 1999, through Ordinance 1784. These proposed changes and additional definitions have been identified by staff as the required changes necessary to bring the Port Orchard into compliance with the identified Washington State requirements; and the only changes being made are to items that have been approved by the Planning Commission that match Kitsap County's Ordinance.

Mayor Coppola noted the Growth Management Area has not been updated since2004 and the Comprehensive Plan has not been updated since 1995. As a result the City has been out of compliance with the State and not eligible for any grants; now that both plans have been updated, the City is in compliance and eligible for grants.

Mayor Coppola opened the Public Hearing at 7:51 p.m.

George Warrington voiced opposition to the buffer zones, noting that they increased from 100 feet to 200 feet.

Richard Brown voiced opposition to the proposed Title 16 changes, noting that he did not recall any significant changes that would support the City's proposed changes.

Gil Michael voiced concerns with the increased buffer and urged the Council to reduce the buffer to 100 feet; and noted that as a member of the Planning Commission he did not vote in favor of the proposed changes.

Ron Rice stated that during Kitsap County's process, the County could not provide supporting documentation that the changes were based on the best available science and he hoped the City was not going in the same direction of the County.

In response to Councilmember Childs, Development Director Weaver indicated that although some buffers increased, some also were reduced making it balanced. The City only has one S1 stream type and it is Blackjack Creek of which the City owns a majority of the property that will be affected.

Tim Matthes encouraged the Council and citizens to keep asking questions as this is a great learning experience and reminded the Council that they are able to revisit this item next year upon approval of the proposed changes.

Gary Anderson urged the Council to reconsider that portion of the buffer on the southwest side of the Sedgwick intersection to the culvert that the buffer be reduced to 100

feet. Development Director Weaver stated he would look into that particular parcel and work with Mr. Anderson to come to some form of resolution.

Mayor Coppola thanked those who testified, noting that he shares some of their same concerns.

There being no further testimony, Mayor Coppola closed the Public Hearing at 8:08 p.m.

D. Public Hearing: 2009 Amendments to the Port Orchard Comprehensive Plan

Development Director Weaver presented the staff report, noting the Growth Management Act (GMA), RCW 36.70A requires that each city that plans under the GMA must periodically review, and, if needed, revise its comprehensive plan and development regulations every seven years to ensure compliance with the Growth Management Act. These amendments were developed in consideration of the goals of the GMA for the development of local comprehensive plans, as codified at RCW 36.70A.020, and reflect a careful balancing of these goals within the local conditions of the City of Port Orchard. These amendments were developed from and are consistent with the Kitsap Countywide Planning Policies (CPPs). Further, Development Director Weaver explained that everything listed in Appendix F, attached to the Comprehensive Plan, identifies existing documents, policies, and plans with minor policies that compliment the Puget Sound Regional Council's (PSRC) recommendations.

Mayor Coppola opened the Public Hearing at 8:20 p.m.

Tim Matthes noted there were two important items in Appendix F that were of concern. First, what will Port Orchard look like; and second what will it cost the taxpayers. He urged the Council to not be fooled with "bending the trend" and that he had faith the City will obtain the necessary funding without the assistance of the Puget Sound Regional Council.

Gerry Harmon voiced concern that the Puget Sound Regional Council (PSRC) is trying to change what our community is all about and encouraged the Council keep Port Orchard a small town.

Bob Benze voiced opposition to Port Orchard being designated as an Urban Growth Center, noting he was not aware of any real benefit to the City if this would occur.

Vivian Henderson voiced opposition to the Urban Growth Center, noting citizens will be cut out of the public process; lose property rights; and it will leave the schools and water and fire districts out of the process.

Ron Ross voiced opposition regarding the Urban Growth Center, noting that PSRC will slowly transition Port Orchard into what they want, not what the residents want.

Gil Michael voiced his support of items 1, 2, and 4 in the proposed Comprehensive Plan. However, he had concerns with Appendix F and urged the Council to strike it from the proposed amendments indicating that PSCR should not dictate the density or character of our City; and that the Council revises their proposed parking garage plan to exclude the Sidney Art Museum.

Richard Brown urged the Council to read Appendix F to fully understand the dangers of becoming an Urban Grown Center before approving as the proposal is basically supporting the PSRC's 2040 Vision Plan.

George Warrington stated that should the Council insist on approving the Urban Grown Center Plan, Appendix F, they should consider the option of withdrawing from the agreement if it doesn't go in the direction they perceive.

Dan Defenbaugh encouraged Councilmembers to become educated on what is happening with Puget Sound Regional Council and how becoming an Urban Growth Center will affect our community. He thanked the Council and Mayor for being fiscally responsible and for all of the changes that are happening within the community.

There being no further testimony, Mayor Coppola closed the Public Hearing at 9:02 p.m.

E. Public Hearing: Sidney-Pottery Multi-Modal Corridor Plan

Associate Planner Bonsell presented the staff report, noting *The Sidney-Pottery Corridor Plan* is a community based transportation study focused on Sidney Road SW and Pottery Avenue between Sedgwick Road to the south and Tremont Street to the north. The Port Orchard City Council determined that Port Orchard's residents would be better served by advance planning within the corridor area to insure that consistent infrastructure development occurs for future commercial and multi-family uses. Under direction of the City Council, the Planning Commission coordinated with City staff in creating and planning a development strategy for the Sidney-Pottery Roadway Corridor. The Planning Commission implemented the vision through a subcommittee intended for that sole purpose. The subcommittee included a variety of stakeholders, including three members of the Planning Commission, affected and adjacent property owners, developers, and interested members of the public. It met once a month for three months to discuss elements and aesthetics of the corridor. The subcommittee discussions resulted in three alternatives provided to the Planning Commission to assist in the creation of uniform roadway standards for consistency along the entire corridor. The Sidney/Pottery Corridor Plan accommodates the community's desire to have a safer, pedestrian friendly, parkway linkage that knits Sidney Road and Pottery Avenue into the fabric of the community while

facilitating the requirements and standards associated with the operation of a City thoroughfare. The Plan reconfigures the roadway from a 2-lane rural standard configuration to a minimum of a 3-lane configuration with commuter bike lanes, parking improvements, accommodation for transit, and streetscape character improvements. Promoting a vision for a safer, more aesthetically pleasing and bike friendly corridor all within the framework of City Road Standards is clearly articulated as a primary goal of this plan.

Mayor Coppola opened the Public Hearing at 9:07 p.m.

Bek Ashby reported the Planning Commission wanted the plan to be something that could be accomplished and reasonable, noting the purpose was to move traffic north and south in an efficient manner and that the Commission had only looked at traffic flow; therefore signage was not addressed.

Richard Brown complimented Associate Planner Bonsell on a job well-done with the Committee to ensure all parties involved were heard and a part of the process.

Ron Rice noted the City should be paying for the expense of the roads, not the developers, with the City being reimbursed as the development was completed.

There being no further testimony, Mayor Coppola closed the Public Hearing at 9:17 p.m.

At 9:28 p.m. Mayor Coppola reconvened the meeting after an eleven-minute recess.

7. BUSINESS ITEMS

A. Adoption of Resolution No. 114-09, Authorizing the Mayor to Execute a Collective Bargaining Agreement with Teamsters Local 589 – Police Support Staff

Assistant City Attorney Forbes presented the staff report, noting the Collective Bargaining Agreement has been ratified by the Police Support Staff bargaining unit and executed by the union's representative.

Councilmember Clauson MOVED and Councilmember Colebank seconded the motion to ratify the terms of the Collective Bargaining Agreement with Teamsters Local 589 representing the Police Support Staff bargaining unit and authorize the Mayor to execute the same. *Upon vote, the motion passed unanimously; Councilmember Powers was absent.*

B. Adoption of Ordinance No. 027-09, Making a Declaration of Substantial Need for Purposes of Setting the Limit Factor and Protecting Future Levy Capacity

City Treasurer Martin presented the staff report, noting that at its November 10, 2009, Council meeting Ordinance No. 025-09, was adopted setting the amount of property taxes to be levied for the year 2010. In 2009, the City had grown to a population greater than 10,000, and for cities of ten thousand or greater state law allows increasing its budget by up to the Implicit Price Deflator (IPD) or one percent, whichever is lower, from the highest lawful levy unless the City Council passed a substantial need ordinance. Because the IPD is less than one percent, to raise the levy to anything above the IPD or to bank excess levy capacity, required the adoption of a second ordinance commonly referred to as substantial need. The substantial need ordinance failed, resulting in a statutory levy factor of 99.152 percent. At its November 17, 2009, study session the Council requested that a substantial need ordinance be prepared that protects future levy capacity and provides for setting property tax to be levied for 2010. The Council directed an increase (exclusive of adjustments for new construction and certain other factors) of zero percent (0%) over the maximum allowable levy for 2009. This requested substantial need ordinance makes a finding that there is a substantial need and sets the limit factor at 101% for purposes of calculating the maximum allowable levy amount for the 2010 levy to preserve the city's levy capacity in the event this levy capacity is needed in future years and allows the Council to accomplish its stated directive to levy a "0 percent" increase over the maximum allowable levy for 2009. RCW 84.55.0101 requires a finding of substantial need of a majority plus one approval of the board when the board consists of more than four members.

Councilmember Olin voiced opposition to the 101% substantial need, and would not support bank capacity.

Councilmember Putaansuu voiced support of the 101% substantial need and bank capacity.

Councilmember Chang voiced opposition to the 101% substantial need and bank capacity and stated he would be voting no on the proposed ordinance.

Councilmember Clauson MOVED and Councilmember Putaansuu seconded the motion to adopt Ordinance No. 027-09, making a declaration of substantial need for purposes of setting the limit factor and protecting future levy capacity; and reducing the levy amount in Ordinance No. 025-09, to an amount equal to a $0 (0%) increase over the 2009 levy amount exclusive of adjustments attributable to new construction, improvements to property, any increase in the values of state assessed property and any annexations that have occurred.

Councilmember Putaansuu MOVED and Councilmember Clauson seconded the motion to amend Ordinance No. 027-09, striking reference to 101% and changing to 100% with no banked capacity. ***Upon vote, the motion to amend passed unanimously; Councilmember Powers was absent.***

Upon vote, the main motion as amended passed unanimously; Councilmember Powers was absent.

C. First Reading of Ordinance No. 028-09, Amending Port Orchard Municipal Code 15.32 Stormwater Management

Assistant City Engineer Archer presented the staff report, noting in January of 2007, the Washington State Department of Ecology issued a National Pollutant Discharge Elimination System (NPDES) Phase II municipal storm water permit to the City of Port Orchard under its delegated authority to implement requirements of the federal Clean Water Act. The NPDES storm water permit pertains to municipal storm sewer systems that discharge to surface waters (such as streams, lakes, and bays) and which are not part of a combined storm and sanitary sewer system. The City's Phase II permit identifies minimum control measures, technical thresholds, and definitions for development, redevelopment and construction site runoff that must be implemented in order to be compliant with this permit. One of the requirements includes the legal authority, through the approval process for new development, to inspect private stormwater facilities that discharge to the City's Municipal Separate Storm Sewer System. Fortunately, the City's existing ordinance already had several of the necessary pieces implemented, but required additional information in some areas. One of the areas that expanded was the Minimum Site Development Requirements, section 15.32.065, previously this was part of 15.32.070, but due to the importance and amount of this information a new section of code was created. The proposed ordinance addresses all of the items required by the City's NPDES permit and conforms to the guidance document published by the Department of Ecology.

Councilmember Putaansuu MOVED and Councilmember Colebank seconded the motion to accept Ordinance No. 028-09, amending Port Orchard Municipal Code Chapter 15.32 "Stormwater Management" in first reading and move to second reading and adoption at the December 8, 2009, Council meeting. ***Upon vote, the motion passed unanimously; Councilmember Powers was absent.***

Councilmember Clauson moved and Councilmember Chang seconded the motion to extend the meeting through the conclusion of business items. ***Upon vote, the motion passed with five affirmative votes and one dissenting vote. Councilmember Colebank cast the dissenting vote; Councilmember Powers was absent.***

D. Adoption of Resolution No. 115-09, Turtle Ridge Preliminary Plat Request for Waiver from City Council Resolution No. 1971

Development Director Weaver presented the staff report, noting on February 27, 2009, the City of Port Orchard received a request to subdivide 8.8 acres into nine lots from Steve Dutton on behalf of Maureen Barta. The City reviewed the proposal for environmental impacts and on April 3, 2009, issued a Mitigated Determination of Non Significance (MDNS). The City reissued the MDNS with the correct number of lots within the description. The City prepared a staff report and reviewed the proposal for conformance with applicable regulations and policies. On September 24, 2009, the Hearing Examiner held an open record hearing on the preliminary plat request. Members of the public submitted comments and testified on the proposed plat. Mr. Steve Dutton submitted to the Hearing Examiner a petition from the Caseco Lane neighborhood in support of the Turtle Ridge Preliminary Plat with an attached preliminary road improvement Plan to be constructed prior to final plat approval by the City Council. On October 5, 2009, the Hearing Examiner approved the preliminary plat with conditions.

Assistant City Attorney Forbes reminded the Council that while they normally operate in a legislative capacity, during this Public Hearing the Council is acting as a quasi-judicial body. Assistant City Attorney Forbes asked if any Councilmember had any ex-parte communication with anyone regarding this application. There was no response from any Councilmember. Assistant City Attorney Forbes further asked if any Councilmember had any financial interest in this property, with the applicant or representative of the applicant, either directly or indirectly relating to the property involved. There was no response from any Councilmember. Assistant City Attorney Forbes asked if any Councilmember had any reason to believe they would not be able to render a fair and impartial decision based on the information they receive today. There was no response from any Councilmember. Assistant City Attorney Forbes asked if any member of the audience felt any of the Councilmembers should not participate in the hearing. There was no response from any audience member.

Mayor Coppola opened the floor for public testimony at 9:58 p.m.

Charles Hausted voiced support of the waiver, noting approval of this project would needed improvements to the road.

There being no further testimony, Mayor Coppola closed the floor for public testimony at 9:59 p.m.

Councilmember Colebank moved and Councilmember Olin seconded the motion to approve Resolution No. 115-09, to allow a waiver from City Council Resolution No. 1971. *Upon vote, the motion passed unanimously; Councilmember Powers was absent.*

E. Adoption of Resolution No. 116-09, Declaring Thursday, December 24, 2009 and Thursday December 31, 2009, as a City Hall Closure

City Clerk Kirkpatrick presented the staff report, noting in previous years the Council has closed City Hall either the day before or after when Christmas Day and New Year's Day fall on a weekday. This year, Christmas and New Year's Day fall on a Friday and staff anticipates minimal public use of City services on either Thursday, December 24, 2009, or Thursday, December 31, 2009. Staff will have the option of using accrued leave (vacation, personal leave, floating holiday, or comp time), taking leave without pay, or working that day.

Councilmember Colebank moved and Councilmember Olin seconded the motion to adopt Resolution No. 116-09, declaring Thursday, December 24, 2009 and Thursday, December 31, 2009, as a City Hall closure and allow staff to either work that day, take leave without pay, or use accrued leave. ***Upon vote, the motion passed with five affirmative votes and one dissenting vote. Councilmember Clauson cast the dissenting vote; Councilmember Powers was absent.***

8. CITIZENS COMMENTS

There were no citizen's comments.

9. COMMITTEE REPORTS

Councilmember Childs announced Saturday, November 28, 2009, was the Movie Premier and Black Tie Reception featuring Debbie Macomber's movie "Mrs. Miracle," noting 100% of the proceeds will be going to support the Port Orchard Library and to help fund the South Kitsap High School Marching Band efforts to participate in the Rose Bowl Parade.

Councilmember Colebank reported he attended the Peninsula Regional Transportation Planning Organization Committee meeting where the Committee received an update on the Transportation Plan, Statewide Multi-mortal Plan, and the Statewide Highway System Plan.

Councilmember Clauson reported he met with Eric Baker with Kitsap County and Development Director Weaver regarding the Revenue Sharing Agreement of which both parties had an eye-opening experience of each other's concerns and that the City will be sending Kitsap Regional Coordinating Council the City's second notice of withdrawal.

Councilmember Clauson moved and Councilmember Colebank seconded the motion to move the 2010 Budget Special Work Study Session to Wednesday, December 2, 2009. ***Upon vote, the motion passed unanimously; Councilmember Powers was absent.***

10. MAYOR'S REPORT

Mayor Coppola reported on the following;

- Was back in the hospital, but is recovering;
- Attended the Long Range Planning Retreat with Kitsap Transit;
- Met with a developer interested in a public/private partnership regarding the proposed parking garage;
- Attended the Chamber Luncheon;
- Attended the Legislative Committee Meeting;
- Met with Representative Seaquist;
- Attended the Port Orchard Party

Mayor Coppola congratulated Police Chief Townsend for his service as a mentor in the International Association of Chiefs of Police: New Police Chief Mentoring Project.

11. REPORT OF DEPARTMENT HEADS

City Clerk Kirkpatrick announced the next Chamber Legislative Committee meeting will be held on Wednesday, December 16, 2009, at 8:00 a.m. at City Hall, noting the speaker will be newly-elected Port Commissioner Zabinski; and there will be a Pre-Legislative Reception being held on January 5, 2010, at 5:30 p.m. tentatively scheduled at the Port Orchard Pavilion.

In response to City Clerk Kirkpatrick, Council directed staff to add a discussion item on Branding to the December 15, 2009, Work Study Session.

Development Director Weaver announced the City has received a grant to obtain a new 13 passenger van for trail and park construction.

Treasurer Martin thanked Council and staff for their patience with him during his first budget cycle with the City, noting it was a pleasure to work with such a professional group.

Public Works Director Dorsey reported the Seawall project will be ready to go out for bids in February/March.

12. ADJOURNMENT

At 10:28 p.m. Mayor Coppola adjourned the meeting.

Patricia J. Kirkpatrick, CMC, City Clerk

Lary Coppola, Mayor

Appendix C
City of Port Orchard & West Sound Utility District Agreement

City of Port Orchard & West Sound Utility District Agreement is on file in city Hall and is available for public review. Copies can be provided to interested parties.

Appendix D
Fact Sheet – Joint Wastewater Treatment Plant

FACT SHEET FOR NPDES PERMIT WA-002034-6
PORT ORCHARD/KARCHER CREEK SEWER DISTRICT
JOINT WASTEWATER TREATMENT PLANT

SUMMARY

There are three entities involved in wastewater treatment in the Port Orchard area: The City of Port Orchard collection system, Karcher Creek Sewer District collection system, and the Joint Wastewater Treatment Facility (treatment plant). The treatment plant is considered a separate entity which is jointly owned by the City of Port Orchard (City) and Karcher Creek Sewer District (Sewer District). The City has contracted with the Sewer District to operate the treatment plant.

The treatment plant was recently upgraded and expanded to accommodate increasing demand for sewer service in the City's and Sewer District's service areas. The existing activated sludge treatment plant was upgraded with the addition of a Zenon - membrane bioreactor (MBR) - treatment process. In addition, a ballasted clarifier was added at the plant to provide advanced primary treatment for peak flows during wet weather periods. The new plant began operation in March 2006. During normal operation, the incoming wastewater is provided secondary treatment via the activated sludge and MBR treatment processes. Effluents from both these secondary treatment processes are combined and disinfected prior to discharging to Sinclair Inlet, Puget Sound. When influent flows to the plant exceed 6 million gallons per day (MGD), the excess wastewater (greater than 6 MGD) is provided advanced primary treatment via the ballasted clarifier treatment system. Effluents from all three treatment processes are combined and disinfected prior to discharging to Sinclair Inlet.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC), water quality criteria for surface and ground waters (chapters 173-201A and 200 WAC), and sediment management standards (chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A—*Public Involvement* of the fact sheet for more detail on the public notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix G—*Response to Comments.*

GENERAL INFORMATION	
Applicant	City of Port Orchard 216 Prospect Street Port Orchard, WA 98366
Facility Name and Address	City of Port Orchard/Karcher Creek Sewer District Joint Wastewater Treatment Plant 1165 Beach Drive Port Orchard, WA 98366
Type of Treatment	Membrane Bioreactor (MBR) and Activated Sludge – Secondary Treatment System
Discharge Location	Sinclair Inlet, Puget Sound Latitude: 47° 33' 10" N. Longitude: 122° 36' 40" W.
Waterbody ID Number	1224026474620

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The treatment plant was recently upgraded and expanded to accommodate increasing demand for sewer service in the City's and Sewer District's service area. The plant was upgraded by adding a new Zenon - Membrane Bioreactor (MBR) - treatment process to provide additional secondary treatment capacity at the plant. In addition, a new ballasted clarifier was added at the plant to provide advanced primary treatment to peak flows during wet weather periods. Effluents from these treatment processes are combined and disinfected. The plant effluent is discharged to Sinclair Inlet, Puget Sound. The new plant began operation in March 2006.

DESCRIPTION OF THE WASTEWATER COLLECTION SYSTEM

The City's sewage collection system consists of a combination of many neighborhood systems. The age of the sewer mains in the City vary from 70 years old to brand new. The older areas of the City have noticeable flows from infiltration and inflows (I/I) in the system. As part of the I/I reduction efforts, many roof drains have been disconnected from sanitary sewers and the pipe joints air tested and grouted. However, groundwater still enters the system. Currently, the City allocates approximately $25,000 per year for the I/I reduction program.

The Sewer District's sewage collection system includes two major trunk sewers, collector sewer lines, and 18 pump stations and associated forcemains. Developments constructed in the 1990s have primarily installed PVC pipes for the collector sewers and laterals. Developments constructed prior to 1990 primarily used concrete pipe for collector sewers. A small percentage of the collector sewers have concrete asbestos and clay pipe.

Based on the I/I reports submitted for the treatment plant, annual I/I (from 1991 through 2004) has ranged from 12 to 28 percent of the plant inflow.

Both the City and the Sewer District have ongoing programs to reduce I/I. The City's efforts to reduce I/I include grouting of leaking joints, and locating and eliminating inflow sources. The Sewer District's Capital Improvement Plan includes wartime (World War II) era sewer replacement projects over the next 20 years.

WASTEWATER SOURCES

Primary sources of wastewater tributary to the facility are domestic sewage from residential and light commercial activities in the sewer service areas of the City of Port Orchard and Karcher Creek Sewer District.

WASTEWATER CHARACTERISTICS

Wastewater received at the facility is typical domestic wastewater with conventional pollutants and low levels of metals, as shown in the following table. The influent and effluent monitoring data for conventional pollutants are the annual averages for the year 2004. The effluent measurements for copper and zinc shown in the table below are the highest of the measurements from effluent monitoring conducted during July 1995 through January 2006. Effluent measurements during this period, for arsenic, cadmium, chromium, lead, mercury, nickel, and silver were all below method detection limit (MDL).

PARAMETER	**INFLUENT**		**EFFLUENT**	
	Concentration (mg/L)	**Mass Emission (lbs/day)**	**Concentration (mg/L or ug/L)**	**Mass Emission (lbs/day)**
Flow	----------	----------	1.59 MGD	----------
BOD_5	236 mg/L	3051 lbs/day	20 mg/L	265 lbs/day
TSS	340 mg/L	4035 lbs/day	16 mg/L	210 lbs/day
Fecal Coliform	----------	----------	55/100 mL	----------
Copper	----------	----------	16 ug/L[a]	----------
Zinc	----------	----------	536 ug/L	----------

[a] Effluent sample measurement of 16 µg/L for copper is less than the reportable detection limit (RDL).

DESCRIPTION OF THE WASTEWATER TREATMENT PLANT AND DISCHARGE OUTFALL

The liquid stream treatment at the plant consists of three different treatment systems:

(1) The activated sludge (secondary) treatment system.

(2) The MBR (secondary) treatment system.

(3) The ballasted clarifier (advance primary) treatment system for treatment of peak flows when influent flows exceed 6 MGD.

The liquid stream treatment system at the plant includes 3 (mechanically cleaned) rotary fine screens and 1 (manually cleaned) standby bar screen, 3 vortex grit removal units (2 units preceding primary clarifiers for use during dry weather, and 1 unit preceding ballasted clarifier for use during wet weather), 3 primary clarifiers, a ballasted clarifier for primary treatment of peak flows (when influent flows exceed 6 MGD), 2 aeration basins (with 3 chambers per basin) for activated sludge treatment, 2 secondary clarifiers, 2 MBR basins, 2 chlorine contact channels (along the outer periphery of the secondary clarifiers) for disinfection by sodium hypochlorite, a sodium bisulfite dechlorination unit for effluent dechlorination, and a Parshall flume for effluent flow measurement.

The solids stream treatment system at the plant includes 4 sludge storage tanks, 2 anaerobic digesters, and 2 centrifuges for sludge dewatering and thickening.

Treated and disinfected effluent from the plant is discharged to Sinclair Inlet, Puget Sound. The effluent is discharged via a 36-inch diameter outfall terminating 1600 feet offshore into Sinclair Inlet at a depth of approximately 52 feet below mean lower low water (MLLW). The terminal portion of the outfall consists of a 10-port diffuser with 8-inch diameter risers at 10-foot spacing. The diffuser ports discharge horizontally in alternating directions.

Appendix C includes diagrams of the outfall location in Sinclair Inlet and the treatment process schematic.

RESIDUAL SOLIDS

The treatment plant removes solids from the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers (primary and secondary sludge), in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are disposed of as solid waste at a local landfill. Primary and secondary sludge are thickened, stabilized, and dewatered for utilization. The dewatered sludge is transported to any Class B site as permitted by local health departments.

FLOW BLENDING

The wastewater treatment system is designed for a maximum month flow of 4.2 million gallons per day (MGD) and a peak (wet weather) flow of 16 MGD. The primary treatment train at the plant consists of primary clarifiers, followed by a secondary biological treatment (conventional activated sludge or MBR) system, and secondary clarifiers. This portion of the treatment plant is designed to provide secondary treatment for a minimum of 6 MGD peak flow without compromising its integrity. During the plant's design life, influent flows are expected to exceed 6 MGD only a few times during wet weather months, in any given year. Therefore, a ballasted clarifier with a design capacity of 10 MGD was constructed at the plant to provide primary treatment for flows that would need to be bypassed around the secondary treatment system to protect its integrity. The ballasted clarifier provides advanced primary treatment and is expected to remove 90% or greater total suspended solids and 40% or greater BOD.

As described in the engineering report for the treatment plant, approved by the Department of Ecology, influent flows in excess of 6 MGD as a result of precipitation may bypass secondary treatment and receive primary treatment via the ballasted clarifier. During such events, the ballasted clarifier effluent is blended with the secondary treated effluent prior to disinfection and discharge. The practice of flow blending is used to protect the secondary treatment process from major upsets that can detrimentally impact effluent quality.

Condition S11 of the proposed permit, *Flow Blending,* allows influent flows greater than 6 MGD to bypass the secondary treatment system. The permit requires that all bypassed flows must be provided advanced primary treatment through the ballasted clarifier, and that the combined effluent from the ballasted clarifier and secondary treatment must comply with the secondary treatment limits specified in Condition S1.A at all times. This alternative would ensure compliance with the permitted effluent limits without compromising the secondary treatment system at the plant.

Port Orchard area experienced very heavy rains during November and December 2006. Highest daily average flows recorded at the plant were 3.94 MGD and 4.6 MGD in November and December 2006, respectively. Rainfalls recorded on these days were 2.1 inches and 2.41 inches, respectively. During this period, the flows at the plant did not reach high enough to have any flow to bypass the secondary treatment system, and there was no need to operate the ballasted clarifier.

PERMIT STATUS

The existing permit for the plant expired on June 30, 2006. An application for permit renewal was received by the Department on September 6, 2005, and accepted by the Department on March 9, 2006. The existing permit was extended by the Department on June 9, 2006. The treatment plant is currently operating under the terms and conditions of the extended permit.

SUMMARY OF INSPECTIONS

A Class I inspection of the treatment plant was conducted on March 18, 2005, by the Department's Northwest Regional Office (NWRO) staff. Construction of the plant expansion/upgrade using two new technologies - Membrane Bioreactor (MBR) and High Rate (Ballasted) Clarification (HRC) - was under way at the time of this inspection. All the treatment units appeared to be operating well at the time of this inspection. The effluent looked very clear, and the plant appeared to be well operated and maintained. The inspection reports are on file at the Department's NWRO office.

As stated in *Port Orchard/KCSD 5 Mixing Zone Study*, Cosmopolitan Engineering Group, May 2002, the outfall and diffuser were visually inspected by a certified diver and licensed professional engineer on April 11, 1998. The diffuser ports were found to be flowing fully with no significant structural damage to the diffuser. The study report includes photographs of the outfall and diffuser ports.

SUMMARY OF COMPLIANCE WITH THE EXISTING PERMIT

Based on Discharge Monitoring Reports (DMRs) submitted to the Department, from November 1, 2001 through February 1, 2006, there were three violations of the BOD effluent limits, two violations of the TSS effluent limits, and one violation of the chlorine effluent limit. Two BOD and the chlorine effluent limits violations were minor violations. One BOD and the two TSS effluent limits violations occurred during the month of August 2004, when the plant received excessive influent TSS loading. During this month, the influent TSS exceeded the approved design criteria for the plant. Based on DMRs submitted to the Department, the Permittee has remained in compliance with the effluent limits and there have been no exceedance of influent design criteria since August 2004.

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the surface water quality standards (chapter 173-201A WAC), ground water standards (chapter 173-200 WAC), sediment quality standards (chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The following design criteria are taken from the plans and specifications for the treatment plant, approved by the Department of Ecology on September 2, 2004.

Parameter	Phase I Design Criteria
Average flow for the maximum month	4.2 MGD
BOD_5 influent loading for the maximum month	6340 lbs/day
TSS influent loading for the maximum month	6910 lbs/day

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from chapter 173-221 WAC are:

Parameter	Limit
pH	Shall be within the range of 6.0 to 9.0 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly average effluent mass loadings for BOD_5 and TSS = 4.2 MGD (maximum monthly design flow) x 30 mg/L (concentration limit) x 8.34 (conversion factor) = 1051 lbs/day.

Weekly average effluent mass loadings for BOD_5 and TSS = 4.2 MGD (maximum monthly design flow) x 45 mg/L (concentration limit) x 8.34 (conversion factor) = 1577 lbs/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State surface water quality standards (chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's water quality standards for surface waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water-body while remaining protective of aquatic life. Numerical criteria set forth in the water quality standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDEGRADATION

Washington State’s Antidegradation Policy requires that discharges into a receiving waterbody shall not further degrade the existing water quality of the waterbody. In cases where the natural conditions of a receiving waterbody are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the Washington State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses.

MIXING ZONES

The water quality standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones

can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The treatment plant effluent is discharged to Sinclair Inlet, Puget Sound, which is designated as Class A-Marine Waters, in the vicinity of the outfall. Characteristic uses include the following:

> Class A (Excellent) water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Parameter	Criteria
Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	6 mg/L minimum
Temperature	16 degrees Celsius maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	Less than 5 NTUs above background
Toxics	No toxics in toxic amounts

The Federal Clean Water Act (Section 303(d)) requires the state to prepare a list of water bodies that do not meet water quality standards. This list is called the 303(d) list because the process is described in section 303(d) of the Clean Water Act. The Department is required to submit the 303(d) list to the Environmental Protection Agency (EPA) for approval. After approval by the EPA, the Department is required to develop water clean up plans, also known as Total Maximum Daily Loads or TMDLs, for each of the water bodies on the 303(d) list. The latest approved 303(d) list is the 2002/2004 303(d) list, which lists Sinclair Inlet for various parameters for both water and tissue mediums. The parameters listed for water medium in this list are dissolved oxygen (DO), fecal coliform, pH, and temperature.

Of the parameters listed for water medium in Sinclair Inlet in the 2002/2004 303(d) list, only DO is listed as Category 5; the rest are listed as Category 2, *Waters of Concern*. The parameters included in Category 2 of the 303(d) list are the ones that show some evidence of water quality problem, but not enough to require a TMDL study at this time. Additional monitoring for these parameters would need to be conducted to determine if a TMDL study needs to be conducted.

The Department, in the near future, is planning to conduct a TMDL study in Sinclair Inlet to address noncompliance with the water quality standards for DO. The results of the TMDL study will be used to determine whether wasteload allocations for BOD and nutrients are necessary. Nutrients can contribute indirectly to DO depression by stimulating phytoplankton growth).

Fecal coliform bacteria in Sinclair Inlet are listed as Category 2, Waters of Concern, on the 2004 303(d) list, also called the Water Quality Assessment. A fecal coliform TMDL was initiated in 2000 based on the 1998 303(d) listing of fecal coliform bacteria in Dyes and Sinclair Inlets. Though these listings are not on the 2004 303(d) list, the marine waters of nearshore areas of Sinclair and Dyes Inlets have been shown to be impaired through additional monitoring conducted for the TMDL and routine monitoring conducted by Kitsap County Health District and Washington State Department of Health. The Department of Ecology is continuing to develop the TMDL in a cooperative effort with Puget Sound Naval Shipyard (PSNS) in Bremerton and U.S. Environmental Protection Agency (EPA) Region 10. The Department plans to establish wasteload allocations for fecal coliform bacteria from point sources (wastewater treatment plants and Municipal Phase II NPDES Stormwater Permittees) and from nonpoint sources that discharge to Sinclair Inlet. If the fecal coliform waste load allocation for the Permittee's treatment plant results in lower than permitted effluent limits, the Department may impose the more stringent TMDL-based limits through permit modification or issuance of an Administrative Order. A reasonable time period may be given to the Permittee to make plant modifications, if needed, to comply with the more stringent limits.

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. Acute and chronic mixing zones are authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in chapter 173-201A WAC. Mixing zone boundaries for discharges to estuaries such as Sinclair Inlet are defined as follows:

(a) In estuaries, mixing zones, singularly or in combination with other mixing zones, shall:

  (i) Not extend in any horizontal direction from the discharge port(s) for a distance greater than 200 feet plus the depth of water over the discharge port(s) as measured during mean lower low water; and

  (ii) Not occupy greater than 25 percent of the width of the waterbody as measured during mean lower low water.

(b) In estuarine waters, a zone where acute criteria may be exceeded shall not extend beyond ten percent of the distance established in (a) above, as measured independently from the discharge port(s).

(c) Vertical limitations for both chronic and acute zones is the depth of water over the discharge port(s) as measured during mean lower low water (MLLW).

The acute and chronic mixing zone boundaries for the plant's discharge are determined based on the above definitions and are specified in Condition S1.B of the proposed permit.

The dilution ratios of effluent to receiving water that occur within these zones have been determined at the critical condition by using near-field and far-field dilution modeling. The modeling provides dilution predictions under critical (worst case) receiving water conditions and for the range of receiving water conditions expected at the discharge site. The dilution modeling and results are discussed in the *"Port Orchard/KCSD5 Mixing Zone Study,"* Cosmopolitan Engineering Group, May 2002. The effluent flows used in the model are Phase II design flows (for the year 2020) for the plant - 4.8 MGD maximum month flow and 16 MGD maximum day flow. The current (Phase I) capacity of the treatment plant is 4.2 MGD maximum month flow and 16 MGD maximum day flow. Model-predicted dilutions for the 2020 (Phase II) discharge conditions (4.8 MGD maximum month flow and 16 MGD maximum day flow) are as follows:

Dilution Ratios for the Year 2020 (Phase II) Design Conditions - 4.8 MGD Maximum Month Flow, and 16 MGD Maximum Day Flow:

	Acute	**Chronic**
Aquatic Life	25	321
Human Health, Non-carcinogen		321
Human Health, Carcinogen		

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

BOD_5—This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution (321:1) occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature—Due to the high dilution achieved (321:1) under critical conditions, there is no predicted violation of the water quality standard for surface waters. Therefore, no effluent limitation for temperature is placed in the proposed permit.

pH—Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards for surface waters.

Fecal Coliform—As stated earlier, the Department is planning to develop wasteload allocations for fecal coliform for various point and non-point sources that discharge to Sinclair Inlet. Until then, technology-based fecal coliform limits (200/100 mL monthly average and 400/100 mL weekly average) are placed in the proposed permit. If the fecal coliform wasteload allocation for the treatment plant results in lower than permitted effluent limits, the Department will impose the more stringent TMDL-based limits through permit modification or issuance of an Administrative Order.

Toxic Pollutants—Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the water quality standards for surface waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, and metals. A reasonable potential analysis (see Appendix D of this fact sheet) was conducted for ammonia and metals to determine whether or not effluent limitations would be required in this permit. Of the various metals measurements, only copper and zinc were determined to be present in the effluent. The effluent metals measurements were in the form of "Total Metals," whereas, the water quality standards are in the form of "Total Recoverable Metals." Total metal measurements in a water sample are always either equal to or greater than total recoverable metal measurements. By using total metal values, the results of this reasonable potential analysis for metals are more conservative.

The determination of the reasonable potential for ammonia, copper and zinc, to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The dilution ratios used in the critical condition modeling are as follows: acute dilution ratio 25:1 and chronic dilution ratio 321:1.

Valid ambient background data was available for ammonia, copper, and zinc. Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge to cause a violation of water quality standards.

The plant effluent is disinfected with sodium hypochlorite. Since chlorine is toxic to aquatic life, effluent limits were derived for chlorine using methods from EPA, 1991, as shown in Appendix E of this fact sheet.

The resultant effluent limits for chlorine are: (i) Average Monthly 0.13 mg/L, and (ii) Maximum Daily 0.33 mg/L. These limits are specified in Condition S1.A. of the permit.

WHOLE EFFLUENT TOXICITY

The water quality standards for surface waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria,* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center at (360) 407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in chapter 173-205 WAC. However, in order to determine the impacts of the facility’s discharge on the receiving waterbody, whole effluent toxicity characterization testing is required in this permit. In addition, Part E, *Toxicity Testing Data* of the EPA Form 3510-2A, *NPDES application*, requires treatment plants with design flows equal to or greater than 1.0 MGD to test for whole effluent toxicity.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

Based on monitoring data submitted by the Permittee, the Department has determined that the applicant's discharge does not contain chemicals of concern. The discharge will be reevaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the sediment quality standards, an order will be issued to require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated ground water quality standards (chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF THE PROPOSED EFFLUENT LIMITS WITH THE EXISTING EFFLUENT LIMITS

Comparison of the proposed and existing effluent limits (monthly averages) is shown in the following table. The effluent limits for conventional pollutants (BOD, TSS, fecal coliform bacteria, and pH) in the proposed permit are same as the ones in the existing permit. The effluent limits for chlorine are technology-based limits in the existing permit, but (more stringent) water quality-based limits in the proposed permit.

Parameter	Existing Effluent Limits	Proposed Effluent Limits
BOD_5 (average monthly concentration)	30 mg/L	30 mg/L
TSS (average monthly concentration)	30 mg/L	30 mg/L
Fecal Coliform (average monthly concentration)	200/100 mL	200/100 mL
pH (standard units)	6.0 to 9.0	6.0 to 9.0
Total Residual Chlorine (average monthly concentration)	0.5 mg/L	0.13 mg/L

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication No. 92-109) for Activated Sludge Plant with 2.0 to 5.0 MGD Average Design Flow.

Priority pollutants (listed in Appendix F of this fact sheet) and conventional pollutants monitoring is required [see Condition S2.A.(3) and (5) of the permit] for reporting in the next permit application. Monitoring for additional nitrogen compounds (nitrite, nitrate and TKN) is required for use by the Department in the Sinclair Inlet TMDL study.

It should be noted that the Permittee has been monitoring effluent from its new MBR treatment system for various parameters including, BOD, TSS, and ammonia. MBR system effluent is also continuously monitored for turbidity. Grab samples of MBR system effluent are collected periodically for these analyses. The Permittee has submitted analytical results for samples collected from March 2006 through January 2007. Based on the sample results, the MBR treatment system is producing effluent with very low turbidity and very low concentrations of BOD, TSS, and ammonia. Based on the monitoring data submitted by the Permittee, the summary of the analyses in the table below indicates the quality of effluent produced by the MBR treatment system. The Permittee through sampling and analysis has shown the effectiveness of the new MBR treatment system in producing good quality effluent.

MBR Effluent Analyses Results from March 2006 through January 2007

PARAMETER	SAMPLE DATES	NUMBER OF SAMPLES	SAMPLE RESULTS
BOD	03/21/2006 through 12/28/2006	47	34 samples < 1 mg/L 1 sample > 10 mg/L
TSS	03/20/2006 through 01/12/2007	29	All samples < 2 mg/L
Ammonia (NH3-N)	05/16/2006 through 01/17/2007	76	63 samples < 1mg/L 6 samples > 10 mg/L
Turbidity	3/14/2006 through 10/13/2006	50	All samples < 0.11 NTU

LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The laboratory at this facility is accredited for BOD, TSS, ammonia, fecal coliform, and pH. Samples for analyzing other parameters are sent to commercial laboratories.

OTHER PERMIT CONDITIONS

REPORTING AND RECORD KEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems, the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW and chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the local health department(s).

PRETREATMENT

Since the pretreatment program has not been delegated to the Permittee, the pretreatment Condition S8 in the permit is a standard condition derived from the Federal Regulation 40 CFR 403.5.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary, to meet water quality standards, sediment quality standards, or ground water standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for the full allowable five (5)-year period.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. *National Toxics Rule.* Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control.* EPA/505/2-90-001.

1983. *Water Quality Standards Handbook.* USEPA Office of Water, Washington, D.C.

Washington State Department of Ecology

Laws and Regulations http://www.ecy.wa.gov/laws-rules/index.html

Permit and Wastewater Related Information
http://www.ecy.wa.gov/programs/wq/wastewater/index.html

1994. *Permit Writer's Manual*. Publication Number 92-109

City of Port Orchard and Karcher Creek Sewer District

2004. *City of Port Orchard/Karcher Creek Sewer District Joint Wastewater Treatment Facility Expansion Phase II – Facility Expansion Construction Plans and Specifications,* RH2 Engineering

2002. *City of Port Orchard and Karcher Creek Sewer District Joint Wastewater Treatment Facility Engineering Report,* RH2 Engineering

2002. *Port Orchard/KCSD 5 Mixing Zone Study*, Cosmopolitan Engineering Group

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on March 10 and 17, 2006, in the *Kitsap Sun* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on May 24, 2007, in the *Kitsap Sun* to inform the public that a draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments were mailed to:

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (425) 649-7201, or by writing to the address listed above.

APPENDIX B—GLOSSARY

Acute Toxicity—The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART—An acronym for "all known, available, and reasonable methods of prevention, control, and treatment."

Ambient Water Quality—The existing environmental condition of the water in a receiving water body.

Ammonia—Ammonia is produced by the breakdown of nitrogenous materials in waste water. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect waste water.

Average Monthly Discharge Limitation—The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation—The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)—Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5—Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass—The intentional diversion of waste streams from any portion of a treatment facility.

$CBOD_5$—The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine—Chlorine is used to disinfect waste waters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity—The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)—The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)—The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling—A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample—A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity—Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring—Uninterrupted, unless otherwise noted in the permit.

Critical Condition—The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor—A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report—A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria—Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the waste water. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample—A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial User—A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater—Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)—"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference—A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) [including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA], sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility—A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation—The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)—The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility—A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone—A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in Washington State regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)—The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

Pass-through—A discharge which exits the POTW into waters of the state in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of state water quality standards.

pH—The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User—A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day; or

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass-through or interference at the POTW (for example, facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)—A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)—

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

2) Any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters—Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater—That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit—A permit limit that is based on the ability of a treatment method to reduce the pollutant.

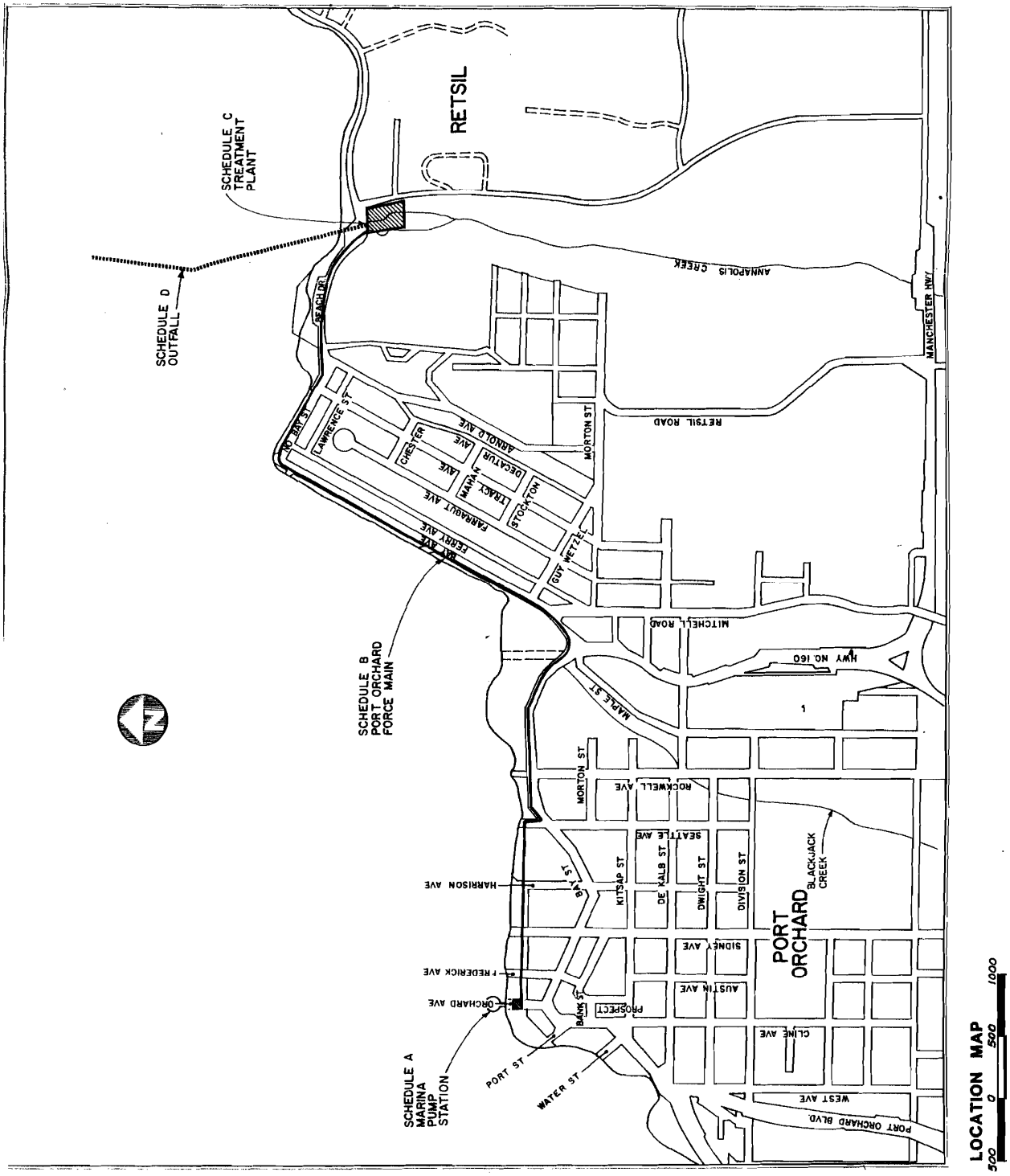
Total Suspended Solids (TSS)—Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset—An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

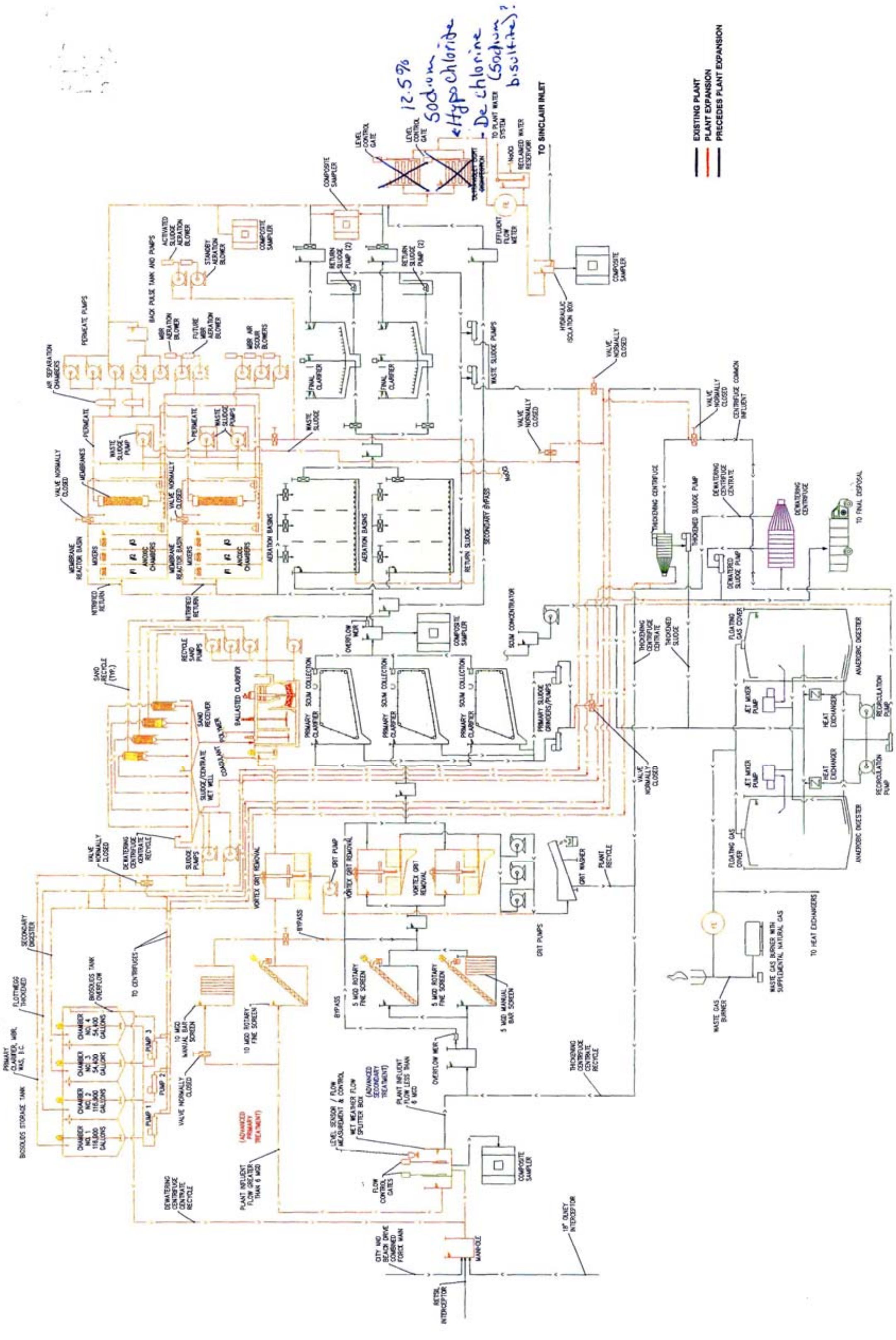
Water Quality-based Effluent Limit—A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C—OUTFALL LOCATION AND TREATMENT PROCESS SCHEMATIC

OUTFALL LOCATION IN SINCLAIR INLET



TREATMENT PROCESS SCHEMATIC



APPENDIX D—REASONABLE POTENTIAL CALCULATION FOR WATER QUALITY CRITERIA

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at (http://www.ecy.wa.gov/programs/wq/wastewater/index.html)

AMMONIA WATER QUALITY CRITERIA CALCULATION

Calculation of seawater fraction of un-ionized ammonia
from Hampson (1977). Un-ionized ammonia criteria for
salt water are from EPA 440/5-88-004.

Based on Lotus File NH3SALT.WK1 Revised 19-Oct-93

INPUT	
1. Temperature (deg C):	18.0
2. pH:	8.4
3. Salinity (g/Kg):	28.0
OUTPUT	
1. Pressure (atm; EPA criteria assumes 1 atm):	1.0
2. Molal Ionic Strength (not valid if >0.85):	0.574
3. pKa8 at 25 deg C (Whitfield model "B"):	9.312
4. Percent of Total Ammonia Present as Unionized:	6.776%
5. Unionized ammonia criteria (mg un-ionized NH3 per liter) from EPA 440/5-88-004	
Acute:	0.233
Chronic:	0.035
6. Total Ammonia Criteria (mg/L as NH3)	
Acute:	3.44
Chronic:	0.52
7. Total Ammonia Criteria (mg/L as NH3-N)	
Acute:	2.83
Chronic:	0.42

REASONABLE POTENTIAL CALCULATION TO DETERMINE EXCEEDANCE OF WATER QUALITY-BASED CRITERIA

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

				State Water Quality Standard		Max concentration at edge of...												
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*	*ug/L*	*CV*	*s*	*n*				COMMENTS
AMMONIA			0.05	2830	420	2459.10	191.56	NO	0.95	0.946	61000	0.21	0.21	54	1.01	25	321	
ARSENIC				69	36	2.65	0.21	NO	0.95	0.873	50	0.60	0.55	22	1.32	25	321	NOTE FOR METALS DATA
																		Sample measurements are Total Metals, whereas,
																		Water Quality Standards are Total Recoverable Metals.
CADMIUM			0.08	42.00	9.3	0.24	0.09	NO	0.95	0.873	3	0.60	0.55	22	1.32	25	321	All sample measurements for Aresenic, Cadmium,
																		Chromium, Lead, Mercury, Nickel, and Silver are below
																		Method Detection Limit (MDL). Two of the sample
CHROMIUM				1100	50	0.26	0.02	NO	0.95	0.873	5	0.60	0.55	22	1.32	25	321	measurements for Copper are below MDL; the rest are
																		below Reportable Detection Limit (RDL).
																		Four sample measurements for Zinc are below RDL.
COPPER			0.54	4.80	3.10	1.37	0.60	NO	0.95	0.873	16	0.60	0.55	22	1.32	25	321	
LEAD			0.12	210.00	8.10	1.70	0.24	NO	0.95	0.873	30	0.60	0.55	22	1.32	25	321	
MERCURY				1.80	0.0250	0.01	0.00	NO	0.95	0.873	0.20	0.60	0.55	22	1.32	25	321	
NICKEL			0.41	74.00	8.20	1.45	0.49	NO	0.95	0.873	20	0.60	0.55	22	1.32	25	321	
SILVER				1.90	10000.0000	0.21	0.02	NO	0.95	0.873	4	0.60	0.55	22	1.32	25	321	
ZINC			0.49	90.00	81.00	38.38	3.44	NO	0.95	0.873	536	1.60	1.13	22	1.77	25	321	

APPENDIX E—WATER QUALITY-BASED PERMIT LIMITS CALCULATIONS FOR CHLORINE

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.

	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translat or Acute	Metal Criteria Translat or Chronic	Ambient Concentr ation	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	Comments	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	LTA Proby Basis	Limiting LTA	Coeff. Var. (CV)	AML Proby Basis	MDL Proby Basis	# of Samples per Month
	Permit Limit Calculation Summary										Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation			
PARAMETER					ug/L	ug/L	ug/L	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L	decimal	decimal	ug/L	decimal	decimal	decimal	n
CHLORINE	25	321				13	7.50	**124.1**	**325.0**		325	2407.50	104.4	1269.8	0.60	0.99	104.4	0.60	0.95	0.99	30.00	1.00

This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98.
Written by G. Shervey

APPENDIX F—LIST OF POLLUTANTS FOR TESTING REQUIRED IN PERMIT CONDITION S2.A.(3)

EPA "PART D" NPDES APPLICATION FORM 2A TESTING REQUIREMENTS

The following pollutant scan data are required at the time of NPDES permit application for municipal treatment facilities with design flow greater than 1.0 mgd. At least three scans are to be conducted during the term of the permit. The metals are to be analyzed as "Total recoverable Metals" Section 4.1.4, Publication EPA-600/4-79-020, *Methods for Chemical Analysis of water and Wastes*, 1979. Please see Condition S2.A(4) of the permit.

METALS & MISC.	**VOL. ORGANICS (Cont.)**	**BASE NEUTRALS (Cont.)**
Antimony	Ethylbenzene	Bis (2-Chloroethyl)-Ether
Arsenic	Methyl Bromide	Bis (2-Chloroiso-Propyl) Ether
Beryllium	Methyl Chloride	Bis (2-Ethylhexyl) Phthalate
Cadmium	Methylene Chloride	4-Bromophenyl Phenyl Ether
Chromium	1,1,2,2-Tetrachloro-Ethane	Butyl Benzyl Phthalate
Copper	Tetrachloro-Ethylene	2-Chloronaphthalene
Lead	Toluene	4-Chlorphenyl Phenyl Ether
Mercury	1,1,1-Trichloroethane	Chrysene
Nickel	1,1,2-Trichloroethane	Di-N-Butyl Phthalate
Selenium	Trichlorethylene	Di-N-Octyl Phthalate
Silver	Vinyl Chloride	Dibenzo(A,H) Anthracene
Thallium		1,2-Dichlorobenzene
Zinc	**ACID EXTRACTABLES**	1,3-Dichlorobenzene
Cyanide	P-Chloro-M-Cresol	1,4-Dichlorobenzene
Total Phenolic Compounds	2-Chlorophenol	3,3-Dichlorobenzidine
Hardness (As $CaCO_3$)	2,4-Dichlorophenol	Diethyl Phthalate
	2,4-Dimethylphenol	Dimethyl Phthalate
VOLATILE ORGANICS	4,6-Dinitro-O-Cresol	2,4-Dinitrotoluene
Acrolein	2,4-Dinitrophenol	2,6-Dinitrotoluene
Acrylonitrile	2-Nitrophenol	Fluoranthene
Benzene	4-Nitrophenol	Fluorene
Bromoform	Pentachlorophenol	Hexachlorobenzene
Carbon Tetrachloride	Phenol	Hexachlorobutadiene
Clorobenzene	2,4,6-Trichlorophenol	Hexachlorocyclo-Pentadiene
Chlorodibromo-Methane		Hexachloroethane
Chloroethane	**BASE NEUTRALS**	Indeno(1,2,3-CD)Pyrene
2-Chloro-Ethylvinyl Ether	Acenaphthene	Isophorone
Chloroform	Acenaphthylene	Naphthalene
Dichlorobromo-Methane	Anthracene	Nitrobenzene
1,1-Dichloroethane	Benzidine	N-Nitrosodi-N-Propylamine
1,2-Dichloroethane	Benzo(A)Anthracene	N-Nitrosodi-Methylamine
Trans-1,2-Dichloro Ethylene	3,4 Benzo-Fluoranthene	N-Nitrosodi-Phenylamine
1,1-Dichloroethylene	Benzo(Ghi)Perylene	Phenanthrene
1,2-Dichloropropane	Benzo(K)Fluoranthene	Pyrene
1,3-Dichloro-Propylene	Bis (2-Chloroethoxy) Methane	1,2,4-Trichlorobenzene

APPENDIX G—RESPONSE TO COMMENTS

No comments were submitted to the Department of Ecology during the public notice period.

Appendix E
Pump Station Site Visit, July 9, 2008, by John Freck PE, BHC Consultants

City of Port Orchard
Pump Station Site Visit
July 9th, 2008

John Frech of BHC Consultants toured four sewage pump station facilities with Jay Cookson and Dave Boltz. Three of the pump stations, McCormick Woods #1, McCormick Woods #2 and Marina Pump Station have been identified as stations most needing repair. The fourth pump station visited, McCormick Ridge, was recently constructed and is considered a model for other pump stations.

Pump Station constructed around 1994

Pumps
- Submersible Centrifugal Sewage Pump Manufactured by Hydromatic S6LX
- Configuration - duplex
- Power - 25 hp, 1,750 RPM, 460 Volt, 3 Phase
- Flow – 1, 000 gpm at 59.74 ft TDH
- Rail system – dual rail for each pump complete with discharge elbow.

Wetwell
- 12-foot diameter fiberglass reinforced plastic (FRP) manhole
- Access – two 31” x 39” aluminum hatches
- Float system control

Valve Vault
- 10-foot diameter fiberglass reinforced plastic (FRP) manhole

Access – two 31” x 39” aluminum hatches
- 2 sets of valves to provide control for each pump
  - 10-inch check valve
  - 10-inch plug valve

Isolation Valve Vault
- 5-foot diameter fiberglass reinforced plastic (FRP) manhole
- Access – one 31” x 39” aluminum hatch
- One 16” plug valve
- One Saddle for chemical injection

Generator
- Size ?
- Make – Stamford Generator
- Configuration – externally mounted with manufacturer’s enclosure
- Footprint – 6’-8” x 9’-0”
- Sound Attenuation –exhaust muffler only

Building
- Structure – 10’ x 10’ fiberglass enclosure with divider wall. One side for aeration pump, the second side for chemical feed system. The building is set on a concrete foundation that is in sound condition.

- Exterior – fiberglass appears to be weathering well

Electrical – lights and heater are being corroded by Chlorine chemical attack

Ventilation – exhaust fan

Control Panel
Size – 200 amp x 460 volt
Each pump has a 70 amp x 460 volt breaker
Minimal Corrosion

Pump Power and Float Connection Boxes
Corrosion free in interior

Chemical Feed System

Chemical System – 12.5% Sodium Hypochlorite

Containment – Fiberglass storage tank

Secondary Containment – Concrete floor and raised perimeter with sump draining to wetwell. 8'x12' containment

Small metering pumps feed system

PVC piping used for feed lines. Pipe glue attacked by chlorine and requires intermittent replacement.

Injection Points – chemical injected into wetwell. In the past injection occurred in the wetwell and direct injection into the pipe in the last valve vault

Metering System
No pressure gauge
No flow meter
No pump amp meter. Portable unit available to check amperage
Hour meter -Analog totalizers time each pump
-Separate Analog totalizer sums all pump hours
Flow calculated by multiplying time x pump rate

Telemetry
New system installed recently – 2006+/-
Monitored items:

- Communication – enabled or disabled
- Alarm - displays enabled or not
- Alarm – intrusion will be indicated if control panel is opened w/o dearming
- Power source – displays if primary power is providing power or not
- Pump 1 and 2 – displays on, off or removed for each pump

Aesthetics
Noise from generator
Bad odor from wetwell

Safety

Chlorine gas emitted in building could be hazardous

Security

Comfortable with current level of security
Security sign added to fence has helped
Intrusion alarm on control panel

Deficiency

Corrosion – caused by chlorine feed system and increased by aggressive STEP influent sewage

- Pump rails and rail mounts are heavily corroded
- Pump power cable insulation may be compromised where exposed to wetwell gases
- Building lights and heaters are being corroded by chlorine
- Check valves
    - Springs are rusted off
    - Backflow is occurring during pump shutoff causing valve to slam
- Plug handles are rusted off and many valves are inoperable
- Saddle at second valve vault appears structurally compromised
- Concrete lids of wetwell and valve vaults – coatings are split and rusty residue is leaking out

Chemical Feed

- Sodium hypochlorite is not recommended due to corrosion, potential danger, chlorinated byproducts and ability to upset biology of waste stream prior to reaching treatment plant.
- New storage tank, feed pumps and injection cycle may be needed with new chemical
- Secondary containment - the concrete area provided for secondary containment should not be allowed to automatically drain to wetwell

Lighting

- No area lighting

Pumps

- Pump failed during visit. May be reaching end of useful life

Generator

- May be too loud for future neighboring houses
- Size may be too small for future pumps

Pump Removal

- City has to contract out service to remove pumps. Makes maintenance difficult. Truck with swinging boom desired by City

Maintenance

Activities

- Daily site visit to read hour meters and look over station
- Vactor out wetwell when needed

- Cleaning not required frequently since STEP effluent is typically free from grease and solids that will clog the pumps

Space provided for maintenance

- Two 39” x 31” aluminum hatches allow access the wetwell
- Two 39” x 31” aluminum hatch for valve vault
- One 39” x 31” aluminum hatch for second valve vault

McCormick Woods 1 Pump Station:

Pump Station constructed around 1995

Pumps

- Submersible Centrifugal Sewage Pump Manufactured by ???
- Configuration - duplex
- Power - 60 hp, 460 Volt, 3 Phase
- Flow – gpm at TDH
- Rail system ??
- Loud with significant vibration during operation

Wetwell

- 12-foot diameter concrete manhole
- Access – two 31” x 39” aluminum hatches
- Float system control
- (Did not look at wetwell)

Valve Vault

- 10-foot diameter concrete manhole
- Access – two 31” x 39” aluminum hatches
- 2 sets of valves to provide control for each pump
  - 10-inch check valve
  - 10-inch plug valve
- Plug valves not exercised regularly and may not close if needed.
- Check valve slams when pump stops

Isolation Valve Vault

- Concrete Manhole
- Access – one 31” x 39” aluminum hatch
- One 16” plug valve

Generator

- Size 280 KVA
- Make – Stamford Generator stamped June1995
- Configuration – externally mounted with manufacturer’s enclosure
- Footprint – 6’-8” x 11’-0”
- Sound Attenuation –exhaust muffler only

Building

Structure – 10’ x 10’ fiberglass enclosure with divider wall. One side for aeration pump, the Second side for chemical feed system. The building is set on a concrete foundation that is in sound condition.

Exterior – fiberglass appears to be weathering well

Electrical – lights and heater are being corroded by Chlorine chemical attack

Ventilation – exhaust fan

Control Panel

Size – 400 amp x 460 volt
Minimal Corrosion

Pump Power and Float Connection Boxed

Corrosion free in interior
Bolts to secure panel shut are corroded and should be replaced

Chemical Feed System

Chemical Used – 12.5% Sodium Hypochlorite 1200 gallons/year

Containment – Fiberglass storage tank. Sprung a leak a few years back and injured two workers

Secondary Containment – Concrete floor and raised perimeter with sump draining to wetwell. 8'x12' containment

Small metering pumps feed system

PVC piping used for feed lines. Pipe glue attacked by chlorine and requires intermittent replacement.

Injection Points – chemical injected into wetwell. In the past injection occurred in the wetwell and direct injection into the pipe in the last valve vault

Metering System

Pressure gauge is broken
No flow meter
No pump amp meter. Portable unit available to check amperage
Hour meter

- Analog totalizers time each pump
- Separate Analog totalizer sums all pump hours

Flow calculated by multiplying time x pump rate

Telemetry

New system installed recently – 2006+/-
Monitored items:

- Communication – enabled or disabled
- Alarm - displays enabled or not
- Alarm – intrusion will be indicated if control panel is opened w/o dearming
- Power source – displays if primary power is providing power
- Pump 1 and 2 – displays on, off or removed for each pump
- Phone monitoring line cuts out frequently

Aesthetics

Noise from generator OK for area. No future houses sited nearby.

Safety

Chlorine gas emitted in building could be hazardous

Security

Comfortable with current level of security
Security sign added to fence has helped
Intrusion alarm on control panel

Deficiency

Corrosion – less corrosion than McCormick PS#2

- Pump power cable insulation may be compromised where in wetwell
- Building lights and heaters are being corroded by chlorine
- Check valves
    - Backflow is occurring during pump shutoff causing valve to slam
- Plug valves are not operated frequently and may be inoperable.

Chemical Feed

- Sodium hypochlorite is not recommended due to corrosion, potential danger, chlorinated byproducts and ability to upset biology of waste stream prior to reaching treatment plant.
- New storage tank, feed pumps and injection cycle may be needed with new chemical
- Secondary containment - the concrete area provided for secondary containment should not be allowed to automatically drain to wetwell

Lighting

- No area lighting

Pump Removal

- City has to contract out service to remove pumps. Makes maintenance difficult. Truck with swinging boom desired by City

Maintenance

Activities

- Daily site visit to read hour meters and look over station
- Vactor out wetwell when needed
- Cleaning not required frequently since STEP effluent is typically free from grease and solids that will clog the pumps. Have occasionally had ragging caused by activities at Juvenile Detention Center

Space provided for maintenance

- Two 39” x 31” aluminum hatches allow access the wetwell
- Two 39” x 31” aluminum hatch for valve vault
- One 39” x 31” aluminum hatch for second valve vault

Marina Pump Station:

Pump Station originally constructed in 1983, new chopper pumps in 2004

Pumps

Dry Pit Configuration – 4 pumps: 2 large and 2 small

Pumps 1 and 2:

Power - 150 hp GE motors, 460 Volt, 3 Phase, 1175 RPM
Flow - 2,600 gpm at 115 TDH
Control - VFD pump 1, Constant speed pump 2
2 Dry Pit Centrifugal Sewage Pump
Manufactured by McGraw Edison Worthington

Pumps 3 and 4

Power - 25 hp Baldor, 460 Volt, 3 Phase, 1175 RPM
Flow - ??? gpm at 115 TDH
Control - VFD pump 1, Constant speed pump 2
2 Dry Pit Chopper Pump
Manufactured by Vaughn
Pumps are relatively new and appear to be in good condition (pump 3 has had seal issues- problem seems to be resolved)

Wetwell

(Did not look at wetwell due to difficult access)
Access – Manhole lid and concrete rectangular panel

Dry Pit

Large open room
Access

Personnel - single mandoor at top of staircase
Equipment - Removable concrete panel at top of structure in parking lot to permit removal of pumps by crane

Valves – Each pump has valves to prevent backflow and provide isolation

Small pumps:

8-inch check valve
8-inch plug valve

Big pumps:

14-inch check valve
14-inch plug valve

Valves appear to be in good condition, need to be exercised to determine proper operation

Generator

Size 281 KVA, 301 hp diesel engine
Make – Mitusbishi (difficult to get parts)
External fuel tank – single wall, no secondary containment, positioned near floor drain
Configuration – internally mounted
Sound Attenuation – concrete structure and muffler. Louvers are non sound attenuating.

Noise – moderate outside during operation, no complaints from nearby marina neighbors.

Building

Structures–

Wet pit and dry pit below grade

Dry Pit: Appears to be in good condition. Small deposits formed where groundwater has leaked through. Lighting is minimal, but adequate. Analysis of ventilation and entrance protocol may be required to protect workers from dangers of confined space.

Control and Generator Building: Interior in good condition. Leak in ceiling fixed in past waterfront improvement project. Lighting is minimal, but adequate. Exterior foundation being compromised by rusting sheet pile around the perimeter of the structure located at the shoreline.

Control Panels

Pump 1 – Robocon VFD
Pump 2 – Klockner Mueller JBox 480 volt, 3 phase, 180 amp
Pump 3 and 4 – General Electric 8000 Model
No Visible corrosion

No Chemical Feed System

Metering System

Pressure gauge for each pump
Flow meter: 1 meter for small pumps and 1 meter for large
No pump amp meter, can use portable unit to check amperage
Hour meter -Analog totalizers time each pump
-Separate analog totalizer sums all pump hours

Telemetry

System installed ???
Monitored items:

- Communication – enabled or disabled
- Alarm - displays enabled or not
- Alarm – intrusion will be indicated if door is opened to control room??
- Power source – displays if primary power is providing power or if generator is operating
- Pump 1 and 2 – displays on, off or removed for each pump

Aesthetics

Pump station and control building are very well hidden. Odor coming from manhole near wetwell has been addressed by placing treated aggregate in a basket located in the manhole chimney.

Safety

Confined space to drywell could be hazardous. Ventilation and entrance protocol should be examined.

Security

Comfortable with current level of security
Fence to prohibit access to waterfront side of control room has reduced vandalism
Intrusion alarm on control room door

Deficiency

Lighting - increased lighting in control room and dry pit may be desired
Generator - parts availability limited and fuel storage needs secondary containment
Access to wetwell is challenging. Makes routine inspection difficult.
Confined space to drywell could be hazardous. Ventilation and entrance protocol should be examined.

Maintenance

Activities

- Daily site visit to read hour meters and look over station

Appendix F
Pump Station Flow Evaluation

City of Port Orchard

Watewater Flow Recorded through Marina Pump Station

MONTHLY FLOWS							
2007							
	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	FLOW	MGD		
JAN	1	2.431	804175	9315003	1.10	45.1	1.14
	2	4.165	804239	9325332	**1.96**	47.2	0.42
	3	2.801	804838	9338983	1.20	42.8	0.24
	4	2.189	804894	9350401	0.87	39.7	0.32
	5	3.596	804957	9358452	1.80	50.2	**2.08**
	6	2.877	805377	9372296	1.44	50.0	0.54
	7	3.961	805578	9384670	1.58	39.8	0.84
	8	2.377	805836	9397853	0.98	41.2	0.02
	9	2.083	805901	9406996	0.94	45.2	0.32
	10	1.836	805925	9416174	0.83	45.4	0.50
	11	1.809	805938	9424375	0.78	43.4	0.00
	12	1.605	805963	9431968	0.75	46.9	0.00
	13	1.680	806002	9439104	0.70	41.6	0.00
	14	1.635	806027	9445849	0.76	46.4	0.00
JAN	15	1.718	806050	9453202	0.73	42.4	0.24
	16	1.515	806072	9460260	0.70	45.9	0.00
	17	1.637	806095	9466987	0.76	46.2	0.28
	18	1.612	806117	9474337	0.75	46.7	0.16
	19	1.539	806140	9481641	0.72	46.9	0.23
	20	1.540	806180	9488461	0.78	50.4	0.02
	21	1.577	806204	9495990	0.71	44.8	0.01
	22	1.527	806227	9502828	0.77	50.2	0.01
	23	1.403	806237	9510387	0.88	62.4	0.00
	24	1.533	806276	9518757	0.52	34.2	0.00
	25	1.488	806290	9523859	0.74	49.6	0.00
	26	1.443	806329	9530852	0.62	43.0	0.00
	27	1.505	806368	9536664	0.73	48.3	0.00
	28	1.872	806392	9543694	0.79	42.4	0.00
	29	1.402	806415	9551401	0.72	51.7	0.00
	30	1.622	806453	9558264	0.69	42.6	0.00
	31	1.569	806483	9564866	0.66	41.9	0.00
Total					28.0		7.37
Average					0.902		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	**FLOW**	**MGD**		
FEB	1	1.516	806518	9571089	0.75	49.4	0.00
	2	1.582	806554	9578222	0.71	44.8	0.00
	3	1.541	806579	9585054	0.74	47.9	0.06
	4	1.580	806616	9592064	0.65	41.2	0.00
	5	1.519	806654	9598190	0.69	45.5	0.00
	6	1.592	806691	9604725	0.70	44.2	0.00
	7	1.417	806706	9611610	0.71	50.3	0.00
	8	1.483	806728	9618522	0.74	49.9	0.10
	9	1.397	806752	9625689	0.66	47.1	0.09
	10	1.600	806776	9632027	0.81	50.9	0.40
	11	1.877	806800	9639933	0.68	36.4	0.25
	12	1.482	806823	9646528	0.70	46.9	0.02
	13	1.446	806861	9653101	0.70	48.3	0.00
	14	1.522	806899	9659711	0.71	46.9	**1.00**
FEB	15	1.527	806935	9666482	0.71	46.7	0.00
	16	1.431	806947	9673492	0.67	46.7	0.50
	17	1.573	806984	9679807	0.70	44.5	0.00
	18	1.490	807018	9686465	0.68	45.8	0.18
	19	1.873	807042	9693056	0.91	48.6	0.59
	20	1.661	807068	9701899	0.83	50.2	0.05
	21	1.518	807092	9709998	0.70	46.4	0.23
	22	1.666	807118	9716777	0.65	38.8	0.00
	23	1.432	807143	9722989	0.78	54.8	0.24
	24	2.020	807166	9730606	0.91	44.8	0.44
	25	2.029	807190	9739425	**1.01**	49.6	0.31
	26	1.767	807214	9749253	0.70	39.7	0.04
	27	1.537	807255	9755855	0.81	52.7	0.02
	28	1.530	807277	9763740	0.70	46.1	0.02
Total					20.7		4.54
Average					0.740		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	**FLOW**	**MGD**		
MAR	1	1.515	807315	9770409	0.66	43.2	0.02
	2	1.345	807338	9776729	0.70	52.4	0.02
	3	1.526	807362	9783538	0.75	49.0	0.24
	4	1.779	807398	9790652	0.78	43.8	0.00
	5	1.559	807422	9798197	0.70	45.0	0.06
	6	1.601	807449	9804939	0.73	45.8	0.01
	7	1.860	807484	9811921	0.83	44.5	0.24
	8	2.158	807508	9819950	0.94	43.4	0.60
	9	1.779	807533	9829055	0.86	48.1	0.90
	10	2.143	807557	9837373	1.03	48.1	0.08
	11	2.376	807583	9847413	**1.32**	55.5	0.72
	12	2.300	807613	9860300	1.08	47.1	**1.02**
	13	1.843	807639	9870876	0.77	42.0	0.01
	14	1.714	807664	9878369	0.76	44.4	0.05
MAR	15	1.768	807693	9885682	0.76	43.0	0.00
	16	1.607	807722	9892996	0.82	51.1	0.00
	17	1.637	807762	9900806	0.59	36.2	0.10
	18	1.851	807786	9906486	0.79	42.8	0.00
	19	2.034	807809	9914170	0.80	39.6	0.74
	20	1.672	807833	9921976	0.89	53.4	0.01
	21	1.683	807844	9930788	0.64	38.2	0.15
	22	1.690	807883	9936830	0.70	41.3	0.00
	23	1.702	807908	9943558	0.76	44.5	0.68
	24	2.298	807941	9950805	0.87	37.9	0.30
	25	1.983	807965	9959275	0.84	42.6	0.03
	26	1.897	807988	9967484	0.80	42.1	0.11
	27	1.922	808012	9975225	0.73	37.9	0.19
	28	1.657	808035	9982282	0.75	45.1	0.00
	29	1.629	808068	9989424	0.76	46.5	0.00
	30	1.605	808101	9996674	0.73	45.6	0.48
	31	1.846	808126	10003750	0.72	39.2	0.02
Total					24.9		6.78
Average					0.802		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	FLOW	MGD		
APR	1	1.710	808150	10010743	0.62	36.5	0.00
	2	1.470	808173	10016762	0.69	47.0	0.08
	3	1.570	808197	10023430	0.66	41.8	0.00
	4	1.490	808236	10029604	0.63	42.2	0.00
	5	1.480	808259	10035667	0.67	45.1	0.00
	6	1.420	808293	10042009	0.63	44.3	0.00
	7	1.560	808327	10047957	0.69	44.2	0.08
	8	1.710	808350	10054624	**0.77**	45.1	**0.48**
	9	1.560	808361	10062232	0.22	14.3	0.00
	10	1.650	808384	10064226	0.37	22.6	0.00
	11	1.610	808420	10067596	0.07	4.4	0.05
	12	1.670	808458	10067930	**2.18**	130.7	0.00
	13	1.610	808481	10089523	0.63	39.3	0.25
	14	1.600	808518	10095479	0.70	43.7	0.00
APR	15	1.500	808543	10102224	0.75	50.1	0.02
	16	1.550	808586	10109302	0.68	44.2	0.02
	17	1.540	808638	10115630	0.73	47.6	0.20
	18	1.510	808671	10122627	0.72	47.5	0.24
	19	1.520	808708	10129435	0.75	49.3	0.00
	20	1.470	808748	10136525	0.70	47.9	0.00
	21	1.520	808771	10143338	0.74	49.0	0.22
	22	1.690	808795	10150545	0.72	42.8	0.02
	23	1.560	808830	10157428	0.70	45.1	0.20
	24	1.490	808864	10164129	0.70	47.3	0.04
	25	1.540	808902	10170791	0.73	47.3	0.00
	26	1.560	808926	10177842	0.74	47.1	0.00
	27	1.370	808949	10184966	0.67	49.2	0.02
	28	1.420	808984	10191357	0.71	50.0	0.00
	29	1.630	809013	10198167	0.66	40.2	0.00
	30	1.530	809036	10204493	0.72	46.9	0.12
Total					21.0		2.04
Average					0.699		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	FLOW	MGD		
MAY	1	1.507	809068	10211355	0.71	47.3	0.13
	2	1.480	809103	10218127	0.71	48.0	0.50
	3	1.465	809152	10224738	0.72	49.3	0.08
	4	1.440	809190	10231585	0.70	48.7	0.15
	5	1.517	809225	10238243	0.70	46.0	0.01
	6	1.628	809248	10244997	0.71	43.8	0.00
	7	1.410	809272	10251887	0.76	54.2	0.00
	8	1.601	809294	10259314	0.70	43.5	0.00
	9	1.473	809331	10265909	0.72	48.8	0.00
	10	1.475	809369	10272723	0.74	50.0	0.00
	11	1.387	809403	10279762	0.84	60.6	0.00
	12	1.448	809429	10287905	0.67	45.9	0.05
	13	1.582	809452	10294325	0.65	41.2	0.00
	14	1.656	809484	10300527	0.74	45.0	0.00
MAY	15	1.457	809506	10307756	0.71	48.8	0.00
	16	1.352	809545	10314479	0.70	51.8	0.00
	17	1.507	809577	10321164	0.72	47.9	0.00
	18	1.407	809615	10327999	0.73	52.2	0.24
	19	1.484	809650	10334998	0.67	45.0	0.18
	20	1.804	809688	10341289	0.75	41.5	**0.56**
	21	1.580	809712	10348532	0.74	47.0	0.25
	22	1.450	809724	10355833	0.70	48.4	0.00
	23	1.548	809753	10362559	0.74	48.1	0.00
	24	1.580	809789	10369641	0.78	49.6	0.00
	25	1.415	809826	10377111	0.68	48.2	0.00
	26	1.520	809865	10383545	0.69	45.7	0.00
	27	1.462	809900	10390137	0.68	46.3	0.04
	28	1.533	809923	10396673	**0.86**	56.3	0.00
	29	1.489	809946	10405080	0.67	45.0	0.00
	30	1.436	809970	10411542	0.70	48.6	0.00
	31	1.426	810006	10418157	0.75	52.3	0.00
Total					22.4		2.19
Average					0.721		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	FLOW	MGD		
JUN	1	1.422	810029	10425384	0.62	43.3	0.00
	2	1.409	810066	10431171	0.79	56.2	0.00
	3	1.589	810091	10438840	0.59	37.2	0.00
	4	1.528	810114	10444514	0.70	45.9	0.00
	5	1.407	810137	10451298	0.72	51.4	0.21
	6	1.361	810182	10458082	0.70	51.5	0.00
	7	1.532	810241	10464507	0.75	49.2	0.00
	8	1.415	810264	10471821	0.72	51.0	0.00
	9	1.546	810306	10478620	0.79	51.3	**0.39**
	10	1.640	810346	10486155	**1.15**	70.0	0.00
	11	1.448	810368	10497415	0.22	14.9	0.00
	12	1.349	810399	10499261	0.72	53.4	0.00
	13	1.538	810420	10506258	0.72	46.6	0.00
	14	1.432	810451	10513114	0.73	51.1	0.00
JUN	15	1.394	810475	10520190	0.75	54.0	0.00
	16	1.440	810506	10527401	0.73	50.6	0.22
	17	1.554	810540	10534347	0.70	44.9	0.13
	18	1.504	810552	10541205	0.72	47.9	0.00
	19	1.612	810592	10548002	0.72	44.9	0.00
	20	1.652	810629	10554866	0.70	42.2	0.00
	21	1.569	810657	10561557	0.72	46.1	0.22
	22	1.513	810682	10568541	0.68	44.7	0.00
	23	1.440	810731	10574817	0.67	46.7	0.07
	24	1.580	810768	10581176	0.65	40.9	0.05
	25	1.416	810802	10587302	0.95	67.1	0.00
	26	1.632	810828	10596549	0.48	29.3	0.00
	27	1.402	810864	10600974	0.68	48.4	0.03
	28	1.457	810906	10607338	0.70	48.3	0.23
	29	1.614	810944	10613990	0.77	47.6	0.00
	30	1.600	810971	10621401	0.71	44.2	0.00
Total					21.3		1.55
Average					0.708		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	FLOW	MGD		
JUL	1	1.320	811010	10628087	0.71	53.5	0.00
	2	1.489	811056	10634694	0.73	49.3	0.00
	3	1.336	811080	10641793	0.65	48.5	0.00
	4	1.395	811115	10647926	0.70	50.5	0.00
	5	1.475	811138	10654735	0.70	47.6	0.00
	6	1.470	811163	10661505	0.62	41.9	0.00
	7	1.485	811187	10667428	0.63	42.6	0.00
	8	1.438	811232	10673305	0.63	43.8	0.00
	9	1.500	811266	10679259	0.64	42.4	0.00
	10	1.443	811345	10684823	0.75	52.0	0.00
	11	1.441	811451	10691271	0.63	43.8	0.00
	12	1.362	811425	10697844	0.67	49.0	0.00
	13	1.467	811458	10704193	0.63	42.7	0.00
	14	1.473	811469	10710352	0.62	42.3	0.00
JUL	15	1.455	811484	10716432	0.69	47.5	0.00
	16	1.435	811564	10722546	0.64	44.7	0.16
	17	1.425	811595	10728648	0.70	49.1	0.10
	18	1.548	811627	10735322	0.71	46.0	0.02
	19	1.516	811667	10742041	0.70	46.4	0.03
	20	1.527	811707	10748673	0.74	48.1	0.12
	21	1.626	811742	10755674	**0.75**	46.2	**0.60**
	22	1.715	811767	10762932	0.67	39.0	0.19
	23	1.655	811791	10769387	0.68	41.3	0.00
	24	1.496	811832	10775811	0.69	46.0	0.00
	25	1.512	811877	10782239	0.69	45.8	0.00
	26	1.392	811901	10788920	0.72	51.7	0.00
	27	1.541	811938	10795748	0.67	43.5	0.00
	28	1.468	811974	10802098	0.59	40.4	0.00
	29	1.461	811987	10807892	0.72	48.9	0.00
	30	1.556	812049	10814422	0.71	45.6	0.00
	31	1.389	812077	10821231	0.66	47.2	0.00
Total					21.0		1.22
Average					0.679		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	FLOW	MGD		
AUG	1	1.646	812118	10827373	0.64	38.7	0.00
	2	1.397	812157	10833348	0.67	47.8	0.03
	3	1.467	812186	10839741	0.63	43.2	0.00
	4	1.354	812228	10845665	0.63	46.2	0.00
	5	1.506	812250	10851702	0.65	43.0	0.00
	6	1.429	812277	10857905	0.67	46.6	0.00
	7	1.425	812317	10864163	0.67	46.8	0.03
	8	1.481	812372	10870276	0.66	44.4	0.02
	9	1.405	812402	10876558	0.69	48.8	0.02
	10	1.392	812439	10883045	0.67	48.0	0.00
	11	1.425	812468	10889435	0.60	42.1	0.00
	12	1.371	812506	10895050	0.65	47.3	0.00
	13	1.423	812532	10901272	0.68	47.8	0.00
	14	1.272	812572	10907678	0.62	48.4	0.00
AUG	15	1.385	812601	10913549	0.68	49.3	0.00
	16	1.668	812624	10920141	0.67	40.4	0.00
	17	1.081	812662	10926504	0.66	61.4	0.00
	18	1.425	812699	10932772	0.69	48.6	0.15
	19	1.623	812721	10939482	0.65	39.8	**0.28**
	20	1.628	812761	10945539	**0.74**	45.6	0.24
	21	2.046	812795	10952625	0.68	33.4	0.00
	22	1.466	812835	10959060	0.69	46.8	0.00
	23	1.457	812873	10965537	0.72	49.2	0.00
	24	1.419	812912	10972309	0.66	46.4	0.00
	25	1.430	812945	10978565	0.64	45.0	0.05
	26	1.386	812968	10984776	0.64	46.2	0.00
	27	1.373	813015	10990708	0.67	48.9	0.00
	28	1.296	813044	10997126	0.67	51.7	0.00
	29	1.401	813089	11003370	0.64	45.8	0.00
	30	1.463	813138	11009301	0.67	46.0	0.00
	31	1.553	813169	11015718	0.67	43.4	0.00
Total					20.6		0.82
Average					0.663		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	**FLOW**	**MGD**		
SEP	1	1.504	813208	11022069	0.67	44.5	0.00
	2	1.631	813247	11028369	0.63	38.3	0.00
	3	1.632	813270	11034392	0.76	46.6	0.30
	4	1.559	813293	11041763	0.69	44.5	0.24
	5	1.400	813332	11048312	0.57	40.6	0.00
	6	1.560	813374	11053580	0.76	48.9	0.00
	7	1.377	813414	11060814	0.56	40.3	0.00
	8	1.500	813442	11066087	0.69	46.2	0.00
	9	1.421	813510	11072330	0.75	52.6	0.00
	10	1.591	813558	11079329	0.11	6.7	0.00
	11	1.477	813002	11085950	**1.23**	83.3	0.00
	12	1.775	813625	11092025	0.67	37.6	0.00
	13	1.482	813655	11098392	0.72	48.4	0.00
	14	1.343	813695	11105170	0.69	51.1	0.00
SEP	15	1.620	813740	11111583	0.65	40.2	0.00
	16	1.789	813764	11117858	0.72	40.1	0.24
	17	1.515	813796	11124718	0.72	47.8	0.04
	18	1.332	813828	11131644	0.67	50.0	0.04
	19	1.576	813857	11138011	0.68	42.9	0.00
	20	1.390	813884	11144507	0.72	51.5	0.00
	21	1.351	813907	11151438	0.59	43.5	0.23
	22	1.503	813946	11156921	0.64	42.7	0.04
	23	1.480	813987	11162929	0.73	49.5	0.00
	24	1.495	814033	11169799	0.70	46.5	0.00
	25	1.403	814062	11176460	0.66	46.8	0.00
	26	1.428	814102	11182625	0.67	47.1	0.00
	27	1.478	814142	11188946	0.68	45.7	0.36
	28	1.440	814180	11195318	0.67	46.8	0.12
	29	1.454	814208	11201784	**0.87**	59.8	0.52
	30	2.180	814221	11210344	0.80	36.8	**1.03**
Total					20.64		3.16
Average					0.688		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	FLOW	MGD		
OCT	1	1.702	814244	11218129	0.82	48.4	0.32
	2	1.831	814268	11226123	0.84	45.8	0.29
	3	1.708	814295	11234243	0.72	42.3	0.15
	4	1.641	814317	11241246	0.76	46.3	0.50
	5	1.780	814340	11248617	0.66	36.8	0.00
	6	2.065	814379	11254778	0.74	35.7	0.06
	7	1.873	814418	11261758	0.70	37.5	0.32
	8	1.841	814457	11268393	0.74	40.4	0.36
	9	1.644	814480	11275592	0.70	42.7	0.24
	10	1.613	814518	11282226	0.73	45.1	0.04
	11	1.582	814550	11289178	0.70	44.3	0.02
	12	1.437	814590	11295787	0.62	43.2	0.00
	13	1.429	814637	11301519	0.62	43.5	0.00
	14	1.434	814675	11307350	0.65	45.3	0.00
OCT	15	1.600	814732	11313282	0.60	37.3	0.14
	16	1.470	814741	11319160	0.58	39.3	0.19
	17	1.525	814782	11324520	0.66	43.5	**0.56**
	18	1.582	814830	11330674	0.69	43.7	0.35
	19	2.270	814857	11337316	**0.97**	42.6	0.00
	20	2.013	814883	11346733	0.76	37.6	0.04
	21	1.949	814897	11354164	0.78	40.1	0.12
	22	1.704	814921	11361746	0.73	43.1	0.00
	23	1.635	814945	11368850	0.70	42.8	0.00
	24	1.726	814985	11375451	0.74	42.8	0.25
	25	1.680	815024	11382454	0.71	42.5	0.02
	26	1.526	815047	11389363	0.66	43.5	0.00
	27	1.604	815069	11395784	0.71	44.0	0.00
	28	1.805	815107	11402457	0.71	39.5	0.00
	29	1.667	815146	11409199	0.84	50.4	0.00
	30	1.618	815186	11417203	0.65	39.9	0.00
	31	1.614	815224	11423281	0.69	42.8	0.00
Total					22.19		3.97
Average					0.716		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	**FLOW**	**MGD**		
NOV	1	1.510	815264	11429785	0.72	47.5	0.00
	2	1.660	815302	11436575	0.69	41.4	0.00
	3	1.590	815340	11443068	0.68	42.8	0.01
	4	1.840	815362	11449651	0.71	38.6	0.00
	5	1.680	815375	11456623	0.69	41.0	0.00
	6	1.480	815407	11463193	0.69	46.4	0.05
	7	1.560	815445	11469683	0.73	46.8	0.05
	8	1.630	815483	11476607	0.68	41.5	0.14
	9	1.450	815506	11483148	0.65	44.9	0.25
	10	1.530	815544	11489280	0.68	44.2	0.08
	11	1.750	815566	11495827	0.86	49.1	0.96
	12	2.190	815604	11504042	1.05	48.1	0.48
	13	1.650	815630	11514311	0.68	41.1	0.00
	14	1.620	815669	11520700	0.80	49.3	0.35
NOV	15	3.070	815693	11528448	**1.39**	45.1	**1.68**
	16	1.930	815762	11541615	0.89	46.0	0.02
	17	2.010	815804	11550081	0.81	40.1	0.34
	18	1.860	815829	11557896	0.75	40.4	0.00
	19	1.690	815853	11565177	0.77	45.4	0.08
	20	1.830	815894	11572435	0.74	40.4	0.00
	21	1.620	815917	11579590	0.70	43.1	0.00
	22	1.650	815957	11586177	0.74	45.1	0.00
	23	1.620	815981	11593379	0.70	43.0	0.00
	24	1.560	816004	11600113	0.72	46.4	0.00
	25	1.820	816026	11607128	0.71	38.9	0.00
	26	1.570	816065	11613820	0.76	48.2	0.43
	27	1.520	816104	11620995	0.69	45.3	0.00
	28	1.660	816115	11627765	0.73	44.1	0.25
	29	1.610	816153	11634707	0.74	45.8	0.08
	30	1.550	816191	11641693	0.63	40.8	0.00
Total					22.75		5.25
Average					0.758		

	DATE	STP	HIGH	LOW	CITY	PERCENT	RAIN
			FLOW	**FLOW**	**MGD**		
DEC	1	1.915	816229	11647632	0.94	48.9	0.84
	2	4.593	816253	11656747	3.37	73.4	**5.15**
	3	8.755	818542	11667571	**3.84**	43.8	3.14
	4	3.876	821923	11672142	1.76	45.3	0.14
	5	2.472	822266	11686286	1.03	41.5	0.05
	6	2.167	822293	11696272	0.88	40.7	0.03
	7	1.961	822317	11704854	0.85	43.4	0.00
	8	1.782	822341	11713128	0.71	40.0	0.00
	9	1.999	822365	11720014	0.72	36.0	0.00
	10	1.827	822388	11726982	0.77	42.2	0.00
	11	1.671	822411	11734465	0.73	43.5	0.00
	12	1.952	822448	11741366	0.80	41.1	0.00
	13	1.824	822484	11749030	0.66	36.2	0.05
	14	1.626	822513	11755340	0.78	48.0	0.50
DEC	15	2.290	822540	11762882	0.94	40.9	0.78
	16	2.188	822565	11772006	0.96	44.0	0.62
	17	2.093	822591	11781376	0.95	45.2	0.17
	18	2.457	822618	11790565	1.14	46.2	0.78
	19	2.539	822644	11801660	1.26	49.7	0.58
	20	2.291	822669	11814025	0.92	40.0	0.02
	21	1.890	822693	11822952	0.81	43.0	0.30
	22	2.124	822718	11830829	0.96	45.3	0.24
	23	2.540	822743	11840199	1.16	45.8	0.48
	24	1.851	822768	11851580	0.84	45.6	0.10
	25	1.845	822793	11859773	0.86	46.6	0.21
	26	2.113	822819	11868115	0.79	37.6	0.42
	27	2.438	822844	11875800	1.02	41.7	0.00
	28	2.102	822870	11885699	0.96	45.7	0.10
	29	1.957	822897	11895038	0.85	43.6	0.23
	30	1.942	822921	11903336	0.70	35.9	0.00
	31	1.883	822947	11910045	0.75	39.7	0.00
			822971	11917278			
Total					33.71		14.93
Average					1.087		
An Total					9.164		53.82
An Avg					0.764		

Appendix G
Trunk Sewer Capacities

City of Port Orchard
Trunk Sewer Capacities

28-Aug-08

Build-Out Capacities

Trunk	UpStream Basins/PS	Contributing Basins: Basin	Population	Employees	Wastewater Flow: GPD/Capita	GPD/Employee	Avg Day GPD	Peak Factor	Peak Hour MGD	Pipe inch	Pump GPM
A	None	4	512	186	67	45	42,674	5.0	0.213	8	
B	None	5	935	1,035	67	45	109,220	5.0	0.546	8	
Coast PS	4 & 5						151,894		0.759	12	633
C-east	Coast PS	6	2,832	2,707	67	45	311,559	5.0	2.469		
	C-e total						463,453	5.0	2.317	18	
C-west	D & F	none					2,552,913	4.0	10.212	24	
D	E & H	8	957	426	67	45	83,289	4.5	0.375		
	D Total						2,471,254	3.5	8.649	**12+18**	
E	Albertson	11	1,955	343	67	45	146,420	4.5			
	G		3,356	2,879			354,407				
	E Total		5,311	3,222			500,827	4.0	2.452	**15**	
F	None	10	1,022	293	67	45	81,659	5.0	0.408	18	
G	None	3	1,000	247	67	45	78,115				
		12	182	1,318	67	45	71,504				
	Albertson PS	3&12	1,182	1,565			149,619	3.0	0.449		374
	Bravo Terrace	14-S	211	197	67	45	23,002	5.0	0.115		96
		14-N	1,848	604	67	45	150,996	4.5			
		13	115	513	67	45	30,790	4.5			
	G Total		3,356	2,879			354,407	4.0	1.418	**18**	
H	McCormick 1	7	1,117	422	67	45	93,829	4.5	0.422		
	H Total						1,887,138	4.0	7.549	**18**	
McCormick 1	I						1,793,309	4.0	7.173	**18**	5,978
I	J & K	2	1,038	18	67	45	70,356	5.0			
		9	585	536	67	45	63,315	5.0			
		15	415	9	67	45	28,210	5.0			
	I subtotal						161,881	5.0	0.809		
	Ridge PS	16	165	83	67	45	14,790	5.0	0.074		62
	I Totals						1,793,309	4.0	7.173	**18**	
J	None	17	401	452	67	45	47,207				
		18	705	0	67	45	47,235				
		1	1,410	0	67	45	94,470				
		SKIA	0	9,350	0	128	1,196,800				
	J Totals		2,516	9,802			1,385,712	3.5	4.850	12	
K		19	623	37	67	45	43,406				
		20	1,245	28	67	45	84,675				
		21	1,535	0	67	45	102,845				
	K Totals		3,403	65			230,926	5.0	1.155	15	
McCormick 2	J & K						1,616,638	3.0	4.850	16	4,042
Marina	C-east & west						3,016,366	4.0	12.065	18	10,055
SKIA	None	SKIA	None	9,350	0	128	1,196,800	2.4	2.872	15	2,394

City of Port Orchard
Trunk Sewer Capacities

8-Aug-08

2025 Capacities

Trunk	UpStream Basins/PS	Contributing Basins Basin	Population	Employees	Wastewater Flow GPD/Capita	GPD/Employee	Avg Day GPD	Peak Factor	Peak Hour MGD	Pipe inch	Pump GPM
A	None	4	508	186	67	45	42,406	5.0	0.212	8	
B	None	5	611	1,035	67	45	87,512	5.0	0.438	8	
Coast PS	4 & 5						129,918		0.650	12	541
C-east	Coast PS	6	2,319	2,707	67	45	277,188	5.0	2.165		
	C-e total						407,106	5.0	2.036	18	
C-west	D & F	none					2,405,513	4.0	9.622	24	
D	E & H	8	942	426	67	45	82,284	4.5	0.370		
	D Total						2,314,206	3.5	8.100	**12+18**	
E	Albertson	11	1,955	343	67	45	146,420	4.5			
	G		3,179	2,879			342,548				
	E Total		5,134	3,222			488,968	4.0	2.416	**15**	
F	None	10	1,166	293	67	45	91,307	5.0	0.457	18	
G	None	3	1,000	247	67	45	78,115				
		12	240	1,318	67	45	75,390				
	Albertson PS	3&12	1,240	1,565			153,505	3.0	0.461		384
	Bravo Terrace	14-S	211	197	67	45	23,002	5.0	0.115		96
		14-N	1,613	604	67	45	135,251	4.5			
		13	115	513	67	45	30,790	4.5			
	G Total		3,179	2,879			342,548	4.0	1.370	**18**	
H	McCormick 1	7	937	422	67	45	81,769	4.5	0.368		
	H Total						1,742,954	4.0	6.972	**18**	
McCormick 1	I						1,661,185	4.0	6.645	**18**	5,537
I	J & K	2	642	18	67	45	43,824	5.0			
		9	513	536	67	45	58,491	5.0			
		15	165	9	67	45	11,460	5.0			
	I subtotal						113,775	5.0	0.569		
	Ridge PS	16	165	83	67	45	14,790	5.0	0.074		62
	I Totals						1,661,185	4.0	6.645	**18**	
J	None	17	387	452	67	45	46,269				
		18	599	0	67	45	40,133				
		1	1,410	0	67	45	94,470				
		SKIA	0	9,350	0	128	1,196,800				
	J Totals		2,396	9,802			1,377,672	3.5	4.822	12	
K		19	385	37	67	45	27,460				
		20	771	28	67	45	52,917				
		21	1,113	0	67	45	74,571				
	K Totals		2,269	65			154,948	5.0	0.775	15	
McCormick 2	J & K						1,532,620	3.0	4.598	16	3,832
Marina	C-east & west						2,812,619	4.0	11.250	18	9,375
SKIA	None	SKIA	None	9,350	0	128	1,196,800	2.4	2.872	15	2,394

City of Port Orchard 16-Oct-08

Trunk Sewer Capacities **Revised SKIA Flows in 2025**

Trunk	UpStream Basins/PS	Contributing Basins Basin	Popula	Employ	Wastewater Flow GPD/Cap	GPD/Employ	Avg GPD	Peak	Pk Hr MGD	Pipe inch	Pump GPM
A	None	4	508	186	67	45	42,406	5.0	0.212	8	
B	None	5	611	1,035	67	45	87,512	5.0	0.438	8	
Coast PS	4 & 5						129,918		0.650	12	541
C-east	Coast PS	6	2,319	2,707	67	45	277,188	5.0	2.165		
	C-e total						407,106	5.0	2.036	18	
C-west	D & F	none					1,358,713	4.0	5.435	24	
D	E & H	8	942	426	67	45	82,284	4.5	0.370		
	D Total						1,267,406	3.5	4.436	**12+18**	
E	Albertson	11	1,955	343	67	45	146,420	4.5			
	G		3,179	2,879			342,548				
	E Total		5,134	3,222			488,968	4.0	2.416	**15**	
F	None	10	1,166	293	67	45	91,307	5.0	0.457	18	
G	None	3	1,000	247	67	45	78,115				
		12	240	1,318	67	45	75,390				
	Albert PS	3&12	1,240	1,565			153,505	3.0	0.461		384
	Bravo Terr	14-S	211	197	67	45	23,002	5.0	0.115		96
		14-N	1,613	604	67	45	135,251	4.5			
		13	115	513	67	45	30,790	4.5			
	G Total		3,179	2,879			342,548	4.0	1.370	**18**	
H	McCorm 1	7	937	422	67	45	81,769	4.5	0.368		
	H Total						696,154	4.0	2.785	**18**	
McCorm 1	I						614,385	4.0	2.458	**18**	2,048
I	J & K	2	642	18	67	45	43,824	5.0			
		9	513	536	67	45	58,491	5.0			
		15	165	9	67	45	11,460	5.0			
	I subtotal						113,775	5.0	0.569		
	Ridge PS	16	165	83	67	45	14,790	5.0	0.074		62
	I Totals						614,385	4.0	2.458	**18**	
J	None	17	387	452	67	45	46,269				
		18	599	0	67	45	40,133				
		1	1,410	0	67	45	94,470				
		SKIA	0	9,350	0	128	150,000				
	J Totals		2,396	9,802			330,872	3.5	1.158	12	
K		19	385	37	67	45	27,460				
		20	771	28	67	45	52,917				
		21	1,113	0	67	45	74,571				
	K Totals		2,269	65			154,948	5.0	0.775	15	
McCorm 2	J & K						485,820	3.0	1.457	16	1,215
Marina	C-east & west						1,765,819	4.0	7.063	18	5,886
SKIA	None	SKIA	None	9,350	0	128	150,000	2.4	0.360	15	300

Build-out Flows with Revised SKIA Flow

Trunk	UpStream Basins/PS	Contributing Basins Basin	Popula	Employ	Wastewater Flow GPD/Cap	GPD/Employ	Avg GPD	Peak	Pk Hr MGD	Pipe inch	Pump GPM
B	None	5	935	1,035	67	45	109,220	5.0	0.546	8	
Coast PS	4 & 5						109,220		0.546	12	455
C-east	Coast PS	6	2,832	2,707	67	45	311,559	5.0	2.213		
	C-e total						420,779	5.0	2.104	18	
C-west	D & F	none					1,506,113	4.0	6.024	24	
D	E & H	8	957	426	67	45	83,289	4.5	0.375		
	D Total						1,424,454	3.5	4.986	**12+18**	
E	Albertson	11	1,955	343	67	45	146,420	4.5			
	G		3,356	2,879			354,407				
	E Total		5,311	3,222			500,827	4.0	2.452	**15**	
F	None	10	1,022	293	67	45	81,659	5.0	0.408	18	
G	None	3	1,000	247	67	45	78,115				
		12	182	1,318	67	45	71,504				
	Albertson PS	3&12	1,182	1,565			149,619	3.0	0.449		374
	Bravo Terrace	14-S	211	197	67	45	23,002	5.0	0.115		96
		14-N	1,848	604	67	45	150,996	4.5			
		13	115	513	67	45	30,790	4.5			
	G Total		3,356	2,879			354,407	4.0	1.418	**18**	
H	McCormick 1	7	1,117	422	67	45	93,829	4.5	0.422		
	H Total						840,338	4.0	3.361	**18**	
/cCormick	I						746,509	4.0	2.986	**18**	2,488
I	J & K	2	1,038	18	67	45	70,356	5.0			
		9	585	536	67	45	63,315	5.0			
		15	415	9	67	45	28,210	5.0			
	I subtotal						161,881	5.0	0.809		
	Ridge PS	16	165	83	67	45	14,790	5.0	0.074		62
	I Totals						746,509	4.0	2.986	**18**	
J	None	17	401	452	67	45	47,207				
		18	705	0	67	45	47,235				
		1	1,410	0	67	45	94,470				
		SKIA	0	9,350	0	128	150,000				
	J Totals		2,516	9,802			338,912	3.5	1.186	12	
K		19	623	37	67	45	43,406				
		20	1,245	28	67	45	84,675				
		21	1,535	0	67	45	102,845				
	K Totals		3,403	65			230,926	5.0	1.155	15	
/cCormick :	J & K						569,838	3.0	1.710	16	1,425
Marina	C-east & west						1,926,892	4.0	7.708	18	6,423
SKIA	None	SKIA	None	9,350	0	128	150,000	2.4	0.360	15	300

Appendix H
Capital Cost Estimation Spreadsheets

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
Gravity Trunk Sewer G

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 149,796	$ 149,796
2	Traffic Control Labor and Equipment	LS	1	$ 35,000	$ 35,000
3	Dewatering	LS	1	$ 35,000	$ 35,000
4	Sheeting, Shoring and Bracing	LS	7000	$ 1	$ 7,000
5	Sawcutting Pavement	LF	14000	$ 4	$ 56,000
6	Pavement Removal	SY	4667	$ 4	$ 18,667
7	Temporary Sewer Bypass	LS	0	$ 10,000	$ -
8	8-inch Sanitary Sewer	LF	0	$ 80	$ -
9	10-inch Sanitary Sewer	LF	0	$ 90	$ -
10	12-inch Sanitary Sewer	LF	0	$ 100	$ -
11	15-inch Sanitary Sewer	LF	7000	$ 110	$ 770,000
12	48-inch Dia Manhole, 0' to 8' deep	EA	23	$ 4,000	$ 92,000
13	48-inch Dia Manhole, extra depth	VF	23	$ 300	$ 6,900
14	Lateral Connection, 6-inch PVC	EA	0	$ 1,500	$ -
15	Import Trench Backfill	TN	5200	$ 20	$ 103,992
16	Crushed Surfacing, Base Course	TN	1970	$ 25	$ 49,259
17	Crushed Surfacing, Top Course	TN	985	$ 25	$ 24,630
18	HMA Trench Patch, CL 1/2, PG 58-22	TN	1089	$ 150	$ 163,333
19	Restoration	LS	1	$ 68,089	$ 68,089
20	Cleanup and Testing	LS	1	$ 68,089	$ 68,089

Subtotal	$ 1,647,755
40% Contingency	$ 659,102
Subtotal	$ 2,306,856
8.6% State Sales Tax	$ 198,390
Estimated Total Construction Costs	**$ 2,505,246**

PROJECT ALLIED COSTS	
Engineering Design, Survey, Geotechnical and Permits	$ 300,630
Construction Services	$ 175,367
District Project Administration	$ 50,105
Legal	$ 25,052
Subtotal Project Allied Costs	**$ 551,154**

Total Estimated Project Costs	**$ 3,056,400**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
Gravity Trunk Sewer H

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 51,413	$ 51,413
2	Traffic Control Labor and Equipment	LS	1	$ 12,000	$ 12,000
3	Dewatering	LS	1	$ 12,000	$ 12,000
4	Sheeting, Shoring and Bracing	LS	2400	$1	$ 2,400
5	Sawcutting Pavement	LF	4800	$ 4	$ 19,200
6	Pavement Removal	SY	1600	$ 4	$ 6,400
7	Temporary Sewer Bypass	LS	0	$ 10,000	$ -
8	8-inch Sanitary Sewer	LF	0	$ 80	$ -
9	10-inch Sanitary Sewer	LF	0	$ 90	$ -
10	12-inch Sanitary Sewer	LF	0	$ 100	$ -
11	15-inch Sanitary Sewer	LF	2400	$ 110	$ 264,000
12	48-inch Dia Manhole, 0' to 8' deep	EA	8	$ 4,000	$ 32,000
13	48-inch Dia Manhole, extra depth	VF	8	$ 300	$ 2,400
14	Lateral Connection, 6-inch PVC	EA	0	$ 1,500	$ -
15	Import Trench Backfill	TN	1783	$ 20	$ 35,654
16	Crushed Surfacing, Base Course	TN	676	$ 25	$ 16,889
17	Crushed Surfacing, Top Course	TN	338	$ 25	$ 8,444
18	HMA Trench Patch, CL 1/2, PG 58-22	TN	373	$ 150	$ 56,000
19	Restoration	LS	1	$ 23,369	$ 23,369
20	Cleanup and Testing	LS	1	$ 23,369	$ 23,369

Subtotal	$ 565,539
40% Contingency	$ 226,216
Subtotal	$ 791,755
8.6% State Sales Tax	$ 68,091
Estimated Total Construction Costs	**$ 859,846**

PROJECT ALLIED COSTS	
Engineering Design, Survey, Geotechnical and Permits	$ 103,181
Construction Services	$ 60,189
District Project Administration	$ 17,197
Legal	$ 8,598
Subtotal Project Allied Costs	**$ 189,166**

Total Estimated Project Costs	**$ 1,049,012**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
Force Main E

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 32,782	$ 32,782
2	Traffic Control Labor and Equipment	LS	1	$ 12,500	$ 12,500
3	Dewatering	LS	1	$ 2,500	$ 2,500
4	Sheeting, Shoring and Bracing	LS	2500	$1	$ 2,500
5	Sawcutting Pavement	LF	5000	$ 4	$ 20,000
6	Pavement Removal	SY	494	$ 4	$ 1,975
7	Temporary Sewer Bypass	LS	0	$ 10,000	$ -
8	8-inch Sanitary Sewer	LF		$ 80	$ -
9	10-inch Sanitary Sewer	LF		$ 90	$ -
10	12-inch Sanitary Sewer	LF		$ 100	$ -
11	12-inch Force Main	LF	2500	$ 60	$ 150,000
12	48-inch Dia Manhole, 0' to 8' deep	EA	0	$ 4,000	$ -
13	48-inch Dia Manhole, extra depth	VF	0	$ 300	$ -
14	Lateral Connection, 6-inch PVC	EA	0	$ 1,500	$ -
15	Import Trench Backfill	TN	1662	$ 20	$ 33,230
16	Crushed Surfacing, Base Course	TN	626	$ 25	$ 15,638
17	Crushed Surfacing, Top Course	TN	313	$ 25	$ 7,819
18	HMA Trench Patch, CL 1/2, PG 58-22	TN	346	$ 150	$ 51,852
19	Restoration	LS	1	$ 14,901	$ 14,901
20	Cleanup and Testing	LS	1	$ 14,901	$ 14,901

Subtotal	$	360,597
40% Contingency	$	144,239
Subtotal	$	504,836
8.6% State Sales Tax	$	43,416
Estimated Total Construction Costs	**$**	**548,252**
PROJECT ALLIED COSTS		
Engineering Design, Survey, Geotechnical and Permits	$	65,790
Construction Services	$	38,378
District Project Administration	$	10,965
Legal	$	5,483
Subtotal Project Allied Costs	**$**	**120,616**
Total Estimated Project Costs	**$**	**668,868**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
Force Main South Kitsap Industrial Area (SKIA)

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 88,126	$ 88,126
2	Traffic Control Labor and Equipment	LS	1	$ 20,000	$ 20,000
3	Dewatering	LS	1	$ 13,000	$ 13,000
4	Sheeting, Shoring and Bracing	LS	13000	$1	$ 13,000
5	Sawcutting Pavement	LF	8000	$ 4	$ 32,000
6	Pavement Removal	SY	2370	$ 4	$ 9,481
7	Temporary Sewer Bypass	LS	0	$ 10,000	$ -
8	8-inch Sanitary Sewer	LF		$ 80	$ -
9	10-inch Sanitary Sewer	LF		$ 90	$ -
10	12-inch Sanitary Sewer	LF		$ 100	$ -
11	8-inch Force Main - In Road	LF	4000	$ 45	$ 180,000
12	8-inch Force Main - X Country	LF	9000	$ 40	$ 360,000
13	48-inch Dia Manhole, 0' to 8' deep	EA	0	$ 4,000	$ -
14	48-inch Dia Manhole, extra depth	VF	0	$ 300	$ -
15	Lateral Connection, 6-inch PVC	EA	0	$ 1,500	$ -
16	Import Trench Backfill	TN	2658	$ 20	$ 53,169
17	Crushed Surfacing, Base Course	TN	1001	$ 25	$ 25,021
18	Crushed Surfacing, Top Course	TN	500	$ 25	$ 12,510
19	HMA Trench Patch, CL 1/2, PG 58-22	TN	553	$ 150	$ 82,963
20	Restoration	LS	1	$ 40,057	$ 40,057
21	Cleanup and Testing	LS	1	$ 40,057	$ 40,057

Subtotal	$ 969,384
40% Contingency	$ 387,754
Subtotal	$ 1,357,138
8.6% State Sales Tax	$ 116,714
Estimated Total Construction Costs	**$ 1,473,852**

PROJECT ALLIED COSTS	
Engineering Design, Survey, Geotechnical and Permits	$ 176,862
Construction Services	$ 103,170
District Project Administration	$ 29,477
Legal	$ 14,739
Subtotal Project Allied Costs	**$ 324,247**

Total Estimated Project Costs	**$ 1,798,099**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
Marina Pump Station 2010 Upgrade - Replace Large Pumps

Item No.	Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 103,860	$ 103,860
2	Traffic Control Labor and Equipment	LS	1	$ 2,500	$ 2,500
3	Temporary Flow Bypass	LS	1	$ 5,000	$ 5,000
4	Demolition of Mechanical - Remove Existing Pumps and Valves	LS	1	$ 5,000	$ 5,000
5	Demolition of Electrical	LS	1	$ 10,000	$ 10,000
	Cross Connection Control	LS	1	$ 2,500	$ 2,500
6	Replace Valves	LS	1	$ 52,600	$ 52,600
	8" Check Valve		2	$ 2,025	
	8" Plug Valve		5	$ 1,350	
	14" Check Valve		2	$ 6,600	
	14" Plug Valve		4	$ 4,650	
	18" Cut In Valve		1	$ 10,000	
	18" Plug Valve		0	$ 6,000	
7	Replace Louvers	LS	1	$ 9,000	$ 9,000
	9' x 12'	LS	1	$ 5,000	
	9' x 8'	LS	1	$ 4,000	
8	Pumps 4000 gpm x 200 HP x 140 feet TDH	LS	1	$ 476,000	$ 476,000
	Level Sensing System		1		
9	Drywell Repair	LS	1	$ 14,000	$ 14,000
	Ventilation		1	$ 10,000	
	Lighting		1	$ 2,000	
	Heater		1	$ 2,000	
10	Control Building Repair	LS	1	$ 4,000	$ 4,000
	Lighting		1	$ 2,000	
	Heater		1	$ 2,000	
11	Electrical	LS	1	$ 100,000	$ 100,000
12	600 KW Generator and ATS	LS	1	$ 175,000	$ 175,000
13	Seawall Repair	LS	1	$ 180,000	$ 180,000
13	Restoration	LS	1	$ 3,000	$ 3,000
14	Cleanup and Testing	LS	1	$ 2,000	$ 2,000

Subtotal	$ 1,144,460
40% Contingency	$ 457,784
Subtotal	$ 1,602,244
8.6% State Sales Tax	$ 137,793
Estimated Total Construction Costs	**$ 1,740,037**

PROJECT ALLIED COSTS	
Engineering Design, Survey, Geotechnical and Permits	$ 181,603
Construction Services	$ 121,803
District Project Administration	$ 34,801
Legal	$ 17,400
Subtotal Project Allied Costs	**$ 355,607**
Total Estimated Project Costs	**$ 2,095,644**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
Marina Pump Station 2020 Upgrade - Replace Small Pumps

Item No.	Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 17,900	$ 17,900
2	Traffic Control Labor and Equipment	LS	1	$ 1,000	$ 1,000
3	Temporary Flow Bypass	LS	1	$ 5,000	$ 5,000
4	Demolition of Electrical	LS	1	$ 5,000	$ 5,000
5	Pumps 1500 gpm x 60 HP	LS	1	$ 147,000	$ 147,000
6	Electrical	LS	1	$ 20,000	$ 20,000
7	Restoration	LS	1	$ 1,000	$ 1,000
8	Cleanup and Testing	LS	1	$ 1,000	$ 1,000

Subtotal	$ 197,900
40% Contingency	$ 79,160
Subtotal	$ 277,060
8.6% State Sales Tax	$ 23,827
Estimated Total Construction Costs	**$ 300,887**
PROJECT ALLIED COSTS	
Engineering Design, Survey, Geotechnical and Permits	$ 27,080
Construction Services	$ 21,062
District Project Administration	$ 6,018
Legal	$ 3,009
Subtotal Project Allied Costs	**$ 57,169**
Total Estimated Project Costs	**$ 358,056**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
McCormick Woods Number 1

Item No.	Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 40,914	$ 40,914
2	Traffic Control Labor and Equipment	LS	1	$ -	$ -
3	Temporary Flow Bypass	LS	1	$ 20,000	$ 20,000
4	Demolition of Mechanical	LS	1	$ 10,000	$ 10,000
5	Demolition of Electrical	LS	1	$ 4,000	$ 4,000
	Bypass Connection Vault	LS	1	$ 40,000	$ 40,000
6	Replace Valves	LS	1	$ 10,800	$ 10,800
	10" Check Valve		2	$ 3,150	
	10" Plug Valve		2	$ 2,250	
	16" Plug Valve		0	$ 5,250	
7	Replace Piping	LS	1	$ 19,376	$ 19,376
	8" Discharge Piping		30	$ 88	
	8" Elbow (FLxFL)		2	$ 686	
	8" x 10" Reducers (FLxFL)		2	$ 1,182	
	10" Discharge Piping		40	$ 102	
	10" Elbow (FLxFL)		2	$ 1,116	
	10"x16" Cross w/ 16" Blind (FLxFL)		1	$ 6,688	
8	Pumps 2000 gpm x 120 HP x 140 feet TDH	LS	1	$ 165,200	$ 165,200
	Discharge Elbows		2		
	Rails		2		
	Level Sensing System		1		
9	Wetwell Repair	LS	1	$ 9,816	$ 9,816
	Wet well lid 12' diameter				
	(3) 3'x3' Aluminum Access Hatch H-20				
10	Valve Vault Repair	LS	1	$ 7,452	$ 7,452
	Valve vault lid 10' diameter				
	(3) 3'x3' Aluminum Access Hatch H-20				
	Ladder				
11	Isolation Vault Repair	LS	0	$ 2,643	$ -
	Isolation valve vault lid 6' Diameter				
	3'x4' Aluminum Access Hatch H-20				
	Ladder				
12	Electrical	LS	1	$ 25,000	$ 25,000
13	250 KW Generator and ATS	LS	1	$ 87,500	$ 87,500
14	Odor and Corrosion Control using existing structure	LS	1	$ 5,500	$ 5,500
15	Restoration	LS	1	$ 2,500	$ 2,500
16	Cleanup and Testing	LS	1	$ 2,000	$ 2,000

Subtotal	$ 450,058
40% Contingency	$ 180,023
Subtotal	$ 630,081
8.6% State Sales Tax	$ 54,187
Estimated Total Construction Costs	**$ 684,268**

PROJECT ALLIED COSTS	
Engineering Design, Survey, Geotechnical and Permits	$ 61,584
Construction Services	$ 47,899
District Project Administration	$ 13,685
Legal	$ 6,843
Subtotal Project Allied Costs	**$ 130,011**
Total Estimated Project Costs	**$ 814,278**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
McCormick Woods Number 2

Item No.	Description	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	$ 37,199	$ 37,199
2	Traffic Control Labor and Equipment	LS	1	$ -	$ -
3	Temporary Flow Bypass	LS	1	$ 20,000	$ 20,000
4	Demolition of Mechanical	LS	1	$ 10,000	$ 10,000
5	Demolition of Electrical	LS	1	$ 4,000	$ 4,000
	Bypass Connection Vault	LS	1	$ 40,000	$ 40,000
6	Replace Valves	LS	1	$ 10,800	$ 10,800
	10" Check Valve		2	$ 3,150	
	10" Plug Valve		2	$ 2,250	
	16" Plug Valve		0	$ 5,250	
7	Replace Piping	LS	1	$ 19,376	$ 19,376
	8" Discharge Piping		30	$ 88	
	8" Elbow (FLxFL)		2	$ 686	
	8" x 10" Reducers (FLxFL)		2	$ 1,182	
	10" Discharge Piping		40	$ 102	
	10" 90 elbow (FLxFL)		2	$ 1,116	
	10"x16" Cross w/ 16" Blind (FLxFL)		1	$ 6,688	
8	Pumps 1400 gpm x 50 HP x 90 feet TDH	LS	1	$ 144,900	$ 144,900
	Discharge Elbows		2		
	Rails		2		
	Level Sensing System		1		
9	Wetwell Repair	LS	1	$ 9,816	$ 9,816
	Wet well lid 12' diameter				
	(3) 3'x3' Aluminum Access Hatch H-20				
10	Valve Vault Repair	LS	1	$ 7,452	$ 7,452
	Valve vault lid 10' diameter				
	(3) 3'x3' Aluminum Access Hatch H-20				
	Ladder				
11	Isolation Vault Repair	LS	1	$ 2,643	$ 2,643
	Isolation valve vault lid 6' Diameter				
	3'x4' Aluminum Access Hatch H-20				
	Ladder				
12	Electrical	LS	1	$ 25,000	$ 25,000
13	100 KW Generator and ATS	LS	1	$ 70,000	$ 70,000
14	Odor and Corrosion Control using existing structure	LS	1	$ 5,500	$ 5,500
15	Restoration	LS	1	$ 2,500	$ 2,500
16	Cleanup and Testing	LS	1	$ 2,000	$ 2,000

Subtotal	$ 411,184
40% Contingency	$ 164,474
Subtotal	$ 575,658
8.6% State Sales Tax	$ 49,507
Estimated Total Construction Costs	**$ 625,165**

PROJECT ALLIED COSTS	
Engineering Design, Survey, Geotechnical and Permits	$ 56,265
Construction Services	$ 43,762
District Project Administration	$ 12,503
Legal	$ 6,252
Subtotal Project Allied Costs	**$ 118,781**
Total Estimated Project Costs	**$ 743,946**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
Pottery Pump Station

Item No.	Description	Unit	Quantity	Unit Price	Amount
	Lynden Pump Station	LS	1	$ 725,000	$ 725,000
	Difference in Cost Between Stations	LS	1	$ (249,000)	$ (249,000)
				Subtotal	$ 476,000
	Escallation from 1/2006 to 10/2008 (8623/7883)			9.39%	$ 44,683
				Subtotal	$ 520,683
				40% Contingency	$ 208,273
				Subtotal	$ 684,273
				8.6% State Sales Tax	$ 58,848
				Estimated Total Construction Costs	**$ 743,121**
				PROJECT ALLIED COSTS	
				Engineering Design, Survey, Geotechnical and Permits	$ 66,881
				Construction Services	$ 52,018
				District Project Administration	$ 14,862
				Legal	$ 7,431
				Land Acquaition (3000 SF)	$ 45,000
				Subtotal Project Allied Costs	**$ 186,193**
				Total Estimated Project Costs	**$ 929,314**

City of Port Orchard
Capital Improvement Projects
Cost Estimate CIP
SKIA PUMP STATION

Item No.	Description	Unit	Quantity	Unit Price	Amount
	Rockaway Beach PS - similar configuration 194k in 6/2004	LS	1	$ 194,000	$ 194,000
	Escallation from 1/2006 to 10/2008 (8623/7883)			21.30%	$ 41,316
				Subtotal	$ 235,316
	Difference in Cost Between Stations				
	ODOR CONTROL	LS	1	$ 10,000	$ 10,000
				Subtotal	$ 245,316
				40% Contingency	$ 98,126
				Subtotal	$ 333,443
				8.6% State Sales Tax	$ 28,676
				Estimated Total Construction Costs	**$ 362,119**
				PROJECT ALLIED COSTS	
				Engineering Design, Survey, Geotechnical and Permits	$ 32,591
				Construction Services	$ 25,348
				District Project Administration	$ 7,242
				Legal	$ 3,621
				Subtotal Project Allied Costs	**$ 68,803**
				Total Estimated Project Costs	**$ 430,921**

Appendix I
Financial Documentation

CITY OF PORT ORCHARD
OPERATING STATEMENT
4th QUARTER 2005

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	OPERATING REVENUES					
460	UNMETERED SALES CUSTOMERS-WA	30		156	2,241	2,428
461.1	METERED WA SALES-GEN CUSTOMERS	142,337	145,351	298,116	182,147	767,951
461.2	PUBLIC FIRE PROTECTION SERVICES	115	130	140	155	540
461.3	SALES TO PUBLIC MUNICIPALITIES - WA	625	1,032	2,312	878.38	4,848
461.4	METERED SALES-PUBLIC AUTHORITIES	15,225	18,113	17,374	19,531	70,244
462.1	SEWER SERVICES FLAT RATE	303,867	298,848	462,705	506,603	1,572,023
462.2	SVS-PUBLIC MUNICIPALITIES-SEWER	996	1,571	1,800	2,339	6,707
462.3	SALES TO PUBLIC AUTHORITIES	22,455	32,735	32,097	47,587	134,873
470	LATE PAYMENT / PENALTIES	7,092	5,607	7,463	7,756	27,918
471	MISC SVS REV.-WA SW SVS T-OFF	635	710	750	500	2,595
472	RENT-UTILITY PROPERTIES	9,174	8,242	8,313	8,998	34,727
474	OTHER WA SW REVENUES	910	1,185	1,380	1,810	5,284
474.1	OTHER WA SW REVENUES-INS REIMBURSE					-
	TOTAL OPERATING REVENUE WATER	176,143	180,370	336,006	224,016	916,535
	TOTAL OPERATING REVENUE SEWER	327,318	333,155	496,602	556,529	1,713,604
	TOTAL OPERATING REVENUES	503,461	513,525	832,608	780,546	2,630,138
	OPERATING EXPENSES-WATER					
602.1	PURCHASED WATER	267	118	345	395	1,125
603.1	MISC EXPENSE - WATER					-
611.1	MAINTENANCE STRUCTURES&IMPROV	45	-	67	444	555
614.1	MAINTENANCE OF WELLS	7	1		-	8
616.1	MAINTENANCE OF SUPPLY MAINS					-
621.1	FUEL POWER PRODUCTION-WATER					-
622.1	POWER PROD LABOR & EXPENSE					-
623.1	PWER PURCH FOR PUMPING-WATER	16,180	15,330	22,942	16,330	70,782
624.1	PUMPING LABOR & EXPENSE-WATER	7,684	7,238	7,176	9,555	31,653
631.1	MAINTAIN STRUCTURES-WA PUMP	7	26	7	253	293
632.1	MAINTAIN PWR PRODCTN EQUIP-WATER					-
633.1	MAINTAIN PUMP EQUIPMENT-WATER	6,323	8,561	14,496	6,254	35,634
641.1	CHEMICALS-WATER TREATMENT	3,998	4,036	1,974	3,154	13,162
642.1	MAINT, OPERATION, LBR,EXP-WATER	12,980	15,240	11,504	13,862	53,586
652.1	MAINT WATER TREATMENT EQUIP					-
665.1	MISC EXPENSE - WATER INVENTORY					-
670.1	OLD CLIFTON LANDFILL-ENGINEERING					-
671.1	MAINT TRANSMSN DIST EXP-WATER					-
672.1	MAINT DISTRBTN RSRVR& ST PIPES	4,206	6,142	1,656	7,024	19,028
673.1	MAINT TRNSMSN&DISTRBTN MAINS-WA	11,115	10,631	40,098	24,014	85,857
675.1	MAINT OF SVS-WA TRNSMSN DISTRBN	13,407	13,082	31,049	30,554	88,092
676.1	MAINTENANCE OF METERS-WATER	(1,381)	9,050	4,078	4,033	15,780
677.1	MAINT OF HYDRANTS-WATER	(1,004)	-	3,956	-	2,951
	TOTAL OPERTATING EXPENSES-WATER	73,832	89,456	139,350	115,871	418,506
	OPERATING EXPENSES-SEWER					
622.2	POWER PROD LABOR&EXPENSE-SEWER					-
623.2	POWER PURCHASED FOR PUMPING-SEWER	5,148	4,485	5,240	5,351	20,224
624.2	PUMP LABOR & EXP-SW LIFT STATION	9,518	9,542	9,382	11,624	40,066
631.2	MAINTAIN STRUCTURES-SW PUMP	22	239	53	129	444
632.2	MAINT POWER PRODUCTN EQUIP-SW					-
633.2	MAINTAIN PUMP EQUIPMENT-SEWER	9,840	4,857	8,711	11,399	34,807
641.2	CHEMICALS-SEWER TREATMENT	1,025	1,079	8,438	1,091	11,634
642.2	OPER,LABOR, EXP-SEWER PLANT	313,668	234,976	234,935	156,600	940,179
673.2	MAINT,COST OF LABR MAINS-SEWER	3,672	9,562	33,144	8,237	54,615
675.2	MAINT OF SERVICE-SEWER	8,279	25,276	13,511	8,535	55,601
	TOTAL OPERATING EXPENSES SEWER	351,172	290,017	313,414	202,966	1,157,570
	TOTAL OPERATING EXPENSES WA/SW	425,004	379,473	452,763	318,837	1,576,076

CITY OF PORT ORCHARD
OPERATING STATEMENT
4th QUARTER 2005

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	CUSTOMER ACCOUNTS					
902	METER READINGS CUST EXP-WATER	8,208	2,280	3,194	4,084	17,766
903	CUSTOMER RECORD & COLLECTION EXP	33,854	32,317	32,988	38,044	137,203
	TOTAL CUSTOMER ACCOUNTS	42,062	34,596	36,182	42,128	154,968
	ADMIN/GENERAL EXPENSE					
920.1	ADMIN/GENERAL SALARIES	19,846	27,087	35,394	34,636	116,964
920.2	GENERAL SALARY-CLERICAL	27,028	27,714	30,625	32,759	118,125
921	OFFICE SUPPLIES & OTHER EXPENSE	5,979	10,829	4,146	8,631	29,585
922	ADMIN EXPENSE TRANSFERRED OVERHEAD	(1,879)	(1,298)	(887)	(913)	(4,977)
923	OUTSIDE SERVICES EMPLOYED	7,232	2,608	23,721	20,289	53,850
924	PROPERTY INSURANCE	7,401	7,401	6,851	5,750	27,404
925	INJURY & DAMAGES-LIABILITY INS	11,102	11,102	10,276	8,626	41,106
926.2	EMPLOYEE PENS-PERS RETIREMENT	3,953	-		-	3,953
926.3	EMPLOYEE BENEFITS-II MED AID SUPPORT					-
926.4	EMPLOYEE BENEFITS-VACATION	2,949	4,670	12,224	9,276	29,120
926.5	EMPLOYEE BENEIFTS-SICK LEAVE	5,982	2,252	4,983	7,075	20,292
926.6	EMPLOYEE BENEFITS-HOLIDAY	5,631	2,321	2,988	3,943	14,883
930	MISC GENERAL EXPENSE					-
931	LEASEHOLD EXCISE TAX RENTS	272	(272)			-
932	MAINT OF GENERAL PLANT	7,009	10,654	8,916	9,371	35,950
933	TRANSPORTATION OF EQUIPMENT EXPENSE	4,913	6,073	3,811	7,634	22,431
	TOTAL ADMIN/GENERAL EXPENSE	107,419	111,141	143,048	147,077	508,684
	TAXES CITY & STATE					
408.11	CITY GROSS EARN-UTIL TAX WA-DR	10,167	8,231	15,905	8,206	42,509
408.12	CITY GROSS EARN UT TAX STATE-WA DR	13,404	8,819	16,471	8,536	47,230
	TOTAL TAXES-WATER	23,571	17,050	32,376	16,741	89,740
408.21	CITY GROSS EARN-UTIL TAX SW-DR	20,383	16,658	24,830	22,349	84,219
408.22	CITY GROSS EARN UT TAX STATE-SW DR	3,840	4,369	4,284	4,528	17,020
	TOTAL TAXES SEWER	24,223	21,027	29,114	26,877	101,240
	TOTAL TAXES CITY & STATE	47,794	38,077	61,490	43,618	190,979
	TOTAL REVENUES	503,461	513,525	832,608	780,546	2,630,138
	TOTAL EXPENSES/TAXES	622,279	563,287	693,484	551,659	2,430,707
	OPERATING INCOME (LOSS)	(118,818)	(49,762)	139,124	228,886	199,430
	DEPRECIATION EXPENSE	(122,132)	(122,132)	(122,132)	(122,131)	(488,527)
	NET OPERATING INCOME (LOSS)	(240,950)	(171,894)	16,992	106,755	(289,097)

CITY OF PORT ORCHARD
WATER-SEWER
OPERATING STATEMENT
4th QUARTER 2006

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	OPERATING REVENUES					
460	UNMETERED SALES CUSTOMERS-WA	1,435	30	1,858	16,675	19,999
461.1	METERED WA SALES-GEN CUSTOMERS	146,463	145,669	326,832	190,070	809,034
461.2	PUBLIC FIRE PROTECTION SERVICES	83	549	(1,125)	1,033	540
461.3	SALES TO PUBLIC MUNICIPALITIES - WA	558	1,218	2,942	1,381	6,099
461.4	METERED SALES-PUBLIC AUTHORITIES	10,132	18,087	23,002	20,254	71,474
462.1	SEWER SERVICES FLAT RATE	413,340	402,836	521,753	507,706	1,845,635
462.2	SVS-PUBLIC MUNICIPALITIES-SEWER	1,368	2,088	1,944	2,233	7,633
462.3	SALES TO PUBLIC AUTHORITIES	29,668	43,956	34,037	45,912	153,573
470	LATE PAYMENT / PENALTIES	7,308	6,404	7,391	8,122	29,225
471	MISC SVS REV.-WA SW SVS T-OFF	262	685	450	670	2,067
472	RENT-UTILITY PROPERTIES	9,140	8,240	8,333	9,822	35,535
474	OTHER WA SW REVENUES	1,411	1,350	1,173	950	4,884
474.1	OTHER WA SW REVENUES-INS REIMBURSE					-
	TOTAL OPERATING REVENUE WATER	176,793	182,232	370,856	248,976	978,857
	TOTAL OPERATING REVENUE SEWER	444,376	448,880	557,735	555,851	2,006,841
	TOTAL OPERATING REVENUES	621,169	631,111	928,590	804,827	2,985,698
	OPERATING EXPENSES-WATER					
602.1	PURCHASED WATER	-	78	79	1	159
603.1	MISC EXPENSE - WATER				-	-
611.1	MAINTENANCE STRUCTURES&IMPROV	6	135	144	105	390
614.1	MAINTENANCE OF WELLS	29		-	17	46
616.1	MAINTENANCE OF SUPPLY MAINS			-	-	-
621.1	FUEL POWER PRODUCTION-WATER			-	-	-
622.1	POWER PROD LABOR & EXPENSE			-	-	-
623.1	PWER PURCH FOR PUMPING-WATER	18,732	18,230	24,403	21,384	82,749
624.1	PUMPING LABOR & EXPENSE-WATER	6,269	7,072	6,558	6,293	26,191
631.1	MAINTAIN STRUCTURES-WA PUMP	6		133	-	139
632.1	MAINTAIN PWR PRODCTN EQUIP-WATER			-	-	-
633.1	MAINTAIN PUMP EQUIPMENT-WATER	14,945	3,858	4,082	11,899	34,785
641.1	CHEMICALS-WATER TREATMENT	1,819	2,315	3,836	3,432	11,402
642.1	MAINT, OPERATION, LBR,EXP-WATER	14,112	(14,112)	10,165	39,571	49,735
652.1	MAINT WATER TREATMENT EQUIP				-	-
665.1	MISC EXPENSE - WATER INVENTORY				-	-
670.1	OLD CLIFTON LANDFILL-ENGINEERING				-	-
671.1	MAINT TRANSMSN DIST EXP-WATER				-	-
672.1	MAINT DISTRBTN RSRVR& ST PIPES	2,063	2,977	5,371	15,765	26,176
673.1	MAINT TRNSMSN&DISTRBTN MAINS-WA	15,518	17,573	7,838	20,485	61,415
675.1	MAINT OF SVS-WA TRNSMSN DISTRBN	21,603	11,054	5,774	4,710	43,142
676.1	MAINTENANCE OF METERS-WATER	2,812	27,159	373	134	30,478
677.1	MAINT OF HYDRANTS-WATER	13	734	-	417	1,165
	TOTAL OPERTATING EXPENSES-WATER	97,928	77,073	68,756	124,213	367,972
	OPERATING EXPENSES-SEWER					
622.2	POWER PROD LABOR&EXPENSE-SEWER					-
623.2	POWER PURCHASED FOR PUMPING-SEWER	6,439	5,184	4,933	7,608	24,164
624.2	PUMP LABOR & EXP-SW LIFT STATION	7,405	7,604	10,727	11,016	36,752
631.2	MAINTAIN STRUCTURES-SW PUMP	49		283	10,028	10,360
632.2	MAINT POWER PRODUCTN EQUIP-SW				632	632
633.2	MAINTAIN PUMP EQUIPMENT-SEWER	17,918	8,417	4,339	21,173	51,846
641.2	CHEMICALS-SEWER TREATMENT		1,135	9,030	1,696	11,860
642.2	OPER,LABOR, EXP-SEWER PLANT	363,028	272,097	272,097	181,433	1,088,654
673.2	MAINT,COST OF LABR MAINS-SEWER	30,759	22,555	6,780	11,072	71,166
675.2	MAINT OF SERVICE-SEWER	9,187	29,652	10,538	15,937	65,314
	TOTAL OPERATING EXPENSES SEWER	434,784	346,645	318,726	260,595	1,360,748
	TOTAL OPERATING EXPENSES WA/SW	532,713	423,718	387,482	384,808	1,728,720

CITY OF PORT ORCHARD
WATER-SEWER
OPERATING STATEMENT
4th QUARTER 2006

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	CUSTOMER ACCOUNTS					
902	METER READINGS CUST EXP-WATER	4,011	5,460	3,058	8,375	20,903
903	CUSTOMER RECORD & COLLECTION EXP	38,364	39,688	32,607	45,037	155,696
	TOTAL CUSTOMER ACCOUNTS	42,375	45,148	35,664	53,412	176,599
	ADMIN/GENERAL EXPENSE					
920.1	ADMIN/GENERAL SALARIES	29,262	36,660	30,424	35,933	132,279
920.2	GENERAL SALARY-CLERICAL	28,653	33,730	29,375	37,212	128,970
921	OFFICE SUPPLIES & OTHER EXPENSE	8,640	7,688	5,632	5,377	27,338
922	ADMIN EXPENSE TRANSFERRED OVERHEAD	(1,226)	(633)	(850)	(1,495)	(4,204)
923	OUTSIDE SERVICES EMPLOYED	3,853	367	-	8,228	12,447
924	PROPERTY INSURANCE	7,362	7,362	7,362	7,362	29,449
925	INJURY & DAMAGES-LIABILITY INS	11,043	11,043	11,043	11,043	44,173
926.2	EMPLOYEE PENS-PERS RETIREMENT				-	-
926.3	EMPLOYEE BENEFITS-II MED AID SUPPORT				-	-
926.4	EMPLOYEE BENEFITS-VACATION	2,419	7,433	11,327	5,743	26,923
926.5	EMPLOYEE BENEIFTS-SICK LEAVE	6,402	3,657	1,328	3,528	14,914
926.6	EMPLOYEE BENEFITS-HOLIDAY	6,797	1,892	2,324	4,539	15,553
930	MISC GENERAL EXPENSE				-	-
931	LEASEHOLD EXCISE TAX RENTS			-	-	-
932	MAINT OF GENERAL PLANT	9,114	16,868	8,533	11,585	46,100
933	TRANSPORTATION OF EQUIPMENT EXPENSE	6,793	9,667	7,009	7,561	31,030
	TOTAL ADMIN/GENERAL EXPENSE	119,114	135,735	113,507	136,616	504,972
	TAXES CITY & STATE					
408.11	CITY GROSS EARN-UTIL TAX WA-DR	9,977	8,257	17,739	9,354	45,327
408.12	CITY GROSS EARN UT TAX STATE-WA DR	10,352	8,654	18,383	10,202	47,591
	TOTAL TAXES-WATER	20,329	16,910	36,122	19,556	92,918
408.21	CITY GROSS EARN-UTIL TAX SW-DR	27,695	22,402	27,887	22,284	100,267
408.22	CITY GROSS EARN UT TAX STATE-SW DR	5,784	4,007	6,019	4,939	20,749
	TOTAL TAXES SEWER	33,478	26,409	33,906	27,223	121,016
	TOTAL TAXES CITY & STATE	53,808	43,319	70,028	46,779	213,934
	TOTAL REVENUES	621,169	631,111	928,590	804,827	2,985,698
	TOTAL EXPENSES/TAXES	748,009	647,920	606,681	621,615	2,624,224
	OPERATING INCOME (LOSS)	(126,840)	(16,808)	321,909	183,213	361,474
	DEPRECIATION EXPENSE	(114,568)	(114,568)	(114,568)	(114,568)	(458,273)
	NET OPERATING INCOME (LOSS)	(241,409)	(131,377)	207,341	68,645	(96,799)

CITY OF PORT ORCHARD
WATER-SEWER
OPERATING STATEMENT
4th QUARTER 2007

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	OPERATING REVENUES					
460	UNMETERED SALES CUSTOMERS-WA	273	108	236	243	860
461.1	METERED WA SALES-GEN CUSTOMERS	141,221	137,233	317,636	181,819	777,909
461.2	PUBLIC FIRE PROTECTION SERVICES	115	130	140	155	540
461.3	SALES TO PUBLIC MUNICIPALITIES - WA	654	1,245	2,819	1,694	6,412
461.4	METERED SALES-PUBLIC AUTHORITIES	10,969	20,630	24,997	23,170	79,766
462.1	SEWER SERVICES FLAT RATE	418,478	410,076	550,445	544,342	1,923,341
462.2	SVS-PUBLIC MUNICIPALITIES-SEWER	1,392	2,050	1,944	2,376	7,763
462.3	SALES TO PUBLIC AUTHORITIES	28,520	42,066	32,164	45,273	148,023
470	LATE PAYMENT / PENALTIES	8,189	6,400	9,515	7,982	32,087
471	MISC SVS REV.-WA SW SVS T-OFF	790	410	940	860	3,000
472	RENT-UTILITY PROPERTIES	9,965	9,665	9,460	11,894	40,983
474	OTHER WA SW REVENUES	1,020	1,340	1,330	1,070	4,760
474.1	OTHER WA SW REVENUES-INS REIMBURSE					-
	TOTAL OPERATING REVENUE WATER	169,102	173,962	362,315	224,895	930,274
	TOTAL OPERATING REVENUE SEWER	452,484	457,393	589,311	595,982	2,095,170
	TOTAL OPERATING REVENUES	621,586	631,355	951,626	820,877	3,025,444
	OPERATING EXPENSES-WATER					
602.1	PURCHASED WATER	-	-	-	78	78
603.1	MISC EXPENSE - WATER	-	-	-		-
611.1	MAINTENANCE STRUCTURES&IMPROV	159	7,936	182	49,964	58,241
614.1	MAINTENANCE OF WELLS	14	142	2,615	35,980	38,751
616.1	MAINTENANCE OF SUPPLY MAINS	-	-	-	-	-
621.1	FUEL POWER PRODUCTION-WATER	-	-	-	-	-
622.1	POWER PROD LABOR & EXPENSE	-	-	-	-	-
623.1	PWER PURCH FOR PUMPING-WATER	17,301	15,629	26,745	18,101	77,776
624.1	PUMPING LABOR & EXPENSE-WATER	6,009	5,343	5,163	6,668	23,183
631.1	MAINTAIN STRUCTURES-WA PUMP	22	185	135	-	342
632.1	MAINTAIN PWR PRODCTN EQUIP-WATER	-	-		-	-
633.1	MAINTAIN PUMP EQUIPMENT-WATER	3,882	6,021	5,387	5,707	20,997
641.1	CHEMICALS-WATER TREATMENT	540	3,717	4,119	1,989	10,365
642.1	MAINT, OPERATION, LBR,EXP-WATER	12,313	20,080	13,687	13,376	59,455
652.1	MAINT WATER TREATMENT EQUIP	-	-	2,785	480	3,265
665.1	MISC EXPENSE - WATER INVENTORY	-	-	-	-	-
670.1	OLD CLIFTON LANDFILL-ENGINEERING	-	-	-	-	-
671.1	MAINT TRANSMSN DIST EXP-WATER	1,388	(18)	-	-	1,370
672.1	MAINT DISTRBTN RSRVR& ST PIPES	2,111	1,914	4,437	9,086	17,547
673.1	MAINT TRNSMSN&DISTRBTN MAINS-WA	13,845	12,935	12,154	15,591	54,525
675.1	MAINT OF SVS-WA TRNSMSN DISTRBN	19,131	10,259	6,456	8,180	44,025
676.1	MAINTENANCE OF METERS-WATER	8,279	12,873	8,224	3,968	33,344
677.1	MAINT OF HYDRANTS-WATER	238	637	-	-	875
	TOTAL OPERTATING EXPENSES-WATER	85,231	97,652	92,088	169,167	444,139
	OPERATING EXPENSES-SEWER					
622.2	POWER PROD LABOR&EXPENSE-SEWER	-	-	-	-	-
623.2	POWER PURCHASED FOR PUMPING-SEWER	6,573	5,482	5,244	10,321	27,619
624.2	PUMP LABOR & EXP-SW LIFT STATION	10,383	7,865	10,778	11,340	40,366
631.2	MAINTAIN STRUCTURES-SW PUMP	325	366	1,077	155	1,923
632.2	MAINT POWER PRODUCTN EQUIP-SW	-	1	-	1,739	1,740
633.2	MAINTAIN PUMP EQUIPMENT-SEWER	8,420	7,162	10,220	11,028	36,830
641.2	CHEMICALS-SEWER TREATMENT	2,381	-	10,371	1,665	14,416
642.2	OPER,LABOR, EXP-SEWER PLANT	383,106	287,217	287,290	191,478	1,149,091
673.2	MAINT,COST OF LABR MAINS-SEWER	9,551	61,059	66,048	58,515	195,173
675.2	MAINT OF SERVICE-SEWER	12,866	36,033	7,029	12,301	68,229
	TOTAL OPERATING EXPENSES SEWER	433,605	405,185	398,058	298,541	1,535,388
	TOTAL OPERATING EXPENSES WA/SW	518,836	502,837	490,145	467,708	1,979,526

CITY OF PORT ORCHARD
WATER-SEWER
OPERATING STATEMENT
4th QUARTER 2007

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	CUSTOMER ACCOUNTS					
902	METER READINGS CUST EXP-WATER	4,641	5,251	3,300	7,106	20,298
903	CUSTOMER RECORD & COLLECTION EXP	32,971	37,038	36,038	52,779	158,826
	TOTAL CUSTOMER ACCOUNTS	37,611	42,290	39,338	59,885	179,124
	ADMIN/GENERAL EXPENSE					
920.1	ADMIN/GENERAL SALARIES	31,099	34,424	31,235	49,011	145,770
920.2	GENERAL SALARY-CLERICAL	36,193	41,885	39,985	62,711	180,774
921	OFFICE SUPPLIES & OTHER EXPENSE	9,571	11,349	4,369	8,521	33,810
922	ADMIN EXPENSE TRANSFERRED OVERHEAD	(859)	(3,540)	(2,624)	(4,094)	(11,117)
923	OUTSIDE SERVICES EMPLOYED	-	353	-	3,930	4,283
924	PROPERTY INSURANCE	8,169	8,169	8,169	8,169	32,678
925	INJURY & DAMAGES-LIABILITY INS	12,254	12,254	12,254	12,254	49,016
926.2	EMPLOYEE PENS-PERS RETIREMENT	-	-			-
926.3	EMPLOYEE BENEFITS-II MED AID SUPPORT	-	-			-
926.4	EMPLOYEE BENEFITS-VACATION	1,761	4,451	13,086	16,979	36,277
926.5	EMPLOYEE BENEIFTS-SICK LEAVE	6,670	3,461	2,869	4,369	17,369
926.6	EMPLOYEE BENEFITS-HOLIDAY	6,914	2,110	3,000	5,270	17,293
930	MISC GENERAL EXPENSE	-	-			-
931	LEASEHOLD EXCISE TAX RENTS	-	0			-
932	MAINT OF GENERAL PLANT	10,559	10,787	7,901	14,023	43,270
933	TRANSPORTATION OF EQUIPMENT EXPENSE	4,996	6,822	6,193	8,585	26,595
	TOTAL ADMIN/GENERAL EXPENSE	127,328	132,525	126,437	189,729	576,019
	TAXES CITY & STATE					
408.11	CITY GROSS EARN-UTIL TAX WA-DR	9,734	7,967	17,291	8,176	43,169
408.12	CITY GROSS EARN UT TAX STATE-WA DR	10,520	8,742	18,032	9,351	46,645
	TOTAL TAXES-WATER	20,254	16,709	35,324	17,527	89,814
408.21	CITY GROSS EARN-UTIL TAX SW-DR	27,972	22,710	29,228	23,481	103,390
408.22	CITY GROSS EARN UT TAX STATE-SW DR	9,149	5,072	7,571	5,914	27,706
	TOTAL TAXES SEWER	37,121	27,782	36,798	29,395	131,096
	TOTAL TAXES CITY & STATE	57,375	44,491	72,122	46,922	220,910
	TOTAL REVENUES	621,586	631,355	951,626	820,877	3,025,444
	TOTAL EXPENSES/TAXES	741,151	722,143	728,043	764,243	2,955,580
	OPERATING INCOME (LOSS)	(119,564)	(90,788)	223,584	56,634	69,865
	DEPRECIATION EXPENSE	(116,949)	(116,949)	(116,949)	(116,949)	(467,796)
	NET OPERATING INCOME (LOSS)	(236,513)	(207,737)	106,635	(60,315)	(397,931)

CITY OF PORT ORCHARD
WATER - SEWER OPERATING STATEMENT
3RD QUARTER 2008

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	OPERATING REVENUES					
460	UNMETERED SALES CUSTOMERS-WA	2,430	171	402		3,003
461.1	METERED WA SALES-GEN CUSTOMERS	148,426	139,737	373,947		662,110
461.2	PUBLIC FIRE PROTECTION SERVICES	115	130	152		397
461.3	SALES TO PUBLIC MUNICIPALITIES - WA	715	1,098	3,102		4,915
461.4	METERED SALES-PUBLIC AUTHORITIES	10,500	17,893	23,466		51,859
462.1	SEWER SERVICES FLAT RATE	457,072	435,723	586,342		1,479,138
462.2	SVS-PUBLIC MUNICIPALITIES-SEWER	1,584	2,016	2,160		5,760
462.3	SALES TO PUBLIC AUTHORITIES	27,967	41,302	31,625		100,894
470	LATE PAYMENT / PENALTIES	10,851	8,948	10,854		30,653
471	MISC SVS REV.-WA SW SVS T-OFF	1,000	920	1,000		2,920
472	RENT-UTILITY PROPERTIES	11,546	10,646	10,744		32,937
474	OTHER WA SW REVENUES	1,279	1,450	1,739		4,468
474.1	OTHER WA SW REVENUES-INS REIMBURSE					-
	TOTAL OPERATING REVENUE WATER	181,437	176,519	419,979	-	777,935
	TOTAL OPERATING REVENUE SEWER	492,049	483,515	625,555	-	1,601,118
	TOTAL OPERATING REVENUES	673,486	660,034	1,045,534	-	2,379,054
	OPERATING EXPENSES-WATER					
602.1	PURCHASED WATER	60	30	125		215
603.1	MISC EXPENSE - WATER					-
611.1	MAINTENANCE STRUCTURES&IMPROV	417	65	12		493
614.1	MAINTENANCE OF WELLS	5,422	13	412		5,846
616.1	MAINTENANCE OF SUPPLY MAINS					-
621.1	FUEL POWER PRODUCTION-WATER					-
622.1	POWER PROD LABOR & EXPENSE					-
623.1	PWER PURCH FOR PUMPING-WATER	18,216	19,310	25,142		62,669
624.1	PUMPING LABOR & EXPENSE-WATER	7,097	6,406	7,862		21,366
631.1	MAINTAIN STRUCTURES-WA PUMP	919	11	28		958
632.1	MAINTAIN PWR PRODCTN EQUIP-WATER					-
633.1	MAINTAIN PUMP EQUIPMENT-WATER	6,018	3,481	4,017		13,517
641.1	CHEMICALS-WATER TREATMENT	3,231	2,501	4,729		10,462
642.1	MAINT, OPERATION, LBR,EXP-WATER	13,818	17,221	11,551		42,590
652.1	MAINT WATER TREATMENT EQUIP	2,427	2,156	976		5,559
665.1	MISC EXPENSE - WATER INVENTORY					-
671.1	MAINT TRANSMSN DIST EXP-WATER					-
672.1	MAINT DISTRBTN RSRVR& ST PIPES	5,353	4,348	2,025		11,726
673.1	MAINT TRNSMSN&DISTRBTN MAINS-WA	7,012	15,540	14,698		37,251
675.1	MAINT OF SVS-WA TRNSMSN DISTRBN	15,191	7,845	4,963		27,998
676.1	MAINTENANCE OF METERS-WATER	3,374	8,916	7,364		19,654
677.1	MAINT OF HYDRANTS-WATER	258	3,184	13		3,455
	TOTAL OPERTATING EXPENSES-WATER	88,814	91,028	83,916	-	263,757
	OPERATING EXPENSES-SEWER					
622.2	POWER PROD LABOR&EXPENSE-SEWER					-
623.2	POWER PURCHASED FOR PUMPING-SEWER	6,684	6,487	5,228		18,398
624.2	PUMP LABOR & EXP-SW LIFT STATION	7,385	10,685	11,658		29,727
631.2	MAINTAIN STRUCTURES-SW PUMP	755	(160)	20		615
632.2	MAINT POWER PRODUCTN EQUIP-SW					-
633.2	MAINTAIN PUMP EQUIPMENT-SEWER	5,016	14,358	31,402		50,776
641.2	CHEMICALS-SEWER TREATMENT		1,012	-		1,012
642.2	OPER,LABOR, EXP-SEWER PLANT	344,130	255,975	258,891		858,997
673.2	MAINT,COST OF LABR MAINS-SEWER	97,360	16,501	15,836		129,697
675.2	MAINT OF SERVICE-SEWER	15,208	38,587	24,217		78,012
	TOTAL OPERATING EXPENSES SEWER	476,539	343,444	347,251	-	1,167,234
	TOTAL OPERATING EXPENSES WA/SW	565,353	434,471	431,167	-	1,430,992

CITY OF PORT ORCHARD
WATER - SEWER OPERATING STATEMENT
3RD QUARTER 2008

ACCOUNT #	DESCRIPTION	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TO DATE
	CUSTOMER ACCOUNTS					
902	METER READINGS CUST EXP-WATER	4,886	6,195	3,149		14,230
903	CUSTOMER RECORD & COLLECTION EXP	47,760	45,496	36,436		129,692
	TOTAL CUSTOMER ACCOUNTS	52,646	51,691	39,585	-	143,922
	ADMIN/GENERAL EXPENSE					
920.1	ADMIN/GENERAL SALARIES	34,087	43,436	30,910		108,434
920.2	GENERAL SALARY-CLERICAL	49,483	60,120	59,357		168,960
921	OFFICE SUPPLIES & OTHER EXPENSE	8,972	7,628	6,350		22,951
922	ADMIN EXPENSE TRANSFERRED OVERHEAD	(1,821)	(2,424)	(2,578)		(6,823)
923	OUTSIDE SERVICES EMPLOYED	4,941	3,871	388		9,200
924	PROPERTY INSURANCE	8,766	8,766	8,766		26,299
925	INJURY & DAMAGES-LIABILITY INS	13,150	13,150	13,150		39,449
926.2	EMPLOYEE PENS-PERS RETIREMENT					-
926.3	EMPLOYEE BENEFITS-II MED AID SUPPORT					-
926.31	EMPLOYEE BENEFITS-MED PLAN 100%			(4)		(4)
926.4	EMPLOYEE BENEFITS-VACATION	3,842	6,363	15,631		25,836
926.5	EMPLOYEE BENEIFTS-SICK LEAVE	4,576	3,107	6,056		13,739
926.6	EMPLOYEE BENEFITS-HOLIDAY	6,531	3,015	3,187		12,733
930	MISC GENERAL EXPENSE					-
931	LEASEHOLD EXCISE TAX RENTS					-
932	MAINT OF GENERAL PLANT	9,629	14,327	7,586		31,543
933	TRANSPORTATION OF EQUIPMENT EXPENSE	6,804	7,093	17,549		31,446
	TOTAL ADMIN/GENERAL EXPENSE	148,961	168,454	166,347	-	483,762
	TAXES CITY & STATE					
408.11	CITY GROSS EARN-UTIL TAX WA-DR	10,287	7,951	20,053		38,292
408.12	CITY GROSS EARN UT TAX STATE-WA DR	11,098	10,413	21,113		42,625
	TOTAL TAXES-WATER	21,385	18,365	41,167	-	80,916
408.21	CITY GROSS EARN-UTIL TAX SW-DR	30,450	23,952	31,006		85,409
408.22	CITY GROSS EARN UT TAX STATE-SW DR	8,489	6,045	7,325		21,859
	TOTAL TAXES SEWER	38,939	29,997	38,331	-	107,267
	TOTAL TAXES CITY & STATE	60,324	48,362	79,498	-	188,184
	TOTAL REVENUES	673,486	660,034	1,045,534	-	2,379,054
	TOTAL EXPENSES/TAXES	827,284	702,978	716,597	-	2,246,860
	OPERATING INCOME (LOSS)	(153,799)	(42,944)	328,937	0	132,194
	DEPRECIATION EXPENSE	(116,949)	(116,949)	(116,949)		(350,847)
	NET OPERATING INCOME (LOSS)	(270,748)	(159,893)	211,988	0	(218,653)

Appendix J
Comments Received

Responses to Comments

West Sound Utility District

All comments accepted and revisions entered

City of Bremerton

All comments are acknowledged. References to the SKIA have been revised to refer to 'potential sewer service'.

Overton & Associates

All comments are acknowledged. References to the SKIA have been revised to refer to 'potential sewer service'.

West Sound UTILITY DISTRICT

28 October 2009

District Review Comments for Draft City Comprehensive Sewer Plan

PAGE	REFERENCE	COMMENT
	Fig 1.1	The chart does not show treatment plants at Port Gamble and Hartstene Pointe.
4	Service Areas	The City policy does not recognize that the unincorporated UGA is served by WSUD. Typically, the City policy has been to serve those areas in the UGA that have not been designated to be served by WSUD.
5	Agreements	There should be a note that states that West Sound Utility District is responsible for Karcher Creek agreements. This will avoid confusion in the future.
5	Service Extensions	Only homes within 200 feet of the sewer that have failing on-site systems and are in the urban area have to connect to the sewer. Unless the City is becoming more stringent.
6	Mutual Aid	The City should join WA-WARN which is a statewide mutual aid program.
11	Facility Construction Fee	This fee is restricted to projects at the South Kitsap Water Reclamation Facility, as jointly approved by the City and District. This should be noted to avoid confusion in the future.
16	WSUD Facilities	The sentence stating “Flows exceeding 6 MGD are treated” should read “may be treated”. The December 3 2007 storm produced 8.8 MGD, not 12 MGD. The Annual Average Flow for 2007 was 1.7 MGD, not 1.5 MGD.

16	Service Areas	The agreement for service areas was based on topography and was a SAC discussion item. The District serves east of Blackjack Creek, except for the SR 16 intersection. The dividing line is between Geiger Road and Ramsey Road. The intent is to send the wastewater to the agency that can provide the least cost infrastructure expense to the developer. That is not "everything east to about Bethel Road".
19	Table 3-6	There is no water intertie on Mitchell
22	Plant Operation	WSUD operates the SKWRF
25	Historic Wastewater Flows	The plant is the South Kitsap Water Reclamation Facility; not the "Karcher Creek Treatment Facility"
38	Existing Conditions	What is the "1,200 in this sentence? Pump Station No 1 collects flow from the County Juvenile Detention Center, an office park the **1,200 decant facility** operated by the City,

CITY OF BREMERTON
THE CITY OF PRIDE AND OPPORTUNITY

CECIL MCCONNELL, MAYOR PRO-TEM
mayor@ci.bremerton.wa.us

RECEIVED
OCT 29 2009
CITY OF PORT ORCHARD
CITY CLERKS OFFICE

Tel 360-473-5266
Fax 360-473-5883
345 6th Street, Suite 600
Bremerton WA 98337

RECEIVED
OCT 29 2009
CITY OF PORT ORCHARD
PLANNING DEPARTMENT

October 28, 2009

Port Orchard City Council
216 Prospect Street
Port Orchard, WA 98366

RE: **City of Bremerton's Comments on DNS issued on October 16, 2009 and Port Orchard's 2009 Comprehensive Sanitary Sewer Plan Update**

Dear City Council,

The City of Bremerton ("Bremerton") is in receipt of SEPA DNS issued by the City of Port Orchard ("Port Orchard") on October 16, 2009. This letter addresses Bremerton's comments regarding the DNS issued for Port Orchard's "Comprehensive Sanitary Sewer Plan Update" dated September 2009, as well as the plan as follows:

I. BACKGROUND

Bremerton annexed approximately 3200 acres of land in 2009 known as South Kitsap Industrial Area ("SKIA") urban growth area ("UGA"), City of Bremerton Ordinance Nos. 5053 & 5057. This area was officially annexed on March 1, 2009 and April 1, 2009 utilizing the 75% annexation method as allowed for by RCW 35.13.125. Notification was provided to the Office of Financial Management as required by RCW 35.13.260, and officially recorded with Kitsap County as required by RCW 35.13.150.

Bremerton is the planning authority for all territory within our city limits and our associated UGA'S including the SKIA area. This planning authority extends to planning for all urban services (such as storm water, water, and wastewater) as required by state law under the Growth Management Act by RCW 36.70A.040.

As you may be aware, Bremerton has previously appealed Port Orchard's 2008 Comprehensive Plan Update regarding comments and inclusion of the SKIA region in their planning documents (GMHB Case # 09-3-0003). The City of Bremerton agreed to a settlement with the City of Port Orchard regarding this matter on the basis that Port Orchard removed all reference to SKIA as a "preferred" sewer service provider from their 2008 Comprehensive Plan Update and label as "potential" sewer service provider.

II. BREMERTON'S COMMENTS ON SEPA DNS ISSUED OCTOBER 16, 2009:

General Comments:
The City of Port Orchard has provided inadequate analysis throughout this planning document regarding expansion of sewer services to SKIA. The City of Bremerton finds this data arbitrary for the issuance of the DNS to meet SEPA requirements. Additionally, the SEPA checklist does not address expansion of service area including SKIA.

Below the City of Bremerton comments on specific sections of plan document:

a. **Table 3-2** there seems to be a conflict with the information provided in Table 3-2 and the paragraph immediately following Table 3-2. If the Marina Pump Station's firm capacity is defined as the capacity with the largest pump out of service, then the firm capacity is 2400 GPM or 3.46 MGD. It is not appropriate to add the capacity of the smaller pumps to the larger pump as they do not have the ability to overcome the larger pump's TDH. This is important as the Marina Pump Station capacity is cited when basin planning for the upstream basins. This is a critical component of Port Orchard's basin capacity planning that is not accurately portrayed.
b. **Chapter 4.5 *Population Projections*** does not adequately address the projected population for the SKIA Area; The City of Bremerton intends to complete a full analysis of growth needs during the SKIA Sub Area planning process.
c. **Chapter 5.4 *Wastewater flows*** utilizes data from the 2003 South Kitsap Industrial Area Plan. This is an out of date document which did not anticipate the City of Bremerton's Annexation of SKIA and is not current with projections recognized by the Kitsap County's Capital Facilities Plan. On March 10, 2008 Kitsap County adopted Ordinance 409-2008, which incorporates updates to their Comprehensive Plan and six year Capital Facilities Plan. Additionally, The City of Bremerton has calculated peak flows for this area in the *City of Bremerton September 2008 Sewer Planning Document*. Bremerton's 2008 Sewer Planning Document projects higher flows than the old SKIA plan that is being utilized by the City of Port Orchard for this update. All references to Port Orchard being an authorized sewer provider to SKIA should be removed as Bremerton has not requested that Port Orchard provide service in this area.
d. In addition to the comments made above, the City of Bremerton incorporates section three below for comment on the DNS issued on October 16, 2009.

III. THE 2009 COMPREHENSIVE SANITARY SEWER UPDATE

General Comments:
The Plan references the City of Port Orchard as an "authorized" sewer service provider for SKIA. The City of Bremerton opposes any language making reference to Port Orchard as an authorized sewer provider to the SKIA region as this territory is in the City of Bremerton.

Bremerton recognizes that inter-jurisdictional coordination is an important part of the urban planning process. The City of Bremerton as part of the development of a sub-area plan for SKIA will research and make findings regarding how the area will be served with municipal utilities required by RCW 36.70A.070. Exactly who and where specific services will be provided will be determined by Bremerton and it is premature to conclude anything more definitive right now as to how that planning process will handle the issue. Port Orchard should not do anything in their comprehensive sewer plan to assert sewer service area "authorization" for any part of SKIA let alone all of it. At this time the City of Bremerton has not entered into any agreements with Port Orchard to provide sewer services within Bremerton's City limits. The City of Bremerton believes that the City of Port Orchard could be a potential provider of service to portions of SKIA. After consulting with the City of Port Orchard, Bremerton will determine how each service will be provided and funded.

Below the City of Bremerton comments on the specific sections as follows:

a. **Sewer Service Area, Section 3.34,** This section identifies SKIA as Port Orchard's sewer service area. This area is in the City of Bremerton. The required services needed for future growth in this region will be planned for by the City of Bremerton. Bremerton recognizes that inter-jurisdictional coordination is an important part of the urban planning process and will properly coordinate planning efforts as appropriate during the development of the South Kitsap Industrial Area sub area planning process.
b. **Wastewater Flows, section 5.4,** This section provides in part: "The SKIA is a large site with many possibilities for future development, such as a NASCAR race track or another major facility. However, these possibilities are only speculative for now. Consequently, longer term or build-out projection of wastewater flow projection for the SKIA have not yet been developed by Kitsap County or the Port of Bremerton" (Page 30, Port Orchard Comprehensive Sanitary Sewer Plan). Kitsap County is no longer the authorized planning agency for this region. The City of Bremerton is the authorized planning agency for this area and as such the city will determine the wastewater flows as part of its planning process.
c. **The map figures found throughout the document lack proper labeling, titles, and explanation of what it is to represent.**
    1. The City of Bremerton is not properly shown in many of the maps; it appears that the City of Port Orchard is using old data to create these maps. New data is available at the Kitsap County GIS website.
    2. Figure 1.2 is not labeled properly, assuming that this is the map immediately following Figure 1.1, the city limits of Bremerton include SKIA and need to be properly represented. The SKIA area should be removed from your map as an assigned service area.
    3. Port Orchard is representing that SKIA is part of their sewer service area in some of these maps. Their titles are unknown; therefore properly referencing them is not possible. The City of Bremerton requests that

accurate data is utilized to create all maps and that Bremerton's city limits and sewer provider area include SKIA.

In closing, the City of Bremerton requests the Port Orchard remove all reference to the SKIA area of Bremerton in their planning documents. It is premature for Port Orchard to anticipate servicing the entire SKIA region. Bremerton will cooperate with regional jurisdictions during the sub area planning phase of the SKIA area. It should be noted that at this time there are multiple "potential" sewer services providers to consider.

The City of Bremerton recognizes the efforts Port Orchard has taken to develop this major update to its Sanitary Sewer Comprehensive Plan, and we hope that the city will consider our comments as it deliberates on the draft and finalizes the document prior to adoption. We appreciate Port Orchard's effort to complete this challenging and complicated task.

Sincerely,

Cecil McConnell
Mayor Pro-Tem

Cc:
Roger Lubovich, City Attorney
Port Orchard City Clerk
Department of Ecology

McCULLOUGH HILL, PS

RECEIVED

OCT 31 2009

CITY OF PORT ORCHARD
CITY CLERKS OFFICE

October 30, 2009

SENT VIA FAX AND US MAIL

Port Orchard City Council
216 Prospect Street
Port Orchard, WA 98366

Re: Overton & Associates Comments on 2009 Comprehensive Sanitary Sewer Plan Update and SEPA Determination of Nonsignificance

Dear City Council:

This is on behalf of Overton & Associates Holdings, LLC ("Overton"). We are writing to provide comments on the City's 2006 Comprehensive Sanitary Sewer Plan Update ("Sewer Plan Update") and SEPA Determination of Nonsignificance ("DNS"), dated October 16, 2009.

Overton is a long-term owner of significant acreage in Kitsap County, near the City of Port Orchard ("City"). Overton has an interest in ensuring that the City's land use plans and policies are logical, lawful, and consistent with neighboring jurisdictions' plans, particularly with respect to the South Kitsap Industrial Area ("SKIA") recently annexed by the City of Bremerton.

We have two primary comments on the Sewer Plan Update and DNS. First, these documents identify SKIA as within Port Orchard's sewer service area. This is not accurate. The SKIA area was annexed by the City of Bremerton earlier this year, and the City of Bremerton will soon embark on a sub-area planning process that will identify appropriate municipal utility providers, consistent with RCW 36.70A.070. It is inappropriate and premature for the City of Port Orchard to identify itself as a sewer service provider for the SKIA area at this time.

Second, the Sewer Plan Update and DNS appear to be based on outdated, inaccurate information. Chapter 4.5 of the DNS (Population Projections) does not adequately address the projected population for the SKIA area, and Chapter 5.4 of the DNS (Wastewater flows) utilizes inaccurate data from the 2003 South Kitsap Industrial Area Plan. In addition, Section 5.4 of the Sewer Plan Update states that the SKIA area is currently in Kitsap County's jurisdiction, although it was annexed to the City of Bremerton this year. The Sewer Plan Update and DNS should be revised to reflect the most recent, accurate information available.

In sum, Overton agrees with the issues raised in the City of Bremerton's October 28, 2009 comment letter, and we ask you to consider these comments as you complete the Sewer Plan Update process.

We appreciate your attention to these comments.

Very truly yours,

Courtney E. Flora

cc: Cecil McConnell, Mayor Pro-Tem, City of Bremerton
Port Orchard City Clerk
Department of Ecology
David Overton